

ENGINEERING INVENTIONS.

An improvement in railroads has been patented by Mr. Robert P. Faddis, of Socorro, New Mexico. This invention covers a succession of metallic frames or cribs fitted to receive the rail seats, connections between the frames or cribs arranged opposite each other, and also connections between the rails held in the opposite frames or cribs.

A car brake has been patented by Mr. John Walsh, of Mansfield, Ohio. The invention consists of a lever connected with the brake mechanism, and also pivotally connected with a buffer held to slide longitudinally on the under side of the car, and engaged by a weighted lever held on a car to be coupled, it being specially intended to apply the brakes automatically when two cars come together for coupling.

AGRICULTURAL INVENTION.

A combined harrow, planter, and roller attachment for plows has been patented by Mr. Samuel B. Smith, of Salt Lake City, Utah Ter. A roller is applied to the rear end of the seed-box carrying frame, and adapted to actuate the seed slides, the frame having harrow teeth on its under side, while there is an adjustably applied draught connection between the attachment and plow.

MISCELLANEOUS INVENTIONS.

An improved freezer has been patented by Mr. Theodore L. Delpy, of Paris, France. This invention covers a mechanism for agitating the freezing mixture and a liquid to be frozen in a suitable combined apparatus, while it is also specially adapted for cooling bottles, meat, and other articles.

A nut lock has been patented by Mr. Aaron C. Vaughan, of Shane's Crossing, Ohio. It consists of a concavo-convex nut, thin enough to have some spring, with a round threaded hole in the center, and an adjoining circular segmental hole cut entirely through the nut and opening into the bolt hole.

A writing pen has been patented by Mr. Conrad Seabaugh, of Austin, Texas. This invention provides a thimble-like sleeve, adapted to be easily applied to the index or forefinger, whereby pen holders may be dispensed with, the thimble to be made in various sizes, to fit a large or small finger.

A walking cane has been patented by Mr. George H. Coursen, of Baltimore, Md. This invention covers a novel construction whereby cigarettes and matches may be safely and conveniently contained and carried in an ordinary walking stick.

A lighting attachment for mirrors has also been patented by the same inventor. The invention provides a device specially adapted for use in connection with adjustable mirrors, whereby a lamp or candle will be retained in a vertical position when supported by the device, regardless of the angle or inclination in which the mirror may be placed.

An indicator for doors has been patented by Mr. John D. Vail, of Blairtown, N. J. It is a device for attachment to a door, to indicate whether a room is vacant or occupied, the invention covering novel features of construction and being an improvement on a former patented invention of the same inventor.

A portable extension ladder has been patented by Mr. Simeon Piche, of Lake Linden, Mich. This invention provides a light and strong construction, whereby a ladder may be quickly and conveniently elevated and inclined toward the upper stories of a building, the device being one which may be utilized as a fire escape.

A razor caster, for holding a barber's outfit of razors and shears, has been patented by Mr. John B. Parker, of Wardner, Idaho Ter. It consists of a frame having a series of radial wires, a marginal wire or ring, and an elastic band, in connection with a hollow conical shaped base, the construction being simple and inexpensive.

A scallop turner has been patented by Mr. William D. Hall, of Beloit, Wis. This invention covers a novel construction of machine, to facilitate various kinds of scallop work or beading, especially adapted for turning out the scallops on the files of button boots or on gloves, or turning out the fingers of gloves, etc.

A coal drill has been patented by Mr. Warren C. Johnson, of Oskaloosa, Iowa. A sleeve is interposed between the sliding supports of the drilling apparatus, and a bolt passed through the supports and sleeve adapted to clamp the supports against the side bars of the frame of the drill, whereby the drill may be clamped at any desired elevation by tightening a bolt.

The manufacture of sodium forms the subject of a patent issued to Mr. Henry S. Blackmore, of Mount Vernon, N. Y. It consists in mixing together calcium hydrate, ferric oxide, sodium carbonate, and carbon, heating in a chamber, and collecting and condensing the vapors, mixing in proportions and proceeding after a manner described.

A belt clasp has been patented by Mr. Louis Sanders, of Brooklyn, N. Y. It is for use on belts usually worn by men and women, and is designed to effect a saving of the belt material, the device being such that no lap is necessary with its use, while a belt of any thickness may be easily adjusted and firmly retained in any desired position.

A door bell has been patented by Mr. William B. Atkinson, of Franklin, Ky. One or more pivoted hammers are made to revolve with the shaft which passes through a door, the hammers swinging freely and striking the gong by the action of gravity, the disk to which the hammers are pivoted, and the gong, being adjustable lengthwise on the shaft.

A letter box has been patented by Mr. Henry T. Sidway, of Chicago, Ill. This invention relates to street mail boxes having a mechanism indi-

ating the times of collection, and operated by the door through which the mail matter is removed, the improvement providing for conveniently preventing the operation of the indicator by the door when not desired.

A vibrating propeller for boats has been patented by Mr. Daniel B. Rowland, of Mount Shasta, Cal. Propelling blades to the rear of the boat are pivoted to a bar movable in the direction of its length, the blades closing against the bar moving in one direction, and being extended by the resistance of the water when the bar is moved in the opposite direction.

A piano pedal manual attachment has been patented by Mr. Hartwell R. Moore, of Norwalk, Ohio. This invention provides pedal levers to be attached at pleasure, and especially adapted for an upright piano, to enable the performer to play the base with the foot, and thus secure organ pedal practice, the attachment not interfering with the appearance or action of the piano.

A wagon brake has been patented by Mr. William H. McCowan, of Watertown, Ohio. The parts are so located as to bring the brakes in a convenient position to have a short range of movement in front of the wheels, the construction affording a strong leverage, and requiring but little power and a slight movement of the brake lever, while avoiding rattling and jar.

An ore roasting furnace has been patented by Mr. Albert C. Johnson, of Wilmington, Del. It is for desulphurizing copper ores, iron pyrites, gold-bearing sulphurets and other ores, and is provided with different compartments in which are placed raking bars of novel construction, the ore to be gradually moved from one compartment to the other and agitated in each compartment by the raking teeth or fingers, which also impart an outward or inward motion to the ore.

SCIENTIFIC AMERICAN BUILDING EDITION.

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3. A residence at Richmond Hill, N. Y., lately built, at a cost of ten thousand dollars. Perspective and floor plans.
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5. Villa at Fontainebleau—M. E. Brunnarius, architect. Cost, eight thousand six hundred dollars. Floor plans and perspective.
6. View of the new Protestant church at Lyons, France. Cost, eighty thousand dollars.
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Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

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Minerals sent for examination should be distinctly marked or labeled.

(1) J. H. M. writes: I have a plunge battery with solution of bichromate of potash, oil of vitriol, and water. It works, decomposing water for a minute, and then stops. What is wrong with it, and how would you rectify it? A. You will get much better results with two cells. Your E. M. F. is too low, and now is reduced by polarization.

(2) D. L. writes: Kindly inform me what chemicals I may use to extract the gummy matter from vegetable substances, so that all stickiness might be removed from them in preparing them for the market. A. Steaming and washing, treatment with caustic

soda solution, or with chloride of lime followed by washing, are among the treatments we would suggest. One of the three will undoubtedly do the work.

(3) H. E. A. writes: To what extent is water compressible? A friend of mine says that water is compressible to about half its volume. He says that he experimented by filling a section of pipe to its full capacity, and that he forced in a further (measured) quantity of $\frac{3}{8}$ the full capacity of the pipe, and claims that this was owing to the compressibility of water. A. Water is slightly compressible, but it is doubtful if a pressure has ever been produced by man, or could be produced with the materials at his command, which would compress water more than an infinitesimal amount. Thus a pressure of one atmosphere will compress water about five one hundred-thousandths of its volume. Your friend's experiment was incorrectly performed.

(4) W. C. M.—For bluing gun barrels by staining: Dissolve $\frac{1}{2}$ ounce hyposulphite of soda in 1 quart water, also $\frac{1}{4}$ ounce acetate of lead in 1 quart water. Mix the two solutions and bring to a boil in a porcelain dish or stone pot. Clean the gun barrel free from grease, oil, or varnish, warm the barrel and smear with the hot solution, using a piece of sponge tied to a stick. When color develops wash and wipe dry, finish with boiled linseed oil. You will find the receipt for browning gun barrels, as per U. S. Ordnance Manual, in SCIENTIFIC AMERICAN, December 5, 1885, in No. 18 of Notes and Queries.

(5) S. P. G.—There is no method of dyeing or coloring brass and copper below the surface. An improvement on japanning may be made by coloring the surface. A steel color on brass and copper is developed by boiling the article in a solution of arsenic chloride in water. The same with sodium sulphide causes a blue color. Platinum chloride to which a small portion of tin nitrate has been added gives a black color. These are only surface colors and will not stand severe wear, but by japanning upon them you may obtain a more durable surface than with japan alone.

(6) S. H. H. writes: The light on Cape Bonavista, Newfoundland, can be seen 35 statute miles. The curvature of the earth would be something over 800 feet. How are we enabled to see round this curve? A. The curvature of the earth and refraction, as counted from the topmast of a ship, say 85 feet high, is equal to a distance of 12 miles, which leaves 23 miles for the distance from the horizon to the Bonavista light. The latter must be 340 feet above the sea to complete the 35 mile sight. You are correct as to the height of line of sight for 35 miles. Refraction reduces the height to 681 feet.

(7) S. A. S. writes: I am making brass castings, and am having trouble with some of my heavy work being spongy. Am making new metal. A. You heat your metal too hot, so that it boils. Such metal always pours spongy. The copper should be brought down with old metal put into the pot with the copper. If you are making composition with a mixture of tin, a little tin or old composition should be placed in the pot with the copper. The furnace should be so managed that after the charge is fairly melted and stirred the pot should not stay in the furnace, but be drawn, and if too hot to make smooth castings, it should stand a few minutes, and be stirred until the heat falls to the proper temperature to pour. Castings should be gated up from the runner, which also prevents gas from being driven below the surface as by a down pour. In making 6 or 8 ounce yellow brass castings the bulk of the zinc should be put in the pot after it is taken from the furnace. Always use old metal to draw down the copper to a fluid state at as low a temperature as possible. Large castings should be poured with the coolest metal that will run and fill.

(8) C. L. P. G.—Unbalanced slide valves have the full steam pressure on their backs equal to the area of the exhaust port of the valve and the differential pressure due to mean engine pressure for the steam ports, causing friction and excessive wear. Balanced slide valves are so arranged in their construction as to have a counter opening at the back or its equivalent in the steam chest to relieve nearly all the pressure otherwise pressing the valve hard upon the seat or face of the cylinder ports. These valves allow of an easy movement with little wear, but are more complex and expensive than the plain valves. They are of many forms and mostly covered by patents, the piston valve being one of the forms largely in use now. The double poppet valve used in our river steamers is a nearly balanced valve. Some of the cylindrical rotary valves are also nearly balanced.

(9) J. D. K.—There was a time when steel for rails, tires, and axles was not made here equal in toughness to the English make. The tables have been turned, and now American rails, tires, and axles are fully equal if not superior to English make for toughness and durability, and at less than half the English price of six years ago. We find no complaints from the 775,000 tons of steel rails made in the United States during the first half of the present year and over a million tons made in the last half of 1887.

(10) J. H. McD.—For stopping the bleeding of a tree, heat a sad iron a little hotter than usual for ironing, put some resin, thick tar, or beeswax upon the cut surface, and melt it in by holding the hot iron on for some seconds, so as to heat the wood, that the resin or wax will stop the pores.—The expense of running a first class steam yacht varies greatly, as in ordinary use they are steaming only part of the time. While cruising, the expenses may run as high as \$150 per day, or with economy they may be run for \$100 per day.

(11) W. C. P. asks whether the ice in the great lakes melts or sinks in the spring of the year. A. The ice in late spring changes its conoidal form to acicular crystallization, absorbing water, or, in the common phrase, becomes water-logged and transparent. At this time it is so tender that the least wind breaks it up, when it floats as a mass of small crystals for a short time, and finally melts by the motion of the surface water bringing to the surface the warmer under