ENGINEERING INVENTIONS.

A retort deoxidizing machine has been patented by Mr. Israel D. Condit, Jr., of Millburn, N. J. The object is to obtain as large a heating surface and body of ore to be acted upon as can be worked, and also to secure great economy in the construction of the furnaces and in the time of deoxidation.

A dumper, for dumping coal cars, etc., has been patented by Mr. Samuel M. Keibler, of Saltsburg, Pa. It has a pivoted platform, to the bottom of which two curved bars or plates are fastened, with a weight held adjustably between, and the dumper can be readily checked or released as desired.

An improved car coupling has been patented by Mr. John C. Bryan, of Holly Springs, Ark. The object of the invention is to provide means so an ordinary pin and link coupling may be made to couple automatically, the drawhead having an internal spring so connected with a projecting lipped plate that the pin will ordinarily be held up, but the impact of the link in coupling causes it to fall.

An amalgamator has been patented by Mr. John McL. Thompson, of Trumansburg, N. Y. In an amalgamating cone, with annular grooves, steam pads are provided for keeping the mercury warm; there is also a steam drum and pipes, the device being designed to keep the mercury in proper condition to operate upon the gold in cold weather, and the gold being separated from the mercury in the usual manner.

A blast furnace for zinc ores has been patented by Mr. Amedee M. G. Sebillot, of Paris, France. The object of this invention is to obtain metallic zinc direct from ores containing iron and other metals, where, heretofore, the vapors of zinc are converted into oxide by very little carbonic acid. By this furnace the carbonic acid is destroyed. There are separate condenser chambers for each outlet pipe, a chamber filled with charcoal through which vapors from the lower outlet pipe are conducted, and various novel combinations, parts, and details.

MECHANICAL INVENTIONS.

A machine for forming eyelets has been patented by Mr. L. J. M. Mortenson, of Racine, Wis. It is a combination of mechanism by which the rod is held firmly at about its middle length, when the ends are bent upward around the former and welded together by dies.

A ratchet drill has been patented by Mr. Richard Stephens, of Negaunee, Mich. The invention covers a double acting ratchet brace, with two handles, so that almost a continuous movement can be imparted to the drill, and the same brace may be driven by either the simultaneous or alternating movement.

An oiler for loose pulleys has been patented by Mr. William D. Graves, Jr., of Presque Isle, Me. At a point in a central plane with the pulley is an oil or lubricant cup or vessel, with a screw-threaded attaching tube and wicking, the shaft having a longitudinal aperture, so the oil is, by a novel construction, supplied to the pulley at or near its center only as needed when running.

A knitting machine has been patented by Mr. Joseph M. Merrow, of Merrow, Conn. It is intended to provide that the fabric will be kept from being carried by the needles in the direction of their reciprocations. The machine is adapted to knit in both directions, and while knitting the heel of a stocking some of the needles may be raised and held up.

A water motor has been patented by Mr. Alvey C. Harvey, of Lone Pine, Cal. By admitting water in a suitable tank or cistern, a float is raised, a rack bar from which actuates a train of gearing communicating motion to a shaft, and when the water is withdrawn and the float descends suitable mechanism must intervene so the shaft shall continually rotate in one direction.

AGRICULTURAL INVENTIONS.

A broadcast seed sower has been patented by Mr. John C. Waddell, of Union City, Tenn. There is a hopper with a rotating cross spout on the upper end of a staff connected with the gear frame, and having a foot rest to be supported in a strap carried over the shoulder of the operator, making a simple, compact, and easily working device.

A cultivator has been patented by Mr. E. B. Bellinger, of Kalamazoo, Mich. The frame has pivoted standards with curved lower parts and vertical upper ones, connected at their upper ends in pairs by rods or chains and pivoted bars, the frame being supported adjustably on wheels, so the plows may be caused to work at any desired depth in the ground, or raised above the ground if desired.

A method of and means for making mole ditches has been patented by Mr. M. H. Eaton, of Wilton Junction, Iowa. This invention covers a ditching machine of novel construction, with a plow and cutter for forming the ditch proper and the cement lining cavity, and with a feed hopper or tube for a continuous supply of cement for lining the ditch, the cement being applied as the machine moves along.

A cotton harvester has been patented by Mr. F. L. Warner, of Memphis, Tenn. When the machine is drawn over the row of cotton plants, its supporting wheels actuate a picking mechanism, in which is a belt or apron with wire teeth pickers from two to six inches long; there is a device for guiding the branches of the cotton plants between the picker belts, also strippers to take the cotton therefrom to the carrier trough.

MISCELLANEOUS INVENTIONS.

A finger ring gauge has been patented by Mr. Frank D. McDowell, of Salem, Oregon. It is of tapering form, with lines indicating the sizes, and with intersecting longitudinal lines that mark the differences in the circumference of the different sizes.

A bill holder, for retaining bills, advertisements, and other sheets, has been patented by Mr. Peter Hand, of Glen, N. Y. There are certain novel features of construction whereby the sheets can be secured on the holder, or removed therefrom, easily and rapidly.

A drag saw has been patented by Mr. William A. Bennett, of Dallas, Texas. This machine can be built cheaply in various sizes, may be safely worked by unskilled labor, and will save time and do good work in cross cutting timber for railway ties, cord wood, stove wood, etc.

An improved wagon seat has been patented by Mr. Seth Moore, of Salem, Ohio. The invention is a novel construction of adjustable seats for spring wagons. The seat is fastened by clamps and thumb screws to the wagon body, and the construction is light and strong.

A combined burglar alarm and telephone system has been patented by Mr. Benjamin F. Dillon, of Savannah, Ga. This invention renders possible the application of telephone wires to burglar connections, so as to effect great saving of wires and obstruction to streets in cities.

A faucet for soda fountains and other articles has been patented by Mr. Samuel M. Way, of Hempstead, N. Y. This is a special construction, involving many separate parts, but so designed that any desired substance in the fountain can be readily drawn and its amount easily regulated.

A combined potato scoop and riddle has been patented by Mr. Henry Peggs, of Windham, O. It is of novel construction, the parts being separable, and may be adapted for use with a different variety of articles, does not crush or injure the potatoes, and the leaves, dirt, etc., are separated therefrom.

An improved miner's squib or fuse, for igniting blasts, has been patented by Mr. George Hages, of Girardville, Pa. It is intended to make the match portion burn slowly until the fire reaches the inner match, and then rapidly past the choke, so there is no danger of the fire slumbering at the choke of the squib, while it will not burn rapidly until it gets there.

A scratch gauge has been patented by Mr. John E. Sherman, of North Attleborough, Mass. The marker is a many pointed circular one, and has its durablity increased by the circular construction of the gauge, different scratching points being presented at different times, and the gauge may be quickly and easily applied.

An odometer has been patented by Mr. James Gillespie, of West Point, O. The counting and recording mechanism is fixed in a hollow cylindrical case, properly attached to the axle, and the device may be geared to be readily changed to count any desired distance, striking a bell signal if wished at stated distances.

An improved metallic plastering surface has been patented by Mr. James Stanley, of New York city. The wire cloth used has corrugations or ribs, to increase its stiffness and firmness, and so that it may be fixed to the joists and studding by means of common staples, the ribs being placed transversely to the joists and studding.

An improved fire escape has been patented by Mr. Aaron Palmer, of Rochester, N. Y. It is a special arrangement of cage or frame adapted to slide down a standard, with ropes or cables and pulleys, counterbalancing weight, and spiral spring, so the cage or frame will be readily under command to move up or down, or fast or slow.

A combined table and desk has been patented by Mr. Samuel T. Corbitt, of Odessa, Mo. It is simple in construction, and can be readily adjusted for use either as table or desk, or both, the desk part being arranged to be drawn out of the table frame or pushed back into the same without disturbing articles on the table.

An improved chair has been patented by Mr. James R. Linn, of Toledo, Ohio. It provides for a seat with rockers on the bottom, and downwardly projecting lugs therefrom, the lugs passing through pockets and being surrounded by springs contained in the pockets, thus giving a very easy and comfortable motion.

An improved horse power has been patented by Messrs. Charles B. and John S. Boren, of Booneville, Miss. It has a peculiar arrangement and construction of parts such that the vertical shaft or king post is relieved of all torsional strain, and the master wheel is so elevated that a man or beast can readily pass under it.

A power jack has been patented by Mr. John W. Massey, of Gholson, Miss. It is durable, cheap, very powerful, and adapted for a great variety of uses, such as leveling buildings, laying flooring, rolling logs, etc., and it is easy and convenient to handle. One-half interest in the patent has been assigned to Mr. Madison Edwards.

A hame fastener has been patented by Mr. Marsh Noe, of Davenport, Iowa. It is automatic, and more especially intended for use in fire departments, as the fastening only requires that the ends be brought forcibly together, so the operation may be very quickly performed, and it does not require an experienced hand to manipulate it.

An improved housing for sugar and other mills has been patented by Mr. Burchard Thoens, of New Orleans, La. Its object is to lessen the cost of housing frames and facilitate construction and repairs of sugar and other mills, as well as reduce the bulk and weight of the parts and make them easy of access for removal, etc.

A wagon tongue support has been patented by Mr. A. H. Gleason, of Wabash, Ind. The design is to so hold the tongue that its weight will not be wholly carried by the team, but that it will not be so rigidly held as to produce a pounding action on the necks of the horses, and also that it may be fixed so as not to stick out in the way when not in use.

A flood gate has been patented by Mr. James A. Galloway, of Spring Hill, S. C. The design is to operate flood gates automatically, to be opened by the action of the water when it rises above a given level, for the purpose of allowing the water to escape, and the invention provides a special construction and combination of parts for this purpose.

An improved flying ball target has been patented by Mr. Frank J. Moyer, of Lockport, N. Y. A ball or half ball is provided with a flange or rim whose diameter is less than the diameter of the sphere, so the ball, when thrown from any trap or mechanical device, will rotate only on its vertical axis, and take a direct course through the air.

An improved method of forming a thumb on a continuously knitted mitten has been patented by Mr. Ila N. Moore, of Battle Creek, Mich. This is a special manner of making, requiring less work than where the thumbs are knit on, or where they are made wholly separate from the mittens, and then stitched in openings made to receive them.

A refrigerator has been patented by Mr. Charles J. Berens, of Washington, Ind., in which the valves, vents, or other openings leading to the cold air chambers from the ice may be opened and closed from the outside of the refrigerator, so the warm air may be excluded from the main part when the door or window of one of the chambers is opened.

A fire escape has been patented by Mr. George W. Watts, of Brooklyn, N. Y. It is the design of this invention to use the force of gunpowder or similar explosive for elevating ladders to the roof or windows of buildings in case of fire, by a specially devised mortar working in a swivel on a light carriage, and a peculiar construction of chain ladder.

A chain fastener has been patented by Mr. James H. Armstrong, of Pinconning, Mich. It is for drawing chains taut and holding them so, and consists of a forked lever to which a grab link is pivoted, and to this in turn a latch, so that the latch can be swung against the side of the lever and held in place in this position to draw on the chain.

A shaft press for quickly bending and setting carriage shafts; after they are steamed and softened, until dry and fixed in shape, has been patented by Mr. John C. Bach, of Hillsdale, Mich. The upper surface of a frame is curved as required by the shaft, in one plane, with studs for the lateral curves, and bearer pieces and levers for binding the shafts in position.

An improved lamp has been patented by Mr. Charles H. Bennett, of Blossburg, Pa. It is especially designed to attach to sewing machines, pantry shelves, kitchen tables, etc., so as not to be knocked down or thrown off its supporting surface, and has a novel construction of attached bracket or clamp with a spring hold, which may also be used as a handle for carrying the lamp.

A seal lock has been patented by Messrs. Jesse Jordan and A. P. Powers, of Macon, Ga. A spring bolt, pivoted in a casing in one door, has at its outer end a knife, the knife end adapted to be passed into a casing in the other door in the car body, in which latter a seal card is held, which is cut by the knife when the spring bolt is withdrawn, and the seal card drops, showing the door has been opened.

A combined boiler, fire regulator, and alarm has been patented by Mr. Charles S. Lockwood, of Newburg, N. Y. When the vessel used as a boiler on the stove, under the design of this invention, has evaporated a certain fixed or regulated amount of water, a spring then raises the boiler from the boiler hole, and the incoming air checks the fire, while an alarm connected therewith gives warning.

A fire escape has been patented by Mr. William H. Glenn, of Kirksville, Mo. It provides for a sack of perpendicular ropes, crossed by oblique ones, tied together at points of crossing, with hooks at the rim of the upper end of a projecting frame arranged to hold the sides of the sack perpendicularly, the whole forming a flexible ladder, and so there is no danger of persons falling.

An apparatus for extinguishing fires has been patented by Mr. John K. J. Foster, of Bolton, England. The invention relates to a new method and apparatus whereby air is deprived of its oxygen and vitiated with carbonic acid and other products of combustion, by passing through or over a fire, then forcing or drawing this air deprived of power of supporting combustion through the burning structure.

A knob attachment has been patented by Mr. F. Lattimer, of Richmond, Nova Scotia, Canada. In combination with the knob and its shank is an interior bolt with an exterior screw thread and spindle receiving socket, and the extension shank has interior screw thread and a spindle receiving aperture, whereby the knob can be readily adjusted to the thickness of the door.

An improved hame tug has been patented by Mr. John J. Hipp, of Timberville, O. It is intended to obviate the draught coming upon a single point of the hame and collar, and to this end the hame tug is composed of two, three, or more straps, attached by eyes or otherwise to the hame and on their rear end to the tug buckle, so the draught will be distributed over a considerable space of the hame and collar.

A combined knife brick box and grinder has been patented by Mr. John F. Wood, of Boston, Mass. The box has a grater bottom, whereon the brick is always ready to be ground when dust is wanted for scouring knives, etc., the scouring board being arranged to slide in the box under the bottom to receive dust from the grater; the box is on rockers, so the brick may be ground by rocking the box, and thus avoid getting brick dust on the hands.

Tuttle's patent combination graduated scale is an ingenious and yet simple invention. With a scale having no finer subdivisions than eighty to the inch, it is possible to measure or lay off accurately hundredths, hundred and twentieths, hundred and fiftieths, two hundredths, two hundred and fortieths, and three hundredths of an inch. What the vernier does for angular measure this invention does more completely for linear measure. It is also equally applicable to the metric system, and thus constitutes an invention which will be valuable to engineers, draughtsmen, and surveyors, as well as to the general student.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from $1 to $5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at the office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their indentification.

(1) J. W. K. writes: 1. I am thinking of building a very light wagon, to be run by an electric engine. Do you think it practical? A. It would be interesting as an experiment. 2. If so, how large an engine would it take to do the work? 3. Do you think one-half horse power large enough? Where can I get the engine? A. 2 and 3. One-half horse power would not do it. It would probably require a two horse power engine. 4. What would be the cost of a one horse power engine? A. $200 to $300. 5. Will you make an estimate of the cost of running a one horse engine per hour, the electricity to be generated by a battery? A. The cost would depend on the kind of battery and efficiency of its motor; but in any case it would be several times as much as steam.

(2) C. N. N. asks: Would the explosive force of steam and compressed air be the same, everything being equal? A. Yes; the force would be the same. It is the hot water that underlies the steam in steam boilers that is a magazine of energy and the source of the extraordinary destructiveness of exploding boilers.

(3) J. N. W. asks: 1. At what speed should small circular saws, two inches in diameter, be run for cutting brass and iron? A. For brass fifty or sixty revolutions; for iron forty, to be varied according to the size of the article cut. 2. How can I harden these saws without warping? A. Heat the saw to a good red and then place it between two masses of cold iron—the top of a cold anvil and a planed cast iron bench block are good. Unless the saw is over one-eighth of an inch thick, it will be hardened and be straight. If thicker, plunge it into water. In either case brighten it and draw to a low straw. While warm, these saws may be straightened, if warped, by judicious blows of the hammer on an anvil. 3. At what speed should iron be run in the lathe? A. Good results come from a speed of eighteen feet per minute when the iron is clean, the lathe solid, and the tool properly ground and adjusted.

(4) B. F. G. asks: 1. By what means may the human hair be dissolved and the coloring matter separated from it? A. Hair is dissolved by hydrochloric and sulphuric acids; it is also soluble in the alkalies. 2. What is the chemical composition of each of the different pigments of human hair—black, yellow, and red? A. See article on the "Color of Human Hair," p. 1464 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 92.

(5) W. W. asks: 1. Will you please give receipt for varnish used by the famous Italian violin makers on their instruments? A. The following is said to produce a beautiful varnish for violins: Rectified alcohol, half gallon; add six ounces gum saudarac, three ounces gum mastic, and half pint turpentine varnish; put the above in a tin can by the stove, frequently shaking until well dissolved. Strain and keep for use. If you find it harder than you wish, thin with more turpentine varnish. 2. I have tried to make amber varnish, but I find I cannot dissolve the amber. Can you name the best mode of doing so? A. It is soluble in sulphuric acid and in pure alkalies. In making varnish, amber is generally brought into solution by heating it, then adding the oil and finally stirring in turpentine as it cools. 3. Will you also please give directions for making a practical luminous paint? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 249.

(6) P. H. M. writes: 1. I want to heat a building 40 x 25 ft. by the exhaust from engine; want to run pipe along both sides and across one end. Can I do it without too much back pressure on piston? A. Yes, have your pipe of ample size and fitted with a back pressure valve (safety valve) which you can load to such back pressure as you wish. 2. Please give rule for finding horse power of high pressure engines? A. See rule in SCIENTIFIC AMERICAN SUPPLEMENT, No. 253. 3. Where can I get a paper that treats mostly on steam engineering? A. There is no periodical published in this country specially devoted to steam engineering. For books on this subject see advertising columns.

(7) F. A. W. writes: If not asking too much would like you to give through your paper, diameters, foci, places of diaphragms, and distances apart of lens for making microscope with power of about 250 diameters. A. For your microscope you will require an object lens of one-fifth in. focus and a Huyghens eye piece of an equivalent of 2 in. focus, or what the opticians call a B eye piece. Ten in. from object glass to eye piece is the general practice, but any distance between 7 and 10 in. will be proper. The objective should be achromatic. In SCIENTIFIC AMERICAN SUPPLEMENT, No. 399, you will find an illustrated article upon eye pieces which will interest you. Also in SCIENTIFIC AMERICAN of June 17, 1882, p. 386, No. 9 Notes and Queries, you will find an illustrated description of two objectives as made for modern microscopes.

(8) G. J. S. asks: How can I find the height of hills above the sea? A. The measuring of the heights of hills and mountains from the level of the sea would be a difficult problem for you to manage, unless you were fairly versed in trigonometry and have a theodolite. The heights are sometimes obtained by means of a barometer; observation being taken at base and then at top of mountain, and the difference calculated. We recommend you to get a book on trigonometry, illustrating the methods for distances and heights.

(9) E. W. S. asks: What size ports to use in a cylinder 2 x 2½ in., as I am making model engine of that size? A. Steam ports ¼ x 1⅛ in. Exhaust, ⅛ x 1⅛ in.

(10) L. B. asks: What horse power is a boiler capable of developing, size of boiler being 10 feet long, 42 inches diameter, and 36 3-inch tubes, with a return flue; and would it be advisable to get an engine 4 or 5 horse power less than boiler, or what proportions would you have to work satisfactorily and economically? A. About 15 horse power. Yes, especially if there is a prospect of more power being required in the future.

(11) C. D. R. asks: Can I heat a room 60 x 20 ft., 9 ft. high, with steam from a 5 horse power boiler on the *same floor*, and in any way get the condensed steam back to feed boiler with? A. If your heating pipes are run above near the ceiling, and the boiler is 6 or 8 ft. lower, yes; otherwise you must trap the condensed water into a cistern or receiver and pump back to boiler.

(12) C. C. S. asks: 1. If there is any rule by which, knowing the stroke and the bore of the cylinder of an engine, you can tell its power? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 253. 2. What the relation of foot power is to horse power? We know of no direct comparison of foot power with a horse's power, but the power of 6 men is generally considered equal to 1 horse power.

(13) S. E. R. writes: We have a large cast iron rendering kettle which has a flaw and it leaks now. Will you tell us in your paper what we can do for it? Is there a cement which will stand fire?

A. Iron filings.....10 pts.
Clay.....60 "

These are worked with linseed oil into a thick paste, which is applied after some more linseed oil is added to it. It is then left to dry slowly.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

G. L. R.—The sample is pyrite (iron sulphide) in slate.

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