RECENTLY PATENTED INVENTIONS.

Electrical Devices.

ELECTRICAL CABLEWAY-CONVEYER.—C. Messick, Jr., Hackensack, N. J. The inventor's purpose is to provide a telpher traveling the required rate of speed, about six hundred feet per minute. The device is provided with grooved wheels having a good bearing-surface on the cable being driven by an electric motor of normal speed and to provide a pivot near as possible to the level of the track which will allow the telpher to accommodate itself to vertical variation, especially in a cable-track, due to its only having supports at intervals, without causing the load to sway longitudinally as the telpher ascends in approaching and descends in receding from a support.

Of Interest to Farmers.

CULTIVATOR.—J. E. Spraggins, Bear-creek, Ala. The object of the invention is to produce a cultivator of simple construction the hoes or blades whereof may be adjusted in a simple manner. The improvement is especially applicable in a construction of cultivator involving the use of three hoes. and a further object is to provide an arrangement for attaching a centrally-disposed hoe.

TONGUE-SUPPORT.— . W. Hartwig, Taylor Station, Wis. This support is for tongues of mowers, self-binding harvesters, threshing-machines, and other farm machinery; and the object is to provide a support readily applied, and adjustable to hold the tongue in a proper position relatively to animals drawing the machine, so as to prevent undue strain on their necks, and thereby avoid sores, fatigue, etc.

COUPLING.—J. W. Buller, Jansen, Neb. In this patent the invention relates particularly to improvements in couplings for attaching a traction-engine to a device to be drawn—such as a threshing-machine, separator, tender, wagon, or the like—the object being to provide a coupling that will automatically move to and lock in closed position.

Of General Interest.

THEATER-CHAIR.—E. H. Wierschingand C. J. Bergstrom, Binghamton, N. Y.. The chairs are normally held in rows as usual and the seats are normally held close to the backs of the chairs by tension devices. The chairs are constructed so that at option of an occupant a latch may be operated, whereupon a spring in the pedestal will act to give the body a quarter-turn, bringing it at right angles to normal position, thus opening one row into the next, and when all in the rows of a section are thus operated series of aisles are obtained, enabling persons to find easier exit from a theater or hall than when ordinary chairs are used.

SIPHON-FILLING APPARATUS.—L. P. Setzler, Kansas City, Mo. This is a device for charging siphon bottles with carbonated liquids, and it comprises a peculiar valvular mechanism which upon being engaged by the nozzle of the siphon opens the supply of liquid allowing it to flow through the siphon in through the bottle, and upon relaxing possession of the nozzle on the valvular mechanism the liquid supply is automatically closed and the vent previously closed by the pressure of the siphon nozzle is thereupon opened to allow the escape from the nozzle of the "sniff" or waste liquid lying in the nozzle outward from the siphon valve.

COMBINED TRUNK AND DESK.—T. McCabe, Jr., Homestead, Pa. The object in this instance is to provide a device in which a trunk will serve the usual purposes and having an attachment that may be used as a writing-desk, a drawing-board, a reading-table, or the like, the attachment being so arranged as to fold into the trunk when not in use, thus resulting in economy of space.

FISH-HOOK.—W. E. Koch, Whitehall, N. Y. The hook is particularly adapted for using dead minnows as bait, although live bait may be used with it. The object of the invention is to provide in connection with the hook a simple means for keeping the bait in proper position to simulate a live minnow—that is, with the back up when drawn through the water.

DENTAL DILATING-FORCEPS, OR APPLIANCE FOR DENTAL OR SURGICAL USE.—G. H. Parsons, East St. Louis, Ill. Dr. Parsons' invention is an appliance or implement adapted for use in distending the mouth to facilitate inspection and the performance of dental and surgical operations. It is particularly useful in taking impressions of the jaws, and especially of aged persons; in setting gold crowns; and for surgical operations on the jaw and throat. It aids every operation in the oral cavity, such as disease of the antrum or extraction of wisdom-teeth under chloroform, also in removing tonsils or filling teeth.

BANK-CHECK, RECORD-BOOK, AND BINDER.—M. A. Howe, Tacoma, Wash. The objects of this improvement are, to provide a more economical, systematic, and convenient form of bank-check and record-book than the stub-book form now commonly used; to provide a bank-check-record book and a bank-check book separated from each other, but within one binder, and to provide a detachable binder for a bank-check-record book and check-book together within the one binder.

SPOOL ATTACHMENT.—Fanny G. Hendryx, Springfield, Ohio. In this patent the invention has reference to attachments for spools, having for its principal objects the prevention of waste of thread and the furnishing of means for retaining the spool against rolling upon surfaces upon which it may be placed. If the spool is loose, as in a work-basket, the thread cannot be accidentally unwound.

FLUSHING DEVICE.—A. C. Davidson, Chicago, Ill. This improvement relates to flushing devices, and more especially to devices controlled by movable foot-plates operatively connected with valves for controlling the flow of water or other flushing liquid. One object is to provide a device of this type which will be nearly automatic in action, being set in operation by the pressure of the feet of a person standing near the basin or hopper to be flushed, and which will act automatically to cut off the flow of water when pressure upon the foot-plate is removed.

NAVAL ARCHITECTURE—G. F. R. Blochmann, Kiel, Germany. No armor has been discovered which will effectually protect marine vessels against the disastrous effects of submarine explosions. Such protection becomes more necessary as the weapons for under-water attack, such as fixed and movable torpedoes and submarine boats, become more highly developed and effective for offensive work. The invention consists in giving to the ship several (at least two) complete walls or bottoms under water, of which, however, not the outer skin, but perhaps one of the inner skins, may be armor-clad.

APPARATUS FOR MAKING SHEET-GLASS.—J. P. Taylor, Cicero, Ind. In carrying out this invention Mr. Taylor has particularly in view an apparatus for forming the glass sheet so that both sides of the latter will be polished to the same degree. A further object is to provide means whereby the molten glass may be easily and readily conveyed to and deposited on or in a form of table or carriage arranged adjacent to the receptacle carrying the molten glass. Further an object is to force the molten glass from the receptacle through the medium of a charge of air or steam or any gas, and further in view means for forming a cushion of air or steam in the receptacle or table for the sheet, such molten sheet being supported in its formation by the cushion of air, steam, or any suitable gas or vapor.

VIOLIN WRIST-BRACE.—J. W. Smith, Wellington, Kan. This invention has reference to a brace for the wrist when playing the violin; and the objects of the improvement are, first, to provide a medium to assist the pupil in obtaining the correct position of the wrist while playing the violin, and, second, to afford facilities for executing the shake.

CLIP FOR FASTENING SHOE-LACES.—R. J. H. Hughes, Duquesne, Pa. The general object of the invention is to provide an inexpensive clip which may be quickly applied to shoe-laces, which will hold the laces with perfect security, so doing away with the necessity of tying them in a knot in the ordinary manner, and which may be easily loosened to permit the unlacing of the shoes when desired. The invention may be used for fastening other cords.

MEASURING INSTRUMENT. — L. M. Hodge, San Jose, Cal. The invention relates to measuring instruments such as shown and described in a prior Letters Patent of the United States granted to Mr. Hodge. The object is to provide an instrument upon which is conveniently arranged the lengths, bevels, and cuts of rafters, hoppers, etc., and arms upon which any two of said bevels can be taken at the same time, together with their degree of pitch.

CASKET-CATCH.—L. Greensides, Constantine, Mich. This catch is attached to the cover of a casket and co-operates with a bar, attached to the main part of the casket. The bar is provided with an opening for reception of a tongue and with a projection to enter the opening. When the cover is placed upon the main body of the frame and the tongue and the projection thrust through the openings, the casket parts will be locked together, as the projection prevents motion in one direction, while the tongue prevents upward and forward motion. Means are provided by pressing a projection to readily remove the cover.

GARMENT-FASTENING.—M. W. Ferris, New York, N. Y. One purpose of the invention is to provide a supporting device with means for attachment to a tab, strip, tape, or the like and with end bearings or hangers for the free passage of a safety-pin attachment of any desired type, which bearings will afford a uniform and firm support for the pins effectually preventing displacement of the pin or any injurious or inconvenient twisting action. This device is adapted for use especially in connection with hose-supporters or like articles.

INDICATOR.—F. J. B. Cordeiro, New York, N. Y. This invention relates to devices for indicating the time at different points upon the earth's surface, and has for its principal object the provision of such a device from which the desired information may be readily obtained without special computation. The indicator is set instantly and the times read therefrom without difficulty. It is of great utility for educational purposes to clearly illustrate relation of time and longitude and to business houses to regulate such transactions as sending of cablegrams.

CLOTHES-LINE HOLDER AND TIGHTENER.—C. W. Ott, Pittsburg, Kan. The purpose of this improvement is to provide a form of holder and tightener that will serve as a convenient reel that may be carried about in the hand and also that may be removably attached to a bracket secured to a post or the side of a building and which, further, has a means for retaining the line taut when set up on the poles and drawn tight.

Household Utilities.

TABLE.—W. H. Gibbes, Columbia, S. C. The invention relates to improvements in tables or desks, the object being to provide a table or desk with a longitudinally-movable top, making it particularly useful for bookkeepers, draftsmen, or others, inasmuch as the top, with a large book or drawing-paper thereon, may be moved along to bring the work into proper position for the person sitting at the table, thus obviating the necessity of shifting his seat.

ANIMAL-TRAP.—W. . Harden, Quitman, Ga. The trap is adapted especially for catching rats and mice. The object of the invention is to produce a trap which is sprung or shut automatically by the animal on entering. It comprises a removable cage or auxiliary body which the animal enters after the trap is shut. Automatic arrangement is made for resetting trap by the weight of the animal after it has passed into the upper body or cage.

TRAVELING ROCKING-HORSE.—A. Hettel, Rochester, N. Y. In this patent the invention has reference to improvements in traveling rocking-horses, the object being to provide an amusement device of this character of novel and simple construction, so arranged as to move forward, turn laterally, or to rock without forward or lateral movement.

Machines and Mechanical Devices.

TYPE-WRITING MACHINE.—J. D. White, 50 Clanricarde Gardens, London, England. Mr. White's objects are to provide a machine to afford three times the range of characters afforded by his machine of prior patent. He accomplishes this by modified form of the machine, the arrangement being that three characters follow successively through each longitudinal row on the type-cylinder and individually brought into action by giving the cylinder a regulated sliding movement along the axle, with which it revolves, and by providing devices by which the cylinder may be slid from one of three positions to the next after each printing or spacing stroke and may be so slid by a further independent movement of printing or spacing.

LUBRICATING DEVICE FOR JOURNALS.—J. J. Moss, Chicago, Ill. The object here is to provide a device more especially designed for lubricating the journals of car-axles and like devices and arranged to insure a continuous supply of the lubricant to the journal or other part to be lubricated, to prevent waste of the lubricant by leakage from the oil-retaining vessel, to render the journal completely dust-proof, and reduce to a minimum the jar incident to the running of the journal in the box.

DRIER.—T. Andrews and S. J. Loewenthal, Rockaway, N. J. This drier is particularly designed for drying fabrics of that class having a series of rotary cylinders through which the heating medium, such as steam, is intended to pass. In machines of this character the cylinders are rotated through gear connections one with another, and owing to the friction, very great power and large amount of motive agent is required to operate the machine. Further, these cylinders must be filled with steam, which results in waste by using more steam than is necessary for drying purposes. The object of the inventors is to avoid the above objections.

MACHINE FOR SWAGING HEADS ON NAIL-BLANKS.—E. Perkins, St. John, New Brunswick, Canada. One of the principal objects of this invention is the provision of simplified and effective and reliable devices for upsetting or swaging the heads on horseshoe-blanks, which are fed to such devices in the form of a bar or wire previously rolled to constitute a continuous coil or length of blanks connected together head to point successively.

CHEESE-CUTTER.—B. Blood, Coeur d'Alene, Idaho. In operation if the operating-lever be in position and it is desired to cut from a cheese weighing, say, thirty-two pounds a slice of one pound a cut may be made through the cheese, the knife raised, and the lever be then moved to the right, when the cheese will have been moved from the initial cut an extent necessary to provide a slice of one pound. and the slices may be cut successively of any weight by moving the cheese-plate a distance corresponding to the weight of slice desired.

CIRCULAR-FOLDING MACHINE.—G. A. Wenz and J. McKee, Jr., Bridgeburg, Ontario, Canada. In carrying out the present improvement the inventors provide a machine which will fold letters or circulars the requisite size to enable the same to be inserted in envelops, such folding or creasing operation being performed with positiveness, ease, and facility. The machine is so constructed that the unfolded circulars will at all times when in the receptacle be held in contact with feeding-rolls on top of machine, thereby insuring always an even regular feed of the letters or circulars when the machine is in operation.

MACHINE FOR PUNCHING OR SHEARING METAL.—R. Norrie, Dalla Dockyard, Rangoon, British Burmah, India. In this patent the invention relates to improvements in machines for cutting metal, and especially to those in which a cutting-blade is arranged to cut down between two lower stationary blades. It further relates to improvements in the construction of the upper cutting-blades and lower stationary cutting-blades to enable the machine to be used to shear out a strip of metal or punch out pieces, as desired.

SUPPORT FOR THROAT-PLATES OF SEWING-MACHINES.—F. L. Whitney, Lincoln, Neb. Throat or needle plates of sewing-machines are made quite thin to accommodate working parts located immediately beneath them. They are hence considerably elastic and correspondingly fail to afford firm or rigid support for the work being sewed, so that the needle encounters more friction in piercing the work. In case the needle is broken or bent in use it will strike the plate, which is liable to be broken, as well as the shuttle. This is likely to happen, especially in machines used for manufacturing purposes. Mr. Whitney has devised a support for the plate which renders it perfectly rigid, and avoids result above indicated.

PILE-WIRE MOTION FOR LOOMS.—R. Beattie, Littlefalls, and A. McKendrick, Paterson, N. J. This pile-wire motion is especially adapted for use in wide carpet-looms. The principal object is to do away with the large and cumbrous grooved wheel and the equivalents thereof which are now used on all looms of this character and at the same time to provide a less complicated motion as a substitute for the cam-motion now employed which will require less power and allow the loom to run at a greater speed and with fewer stoppages, thus increasing the production.

MIXING-MACHINE.—G. M. Andersson and A. G. Ahlstrom, Hydepark, Mass. The invention relates to machines employed for mixing liquids or plastic materials so as to render the mass homogeneous and thoroughly blend together the compound elements, and its object is to provide details of construction for a device, which adapt it for convenient use, render it perfect in operation, and enable the quick detachment of its several parts to facilitate thorough cleansing of the interior of the machine. One type is built for mixing cake, which needs hard beating, and it is claimed that it will do its work in one-tenth of the time required by hand.

CUTTING-MACHINE FOR PLASTIC MATERIALS.—E. Logan, Philadelphia, Pa. Mr. Logan's invention relates to machines for cutting disks or sections from a sheet of plastic material, and is particularly intended for cutting biscuit, cakes, or crackers from a sheet of dough. The object is to provide a machine which will cut a number of disks simultaneously and deposit them in a suitable receptacle in one operation. The machine has a minimum number of operating parts compact in structure and attachable to any table or other suitable support.

COTTON-PICKER.—W. W. Hoskins, Velasco, Texas. An object, among others, in this case is to provide a machine in which the picking devices slant from their ground ends forwardly instead of rearwardly or vertically, whereby they come in contact with the top of the plant first and pick down, thus having an upward and backward pull on the plant in operation, and also to construct the picking devices of a picking-roller and an opposing feed-roller correspondingly inclined, and also the provision of other means.

INSTRUMENT FOR PLOTTING GEAR-TEETH.—C. F. Moon, Greensboro, N. C. The improvement relates to instruments for plotting gear-teeth, whether external or internal, and to marking off circles into subdivisions of uniform size. The instrument admits of general use, but is of peculiar value to architects, engineers, draftsmen, pattern-makers, and all other persons who may desire to divide circles or portions thereof into portions separated by radially-disposed lines.

APPARATUS FOR USE IN POLISHING CUT GLASS.—J. J. McCue, Jr., New York, N. Y. This apparatus is for use in polishing cut glass by means of dipping the article in acid. It has been found that polishing cut glass by mechanical methods is much less efficient than by means of an acid-bath. While the invention is especially designed for carrying out this process, it is not strictly limited thereto and is capable of other uses.

Pertaining to Vehicles.

GUIDE-LOOP FOR CHECKREINS.—E. Van Dyck, Adams, Mass. This improvement refers to guiding-supports for overdraw-checkreins. The object is to provide details of construction for a device which afford means to suitably support the rein from the crown-piece of harness and enable the introduction of the two members of an overdraw-checkrein within duplicate guide-loops without disconnecting said reins from the driving-bit or requiring them to be bisected and joined where cut with buckles to permit their loose insertion within the loops.

FOOT-PROPELLED VEHICLE. — W. J. SHIELDS, Bedford, Ala. The principal object of this inventor is to provide a vehicle which will enable occupants to propel it easily, while affording a far greater degree of comfort than usually attained in vehicles of this class. Further, one which may be easily controlled and adapted to be propelled by one or two persons, the seats being independently adjustable to facilitate simultaneous effort of two persons of different sizes in the propulsion of the vehicle.

TIRE-INFLATING PUMP.—S. E. SPENCER, Springville, N. Y. In this patent the invention has reference to improvements in pump mechanism for inflating the tires of motor-vehicles, an object being the provision of a pump mechanism that may be detachably connected to the driving-shaft of the motor and operated therefrom to quickly inflate the tires.

FELLY-JOINT.—J. B. HIGGINBOTHAM, Aberdeen, S. D. In this instance the invention relates to an improved device for connecting the sections of a wheel-felly so that the necessary tension may be exerted on said sections to draw them forcibly together and produce a rigid self-sustaining felly, which with the addition of the tire encircling it forms a most secure and durable structure.

SHIFTING-RAIL FASTENER FOR VEHICLE SEATS.—F. H. DELKER, Henderson, Ky. This invention consists in certain improvements upon the fastener for which Letters Patent of the United States were formerly granted to Mr. Delker. The present invention has for its principal object the provision of a simpler fastener than that disclosed in the former patent and one which may be more cheaply constructed. A further object is to provide a fastener which cannot be so easily accidentally disengaged and which will operate satisfactorily without an aperture in the spring-leaf member to weaken it.

Prime Movers and Their Accessories.

TURBINE.—C. N. SCHOTTMULLER, Taylor's Falls, Minn. In this patent the invention has reference to improvements in steam-turbines, and an object is the provision of a motor of this type that may be operated in either direction with an economical use of steam. Two or more turbines may be connected together, with condensers attached and operated as compound condensing-engines.

SHAFT LIQUID-SEAL PACKING.—C. L. COOK, Louisville, Ky. In this case the invention refers to improvements in packing for shafting, and particularly the shafting of turbine-motors and propeller shafts of steamships, an object being to provide a novel form of packing in which a liquid is employed as a packing or sealing medium, rendering the packing impervious to atmospheric pressure.

ROTARY ENGINE.—I. SEVERANCE, Minneapolis, Minn. The object of this inventor is to provide an engine arranged to allow convenient reversing to insure a positive working of the valves in unison with the rotary motion of the piston and to provide a continuous action of the motive agent under initial pressure on the piston-heads without the usual cut-off for each revolution of the piston.

Railways and Their Accessories.

TIE-PLATE.—B. S. WASSON, Chicago, Ill. In this patent the object is to provide a plate so constructed that when secured on a tie it will not buckle or work loose, also providing protection for the tie from cutting or wear from the rail-base and furnishing a means for rigidly securing the plate to a tie without danger of splitting the tie.

COAL, ORE, OR BALLAST CAR.—G. F. SIMONTON, Vanwert, Ohio. The invention relates to metallic freight-cars, the same being especially adapted for transportation of dumpable material—such as coal, ore, and ballast—although it may be employed for other classes of dumpable substances. In some features the present car is similar to the metallic cars disclosed by Mr. Simonton's prior applications for Letters Patent. One improvement of the present invention is a metallic underframing usable in connection with any style of car. Another, is the construction of the hopper-doors by which material may be discharged in the middle of the track, this being especially desirable when unloading ballast.

Designs.

DESIGN FOR A TOILET-POWDER RECEPTACLE.—S. M. COLGATE, Orange, N. J. The design of this ornamental receptacle for containing toilet-powder is very neat in appearance. It shows a receptacle very practical in shape for easy and convenient handling in use, and in fair proportion to its height the rounded article shows a width about double the thickness.

DESIGN FOR OIL CLOTH.—N. KLAU, New York, N. Y. The design of this ornamental oil-cloth is wholly pictorial, and comprises individual or cluster pictures of children in distinctly separated scenes of games, sports, and diversions of juvenile life of that kind enjoyed almost entirely out of doors.

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Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

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Special Machinery to order, manufacturing, metal stampings, etc., Brickner Machine Co., Tiffin, Ohio.

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Thermo-piles for electrolytic assays and direct-current work. $3 each. Walsh's Sons & Co., Newark, N. J.

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We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc. Metal Novelty Works, 43 Canal Street, Chicago.

Inquiry No. 6299.—For manufacturers of labels.

Patented inventions of brass, bronze, composition or aluminum construction placed on market. Write to American Brass Foundry Co., Hyde Park, Mass.

Inquiry No. 6300.—For manufacturers of and dealers in automobile parts.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Machine Company. Foot of East 138th Street, New York.

Inquiry No. 6301.—For manufacturers of sewing needles.

Literature on the manufacture of vulcanized fiber and tubing. Would like to correspond with a party familiar with the subject. "H" Box No. 128. Fall River, Mass.

Inquiry No. 6302.—For manufacturers of castings for gas engine cylinders.

Patents on a machine being manufactured and sold on royalty which will be used by every grocer and provision man are for sale. Owner in business and need of money. Write for particulars. Address H. W. R., Box 74, Sterling, Mass.

Inquiry No. 6303.—For manufacturers of corrugated rollers, such as used for corrugating wrapping paper boards.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 15 South Canal Street, Chicago.

Inquiry No. 6304.—For makers of rice-milling machinery.

FOR SALE.—Patent No. 723,253, telegraph key, simple, durable and inexpensive. Would arrange with manufacturer on royalty. Address William E. Duncan, Train Dispatcher, G. S. & F. Ry., Macon, Ga.

Inquiry No. 6305.—For makers of bottles for soda water, on the same style as the English-made "Codd's ball-stoppered bottles."

The SCIENTIFIC AMERICAN SUPPLEMENT is publishing a practical series of illustrated articles on experimental electro-chemistry by N. Monroe Hopkins.

Inquiry No. 6306.—For Foster's gluten tester, and for a tintometer to be used in testing wheat and flour.

Robert W. Hunt & Co. bureau of consultation, chemical and physical tests and inspection. The Rookery, Chicago.

Inquiry No. 6307.—For manufacturers of razor handles, also for dealers in English steel.

Drawings, Estimates, Tools, Dies, Sheet, Wire and Rod Specialties (all metals). Stamping, Spinning, Turning and Screw Work, Tin Plating, Nickel Plating, Bronzing, etc. The W. S. Burn Mfg. Co., New Haven, Conn.

Inquiry No. 6308.—For manufacturers of decorative glass spangles.

Inquiry No. 6309.—For manufacturers of or dealers in voting machines similar to those used in New York State.

Inquiry No. 6310.—For machines for making gas from gasoline.

Inquiry No. 6311.—For a mill for powdering licorice root or any similar hard root.

Inquiry No. 6312.—For toy steam engines and steam locomotives for experimental purposes, not to be over ½ h. p.

Inquiry No. 6313.—For makers of twisted metal concrete and expanded metal for fireproofing and concrete construction.

Inquiry No. 6314.—For a metal out of which to make a pump for pumping a weak solution of chlorine in water, without injuring the pump.

Inquiry No. 6315.—For makers of rug machinery for manufacturing old carpets into rugs; also for broom-making machinery.

Inquiry No. 6316.—For a glass disk 10 or 12 inches in diameter from which to grind a mirror for a reflecting telescope.

Inquiry No. 6317.—For the address of the manufacturers of the "Eclipse" smoothing iron.

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.

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Minerals sent for examination should be distinctly marked or labeled.

(9493) E. L. S. asks: 1. How can you tell from the appearance of copper wire when it is burned out? A. You can tell from the appearance of copper wire that it has burned out. If it has burned out it will not be there, any more than a stick of wood or a coal will still be in existence after it has burned out. A "burn-out" is a melting and burning of the wire because of heat. 2. What is meant by the sidereal system? A. The sidereal system is the portion of celestial space occupied by the stars, in distinction to the space occupied by the sun and the planets, the solar system. 3. Can you give me some of the theories why the planet Mars is red? A. The planet Mars is red because its surface is composed of red materials, or because its atmosphere absorbs the other light waves. 4. Why does green wall paper contain arsenic? A. Green wall paper contains arsenic when arsenic is used as a color to print the paper. Paris green is a very beautiful green, and hence was frequently used for printing wall papers. If Paris green is not used, there will not be arsenic in the color. 5. What causes spontaneous combustion? A. A rapid absorption of oxygen, sufficiently rapid to injure the material, is spontaneous combustion. It occurs with paint oils, principally when cotton rags or waste are saturated with a drying oil. 6. Will you please tell me the names of the lightest and heaviest metals known, and their weights? A. Potassium is the lightest metal, with a density of 0.86 to 0.88, and iridium is the heaviest metal, with a density of 21.78 to 22.42. 7. Please explain the working of a steam turbine? A. A steam turbine is driven by jets of steam striking directly against the blades of the rotating parts.

(9494) W. O. S. writes: I am tempted to use your valuable paper, to find out if it is possible to mold articles out of cement, and what substance or composition would have to be used to get as clean a cast as articles molded out of plaster of Paris. A. It is possible and practical to mold hydraulic cement in the same manner as plaster of Paris. The cement should be finely ground and quickly mixed with water, and thick, so as not to run freely, pressed into an oiled mold the same as with plaster. It requires longer time to set than plaster.

(9495) A. K. S. writes: In the picture of a Panhard going 80 miles an hour, printed on front page of your issue of October 22, I noticed the wheels appear very elliptical and the housing is diamond-shaped. Will you be kind enough to explain how this peculiarity occurred? Was it due to the fact that the whole surface of the plate or film was not exposed simultaneously by the action of the shutter, thus allowing some parts enough time to blur, while others did not have time? A. The drawing out of the image of a wheel in a snapshot picture is due to the fact that the car moved while the picture was being taken. A velocity of 80 miles an hour is 117 feet a second. If the exposure were only a hundredth of a second, the car moved a foot while the shutter acted. The lengths of snapshots are very uncertain quantities, and often they are longer than the figures on the shutter would indicate. A slight friction in the plates will make the exposure longer.

(9496) H. H. says: 1. Please inform me of a simple and reliable method of measuring the internal resistance of primary batteries. A. The simplest method of measuring the internal resistance of battery cells is to connect two cells or any number of pairs of cells in opposition, and measure their resistance by a Wheatstone bridge, in the same manner as any other resistance is measured. The cells in opposition send no current into the apparatus, and thus are like any other resistance in opposing the current of the battery of the measuring set. 2. Also the formula for the mixing of paste for positive and negative plates for storage battery. A. The paste for coating the positive plates of a storage cell is made by mixing red lead to the consistency of putty with dilute sulphuric acid made by slowly pouring one part of concentrated sulphuric acid into four times its volume of water. Be sure to pour the acid into the water slowly and with constant stirring. The paste for the negative plate is prepared in the same way with litharge.

(9497) O. R. writes: I desire to obtain or purchase a formula to make the best up-to-date instrument for locating gold and silver. Can you sell me formula for the same so constructed that it can be set to attract one metal and cut off all other attractions? A. We know of no formula or instrument for locating the precious metals but the prospector's judgment, founded upon experience and the diamond core drill. All so-called devices for locating gold and silver are inoperative. There is a device described in our issue of May 2, 1903, which will locate an electrical conductor in the ground, but there is no means of determining without the use of pick and shovel whether this conductor is a valuable mineral deposit or a stratum of moist earth.

(9498) E. E. P. says: I am trying to find out what will be the most satisfactory power for grinding corn and pumping water for irrigation—gasoline engine, kerosene engine, electricity by windmill, liquid air, or just the old-fashioned windmill. A. The cheapest power for a farm for all purposes is a windmill of modern type large enough for the requirements of the farm work. A 30-foot windmill will give 3 horse-power in a 16-mile-per-hour wind, and will do much of the work even for a small threshing machine. Where large quantities of water for irrigation and the heavier machinery are in use, a kerosene engine is a very cheap power ever ready and easily managed.

(9499) V. K. asks: What is the cause of the pitting of steam boilers? Does such pitting occur where soft water is used, rain or condensed water or soft spring water? Do you know of any remedy preventing such pitting? I have a steam boiler that is pitted in several places below the water line, pits nearly as large as a dollar, varying in depth to nearly an eighth of an inch deep in places. I am at a loss to find a remedy. I use hard water containing considerable lime and magnesia, and to prevent or retard formation of scale I daily inject a solution of sodium phosphate. A. The pitting of boiler tubes and shell is a common occurrence due to any kind of water, but more active with the purer or rain water. The cause has been attributed to some peculiar molecular condition of the iron inducing electrical action, and also to particles of slag or other metals that induce electrolysis.

(9500) H. E. F. says: 1. A claims that the ocean has deep pits that have never been sounded, the reason being that no solid body could reach the bottom. B claims that the water of the ocean is, no doubt, under a tremendous pressure, but still could not exceed the specific gravity of some of the heavy metals—granting the depth exceeds 60,000 feet. A. We have answered this question five times in recent years, in this column, but will try again. Water is a very incompressible substance. Sea water is compressed but forty-four millionths by a pressure of an atmosphere, and at higher pressures the compression is less than this. It is not very sensibly denser at the depth of the bottom of the ocean than at its surface, nor are the metals. A body which will sink at the surface of the ocean, will continue to sink to its bottom. This is known, since the sounding lines bring up from all bottoms the fine ooze, which consists of minute forms of life which have died and sunk till they rested on the ocean bottom. There have not been any depths found which the sounding line has not measured and brought back testimony that it touched the bottom. The greatest depth yet found is 30,930 feet, in the South Pacific near the Fiji Islands. Another depth near Japan is 27,600 feet, and one near Porto Rico is 27,366 feet. The deepest places are near the shores. For other information on this interesting point, see Query 8959, volume 88, No. 17. 2. What is the increased pressure for volumes injected into a closed vessel filled with water? A. The increase of pressure produced by forcing a plunger into a closed vessel filled with water may be anything which the walls of the vessel can stand. This pressure may be increased till the strongest vessel is burst by the water pressure. This is known in books upon physics as hydraulic pressure, and the machine for utilizing it is called the Bramah or hydraulic press. Pascal stated its law many years ago: "Pressure exerted upon an inclosed mass of liquid is transmitted undiminished in all directions, and acts with equal force on equal surfaces and in a direction at right angles to those surfaces." This press is the most powerful machine man has ever invented. It has no limit except the strength of the material upon which it presses. It is in use for all great press work. Owing to the slight compressibility of water as given above, you cannot inject any considerable volume of anything into a closed vessel filled with water. It will burst the vessel.

(9501) C. D. C. asks: Would you kindly explain the following: A three-speed desk fan and a 16-candle-power light are connected across one side of a three-wire direct-current. The fan is connected about 20 feet from the light, between it and the source of supply, and is turned off. A wireman, thinking the circuit disconnected at the service switch, cuts the lamp cord with his pliers, when the short circuit is formed, the fan starts and runs until the short circuit is broken. What caused the fan to run? A. In the case you describe, when the short circuit was established by cutting the lamp cord, the rush of