RECENTLY PATENTED INVENTIONS.

Engineering.

ROTARY ENGINE.—Charles Ludvik, Brooklyn, N. Y. It is of that class in which a winged piston revolves in a cylindrical steam or fluid chamber having abutment chambers opening into opposite sides, in which rotary fluid abutments are arranged to alternately cut off the annular space around the piston and be retracted to permit the piston wing to pass, the invention providing for a light construction with simple means for reversing the engine.

CAR COUPLING.—George W. Dawson and Benjamin F. Cleveland, of Sac City, Iowa. A sliding plate fitted in a cavity in the drawhead has a projection engaging a pivoted bar to raise and lower the coupling pin, which is placed in position for coupling by a lever at the side of the car, and when the cars come together the entrance of the link in the drawhead causes them to couple automatically.

STATION INDICATOR.—Philip A. Shanklin, William R. Swager, and William Swager, of Sandoval, Ill. It is designed for street and railway cars, and adapted to be operated by a lever, pull rope, or other power, the invention covering a novel construction, combination, and arrangement of parts.

CABLE RAILWAY.—John Wilde, Providence, R. I. It is designed for use as a conveyor of coal, stone, gravel, and similar articles, or for conveying work, merchandise, or change from one room to another in the same building or different buildings, the invention covering various novel features of construction and combinations of parts.

PUMP.—William Keast, Russell Gulch, Col. It is specially designed for raising impure water from mines and other places, and to separate the impurities from the water before the latter reaches the surface, the invention covering various novel features of construction.

COTTON PRESS.—George J. Loyall and James M. Moyers, Richmond, Va. It is adapted to be operated by hydraulic power, the construction being designed to compress eight hundred to a thousand pounds of cotton to a bale of the usual size containing only four to five hundred, while doing the work with less labor and in the same time.

SAW MILL FEED.—Newton Hoffman, Elizabeth, West Va. Friction cone pulleys are arranged in peripheral contact and placed between the source of power and the carriage pinion, for propelling the carriage of saw mills or other machines back and forth at variable rates of speed, or holding it stationary as desired.

Miscellaneous.

VENDING APPARATUS.—Henry Gates, Brooklyn, N. Y. It has a magazine with vertical tubes, in which are placed goods made up in packages to be delivered to a sliding drawer in exchange for a coin dropped in a slot, the machine being simple in construction and easy of operation, while it is designed to be impossible to work it by a coin of other denomination than that arranged for.

SHOULDER BRACE.—Mattie A. Van Alstine, Armstrong Springs, Ark. Its construction is such that when applied to the person the brace will not cut at the arms, pressure being taken away from the arm pits, while it is designed to effectually restrain a person from growing round-shouldered, without restricting the free action of the lungs.

NEEDLE THREADER.—James M. Miller, Richmond, Va. The body of the threader is formed of a single piece of spring wire doubled upon itself to form nearly parallel arms, to the extremity of one of which the thread hook is rigidly attached, the thread being drawn through the needle by direct pressure, the elasticity of the arms serving only to project the hook through the needle eye.

CALCIMINE.—Charles W. Hurd, Glens Falls, N. Y. This is a new composition of matter for a wash or finish for the interior walls of buildings, and consists of shell marl and sufficient glutinous matter to prevent it rubbing off when applied, with color ing matter as desired.

RULING AND PRINTING MACHINE.—George T. Patterson, New York City, and James W. Dickieson, Brooklyn, N. Y. This invention covers a novel construction and combination of parts making a machine for ruling sheets of paper and printing matter in perfect alignment and impression on the ruled sheet.

VEHICLE SHAFT SUPPORT.—Andrew T. Sears, Bridgeport, Conn. It consists of a frame with means for attaching it to a carriage spring or cross bar, a bar being pivoted to the frame for engaging and supporting a pair of shafts, for holding the shafts of a vehicle up out of the way when not in use.

MAIL BAG.—Carson C. Cook, Camas, Idaho Ter. The locking devices and the formation of the bag at the mouth are simplified, and a means provided whereby, when the bag is locked, matter cannot be abstracted without an indication on the surface of the bag denoting the attempt.

BOOK HOLDER.—Edward H. Roys, Spencertown, N. Y. It consists of pivoted and folding bars, with inwardly extending clips at the outer ends of arms, the holder offering no obstacle to the free turning of the pages of the book, and being likewise adapted for holding manuscripts, its construction being very simple.

BOOK SUPPORT.—James W. Coultas, Clinton, Ill. It is designed for holding dictionaries and other large and unwieldy books, the support having hinged side frames which close together to shut the book with a spring, the side frames, when opened, throwing the springs out of action, so that the book may lie at rest in opened position.

WHIFFLETREE COUPLING.—B. F. Alvey, St. Mary's, Ind., and Frank Leseure, Marshall, Ill. [The latter only to be addressed in relation to the patent.] This invention provides a simple device for coupling whiffletrees to doubletrees to allow of free horizontal play to both trees without rocking motion of either and without strain on the pivot bolt which connects the trees.

AUTOMATIC PUMP.—Francois Romain, Grenoble, France. The device is provided with a water cylinder, pressure-regulating mechanism, and air pump, for operating upon a cask in which beer or liquor is stored, whereby air may be forced in and the contents of the cask forced out of the discharge orifice or faucet.

EGG PACKAGE.—Arthur S. Hoyt, Hoboken, N. J. It consists of a casing formed from a blank of pasteboard, with a removable cell frame, consisting of longitudinal strips interlocking with cross strips, and forming therewith and with the casing a series of egg cells, making a package adapted to be packed in quantities in crates without liability of breaking the eggs.

TOBACCO CURING.—Edwin R. Bardeen, Aiken, S. C. This invention provides an apparatus for admitting into the curing house in which green tobacco is hung dry heated air or moist heated air alternately, under absolute control of the attendant, for drying and sweating out the nicotine and empyreumatic oils, and quickly curing and bleaching the tobacco to the desired color.

ELECTRIC LETTER BOX.—Charles F. Harms, of Hoboken, N. J. This improvement is in the form of an electric attachment whereby the circuit will be closed during the mechanical lifting or removal of the cover to insert mail matter in the box, thereby giving an alarm, which may be located at any desired point.

SHIRT.—Charles and Jacob Falkenberg and Morris Jones, New York City. This invention relates to woolen shirts having attached collars which may be turned in so that a linen collar can be worn, and the construction of the collar band and attached collar is such that when the collar is turned in, all uncomfortable fullness at the neck is avoided.

HAT OR BONNET HOLDER.—Nancy E. Veatch, Gales Creek, Oregon. The device consists of a coil of fine wire with fastening devices at its ends for securing the coil to a hat or bonnet, the coil being of suitable length to pass under the hair of the wearer and of sufficient elasticity to close snugly between the hair and head.

VALVE.—Johan A. Brudin, New York City. It is designed especially for use in connection with flasks of aerated waters, or "siphons," and has a pouch-like packing, a spring-pressed piston arranged in connection therewith, and a thumb piece to throw the piston against the tension of its spring.

SCAFFOLD BRACKET.—William H. Higgins, Forest City, Pa. The bracket proper consists essentially of a flattened forwardly extending tongue and an outwardly extending projection formed with claws, the invention being an improvement on a former patented invention of the same inventor.

STUMP EXTRACTOR.—John Cornelius, Evansville, Ind. Combined with a chain wheel and a worm wheel formed in sections arranged on opposite sides of the chain wheel, a worm is fitted to mesh with the sections, the machine being drawn to face the direction of greatest strain, changing its direction as one, two, or more stumps of a group are pulled.

Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

NEW BOOKS AND PUBLICATIONS.

A DICTIONARY OF TECHNICAL AND TRADE TERMS. London and New York: Ward, Locke & Co. Pp. xxxv, 283. Price $2.

This dictionary covers principally terms related to architectural design and building construction, and is remarkable for the completeness with which it gives the derivations of and French and German equivalents or synonyms for the various terms. The dictionary is distinguished by a comprehensiveness of terms and a fullness of their definitions calculated to make it practically useful to artisans and mechanics in a variety of industries.

TWENTY YEARS WITH THE INDICATOR. By Thomas Pray, Jr. New York: John Wiley & Sons. Pp. 284. Price $2.50.

Mr. Pray's work under this title has already become well known to engineers, but this edition represents what has formerly appeared in two volumes, all now newly arranged and complete in one volume. It is written as a practical text book for the engineer or the student, with no complex formulæ, and with many illustrations and rules as to the best way to run any steam engine to get the most economical results, showing how to adjust valves and to work out horse power, determining the amount of steam or water per horse power, the economy of fuel, etc.

Notes & Queries

HINTS TO CORRESPONDENTS.

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.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(1) C. F. asks for a receipt or two of a method for making heavy felted goods waterproof, if such a thing can be done. A. Stretch the piece in a frame and rub with beeswax on wrong side. Then melt in with a hot smoothing iron. Or use paraffin in the same manner. Also see SCIENTIFIC AMERICAN SUPPLEMENT, No. 317, which we can send by mail for ten cents.

(2) H. W. O. asks: Can you give me a receipt in your Notes and Queries column to make a solution to brass-plate with? I have a five-gallon tank; the zinc goes to the bottom, and the copper deposits. A. The articles must be prepared with great care, by pickling, etc., so as to be perfectly clean. Then for bath use:

Best sheet brass	1 ounce.
Nitric acid (by measure) about	4 "
Water	2 "

After action ceases, if no brass is left undissolved, a little must be added, as an excess of metal is requisite. Pour off the solution from undissolved brass and dilute with three to four times its volume of water, add ammonia (0·880) until all is clear blue in color, then add cyanide of potassium until the color turns yellowish. It should stand twenty-four hours, and be filtered before use. Use not less than 2 volts E.M.F. Use a brass anode. The anode must not be too large or too small. Watch color of deposit, and lower or raise anode until the deposit is yellow. A large anode gives zinc, a small one copper. Keep article quiet while in bath.

(3) P. J. R. asks how he could stain or dye cheaply sawdust the following colors, viz., bright yellow, bright green, light blue, bright red, and if possible a pure white. A. Use aniline colors or Diamond dyes. You will not succeed in producing pure white. Bleaching with chloride of lime or javelle water will give you an approach to it, but may injure the fiber.

(4) W. R. asks: 1. How many Grove's batteries, zincs 2 inches wide by 3 inches long, and platinum 1 inch wide by 3 inches long, would it take to operate a 20 candle power incandescent lamp? A. About 30 cells. 2. How is aniline green manufactured? A. Spons' Encyclopedia, part II., which we can supply for 75 cents, contains a treatise on aniline colors. 3. If tin foil pasted on a board and cut into small squares about a quarter of an inch apart, and connected with the secondary binding screws of an induction coil, would give a light sufficient to light a room 12 feet by 12? A. No.

(5) A. A. F. asks: What is the paste composed of that stereotypers use for making matrix for moulding plates or "turtles" for the web perfecting printing presses? A. Take 5 ounces flour, 7 ounces white starch, 1 large teaspoonful powdered alum, and 4 quarts water. Put the flour, starch, and alum in a saucepan and mix in a little of the water, cold, to about the consistency of thick cream. Then gradually add the remainder of the water, which must be boiling, stirring well meanwhile, to prevent lumps. Then put the whole of it over a fire until it boils. Then allow it to stand until quite cold. When you are ready for work add Spanish whiting, the mixture not to be too stiff, to spread readily with a paste brush. Put through a fine wire sieve with a stiff brush, and it is ready for use.

(6) J. P.—For the horse power of an engine, multiply the square of the diameter of the cylinder by the decimal 0·7854, and this product by eight-tenths of the boiler pressure, if the cut-off is not known. Multiply the last product by the speed of the piston in feet per minute (or twice the stroke in feet and decimals, multiplied by the revolutions per minute). Divide the last product by 33,000 for the horse power.

(7) C. M.—For etching on steel use a ground made of asphalt and beeswax equal parts melted together. Warm the article, and even the ground with a dabber made of cotton in a silk cover. Scratch the figure, and bite with nitric acid mixed with three to four parts water. If you wish to stamp the figure, put a little linseed oil with the above ground to make it as thin as printer's ink. Print with a rubber stamp, and cover parts not required to be bitten with a varnish of asphalt and turpentine.

(8) A. M. M. asks: Is there any place in United States where sheet tin is manufactured? A. We know of but one, the United States Iron and Tin Plate Company, Pittsburg. We export block tin, and import tin plate.

(9) C. A. B. asks the position of the Brooklyn Bridge by the points of the compass. A. It lies very nearly north and south, or NNW. by SSE.

(10) A. B. F. asks how silver-plated ware is treated after being taken from the plating bath. A. Dipped in a boiling solution of caustic potash, one-fourth pound to a gallon of water, then rinsed in hot water, dried in fine boxwood sawdust, and burnished.

(11) G. S. asks: 1. Do ashes made from soft coal form a good material to cover a steam pipe

with, laid in a wooden box? A. Yes. Use the fine light ashes from behind the bridge wall. It is the best. If not enough, sift the ashes under the grate, using the fine ash.

(12) A. P.—A method of making malleable iron casting is described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 399, and a very complete account in Spons' Workshop Receipts, third series, which we can mail for $2.00.

(13) W. T.—The finishing cuts on the ends of pencils are made with a pair of sharp knives that work like scissors, but do not meet. The knives are in a machine, the pencils being passed through automatically.

(14) C. E. L.—There are several telescopic comets within or near the solar system now. The one recently discovered at the Lick Observatory can be seen with small telescopes as a small star with a faint tail about half a degree long. Its position on the 17th November was R. A. 3 h. 57 m., dec. south 2° 30′. It is computed to be visible during one year, in the evening, until March, 1889, then in the morning and evening until November, 1889.

(15) A. McC. — The steepest railway grades are said to be in Switzerland, 369 feet to a mile. Many railways have short grades of 200 or more feet to a mile. The momentum of a locomotive and train will enable the ascent of very steep grades that are short. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 395.

(16) G. W. H.—The expansion of steam pipe for a rise of temperature of 200° is 1⅛ inches per 100 feet or 1·97 inches for 130 feet. This is for a change from 60° to steam heat of 20 pounds pressure. For a pressure of 50 pounds add three-tenths of an inch per 100 feet. All sizes of pipes expand alike with equal change in temperature.

(17) G. C. S.—The outer planets take their apparent retrograde motion from their position in opposition to the earth, when the earth, moving faster in its orbit than the motion of the planets, makes their motion apparently backward among the stars. You will notice this only by close observation when an outer planet is near opposition. The time and amount varies for the different planets. See "Popular Astronomy," by Newcomb, $2.50, which we can mail.

(18) A. O. asks: Does a horse travel with less fatigue over a flat than a hilly country? A. The theory that the ease of down hill travel compensates for the difficulty of going up hill is a great mistake. Holding back is not natural for a horse; it often worries him more than an uphill pull.

(19) R. C. G. asks the way to line a shaft. A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 190.

(20) W. A. asks: What sizes of wire will be required to supply currents for separate plants of three, six, and twelve arc lamps? A. In general terms, the larger the wire, the better. No. 8 or 10 wire suffices.

(21) C. G. writes: 1. What causes a show window to "perspire," as they say? A. The condensation of moisture from the air, largely due to the gas burners and presence of people. 2. How can it be prevented? A. By ventilating at the top thoroughly.

(22) J. C. S. writes: A owes B $500.00, all of which he is unable to pay at once, and B agrees to extend the time twelve months, provided A will pay him part of the principal and interest in advance on the unpaid part at the rate of 8 per cent. A accepts this proposition and pays B $200.00, which is part principal and interest on the unpaid part. How much will A owe B at the expiration of twelve months? A. Let x = unpaid portion of principal, then $500 - x$ = paid portion. We then have the equation—

$$500 - x \times 0{\cdot}08\, x = 200.$$

Solving this, we find:

$$x = \$326.09.$$

This is the portion of the principal that is to be paid at the end of twelve months. In addition to this, 8 per cent has to be paid on the rest of the principal, or on $500 - 326.09 = 173.91$. Eight per cent on 173.91 is 13.91. Adding this to 326.09 we have 340.00 as the total to be paid at end of twelve months.

(23) W. J. L.—The piston of a moving engine travels forward and backward in its relation to the cylinder. It always moves forward in its relation to the roadbed or track when the engine is running forward, and always backward when the engine is running back.

(24) M. S. asks if a good grafting wax can be made sufficiently soft in consistency to be applied when grafting without requiring heat. A. Mix equal parts of beeswax and resin; add tallow until a proper consistency is attained.

(25) A. W. asks: About what is the market value of attar of roses? A. From $40 to $100 per ounce is given as the range of price.

(26) F. P. asks: 1. How can I mix kerosene and lard for a lubricating oil, so that it will not separate? A. Wash the lard well with hot water, have perfectly dry, and it will mix with kerosene. 2. Would it injure drinking water to use a copper pail? A. Not if the pail is kept bright. For Vesuvium, see SCIENTIFIC AMERICAN, Dec. 8, 1888, query No. 9.

(27) F. S. M. writes: I have an electric bell arrangement in my house, and the zinc rod in the battery gets coated with a kind of salt, and occasionally the battery refuses to work until I scrape the zinc. How can I prevent it? A. Add a little hydrochloric acid to your solution. The porous cell is probably exhausted and needs replacing.

(28) A. C. M. asks: Could I not charge a storage battery by means of a dynamo run by a windmill, by using an automatic arrangement that would complete the circuit only when energy greater than that in the storage battery was being developed by the windmill? A. You could construct an automatic arrangement based on the gas evolved when the battery is fully charged. A single cell could be sealed, and the pressure of gas in it could be made to actuate a mechanical cut-off when the pressure reached a definite point. This would provide for cutting off the current. It might be arranged to do the whole work of throwing in and out of circuit.

(29) G. F. writes: I have a mixture of white castile soap and eggs, which looks like soft soap. Could you tell me of something that would "cut" the soap, *i. e.*, take the greasy look out of it, and make it so it will not be stringy, but be in separate particles? A. A little salt solution will tend to make the soap curdle and form in clots.

(30) J. B. asks: 1. Is not hot air a better supporter of combustion than cold air? A. It tends to increase the engery of combustion, and to produce a much higher temperature. 2. Give a scientific explanation of how sparks get out of the fire box of a locomotive. Is not the creation of a vacuum in front end the cause? A. The creation of what is termed a "partial vacuum" is the cause.

(31) R. A. R. asks: Can you give me a recipe for making a preparation that will keep the frost off windows? A. Ventilate the window casing at the top. Sponge the windows with glycerine and water.

(32) A. S. writes: I have read somewhere that you can extend the carbon surface of a porous cup battery by packing powdered coke around the porous cup. Will you please tell me if the coke should be just poured around loose or be packed in tight. A. Break coke to size of beans, screen out dust, and pack loosely. For description of telephone, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 142.

(33) S. M. D. asks: 1. Have not inventors in the United States done more to develop modern practical scientific appliances than inventors in any other single country in the world? A. United States patents exceed in number those of any other country. 2. Have scientific men in Great Britain or France done more to develop theoretical and technical science than the same class of men in any other single country? A. It is impossible to answer your second query.

(34) Carpenter asks: 1. About what year were "cut" nails first introduced? A. The first patent for a machine for "cutting nails" was issued to Josiah G. Peerson, of New York, March 23, 1794. As early as 1606 Sir Davis Bulmer obtained a patent for cutting nails from a rod by water power. 2. What is the name of the wood from which Cuban cigar boxes are made? It much resembles mahogany, but lighter and softer. A. Spanish cedar.

(35) Reader writes: In your paper of November 24, 1888, page 325, appears a table of the number of gallons of water in cylindrical cisterns. The estimates given in this table differ from a table on page 695 of Moore's "Universal Assistant." I would like to know which is correct. Please answer in your next paper. A. The *Sanitary News* table refers to the imperial gallon of 277·274 cubic inches. Moore's table refers to the American gallon of 231 cubic inches.

(36) R. D. asks: 1. How long will an open circuit battery (best make) ring a bell continuously before it becomes polarized, and how long will a closed circuit battery do the same before it runs down? A. It depends on the resistance of the bell magnet and on the general features of its construction and on the size of battery. Ten minutes to one hour for the open circuit, and ten hours and upward for closed circuit. 2. Which line will a battery run the longest on ringing a bell continuously, one a mile long or one 1 foot long, using the same size wire and the same bell in each case? A. If the bell and battery are properly proportioned, it will run longest on the short line.

(37) T. A. M. C. V. asks: 1. What is the pattern of Bunsen cell that may be used for charging accumulators, its size and capacity, and its intensity in amperes? A. The so-called Bunsen cell generally contains a carbon prism in the center, within a porous cup, which is surrounded by a plate of zinc, bent into a nearly complete circle. For the porous vessel, electropoion fluid, often described by us, is used. For the outer cell, water or dilute sulphuric acid. Such cell gives about 2 volts electromotive force, and its resistance may vary from 0·200 to 1 ohm, according to size, strength of solution, etc. With low external resistance, therefore, it may give 10 amperes. 2. What is the rule to calculate the number of such Bunsen cells required to charge an accumulator or several of them of two volts E. M. F.? A. Always arrange storage batteries in series for charging. Then for intensity of current allow 18 amperes, and for electromotive force allow 2·25 volts, or about 40 watts, per cell. If charging with a battery, arrange it so as to produce this current. 3. Is it necessary that a dynamo should have the same voltage and amperage as the accumulator for the purpose of charging, provided the number of watts be the same? Or may the voltage of the dynamo be lower, provided the amperage be higher? Can a dynamo of $4\frac{5}{16}$ amperes and 100 volts charge an accumulator, as good as one of 6 amperes and 75 volts, or 10 amperes and 45 volts, and making all of them the same combination in watts? A. The dynamo should have 12½ per cent more voltage, and should produce a current of 18 amperes intensity. The voltage and amperage cannot compensate, one for the other. The above rate is the correct one. More voltage would be uneconomical, and less amperage would be slow. Hence the third dynamo named would be the best, and should be given not less than $\frac{45}{2\frac{14}{16}}$, or 20 storage cells in series to charge.

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November 27, 1888,

AND EACH BEARING THAT DATE.

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