

Business and Personal.

The charge for insertion under this heading One Dollar a line for each insertion; above eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the following week's issue

"U. S." metal polish. Indiaapolis. Samples free. Best drying machines. S. E. Worrell, Hannibal, Mo.

Corliss engine wanted, 100 H P. Must be in good order and cheap. Box 116, Syracuse, N. Y.

Air compressors for every possible duty. Clayton Air Compressor Works, 26 Cortlandt Street, New York.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Light and Canal Sts., New York.

Wanted—A first class patented lock for folding paper boxes. Address Boxes, care of Scientific American.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Nickel-in-slot machines perfected and manufactured Electrical supplies, Waite Mfg. Co., Bridgeport, Conn.

Centrifugal Pumps for paper and pulp mills. Irrigating and sand pumping plants. Irvin Van Wie, Syracuse, N. Y.

65 ft. steam yacht, \$3,850; also 25 ft. launch, \$650. W. G. Nourse, assignee for Chas. P. Willard & Co., Chicago, Ill.

Carborundum—hardest abrasive known. Send for prices of wheels, powder, etc. The Carborundum Co. Monongahela, Pa.

Emerson, Smith & Co., Ltd., Beaver Falls, Pa., will send Sawyer's Hand Book on Circulars and Band Saws free to any address.

Split Pulleys at Low Prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Extensive stock of small engines and boilers (stationary and marine). Must be sold. W. G. Nourse, assignee for Chas. P. Willard & Co., Chicago, Ill.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4; Munn & Co., publishers, 361 Broadway, N. Y.

Patent Electric Vise. What is claimed, is timesaving. No turning of handle to bring jaws to the work, simply one sliding movement. Capital Mach. Tool Co., Auburn, N. Y.

Competent persons who desire agencies for a new popular book of ready sale, with handsome profit, may apply to Munn & Co., Scientific American office, 361 Broadway, New York.

Half or part territorial interest in patent appliance for the economical use of oil in stoves, heaters, bakers, small boilers, etc., at a sacrifice. Edwin Reineman, 11 Ravine St., Allegheny, Pa.

First class electrical, experimenting, engineering and draughting. New inventions developed. Careful, intelligent, and confidential work. Henry Van Hovenbergh, 145 Elm St., New York.

The Fulton Foundry and Machine Works, No. 21 Furman St., Brooklyn, N. Y. have resumed operations in all their departments, and request a renewal of custom from former patrons. E. B. Willcox.

Send for new and complete catalogue of Scientific and other books for sale by Munn & Co., 361 Broadway, New York. Free on application.

Notes & Queries. (5887) W. W. asks: 1. I want to make gas from gasoline; will you tell me how to do it? A. By passing air over it enough will be taken up to produce a species of gas. The principal trouble is the chilling of the gasoline by the evaporation. 2. I have the bellows described in "Experimental Science." Can I use it for making the gas by passing a current of air over the gasoline? A. Yes.

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. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. 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.

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(5888) H. E. R. writes: I am constructing a small storage battery to operate a two candle power lamp. The battery has four cells 1x1 1/2 x 2 1/2 inches. Size of plates 1/2 x 1 1/2 x 2. I would like to use a paste in the cells, as I want to put it on my bicycle. Can you inform me what kind of a paste to use? Will such a battery give eight volts? Will it operate the two candle power lamp, and how long charging will it require for about five hours by a dynamo giving out ten volts? A. The battery will give 8 volts, and should give amperage at the rate of 1 ampere per 2 1/2 square inches of positive plate immersed in a single cell. Thus, if you have but one positive plate in a cell, your amperage will be only about one-tenth ampere. Your lamp requires 4 1/2 to 5 1/2 volts and 1 to 1 1/2 amperes. It will need about eight hours to fully charge the battery.

(5889) T. H. P. asks: Will you please inform me of the manner in which telephones should be connected where two instruments are used on each end of a line (metallic circuit), one as transmitter and the other as receiver? A. Connect one terminal of each telephone to the line and the other to earth, or if a metallic circuit is used, connect one terminal to each line terminal. It makes no difference in what order the connections are made.

(5890) F. E. C. asks for directions for transferring photographs on to glass. A. Flow dammar varnish over the plate. Let it dry overnight. Soak the photograph in water. When the varnish is tacky, carefully place the photograph on it face down and rub

it on, excluding air bubbles. After the varnish is hard, rub off the back of the paper with the wet finger, dry and varnish.

(5891) A. H. M. asks: Can you give number of SUPPLEMENT on magic lanterns? A. For magic lanterns see SCIENTIFIC AMERICAN, No. 25, vol. 58, and No. 8, vol. 61; also our SUPPLEMENT for Megascop, No. 847; Stereopticon, No. 941.

(5892) F. W. C.—The plant sent for name is the long moss, Tillandsia usneoides.

(5893) W. J. McC. asks: 1. In making a storage battery could I make the plates of ordinary sheet lead such as plumbers use, or would it be better to cast them? Also would 1/2 inch be thick enough, or would three-sixteenths be better? A. Three-sixteenths is better. There is no need of casting them. 2. In what proportion should I mix the sulphuric acid and red lead, with which to coat the plates? A. Use 10 per cent solution of acid with red lead, enough to make a paste. 3. Why is it better to have more negative than positive plates? Also, if I have 8 negative and 7 positive plates, each 7x8 inches, in each cell, what will be the number of ampere hours of each cell, and how do you calculate them? A. You need plenty of oxidizing capacity. Allow 6 amperes per square foot of positive plate immersed. 4. Could plates one-sixteenth inch thick be used, fastening three of them together to form a single plate? A. Yes. 5. Could I charge 2 storage cells from 6 gravity cells, and about how long would it take to charge? A. You would get one-sixteenth ampere; a total time of several weeks. 6. How do you calculate the number of volts necessary to charge a given number of cells? And does the amperage of the charging current have to be taken into account? A. Allow 5-3 amperes per square foot of positive plate and 2 1/2 volts per cell. 7. How thick must the paste be spread on the plates? A. About as thick as a coat of paint. 8. Could I tell by a hydrometer whether or not a cell was charged? If so, how? A. Yes. It is charged when the acid is 1,200 sp. gr. 9. Could you recommend a book on storage batteries where I could find the information requested above? A. Solomon's "Voltaic Accumulators," \$1.50 by mail. 10. In making a dynamo or motor, if the field magnets were made up of a number of cast plates, say 1/2 inch thick, bolted together, would it yield as good or better results than if they were cast solid? A. The solid are better for the field. Cast iron is bad for the armature. 11. If the plates were used, would it be better to place paper between them or paint them before bolting together? A. Armature plates should be of soft iron, with paper interposed. If you use cast iron plates for the armature, then separate with thin paper.

(5894) W. S. asks: 1. Give the dimensions of the ship Great Eastern, that is, length, breadth, depth, and tonnage. What was her mission, did she ever make any successful voyages across the ocean? Was she propelled by steam or sails or both? What was her cost? How long in building? A. The length of the Great Eastern was 680 feet, breadth 83 to 114 feet, 58 feet depth. Tonnage 18,915 tons gross register. Cost \$3,750,000. The Great Eastern was built for coal and passenger traffic. She made many voyages, but was never a success financially. The Great Eastern was propelled both by steam and sails. The vessel was six years in building. See SUPPLEMENT, No. 890, for full account of this vessel. 2. What is the average carrying capacity in tons of our modern steamships? A. The average carrying capacity of ocean steamers is now from 5,000 to 8,000 tons. The latest express passenger steamers are from 10,500 to 12,000 tons burden. 3. I have a common white pine door, and while the workmen were putting on an asbestos roof, they let some of the black paint drip on it, and I scraped it off two or three times, and have painted it over three coats of paint, but still it comes through almost as plain as at first. What can I do to remove the trouble? A. Burn off the paint over the spot with an alcohol lamp, then scrub with turpentine and afterward paint. 4. What is the capacity of a round tank, diameter 8 feet, depth 10 feet, the same size throughout? A. 3,766 gallons. 5. What can I put in a tea kettle to prevent scale or to remove same? A. We do not know how you can prevent scale in a tea kettle. Remove scale by scraping with a knife.

(5895) J. E. M. writes: Please inform me if the English form of dialyte telescope described in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 581, 582 and 583, gives good definition, and if it may be made achromatic by the dimensions given in the article. Also what power could be applied (the greatest) to a telescope of this description of 4 inch aperture and 48 inch focus, to give fair results? A. The dialytic telescope has been made of fine definition by good opticians, but amateurs have not had the best results. The central portions of the field may be made very fine in definition, but the edges are somewhat defective by aberration, principally chromatic. It is a cheap form and easy to correct by the range of movement of the correcting lens. Powers up to 250 may be used on this form of telescope.

(5896) C. G. K. asks: 1. How and of what a dry battery is made? A. There are many kinds. In some the exciting fluid is mixed with plaster of Paris, or oxychloride of zinc, in others gelatine or a similar substance is used. They have generally carbon and zinc electrodes. 2. Will I have to use a spark coil with above battery to produce a spark sufficient to ignite gas? If so, how made? A. You need a spark coil. On a core of iron wire 8 inches long and 3/4 inch thick wind five pounds of No. 22 magnet wire. 3. How long will a dry battery last, used with a gas engine? A. It is impossible to say. It might last many weeks. 4. Why are gas engines so expensive? A. They are complicated in construction and have to be very accurately made. 5. If there are any SUPPLEMENTS treating on the above questions that thoroughly explain them, please give number. A. For dry batteries we refer you to our SUPPLEMENT, Nos. 157, 767, also the SCIENTIFIC AMERICAN, No. 20, vol. 61, No. 2, vol. 67, No. 7, vol. 68. For gas engines we refer you to our SUPPLEMENT, Nos. 715 and 716.

(5897) G. H. De L. asks: 1. What is meant by ampere hour? A. A flow of one ampere for one hour, or one-tenth ampere for ten hours, and so on. 2. How many 8 candle power lamps will an 80 ampere hour storage battery run, and how long will the battery run the lamps? A. You do not give the voltage of the

battery or lamps. The query cannot be answered. 3. In charging a storage battery, how can it be known when it is fully charged? A. By the strong evolution of gas "boiling," or by the specific gravity of the solution, or by the color of the plates.

(5898) E. W. says: Please inform a reader of your valuable paper how to make a black glossy ink (writing fluid). A. Runge's Black Writing Fluid.—Digest 1/2 pound logwood in fine chips for twelve hours in 3 pints boiling water, then simmer down gently to 1 quart, carefully avoiding dust, grease, and smoke. When cold decant the decoction and dissolve in it by agitation 20 grains yellow chromate of potash; it will then be fit for use. Or 30 parts extract of logwood are dissolved in 250 parts of water, 8 parts crystallized carbonate of soda and 30 parts glycerine (sp. gr. 1.25) are added; lastly, 1 part neutral chromate of potash and 8 parts gum arabic, reduced to a powder and dissolved in water. This ink does not attack pens, does not turn mouldy and is very black.

(5899) F. N. P. says: Please give me a receipt for artist's canvas, for oil painting. A. 1 part white lead, 2 parts whiting, a small portion of litharge and sulphate of zinc for driers; mix with equal parts of boiled linseed oil and raw linseed oil, tinted with either brown umber or lampblack, for a neutral ground. The canvas is tacked upon a stretching frame, and sized with weak glue size, to which a small portion of zinc sulphate is added. When dry it is stippled over with some driers and raw linseed oil, as thin as possible, not saturated. When very near dry the white lead, whiting, etc., is mixed up very smooth, and put upon it very thin and smooth with a large palette knife, and hatched over with a large sash tool, drawing it across one way and then at right angles until the face presents a facelike a piece of fine linen or cartridge paper when it is left to dry.

(5900) W. J. asks if the bell must be cut out with a switch when using the telephone (described in No. 5 of the SCIENTIFIC AMERICAN) with only two stations. Or could it be used without a switch for cutting out the bell? A. Your arrangement of telephone as shown in your sketch is inoperative. If you want to leave the call bells in the circuit, place them in series with the telephone. This, however, introduces a resistance which will seriously affect the working of the telephone.

(5901) W. E. V. asks: 1. I am building motor described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641, but by mistake wound the field in the opposite direction to that given. Will it be necessary for me to rewind it? A. No. Connect each field terminal to the brush opposite the one designated. 2. I wish to run a row-boat with it. In what proportion should the gear wheel be, on the motor, to the one on the propeller shaft? A. About 1 to 10. 3. Is the battery described in "Experimental Science," page 408, Fig 408, suitable for running the motor? Is it manufactured? If so, by whom? A. This battery will answer for the motor, but any primary battery will be very cumbersome for a boat. For batteries address Queen & Co., Philadelphia, Pa.

(5902) A. H. W. asks: 1. Can a Sampson battery be made as good as new? If so, how? A. By replacing the contents of the central carbon some improvement should be effected. 2. Would new zincs assist in making it as good as new? A. New zincs are not needed as long as the original ones are intact.

(5903) C. H. writes: I am making an eight light dynamo. Could you suggest an easier and still equally good way of making commutator for the same than the one described in SUPPLEMENT, No. 600? I have not the tools for cutting the segments from the copper tubeproperly. A. We advise you to adhere to the instructions. You might use a cylinder of wood with strips of brass let into its surface, but it would be a very inferior construction. 2. What is the relative resistance of iron and copper wire? I have some No. 18 iron wire. Would that do to make a resistance box in the field circuit of eight light dynamo? A. Iron wire has six times the resistance of copper wire. Your wire will answer the purpose.

(5904) F. R. C. writes: Can you furnish us a formula for solder to use on plates of storage batteries, where they are immersed in the acid, and are subject to the chemical action? A. Use autogenous soldering or lead burning. Very low grade solder would probably answer your purpose.

(5905) A. N. D. asks: 1. How can a continuous current dynamo be connected as a motor to run by the alternating current? A. It cannot be so connected. 2. How can a small motor with a laminated armature, one about an inch in diameter and three inches long, be wound for ten volts and three amperes current? A. Wind the field with No. 18 wire, using nearly 3 pounds, or enough to give 3 1/2 ohms resistance. The armature may have the same resistance, say 1,300 feet No. 20 wire. 3. How can a dynamo described in Fig. 496, in "Experimental Science," be wound to give voltage and current to run four or five motors described above, using laminated armature, using the Edison system of winding? What power would it take to run such a dynamo? What power would one of the above motors give? A. Use a laminated drum armature and wind with 500 turns of wire for each volt required. Use wire of capacity sufficient for amperage. Thus for 10 volts and 12 amperes you would need 5,000 turns No. 15 wire. For field, if in series, wind to two-thirds the resistance of the armature with the largest wire you can get. Each of the motors described will absorb 1-24 horse power, and the dynamo driving them would absorb about 10 per cent more per motor.

(5906) B. A. asks: Do foundry irons receive their proportions of graphite from the fuel in the process of reducing the ore in the blast furnace, or are there certain ores which produce iron of a fixed percentage of carbon? What element is there in white iron which prevents the carbon from separating in the uncombined state? If this element was removed, would the iron be soft? A. The hardness of pig iron is due to the increase of combined carbon; all of which is derived from the fuel in the blast furnace. White iron may contain much less total carbon, so that none separates, there being not enough to separate it.

TO INVENTORS. An experience of forty-four years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unique facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS For which Letters Patent of the United States were Granted March 13, 1894, AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing various inventions and their patent numbers, including items like Adjustable chair, Aerial locomotive, Air brake coupling, Alarm, Amalgamator, Armature for dynamo, Bale or bundle, Bath tubs, Battery, Bicycle gear, and many others.