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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 This is for our information and not for publication.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.

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Minerals sent for examination should be distinctly marked or labeled.

(7864) C. T. D. asks: 1. Would vulcanite do for the plates of a Wimshurst electrical machine? A. Vulcanite can be used for the plates of Wimshurst machine. 2. Can you tell me where to procure tinfoil? A. Tinfoil can be bought from any dealer in electrical goods, or chemical supplies.

(7865) D. E. writes: I am a boy, twelve years of age, and I find much pleasure in reading Notes and Queries. I am interested in the study of electricity, and would like to find out more about it. 1. If a circular sheet of steel were magnetized, where would the poles and the neutral part be? A. It can be magnetized with one pole in the center and the other around the circumference, or with one-half plus and the other minus, on the two sides of a diameter. 2. Why is not the battery of the telephone used to ring the call bell? A. The battery would then be in use all the time and would soon be worn out. The magneto does not work except when the armature is turned and there is no wear in use except the wear of the axle by turning. 3. Can the telephone receiver be used equally as well as a transmitter, and vice versa? A. Yes, but it is not a very good one. 4. Are arc lights arranged in series, or in multiple arc? A. On arc lighting circuits the lamps are put in series. Arc lamps on incandescent circuits are put in multiple arc. 5. Can a soft iron rod be used in a telephone receiver in place of a magnetized steel one? A. No, a permanent magnet must be used. 6. Is the diaphragm in a telephone receiver iron or steel? A. Soft iron, such as tintypes are made upon is often used. 7. Is the volt a measure of pressure of electricity, and the ampere a measure of flow? A. The ampere is the unit of current strength. The coulomb represents the amount of electricity conveyed by one ampere of current acting for one second. We should advise you to buy "Experimental Science," price \$4, by mail, in which you will find the answers to many such questions as these. A good text book of Physics will also be a good thing for you. We can recommend Avery's "School Physics."

(7866) A. P. B. asks: Which is more powerful a natural lodestone or an artificial magnet? Where can it be obtained? Does it soon lose the power of attraction? A. Lodestone has only a slight power of attraction. Even the strongest pieces will only lift small pieces of iron or steel. It is usually hung up and small tacks are held up by it, as many as it will hold. It comes to rest in the magnetic meridian and so remains. It will not lose its power of attraction. We do not know of any special book on the lodestone.

(7867) C. M. D. asks: Would you kindly answer a few questions for me? 1. How is the battery resistance found? A. Your questions suggest a college examination paper. We will either answer them, or better for you, put you in the way of finding the answers for yourself. There are several modes of measuring the internal resistance of a battery. The simplest is to put two cells in opposition, so that they will send no current, and then measure their resistance as any other resistance is measured. For the full treatment of the subject, see Carhart's "Primary Batteries," price \$1.50, by mail. 2. How is the horsepower of a stationary engine calculated? A. The horse power of a steam engine is determined either by the indicator diagram, or directly measured by a dynamometer or friction brake applied to the flywheel. This actual horse power is less than the indicated by the friction of the machine. See Goodeve, "Text Book of the Steam Engine," price \$2.50, by mail, or Kent's "Pocket Book," price \$5. 3. What is the specific resistance of a solution of copper sulphate with 8 volumes of water at 9 degrees C.? A. This question is not stated so as to admit of an answer, taking the temperature into account. It is not possible to determine the volume of a discontinuous substance like copper sulphate, as compared with a continuous one like water. The only proper mode of making solutions is a percentage one, by weight. The tables give the resistance of a copper sulphate solu-

tion, 1 centimeter cube, as follows: 5 per cent, 56 ohms.; 10 per cent, 33 ohms.; 15 per cent, 25; 20 per cent, 20 ohms. These numbers are true at 18°C. and increase with a rise of temperature about 2 per cent per degree C. The probable error is about 10 per cent. The specific resistance can be calculated for any assumed standard, for example, silver, by referring to a table of absolute specific resistances, or resistances in the C. G. S. system. Such tables may be found in Whiting's "Physical Measurements," price \$5, by mail. 4. Can a bar of soft iron be magnetized to any degree? If not, how can it be told when the iron is saturated? A. A bar of soft iron can be magnetized by winding a coil of wire around it and sending a current of electricity through the coil, as is done in every electro-magnet, till it is saturated. The practical limit for saturation is, for gray cast iron, 70,000 lines per square inch, and for soft wrought iron, 100,000 lines per square inch. 5. How are the magnetic lines of force calculated per square inch? A. The lines of force are based on the production of one line of force per square centimeter by one dyne of force on a unit pole. The calculation of the resultant force and lines of force can be found in text-books of electricity. Thompson's "Elementary Electricity and Magnetism," price \$1.40; Thompson's "Electromagnets," price \$6; Fleming's "Magnets and Electromagnets," price \$3, and Hawkins and Wallis' "Dynamo," price \$3, all by mail. All these are standard works. One to whom such questions come should have such books. 6. Please give a simple meaning of ampere turns. A. An ampere turn is produced by one ampere flowing once around a circle. This is very simple. To find the ampere turns measure the amperes of current, count the turns of wire, and multiply the two together.

(7868) A. F. O. asks: If the earth should cease to rotate the Mississippi would flow rather swiftly toward the north. Is that true? A. Certainly, it is true. The earth is not a sphere with all parts of its surface equally distant from its center; but the diameter through the equator is about 26 miles greater than that through the poles. If one should travel from the pole to the equator, he would climb a hill 13 miles high, though he would not be conscious of it. A river flowing south is at its mouth further from the center of the earth than it is at its own source. Or, put in common language, it runs up hill. The cause of this is found in the so-called "centrifugal force" of a rotating body, which causes each part to place itself as far from the center of rotation as possible, which also gives an outward (tangential) force to each part. In the case of the earth all bodies at the equator by 1 289 of their weight. This force it is which deforms the water level line from north to south, so that the southern end of a water level line is higher than its northern end.

(7869) W. & Co. ask: What is the amount of air practically necessary for the complete combustion of the following fuels per pound anthracite coal, refined kerosene, and gasoline; and what is the nature of the products of the combustion and their cubic contents at atmospheric pressure and temperature; and what, if there is any, hydraulic packing will stand a working pressure of 200,000 pounds per square inch? A. Anthracite coal requires for complete combustion from 11 to 12 pounds of air per pound of coal, or from 132 to 144 cubic feet of air at 60° Fah., varying with the quality of the coal. Kerosene requires nearly 18 pounds of air per pound of oil, or 35 cubic feet. Gasoline requires 11 pounds of air, or 143 cubic feet per pound of liquid. The products of combustion if perfect, should be carbonic acid with a variable percentage of carbonic monoxide mixed with the nitrogen of the air. At atmospheric pressure and temperature the volume will be increased by from 10 to 12 per cent for coal, but somewhat less with kerosene and gasoline. We know of no packing that will resist the hydraulic pressure stated.

(7870) W. W. asks: 1. Explain the principles of Marconi's wireless telegraphy. A. We have printed many articles on wireless telegraphy. See SUPPLEMENT, Nos. 790, 925, 1134, 1177, 1192, 1213, 1218, 12, 9 and 1246, price ten cents each. 2. Why isn't operative over 86 miles? A. Messages have been sent over more than 100 miles and no limit can be set to the distance. The height of the vertical wire alone limits the distance. When this is raised about 150 feet messages can be sent 100 miles.

NEW BOOKS, ETC.

JIM SKEEVERS' OBJECT LESSONS. On Railroadings for Railroaders. By John A. Hill. New York: The American Machinist Press. 1899. Pp. 157. Price \$1.

The page is 2 1/4 inches wide and 8 inches high, a decided novelty. As a general thing, knowledge conveyed by way of story or dialogue is either badly conveyed or is not worth the telling. The present tall and narrow volume is an exception, and the little "preachments" are admirable. The author knows his subject and can write upon it withal. It is a safe book.

HOW TO USE PORTLAND CEMENT. By L. Golinelli. Translated by Spencer B. Newberry, E.M., Ph.D. Chicago: Cement and Engineering News. 1899. 16no. Pp. 29. Price 50 cents.

DIE FLÜSSIGKEITS-SCHRAUBE. Winddruck, Luftschiffs- und Schiffschraube, Kanalschiffs Luftschraube, Niederdruck-Windrad, Graf Zepelins Luftschiff. Von Paul Pacher. Vienna: A. Amonesta. 1900. Octavo. Pp. 66. Paper. Price 50 cents.

SCHILLING'S SPANISH GRAMMAR. Translated and Edited by Frederick Zagel. New York and London: Cassell & Company. 1899. 12mo. Pp. iv, 340.

Considered purely as a grammar, it cannot be denied that this book had been prepared with scholarly understanding and painstaking care. Considered as a means of acquiring a knowledge of Spanish (and this, we take it, is the main purpose of the work) the "Grammar" is not essentially different from a horde of similar publications. It is doubtful whether a language should be

taught on the principle of compelling a pupil to memorize disconnected words, which are to be applied in translating meaningless sentences constituting "Exercises." In the more modern methods of language instruction, the pupil learns whole sentences, in which the words are idiomatically grouped to convey complete thoughts. The pupil, therefore, thinks of a word as a member of a complete sentence, and not as an isolated symbol. The work of Mr. Zagel has been conscientiously performed. The book in its English dress bears all the marks of an original work, which is, perhaps, the greatest compliment that can be paid to a translator.

DIE ENTWICKELUNG DER ASYMPTOTISCHEN TELEGRAPHIE (ELECTRISCHEN "TELEGRAPHIE OHNE DRAHT"). Von Dr. Rudolph Blochmann. Mit 17 Skizzen. Berlin: Ernst Siegfried Mittler und Sohn. 1898.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending

APRIL 17, 1900,

AND EACH BEARING THAT DATE.

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

Table listing various inventions and their patent numbers. Includes items like Abdominal bandage, Advertising device, Air, etc., compressor, Alarm, Alloys, producing copper, G. Pailis, Aluminum, obtaining permanent deposits of metal, n. E. Mies, Amalgamating apparatus, metal, J. C. Teller, Animal extractor, J. L. Beck, Animal strain, apparatus, Brunner, Automatic switch, Smith & Chapman, Automobile running gear, L. T. Gibbs, Awning, T. R. Cherry, Ax, F. T. Powell, Axle sand guard, vehicle, F. H. Potter, Axle, vehicle, M. Bruner, Badge button, A. Phelps, Bagtie, A. I. Sandbo, Baking powder, packing, W. F. Clotworthy, Balcony, portable window, W. W. Lawrence, Baling press, M. A. Heath, Band cutter and feeder, automatic, J. H. Ward, Banjo bridge, G. W. Merrill, Barbers' use, towel moistening machine for, Townsend & Shelby, Battery, See Galvanic battery, Battery zinc support, S. E. Smith, Bearing casing, roller, C. S. Lockwood, Bed table, Irvid, W. C. Huming, Bedstead fastening, A. D. Rape, Bedstead fastening, folding, E. N. Owens, Belt fastener, machine, Smith & Parsons, Bicycle alarm, A. W. Smith, Bicycle frame, J. S. Wickman, Bicycle handle, A. H. Macfield, Bicycle lock, T. Frackal, Bicycle support, J. P. Taylor, Bicycle, tandem, J. C. Anderson, Bicycles, etc., divided crank shaft for, R. M. Keating, Biner, packer, J. A. Hall, Blanket, W. H. Mertz, Board, See Ironing board, Flaiting board, Boat, H. M. Williams, Boat, insubmersible, L. Dolone, Boat, sail, J. P. Pool, Boat, steering and launching apparatus, R. White, Boiler tubes, device for removing scale from, Forsyth & Bell, Boilers, means or apparatus for cleaning tubes of tubular, H. Laverack, Boiler stake, W. J. Egan, Book check, W. T. Powers, Book holder, E. B. Pike, Bowling alley, J. N. McIntire, Box, See Dice box, Paper box, Pulley box, Vending box, Boxing machine, D. H. Saunders, Brake, See Car brake, Vehicle brake, Wagon brake, Brake, A. Kholodkovsky, Brake bar, H. R. Whomes, Brake lever, extension, Morford & Ambrose, Brake, L. E. Hale, Brake staff, A. R. Bell, Brick pressing machine, W. W. Wallace, Brooder, poultry, A. S. Whitney, Building construction, M. H. Jester, Burner, See Gas burner, Vapor burner, Button, J. A. Hill, Button printing and gaging machine, J. Schaeffer, Button facing machine, W. E. Nageborn, Cab, cycle, J. C. Anderson, Cab, motorcycle, J. C. Anderson, Cable joint, Brown & McFeaters, Camera, panoramic, M. T. Stone, Can, Butter packing can, Refrigerating milk can, Canoe, D. P. Tuck, Canteen, C. S. Parker, Car brake and fender, J. D. Long, Car, cinder, J. M. Hartman, Car, cinder, W. A. Palmer, Car coupling, J. D. Storie, Car door, freight, W. A. Runyan, Car draught appliance, railway, A. Lipschutz, Car, gondola or other, C. T. Schoen, Car holder, L. G. Repass, Car, hopper bottom, C. T. Schoen, Car, hopper bottom, Schoen & Hansen, Car, metallic, Schoen & Hansen, Car step, N. Gray, Car ventilator, railway, G. H. Moore, Car wheel, T. A. Bainbridge, Cars, electric lighting apparatus for railway, W. F. Richards, Cars, flow for conduit electric, J. B. Gottaberger, Card case, J. M. Mott, Carding engines, grinding mechanism for revolving flats of, J. Fossel, Carriage spring, E. D. O'Hallan, Carriage, etc., mounting for, J. D. Swindell, Case, See Card case, Caster, ball, J. S. Koch, Change machine, C. H. Row, Check, etc., F. Heinz, Cigar cutter and advertising device, combined, M. J. Rudert, Cizart tip protector and cutter, H. Blumenthal, Cigarettes, cigars, vests, cards, or the like, holder for, T. Sayers, Clamp, See Scaffold clamp, Clocks, automatic beat adjust attachment for, M. J. Rudert, Clothes line holder, J. Temple, Clothes line support, R. C. Tucker, Clothes reel, R. Simpson, Coal, etc., product for improving, F. P. Vallet-Koetz, Coin collector, F. A. Langwith, Coke loader, F. McClain, Color board, water, L. H. Collins, Comb foundation, artificial, H. Vogeler, Concrete construction, E. L. Ransome, Conduit holder, D. Strawbridge, Conveyor for coal, ore, etc., W. F. Hunt, Copy holder, J. F. McCloskey, Coring and stemming implement, fruit, D. E. Sharp, Corkscrew, E. Walker, Cotton condenser and feeder, R. R. Pace, Cotton picker, E. D. O'Hallan, Cotton picker, A. B. Floyd, Cotton press, E. M. Werkeiser, Coupling, See Car coupling, Hose coupling, Cows, ventilated wind wheel for, E. N. Higley, Crank pins, etc., machine for turning off, B. L. Glover, Cream separator, S. M. Rainold, Cultivator, W. G. Atwood, Cultivator, L. Toillon, Curtain and shade fixture, J. D. Wintz, Curtain and shade support, window, R. F. Menzel, Cutter, See Band cutter, Twine cutter, Weed cutter,

Table listing various inventions and their patent numbers. Includes items like Dam, movable, W. W. Venable, Damp regulator, automatic, J. T. Luton, Dental combination tool, H. L. Cruttenden, Dental dam, holders, S. M. Myers, Dental handpiece, J. D. Wilkens, Desk ink well holder, adjustable school, F. D. Jones, Dice box, E. H. Turner, Digger, See Potato digger, Dish-making machine, T. Crebbin, Display table and case, combined, E. C. Boeckh, Ditching machine, M. G. Bunnell, Door controller, M. A. DeLew, Door spring, F. M. Bute, Door stay roller, J. D. Swackick, Door, transformable screen, A. M. Stoyer, Draught equalizer, W. E. Billington, Draught equalizer, W. P. Glass, Drawer pull, plate, W. J. & W. P. Dolson, Drawing board apparatus, H. A. Leighton, Drawing implement, A. L. Patterson, Dropper, See Spoon and fertilizer dropper, Drying and pulverizing apparatus, J. J. Seldner, Dust guard, S. A. Cronie, Dust guard, G. F. Price, Dye, black sulfur, Kirchhoff & Haussmann, Dye, green blue, Herzberg & Scharfenberg, Earth crusher, J. S. McCracken, Electric current distributing circuits, switch apparatus for, T. Alleman, Electric furnace, M. Ruthenburg, Electric machines, means for balancing multipolar, S. H. Short, Electric machines, regulating, W. H. Cooley, Electric motor controller, H. Cochrane, Electric power and lighting currents, automatic maximal switch for, T. Alleman, Electric switch, J. I. Gunther, Electrical transmission system, F. Bedell, Electrode storage battery, R. Macrae, Electrotherapeutic device, R. W. Topham, Elevator, See Hay elevator, Elevator carrier, A. J. Wheeldon, End gate rod, wagon, G. C. Conser, Engine, See Explosion engine, Fluid pressure engine, Gas engine, Rotary engine, Steam engine, Evaporating pan, Bouton & Bediant, Explosion engine, C. A. Scott, Explosive compound, high, Penniman & Schrader, Fabric renovating compound, H. Stern, Facet, E. O. Daniels, Feather paring machine, J. Loch, Feeding device for boilers, water, C. E. Squires, Feeding device, poultry, G. W. Brown, Fence machine, wire, J. B. Eagleston, Fence making machine, A. E. Roberts, Fertilizer mixing apparatus, E. U. Holton, Filter, J. D. Capron, Filter, self-cleaning, K. C. Reed, Filtering apparatus, H. Desurieux, Filtering apparatus, W. W. Wilson, Fire alarms, electric thermostat for, Hayes & Tompkins, Fire escape, J. O. Heum, Fire escape, A. J. King, Fire extinguishing apparatus, E. Piepenbrink, Flooring, A. L. Wymer, Flour manufacturing apparatus, Leatham & Simon, Flour mill, O. M. Morse, Fluid pressure engine, J. Denial, Furnace, See Electric furnace, Metallurgical furnace, Muffle furnace, Furnace charging apparatus, P. C. Patterson, Furnace, stove, or fireplace, C. H. Bennett, Furniture, etc., spring seat or support for, W. Vogler, Gage, See Micrometer gage, Optical gage, Railway tie gage, Galvanic battery, Blumenberg & Overbury, Game, J. W. Smith, Game, apparatus, D. Dorff, Game apparatus, F. J. Schneider, Gas apparatus, acetylene, P. Dumont, Gas burner, incandescent, L. T. Alton, Gas check for incandescent burners, L. T. Alton, Gas engine, W. R. Dow, Gas generating apparatus, A. G. Swain, Gas generator, A. G. Guillaume, Gas generator, acetylene, Beggs & Fielding, Gas generator, acetylene, W. R. & H. H. Fox, Gas generator, acetylene, A. Javal, Gas generator, acetylene, S. Jewell, Gas lighting device, electric, Schunemann & Rieler, Gas meter, prepayment attachment, C. M. Burton, Gas, producing ethylene, J. A. Deuther, Gas purifying apparatus, N. A. Guillaume, Gate, See Swing gate, Gear mechanism, reversing, E. Brucksch, Gearing, worm, E. G. Hoffmann, Generator, See Gas generator, Steam generator, Glove fastener, J. D. Stirckler, Grain distributor, T. F. Hall, Grain drum for washing, soaking, and aerating, C. Schwager, Graining, C. Henricus, Grinding, C. G. Newman, Grinder, feed, A. G. Newman, Grinding and sieving pulverizable substances, apparatus for, R. J. Gasslein, Grinding machine, J. B. Eberling, Grinding operation, mechanism, N. Nielsen, Hair fastener, R. F. Gibson, Hammer, trip, C. Rothenberger, Handcuff, F. B. Widmayer, Handle, See Tool handle, Harvester, pea, Wortman & Richmond, Hay elevator, G. Barley, Hay rake and stalk cutter, convertible, W. G. Zickefoose, Headlight, C. L. Wakefield, Heater, See Water heater, Hinge, D. Roche, Hinge, S. P. Stevenson, Hog catcher, S. Grasser, Hook, See Snap hook, Hook, N. F. Oliveros, Horseshoe, F. A. Poppard, Horseshoe hoof plate, J. M. Myers, Horse and diaper supporter, combined, K. Stratton, Hose and garment supporter, W. H. Cornell, Hose coupling, C. H. Blantz, Husking pin, J. F. Reineke, Indicator, See Speed indicator, Induction coil, R. Varley, Indicator, See Indicator, H. Strick, Insole for shoes, electric, H. O. Can Dee, Iron holder, J. Winteringer, Ironing board, D. McDonough, Ironing table, J. B. Beacham, Jack, See Screw jack, Joint, See Clutch joint, Journal box, P. Brown, Journal lubricating box, J. G. Smith, Kinetoscope, E. Schneider, Kinetoscope shutter, E. Schneider, Knitting machine, M. Saldin, Knitting machine, Scott & Swirlinghurst, Lace fastener and tongue support, shoe, A. M. Girtanner, Lamp, Eldridge & Smith, Lamp, electric arc, J. T. Beswick, Lamp, electric arc, C. A. Phueger, Lath binding machine, H. Joncas et al., Lath tail stock, J. G. Blount, Leaching vats, means for charging, C. W. Merrill, Life preserving float, M. Peschmann, Lock, See Bicycle lock, Lock case, H. P. Light, Locomotive buffer beam, J. F. Dunn, Log turner cushion device, J. N. Quinn, Loom for weaving narrow fabrics, D. J. Macdonald, Loom let off mechanism, Draper & Roper, Looms, transferer for filling changing, Draper & Northrop, Lubricants, making, J. M. Jewett, Lumber, D. Gilmour, Lumber, manufacture of, D. Gilmour, Metal articles, joint for, Brown & McFeaters, Metal articles, tool for uniting, Brown & McFeaters, Metal articles, uniting, Brown & McFeaters, Metal working apparatus, electric, G. D. Burton, Metallurgical furnace, E. V. Lanyon, Metallurgical furnace, J. Lanyon, Metallurgical furnace, W. J. Lanyon, Micrometer gage, L. S. Sturrett, Mill, See Flour mill, Mold sanding machine, C. H. Horton, Molding machine, H. C. Herman, Mordanting, E. Holken, Motor, See Wave motor, Motor, M. E. Xander, Mower lawn, G. Norman, Muffle furnace, continuous, W. Dicker, Multicycle, J. C. Anderson, Musical instrument, R. W. Pain,

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