

ENGINEERING INVENTIONS.

A car coupling has been patented by Mr. Edmund O. Sawyer, of Point Pleasant, W. Va. It is a simple device for adjusting a link held in one drawhead to properly enter an opposing drawhead of an equal or different height, by which the link may be adjusted from either side of the car, or, by means of proper connections, from the top of the car.

An auxiliary air accumulator has been patented by Mr. Michael P. Drumme, of Grand Junction, Col. It consists of an attachment to the steam chest of a locomotive, adapted to be connected with the air brake system, and calculated to quickly accumulate compressed air for use in case the supply employed to operate the brakes becomes exhausted from defective action of the compressing mechanism or other cause.

A smoke burning furnace for steam boilers has been patented by Mr. William T. McDonald, of New York city. In the flue by which the smoke and unconsumed gases would naturally escape is formed a dome-like expansion at one part, into which opens funnel-like mouths of a pipe leading to an aperture in front of the fire chamber; opposite this end of such pipe is a nozzle connecting with a kerosene reservoir, and another nozzle connecting with the steam space of the boiler, the discharge of steam through which forces the oil and unconsumed products of combustion drawn back from the flue together in the form of spray upon the fire; the pipe with funnel openings for withdrawing unconsumed products from the smoke flue is also further connected with a pipe extending around the end of the boiler and terminating in an outlet to the air in front of and under the fire grate.

AGRICULTURAL INVENTIONS.

A potato planter has been patented by Mr. Charles C. Maves, of East Davenport, Iowa. It has various novel features of construction and arrangement of parts, whereby potatoes may be planted either in hills or drills, and is so designed that the space between the hills may be varied, as also may the distance between the seed when the potatoes are planted in drills.

MISCELLANEOUS INVENTIONS.

A hoe and rake has been patented by Mr. Frank Middleton, of Richmond, Va. This invention provides for the attachment of the blade and parts to the handle by a screw fastening, whose parts are so protected that dirt has no access, and the lubricant is not likely to be washed out, whereby rusting is prevented and the parts will be easily adjustable.

An improved form of shirt with detachable bosom has been patented by Mr. Julius Schlesinger, of Chicago, Ill. The shirt has an open bosom space, around which extends re-enforcing strips having buttons, a transverse bracing strip extending across the space below the neck band, and permanently attached to the shirt.

A carriage gear has been patented by Mr. Edward Squires, of Beaverton, Oregon. This invention covers a single reach side spring gear, which brings the body of the carriage low down, and makes an easy up and down motion, free from side play and loose joints, being designed with regard to simplicity, cheapness, durability, and finish.

An improved lamp globe sign has been patented by Messrs. Harry L. and Willard L. Harris, of San Francisco, Cal. The lamp globe is made with an opening adapted to hold a framework and sign, in such position that the lettering or symbols will be clearly defined on a wall, sidewalk, fence, or other object, the light of the lamp making the shadowed representation.

A gas regulator forms the subject of a patent also issued to the above inventors. It is an improvement in that class of regulators in which elastic diaphragms are used, and consists in making the diaphragm of horse hide treated with neatfoot oil and beeswax, whereby the hide is rendered soft and elastic, and so it will not be injuriously affected by the moisture caused by condensation of the vapors from the gas.

A building block has been patented by Messrs. Christian Popp and Ludwig Melchior, of Wilmington, Del. It is intended especially for inside work, and is made of ground cinders and ashes, dried and lime, boiled glue, beach sand, plaster of Paris, and Portland cement, mixed with water and subjected to heavy pressure, to make a water and fire tight partition.

A cuff fastener has been patented by Mr. Stephen V. Thomas, of West Branch, Mich. This invention covers a distinctive and peculiar construction of holder, bent out of a single piece of wire, to connect a cuff with ease to a shirt sleeve, either high up or low down, the fastener being designed to take the place of a cuff button.

A door check has been patented by Mr. George N. Clemson, of Middletown, N. Y. It consists of a bracket on the door near the bottom, carrying a swinging arm with convex pad adapted to engage the carpet or floor, whereby the weight of the door will act on the arm and pad to produce sufficient friction to hold the door in any desired position.

A chimney cowl has been patented by Mr. Neal Clifford, of St. Joseph, Mo. It consists in a frame adapted to the chimney top, and combined therewith a revolving cowl shield supported by the frame with its bearings entirely above the cowl shield, and exterior to the chimney or smoke pipe, to prevent down draught and increase up draught.

An abdominal and spinal brace has been patented by Mr. William B. Dewees, of Salina, Kan. It has a front pad made of leather and elastic webbing, and the back combination includes a leather and elastic shoulder brace with S-shaped steel springs, and other novel details, the whole being designed to support and strengthen weakened parts with perfect comfort and freedom.

A chenille pendant has been patented by Mr. Bernhard Dreyfus, of New York city. Within the pendant loop is placed a stiff or rigid frame of me-

tal, hard rubber, celluloid, stiff paper, or other suitable material, and the usual methods of making are otherwise modified, so that the pendants cannot easily be bent out of shape by the pressure to which articles on which they are secured are frequently subjected.

A process of separating the tin from scrap or pieces of tin plate or tinned iron by means of hydrochloric acid has been patented by Mr. Wilhelm Hasenbach, of Mannheim, Germany. It consists in heating the cuttings or scraps and subjecting them while hot to the action of hydrochloric acid in the form of a dry gas or vapor, distilling off the protochloride of tin and avoiding the necessity of washing the scraps.

A thill coupling has been patented by Messrs. Clarence M. Slack and Frank Crawford, of New Brunswick, N. J. Its construction is such that the wear will come mostly upon conical counter-sinks in the coupling block, and conical projections upon inner sides of parallel arms upon the forward arm of the bow, and this wear can be readily taken up and any rattling of the couplings prevented.

An animal trap has been patented by Mr. Sylvester Snell, of Watertown, N. Y. It is a box with a hinged bottom, the front end of which is heavier than the rear end and has an upwardly extending pin, with a swinging door attached to the front end of the box and operated by the pin in the hinged bottom, with other novel features, making a trap adapted to take animals alive.

A heating stove or furnace has been patented by Mr. John Adams, of Findlay, O. It is designed more especially as an improved construction for a gas or oil stove, in which air and gas are mixed within a perforated tube, around which is formed the blaze, and there is a novel arrangement of chambers and flues whereby the products of combustion are brought into contact with a large surface of metal.

A circular sawing machine has been patented by Mr. Everell S. Collins, of Meadville, Pa. This invention consists of a circular saw mounted on an arbor supported by a counterbalance, with pivoted levers for swinging the saw upward to a cutting position on the table, the device being adapted to promote convenience for use in a limited space, as the saw can be placed below the level of the table when not in use.

A drinking straw or tube holder has been patented by Mr. William E. Coleman, of Schooley's Mountain, N. J. It is in the form of a clamp, made of a single piece of spring sheet metal, suitably cut and bent to make lower clips, to fit over and hold on to the rim of a glass, while the upper part is bent to form tubular sockets adapted to hold the drinking straws or tubes.

A reaming tool for use in sinking bored well casings has been patented by Mr. William A. Lloyd, of Macksburg, O. It is a tool which has a compressible cutting head to go down through the casing, but which will expand below that to do the work of enlarging the bore to the full diameter of the casing, so that bores may be thus enlarged and the casing sunk as the boring proceeds.

A new form of belting has been patented by Mr. John D. Channell, of Nevada City, Cal. It is made with flexible side flanges, preferably of rubber, formed of hollow tubes, permanently attached to one face of the band near its edge, making a belt especially adapted for use in ore concentrators, etc., and for conveying water, pulp, and similar material without the use of guides or buckets.

A hose reel has been patented by Mr. Charles H. Weygant, of Newburg, N. Y. It is a spirally grooved reel cylinder, with a traveling frame through which hose may be passed, the hose being wound from its upper end downward by revolving the cylinder, and so held that all the water, when the supply is shut off, will flow out of the discharge end without its being necessary to open any wasteway.

A wheel and axle has been patented by Mr. Granville W. Pittman, of Keokuk, Iowa. On the inner side of a car wheel is a central circular cavity adapted to receive a disk on the end of the axle, the cavity carrying a rubber cushion, and a cushion collar being held in the neck, the device being intended to give increased leverage power and reduce friction, and also adapted for the hubs of carriage wheels.

A carpet rag attachment for sewing machines has been patented by Mr. Charles W. Chamberlin, of Lanark, Ill. This invention consists principally of a number of narrow holders, clamps, or springs connected together in line with each other and adapted to receive and hold the ends of the rags, so they may be passed with the device through a sewing machine and stitched.

A clothes drier has been patented by Mr. Ide V. Cooley, of Berlamont, Mich. Bent wire hooks are fitted to slide easily on a galvanized wire line stretched from the side of the window to a post or adjacent building, the hooks holding clothes drying bars, on which the clothes are fastened by the usual pins, the apparatus being arranged in such way that a large number of clothes can be hung in a very small space.

A wooden scoop has been patented by Mr. Nathaniel E. Nichols, of Mount Tabor, Vt. The heel of the scoop is formed in one piece of the required shape and thickness, to stand at the proper angle to the blade, and the blade tapered so that when bent to conform to the lower curved and beveled side of the heel the deep flaring part and front flat edge will be formed, the handle being secured in any convenient manner.

A tool handle has been patented by Mr. Louis Steinberger, of New York city. It is intended more especially for hammers, axes, and similar implements, the handle having a notched end, a tightening screw to enter the handle centrally in the notch, and a bar to rest crosswise upon the hammer to draw it down upon the handle, whereby the handle may be firmly screwed and subsequently tightened when required, or detached and applied to another implement.

An apparatus for manufacturing aerated beverages has been patented by Mr. Oscar Brunler,

of New York city. This invention provides an apparatus for supplying liquid carbonic acid to the liquids to be aerated in the mixer, or fountain, through a tubular coil within the fountain, whereby the liquefied gas, by its expansion, has a cooling effect upon the contents of the fountain.

A machine for washing coal or other minerals has been patented by Mr. Robert Robinson, of Howlish Hall, near Bishop-Auckland, Durham Co., Eng. The separation of stone, dirt, etc., from the material to be washed is made by difference of specific gravities, the material being placed in water in a hopper-like vessel, in which an upward flow of water is maintained, with means for discharging impurities without interrupting the washing.

A calculator has been patented by Mr. Jules V. Charpentier, of New Orleans, La. The apparatus comprises a box or support, an indicator, an interest table, a maturity table, and a period table, in connection with various working devices to facilitate the determination of amounts of interest, number of days of interest and discount, and date of maturity of commercial paper, this invention being an improvement on a former patented invention of the same inventor.

A gate for railway crossings has been patented by Mr. Abiud G. Miller, of Leyden, N. Y. It has posts at opposite sides of the roadway, bars pivoted to the posts, the lower bar normally vertical and the upper extending horizontally toward it, with a flexible connection between the free ends of the bars, with other novel features, making an inexpensive safety gate which may be operated quickly and easily in all weathers.

NEW BOOKS AND PUBLICATIONS.

SACRED MYSTERIES AMONG THE MAYAS AND THE QUICHES, 11,500 YEARS AGO. By Augustus Le Plongeon. New York: Robert Macey, 1886.

At the close of the ceremony of initiation into the Grecian mysteries, the candidates were dismissed with three cabalistic words, which, curiously enough, had no meaning in any tongue known to the mystic priesthood. Dr. Le Plongeon has discovered that these words are Maya, and are not only perfectly intelligible, but are appropriate to the dismissal of the newly initiated. Starting with this discovery, he attempts to show that the origin of Freemasonry dates back to the ancient civilization of Central America, to the Mayas and Quiches of 11,500 years ago. He traces the relation of their sacred mysteries to those of Egypt, Greece, Chaldea, and India, and gives an interesting account of his explorations among the ruins of the Maya temples. The work is illustrated with drawings and prints from photographs made by the author.

CANADA: ITS HISTORY, PRODUCTIONS, AND NATURAL RESOURCES. Prepared under the Direction of the Minister of Agriculture. Ottawa: Department of Agriculture, 1886.

The present handbook of Canada has been prepared by Mr. George Johnson, for the purpose of the Colonial and Indian exhibition now in progress in London, and furnishes, in a limited space, an excellent resume of the resources of that Dominion. The climate, area, system of government, industrial enterprises, commerce, and other features essential to the interests of the country are briefly reviewed, and will give the other members of the British Empire a very good idea of the development and future possibilities of their sister province in the Western Hemisphere. The book will also prove useful to those who contemplate a Canadian tour, and who desire to inform themselves of the chief characteristics of the country they are about to visit. Two large maps accompany the volume.

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If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN patent agency, 361 Broadway, New York.

Grimshaw.—Steam Engine Catechism.—A series of thoroughly Practical Questions and Answers arranged so as to give to a Young Engineer just the information required to fit him for properly running an engine. By Robert Grimshaw. 18mo, cloth, \$1.00. For sale by Munn & Co., 361 Broadway, N. Y.

Curtis Pressure Regulator and Steam Trap. See p. 142.

Supplement Catalogue.—Persons in pursuit of information of any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

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Nystrom's Mechanics.—A pocket book of mechanics and engineering, containing a memorandum of facts and connection of practice and theory, by J. W. Nystrom, C.E., 18th edition, revised and greatly enlarged, plates, 12mo, roan tuck. Price, \$3.50. For sale by Munn & Co., 361 Broadway, New York city.

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Veneer Machines, with latest improvements. Farrell Fdry. & Mach. Co., Ansonia, Conn. Send for circular.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv., p. 28.

Greene, Tweed & Co., Railroad and Manufacturers' Supplies, have removed to 83 Chambers St., city.

Hercules Lacing and Superior Leather Belting made by Page Belting Co., Concord, N. H. See adv. page 30.

Emery and Corundum in quantity to suit. Walrus and other leather for polishers. Greene, Tweed & Co., N. Y.

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) R. M. R. asks: How is the ink made that is used in inking the indelible ribbon in type writers, which writes black, but copies a very dark blue? How is the ribbon prepared with this ink? A. We presume you refer to the blue record ink, which is made as follows: Take vaseline of high boiling point, melt it on a water bath or slow fire, and incorporate by constant stirring as much Prussian blue as it will take up without becoming granular. Remove the mixture from the fire, and while it is cooling mix equal parts of petroleum benzine and rectified oil of turpentine, in which dissolve the fatty ink, introduced in small quantities by constant agitation. The volatile solvents should be in such quantity that the fluid ink is of the consistency of fresh oil paint. One secret of success lies in the proper application of the ink to the ribbon. Wind the ribbon on a piece of cardboard, spread on a table several layers of newspapers, then unwind the ribbon in such lengths as may be most convenient, and lay it flat on the paper. Apply the ink, after agitation, by means of a soft brush, and rub it well into the interstices of the ribbon with a stiff tooth-brush. Hardly any ink should remain visible on the surface.

(2) W. M. M.—Pear trees are subject to two kinds of blight, one due to insect agency, and the other to fungi. In the case you instance the trouble was probably caused by the insect whose larva you send us.

(3) W. D. S. asks: Which is the oldest city—St. Augustine, Fla., or Santa Fe, N. M.? A. Santa Fe, N. M., is the older city. When visited for the first time by the Spaniards in 1542, it was already a populous Indian pueblo. The fort built by Menendez in 1565 on the site of St. Augustine, Fla., was the first habitation in that city of which we have any record. In spite of these facts, St. Augustine is usually spoken of as the oldest city in the United States.

(4) S. F. W.—Steel, as now made for boilers, is far superior to iron in all respects; it is stronger for the same thickness, tougher in bending, uniform in grain in every direction and not liable to blister. The cylinders of Corliss engines are proportioned to their work and speed, and supposed to be about the best in modern engineering. They are recommended for economy and durability for all work.

(5) R. L. S. asks the advantages in coking coal, which is now so extensively done at the mines before shipping to consumers. A. We do not know that there are any advantages in point of economy of cost over bituminous coal. Cleanliness in firing and a smokeless fire are always desirable if at not too much cost. The great value of coke is in the blast furnaces and the great coking establishments of Western Pennsylvania were originally established to meet this requirement. Competition in manufacture has thrown it into market for general consumption. 2. How is it that the common buzzard, and some other species of hawks, are able to float through the air without moving their wings or making any apparent effort, raising and lowering themselves at pleasure, even propelling themselves against the wind, while their wings are, seemingly motionless? A. When moving against the wind they sometimes appear to be motionless, for a few moments, but sustained in the same manner as a kite, the distance making them appear motionless when they are moving slowly. When they are sailing in a calm, they are always moving on an inclined path. It is our upward view which deceives us. When seen from the top of mountains their real motions are apparent. They gain speed on the downward sail and use it as momentum in nearly gaining their original level.

(6) Subscriber asks: Can you inform me of a combination of chemicals which will produce a degree of cold, say 20° or lower, which will continue for several hours, the said chemicals to be cheap and free from danger? A. We recommend ammonium nitrate and water as the simplest. Or, as a more complicated mixture, try the following:

- Sodium sulphate.....6 parts by weight.
Ammonium nitrate.....5 " "
Dilute nitric acid.....4 " " "

The last formula is very powerful, but has the objection of requiring the use of acid.

(7) C. C. B. asks: 1. What is the best material for a non-conductor to put between the registers and wood for a hot air furnace? A. Soapstone frames to set the register in are the best. 2. Of what metals and what proportion are counterfeit silver dollars made of, and the quickest way to detect them? A. The composition of counterfeit dollars varies a good deal. Detect them by their lightness and absence of ring; also, by the appearance of the die work. 3. Would you suggest Kansas as being a good place for a machine shop? A. Kansas is a large agricultural State, with a population of over a million. There is room for a good number of machine shops, but we do not know how well the demand is filled. 4. What is best to administer to assist nature in cases of diphtheria and fevers? A. For the treatment of diphtheria, see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 281, 50, 369, 51, 125, 249, 373. For the treatment of fevers, see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 358, 239, 172, 251, 143.

(8) W. W. B. asks (1) how to best raise a pine pole measuring 50 feet in length and about 6 inches in diameter at tip end, pole to be put in a hole 4 to 5 feet deep. A. Such a pole should be easily raised with pikes and guy ropes, placing its foot against a plank set in the hole. A small trench may be cut, so that the foot of the pole will rest against the plank below the surface of the ground. The telegraph poles are raised in this manner. 2. About how many Leclanche cells will be required to run a current (sufficiently strong to ring a call bell) through four miles of barb wire, the wire being stapled to fence posts? A. 2 to 4 cells, according to perfection of insulation. Satisfaction will only be obtained in dry weather.

(9) F. D. L. asks: Which moves first in starting a steam engine—the valve or piston? A. Being connected with the shaft, they both move at once. The motion of each has an infinitesimal stop on the centers. In this manner the valve may stop while the piston is moving. The valve nut is often loose, so that the valve stops an appreciable time at the change of stroke.

(10) G. B. asks the best material for small gear wheels about 12 inches in diameter, running at a speed of about 500 revolutions. A. Cast iron is universally used. For fast running gear, the teeth should be cut.

(11) T. S. asks: What is the best steam packing for a stuffing box of a rotary spindle? A. Cotton wicking saturated with plumbago and oil is as good as anything.

(12) L. M. asks: 1. Is it necessary to balance a three cylinder, high speed, upright, double acting engine where the cranks are at 120 degrees apart? A. No. 2. Is it necessary to balance a three cylinder, high speed, upright, single acting engine, the cranks also at 120 degrees apart, and where the steam is at the top of pistons? A. Yes.

(13) J. M. A. asks how sulphurous acid may be made without much expense, and what apparatus would be needed? A. By treating hyposulphite or sulphite of soda with dilute sulphuric acid gas comes off freely, and should be received in pure water, which dissolves it and forms sulphurous acid. A bottle with perforated cork and an eduction tube is all that is required.

(14) F. W. S. writes: I would like to make a small induction coil for taking shocks. I have about 6 ounces No. 31 copper insulated wire, which I would like to use for the secondary coil. Will you please tell me what size and about how much wire I will need for the primary coil, and what size spool it will make? A. Use a bundle of wires a quarter of an inch thick and 2 1/2 long for core. On these wind one hundred feet No. 16 to 18 insulated wire, and on this the fine wire. Use layers of shellacked paper between the core and primary and between primary and secondary.

(15) E. B. D. asks in regard to the construction of Leyden jars? Say we use gallon jars. 1. How thick should the glass be? A. About 1/8 inch. 2. What is the best method of coating the jar with tin foil? A. Paste the tin foil on with flour paste over two-thirds the height of the jar and over the bottom, inside and outside. For inside use it in strips.

(16) A. E. S. writes: If a sphere of average wrought iron weighing 1 ton with a vacuum that renders it without specific gravity be filled with air, will the sphere be made heavier or lighter? And how much peratmospheric pressure? A. A vacuum does not deprive a substance of specific gravity. A hollow with vacuum within it is lighter than when filled with air; how much, depends on the volume of air introduced, which is not given in your question.

(17) C. W. H. says: I wish to construct a battery and lamp for an electric light to be used in connection with a microscope to throw an image upon a screen about 8 feet square. 1. Please explain construction of battery and lamp. I have a telegraph battery, 12 cups; can that be used? A. You need a much higher electro-motive force than 12 gravity cells will give. The lamp you can buy of Stout-Meadowcroft Co., 21 Ann Street, New York. They supply battery, lamp, and all for this express use. 2. I have a small medical battery in which I use sulphate of mercury; can a larger battery of that style be used? A. It could, but would be expensive to run.

(18) W. B. writes: I have four large gravity battery cells, half a mile of No. 18 cotton-covered magnet wire, and desire with these to make a powerful magnet. Please tell me how big should the soft iron core be. What is the best iron—cast or wrought? Need I put any insulator on the magnet before wrapping with wire, and is anything required between the layers? A. Use cores 1 1/4 round iron (Norway annealed), and about 10 inches long. Wind the wire on pasteboard tubes large enough to slide over the covers. Use two tubes for each leg, and wind each tube with a double layer. This gives you a number of combinations, to suit different battery strengths. Nothing more is required than wrapping of wire as an insulator.

(19) H. E. W. asks whether cotton seed oil is combustible; if so, what degree of heat it requires to explode it. Some of the Northern mills have been advised not to handle it, on account of its spontaneous combustibility. A. Cotton seed oil is not explosive in the ordinary sense. Mixed with waste, wood shavings, and the like, it is liable to heat, and so catch fire spontaneously. We should apprehend no more danger in handling it than in the case of linseed oil.

(20) G. H. A. says: I have lately made a workshop of an upper room, and have put in a lathe, boiler, and engine of a total weight of 2,400 pounds, resting upon 3 joists 3 inches by 9 inches by 16 feet 0 inches. Will it strengthen the floor sufficiently to enable it to carry the increased weight if I bolt three 3 inch by 8 inch joists to the existing ones? A. You had better use 4 inch by 8 inch joists bolted with 3/4 inch bolts about 10 inches apart. Take care to provide solid bearings for your new joists, wedging the ends up with tiles in cement.

(21) F. B. M.—The resistance to thrust in the case referred to depends upon the adhesion between the mortar and bricks, and varies from 12 to 24 pounds per square inch. Taking it at 20 pounds per inch, and the approximate resistance to thrust 300 inches we have 53 1/2 cwt., the thrust required to break the wall. The thrust of the beam mentioned would be as follows: Taking 5 1/2 cwt. per square for framing and 7 1/2 cwt. for slates, we have 33 cwt. direct thrust. This is neglecting the wind pressure, which in steep roofs is usually calculated at 36 cwt. per square, bringing the thrust up to 124 cwt.

(22) W. B. asks: How many batteries (bichrom. bat.) will it take to run a seven candle power incandescent lamp? Carbon and zinc are 8 by 4 inches. A. 10 to 15 such cells, run as they probably would be in practice.

(23) A Subscriber asks: Will you give me a few points about the electro magnet that appeared in vol. liv., No. 7, February 13, 1886? 1. What is the electromotive volts and amperes necessary to run the electric motor illustrated in SCIENTIFIC AMERICAN, vol. liv., No. 7? A. About 50-70 volt-amperes. 2. The number of layers of wire used, and what is the weight of it? A. This depends on the exact size. Two or three pounds of wire should suffice. 3. What is the width and the thickness of the armature? A. Make the armature about 1 1/2 inch wide by 1/2 inch thick. 4. Should E project above flange the thickness of the armature? A. Make it project about 3/8 inch for stroke of 1 inch. 5. In winding the bobbin, where should the wire start and end at? A. Immaterial. 6. Is the commutator made of iron too? A. Make commutator of copper or brass.

(24) M. A. asks if one of the materials used in the manufacture of fireworks is meal powder. What is meal powder? A. It is powder that has been mixed and rolled, etc., but not yet compressed and granulated.

(25) L. A. writes: Want to know if there are any chemicals that will produce a gas and create a pressure, so that the said gas can be used expansively the same as steam? A. There are many chemicals that will do it. Limestone and muriatic acid will produce any pressure ordinarily required by evolving carbon dioxide gas.

(26) C. E. M. asks: 1. What is the amount of wire to be used in the dynamo described in SUPPLEMENT, 161? Also, how much (if any) candle power can it give with incandescent lamp? A. Five to six pounds in the field, and half pound in armature. It will give five to ten candle illuminating power. 2. I would also like to know the power of a steam engine which I have constructed (it is horizontal). The bore is 1 in., stroke 2 in., pressure 65 lb., speed 120, size of ports 1/2 in. round. A. If your speed is 120 revolutions per minute, it gives six one-hundredths of a horse power; if the speed is 120 strokes per minute, it is one-half that amount, or three one-hundredths horse power.

(27) W. Z. asks: In a telegraph sounder the core of coils and bar of armature are nickel plated. Is the attractive power lessened by the nickel coating, and would it be better to have them bare iron where close together (on armature opposite core)? A. The nickel plating should not affect the working to any perceptible extent.

(28) H. S. P. asks: 1. How to take mil-dew out of a tent? A. Mix well together a spoonful of table salt, two of soft soap, two of powdered starch, and the juice of a lemon. Lay the mixture on both sides of the stain with a painter's brush, and then expose the tent out of doors day and night until the stain disappears. 2. How to make an emery wheel? A. Take a solid wheel of pine or any similar wood, and of the proper size. Turn the wheel true. Then prepare some best glue, and using it hot and thin, put it on the surface of the wheel with a brush. The first coat of glue should be a light one, and when it is dry a second one should be applied, and, as quickly as possible, as much emery should be sifted upon the wet surface as the glue will hold. When this is dry, another coat of glue and emery should be applied in the same way. See also the article on "Polishing Materials," contained in the SCIENTIFIC AMERICAN for Jan. 17, 1885.

(29) J. W. P. writes: I wish to boil a cigar holder to clean it out. What kind of oil should I use, etc.? A. The best thing to use is alcohol. Care must be taken to prevent this solvent from coming in contact with the outside of the meerschaum. All processes for coloring must be done by experts. These workmen keep their processes secret, and there are not more than two or three persons in the United States who are competent to do it.

(30) W. A. B. asks: 1. Is there an explosive compound known as glucodine? A. Glucodine is no longer manufactured. 2. Which possesses the greater destructive power, weight for weight—No. 1 dynamite or fulminate of mercury? A. Fulminate of mercury is the most intense, and therefore most local. 3. Why are not the higher explosives used in heavy artillery? A. Because they would destroy the guns. Progressive force is desired in artillery practice.

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