#### RECENTLY PATENTED INVENTIONS. **Electrical Devices.**

TELEPHONE ATTACHMENT. F. Howe, Marietta, Ohio. This invention is an improvement in telephone-receiver supports; and it consists of a universal jointed arm which holds the receiver and permits the latter to be moved into position against the ear. This movement works a lever which is connected with the switch of the telephone in such manner as to cut the receiver into circuit.

AUTOMATIC TAKE-UP DEVICE FOR TELEPHONE CONNECTIONS.—F. B. LONG, Los Angeles, Cal. One of the principal objects of the inventor is the provision of means for storing the electrical connections for the receiving and transmitting instruments of an ordinary telephone in such manner that during the time the instruments are hung up or out of use there will be no slack or loose portions of the connections hanging about the telephone.

TELEPHONE ATTACHMENT. - V. REB-HUN, Schaghticoke, N. Y. The more particular object of this inventor is to provide means for improving the acoustic effects of the receiver, to enable the operator to avoid holding the receiver by hand, to enable the receiver to be adjusted to various positions of the head, and to accommodate the receiver to the use of persons whose hearing in one ear is better than in the other.

ELECTRIC TEMPERATURE-ALARM. - C. P. HEPLER, Smithton, Pa. The invention refers to a device for application to a receptacle and designed to give a signal when any certain predetermined temperature is reached in the receptacle. The principal objects are to provide an alarm which can be easily set for any desired temperature, which will be entirely automatic in operation, useful in a large number of different kinds of business-as, for example, distilleries, breweries, bakeries, confectioneries, etc.-and which will be simple in construction and easy to maintain.

#### Of Interest to Farmers.

LEVELING ATTACHMENT FOR SEPA-RATORS .- O. G. VOLD, Dawson, Minn. The object of the invention is to provide a new and improved leveling attachment for portable grain-separators and similar machines or wheels and arranged to permit convenient application to the machine without altering the construction thereof and to form level furrows for the wheels of the machine to stand in.

TANK-HEATER .- W. DIXON, Kimball, Minn. The object of this invention is to provide a heater arranged to prevent the seam of the heater-body from coming in contact with the burning fuel, to prevent the seam from becoming leaky, and at the same time providing a space within the heater-body unobstructed by the draft-flue to provide ample space for the burning fuel. It relates to the care of live stock, and more particularly to heaters for use in stock-tanks to prevent the contents from freezing.

FURROW-OPENING DISK. - H. C. HAM, Liberty, Ind. The invention relates to implements which comprise rotary disks in their make-up, which disks roll upon the ground as the implement advances. While intended to be used especially in connection with furrowopeners when used in planters or seedingmachines, it should be equally useful in the construction of disk harrows and other agri- the sections engaged. cultural implements employing disks for any HOISTING DEVI purpose. Improved means are provided for attaching the disks.

means for controlling the topping devices, so much expenditure of power. that whether or not the beets extend more or SHOE-LAST.—A. R. GAR readily carried out of action, on entering or leaving a field.

BROODER.-G. H. LEE, Omaha, Neb. The object of the inventor is to produce a brooder of simple construction provided with improved means for diffusing the heat supplied thereto and provided also with an improved arrangement for hovering or covering the chicks within the brooder, one of his purposes being to prevent the tendency to crowding of the chicks in the heated space.

tent of the same general character as those heretofore patented by Mr. McCall, the same being light portable tents with the canvas floors forming a part of the tent. It is designed to provide a tent of this general character which may be used singly or in pairs to form a larger shelter-tent.

COMBINATION HAT, COAT, AND UM-BRELLA RACK .- A. ABELSON, New York, N. Y. In the present patent the invention has reference to combination-racks for the storage of articles, and more particularly to the type of rack suitable for storing hats, coats, and umbrellas so as to render the same comparatively secure. Piracy of articles is pre- of liquid. vented by the fact that only a key of a certain type can be used to move the sliding plate or bolt from its position.

EDUCATIONAL DEVICE.-J. B. OLIVERA, Matanzas, Cuba. One purpose of the inven-tion is to provide a means whereby children or students may not only familiarize themselves with letters of the alphabet, but may arrange them in words or series of words, and whereby the device may be placed on the desk of each student and a similar device be employed by the instructor to give the initial idea of the grouping of letters to form words, leaving pupils to themselves afterward to spell out the different words.

BARBER'S ANTISEPTIC UTENSIL. - H. ROSENTHAL, New York, N. Y. In the present patent the invention has reference to barber's supplies; and the inventor's object is the provision of a new and improved barber's antiseptic utensil, insuring to the person to be shaved at a barber-shop the use of an antiseptic-cup, an antiseptic brush, and antiseptic soap.

purpose of the improvement is to so construct a legging that it will lace at the front and so that the front will be open for the introduction of the foot only a portion of the length Further, to so locate and hold the lace at the ; which may be readily connected and disconbottom of the legging that it will not drop under the foot while the legging is being placed upon the person.

HOSE-COUPLING NUT .-- W. C. C. MILLER, Vacaville, Cal. The aim of this inventor is to provide details of construction for a nut which adapt it for a speedy and reliable connection of an end of a hose having the nut thereon with the threaded nozzle of a fire-plug and also for an instant connection or detachment of two sections of hose, one section having the improved nut on its end and the other section a male-threaded nipple, forming a reliable water-tight joint-coupling between the hose ends that are detachably connected by means of the improvement.

COUPLING .--- R. G. McDowell, Anaconda, Mont. This coupling is intended for joining sections of pipe and hose and also for nse in connecting nozzles and fire-plugs and various other analogous uses. It comprises mating sections fitting one within the other, the coupling having a peculiar packing, making a hermetic joint and the outer section carrying a peculiar spring-dog capable of projecting a part through an opening in the outer section into engagement with a shoulder on the inner section, thus removably yet securely holding

HOISTING DEVICE.-J. KAMBISH, JR. Piney, W. Va. The intention in this case is to provide a new and improved hoisting de-MACHINE FOR TOPPING BEETS .- A. H. vice, more especially designed for raising and KRAMER, Montevista, Col. The purpose of the lowering deep-well tubing, pump-rods, and the improvement is the provision of durable and like, and arranged to allow convenient and effective devices for topping the beets and quick raising and lowering of a load without ash-pits.

that whether or not the beets extend more or less out of the ground all of the beets will be Y. The principal object of the invention is to invention is to provide a strainer and sepatopped in a uniform manner. It may be quickly brought into action and as rapidly and to impart to the tread or under surface of to impart to the tread or under surface of the sole of a shoe made thereon a curvature or form tending to turn the foot of the wearer of the shoe in an outward direction in the act of walking.

STANDARD FOR SUPPORTING WIRES .-W. V. GILBERT, Port Elizabeth, Cape Colony. This invention is peculiarly valuable for purposes of fencing. It relates more particularly to a certain form of standard made, prefer-ably, of sheet metal and formed from a blank of such metal bent into suitable conformity INCUBATOR. - G. H. LEE, Omaha, Neb. to be driven into the earth and to support The inventor's object in this instance is the the wires or cables, the standards being particularly adapted to be nested in order to save transportation expenses and possessing many constructional advantages. SKIRT-GAGE .- FRANCES M. DE LEON, New York, N. Y. This invention concerns itself especially with the construction of a skirt gage, which is to facilitate the fitting of the skirt with respect to its length. The object is to produce a gage which will not only enable the skirt to be marked at the desired point at which the lower edge should be turned up, but also to provide an arrangement whereby the yield or spring effect to the entire bottom accuracy of the measurement is much e**n**hanced.

TENT.-T. D. MCCALL, St. Louis, Mo. This proper access or injury by contact and frost invention is in the nature of an improved either below surface of ground or exposed places. The invention relates particularly to an improvement in the lid applied to the neck of the box-cover and means for fastening it, whereby it is held when in use yet adapted for detachment to allow access to enclosed meter for reading, detecting leaks, etc.

> BOTTLE .- R. G. DAVIS, Hot Springs, Ark. In the present patent the invention has reference to improvements in bottles of the nonrefillable class, the object being to provide a bottle of this character that will be of simple invention has reference to improvements on construction, practical to manufacture, with apparatus for elevating water from wells, the the valve mechanism so arranged as to prevent refilling, but permitting the ready outflow | simple and novel construction and in which

SURGICAL APPLIANCE.-A. BRESLIN and J. LEES, Summithill, Pa. The object of the invention is the provision of an appliance adapted for attachment to the body of a patient or sleeper to frustrate his attempts to turn to an inclined or other position and to retain him in the desired position without disturbing or awakening him. It is an improve-ment upon one for which the inventors have filed an application for patent, which has been allowed.

SLEEVE-PROTECTOR. - HELEN GARDNER, New York, N. Y. In the present patent the invention has reference to protectors for the sleeves of garments, having for its principal object the provision of an effective device of this class which while maintaining its position will neither interfere with the garment nor the movements of the wearer.

FOUNTAIN-BRUSH. - W. L. PAYN, Checotah, Ind. Ter. In the present patent the intention of the inventor is the provision of a brush of this character which shall be оар. LEGGING.—J. W. РҮМСН, Ripon, Wis. Опе powder or fluid made into lather by the water supply through the brush and at the same time be useful for general bathing or washing purposes.

HOSE-COUPLING. - J. D. O'BRIEN, Mulof the legging, the lower part of the front lan, Idaho. The principal objects of the in-being permanently closed by a folding tongue. vention are the provision of a secure device nected. The means provided make a fluid tight joint, effectually preventing leaking. Un-coupling the members is readily done. Uncoupling cannot accidentally occur under pressure or twisting of the hose. The packingring will stay in place whether members are coupled or uncoupled, but yet may be readily removed and renewed. There are no threaded or similarly-movable elements to effect the closure.

### Hardware.

WRENCH FOR THRESHING-CYLINDERS. -M. MAHLEN, Osakis, Minn. This invention relates to wrenches used in applying the nuts which retain the teeth of threshing-cylinders upon the bars thereof. The object is to pro-duce a wrench which is so formed as to enable the same to be applied readily in practice, certain parts of the said wrench having useful functions in connection with the straightening of the teeth of a threshing-cylinder where they have become bent or twisted.

#### Heating and Lighting.

FURNACE. - G. S. KENT, Buffalo, N. Y. One purpose of the invention is to provide an improvement upon a furnace for which a former patent was granted to Mr. Kent, the main object of the invention being to so construct a furnace that it will be an overdraftfurnace and will have a vast capacity for producing heat and which will thoroughly burn fine coal before the fuel can escape to the

STRAINER AND SEPARATOR. - J. G. SHOE-LAST.-A. R. GARROD, New York, N. ANSON, San Francisco, Cal. The aim of this rator more especially designed for use in steam-generating plants using crude oil as a fuel in furnaces and the like and arranged to separate the water from the oil, to insure a thorough straining of the oil previous to the latter reaching the burners, and to allow quick - ' and convenient cleaning of the device.

#### Household Utilities.

Y. The invention refers to improvements in the usual V-shaped edge. hangers for sliding doors, the object being to provide a hanger of simple construction and L. DES ANGES, New York, N. Y. The invenhaving means for so suspending a door that it tion refers to an apparatus particularly inwill hang in direct downward alinement with tended for use in connection with steamboat the slide-bearings, thus preventing any vertical and railway systems to collect admission-strain on the sliding member, and therefore tickets from the passengers as they pass permitting an easy sliding movement of the door. SUPPORT FOR BED-BOTTOMS. - C. L. HARRELL, New York, N. Y. Mr. Harrell's in-vention pertains to supports for springs or other bed-bottoms. His principal objects are to provide such a device which may be readily attached and which will furnish a general structure, even at the ordinarily-rigid edges. KITCHEN-CABINET. - H. CLARK, White-PROTECTING BOX OR CASING. - H. W. fish, Mont. In this case the invention has cooks, an object being to provide a kitchen cabinet so arranged that the several ingredients required for use will be conveniently at

#### Hydraulics.

WATER-WHEEL .- T. LAMBETH, Rachel, N. C. In this instance the invention pertains to improvements in water-wheels of the undershot type, the object being to provide a simple and novel means for positively moving the blades outward to receive the water-pressure and moving them inward or into the wheelbody upon leaving the water, thus preventing back pressure.

WATER-ELEVATOR.-J. J. Powers, Cen-tralpark, N. Y. In Mr. Powers' patent the object being to provide a water-elevator of the water is forced to the point of discharge by air-pressure.

#### Machines and Mechanical Devices.

SAW-SET .--- C. DIENER, New York, N. Y. One purpose of the invention is the provision of an effective saw-set adapted for use in connection with any character of saw, one which can be conveniently operated and which will have a hammer action, enabling the teeth of the saw to be set as accurately and readily outside of the shop as at a bench within the shop.

THREAD TWISTING AND WAXING MA-CHINE .- A. H. FORSYTHE, Sarcoxie, Mo. The invention pertains particularly to improvements in machines for twisting together a plurality of threads and waxing the same for use in a leather-sewing machine, an object being to provide a machine for this purpose that will be simple in construction, positive in action, and that may be readily attached to a sewing-machine.

DRYING APPARATUS. - G. STIFF, Norwich, Conn. The invention refers particularly to improvements in vacuum-driers, the object being to provide a drier in which material to be treated may be readily placed and removed therefrom. When the trays containing material to be treated are in the chamber the door is closed, thereby forcing the trap into position and making steam-tight connections, and steam is admitted and passes through tubes into the chambers of the trays, then passes around the ends of partitions and out through exhaust tubes. This exhaust-steam passes into spaces around the vacuum-chamber, the water of condensation flowing away by its own gravity.

CAM-FINISHING MACHINE. — G. MEYER, Griinhof, near Stettin, Germany. Mr. Meyer's invention relates to a machine for finishing, with the aid of a file, cams which have been coarsely worked by a milling-machine or other machine-tool and possess such a shape as to be capable of engaging and sliding in slots with parallel faces. Such cams have an equal diameter in certain directions and are used in many machines-for instance, in sewing machines. Cams finished on this machine will be superior to those by hand, since the file is mechanically and positively guided.

COIN-DISTRIBUTER .- C. H. HALL, Fresno, Cal. The claim of the inventor as an object of his invention is the provision of a new coindistributer which is simple in construction, not liable to easily get out of order, and arranged to distribute the assorted coins according to their size and value and in the proper sequence.

MECHANICAL MOTOR.-E. PUTNAM, Rossville, Ill. This improvement relates to a me-chanical motor for elevating materials or for driving machinery of various sorts. It is particularly useful in connection with animal-power as contradistinguished from use in transmitting engine-power. It is particularly adapted for use in driving grain dumps and elevators, especially in case steam or other engine power is not practical or convenient.

MACHINE FOR SHARPENING AND RE-PAIRING DRILLS .- J. J. BROSSOIT, Grand Rapids, Wis. The apparatus is for operation on rock-drills, particularly the usual cruciform drills, by which to sharpen, re-shape, and otherwise repair the drills. It comprises means for mounting and moving the drill toward and from the tools of the apparatus, these tools furnishing means for reshaping the drill and acting on the edges thereof to sharpen the same. Preferably the shaping-tools are in the form of an anvil and hammer, between which the point of the drill is introduced, DOOR-HANGER.-H. LOBEL, New York, N. means being provided so as to give the drills

TICKET-COLLECTING

provision of a construction which conduces toward a thorough circulation and uniform heating of the air within the incubator, at the same time shielding the eggs from direct aircurrents. The construction facilitates separation of newly hatched chicks from the eggs and also from chicks previously hatched and provides also an arrangement whereby it will be unnecessary to open the main door of the incubator in order to remove chicks from the interior.

#### Of General Interest.

MAIL-POUCH HANGER AND SHIELD .-G. A. CLARK, Nashville, Tenn. The aim of this improvement is to provide a device whereby one or more pouches may be supported between the arms of the mail-crane, and to the manner in which such mail-pouches may be protected from contact with the receivers of the mail-pouch catchers.

 $CLAR\pi$ , Mattoon, Ill. This improvement is in reference to improvements in kitchen-cabinets boxes or casings for housing water-meters, particularly adapted for the use of pastrystop-cocks, valves, and other water appliances and oil and gas appliances and distributers, also telephone and other electric conductors and appliances and protecting them from im- hand.

aboard the train or boat. It is not, however, limited to this particular use and may be employed under various other analogous condi-The principal object is to so construct and arrange the apparatus that fraud on the part of persons in charge will be impossible.

CHUCK-C O BERGMAN and M ELMER. Hastings, Mich. Among other things this invention has for an object to provide for conveniently holding the work on machines. In operation, when centering a piece of metal too large to be held in the milling-machine or shaker-chuck, two prick-punches are made upon one side of the piece and one upon the other and three spurs are manipulated so as to enter the prick-punches and securely hold the work in place. Means are provided for securing both long and delicate adjustments.

Prime Movers and Their Accessories. EXPLOSION-ENGINE. - R. O. LE BARON,

Pontiac, Mich. The object in this case is to provide a gas, gasolene, or the like explosionengine arranged to utilize the expansive power of the gas to the fullest advantage and to allow running the engine with the greatest economy. Mr. Le Baron does not limit himself to the number of pairs of cylinders as the same may be varied and two or more than three pairs may be used and connected with  $\varepsilon ach$  other for producing the desired result.

DRAFT-DRIVEN GENERATOR. - W. H. JORDAN, Hays, Kan. This invention relates to engines, the inventor's more particular object being to economize the draft thereof in such manner that when the draft is excessive it may be used to operate machinery, thus utilizing a certain amount of power otherwise wasted. It is of peculiar value upon locomo tives, where under certain conditions the draft requires to be frequently shut off.

ROTARY ENGINE.-J. P. BRUYÈRE, Pas-saic, N. J. A purpose of the inventor is to provide an effective construction of rotary engine, and one which will be economic in the use of steam. A further purpose is to so construct the engine that a piston is located in a casing, both of which parts may be employed as drivers, and wherein each is mounted to revolve relatively to the other. Another is to provide the engine with a simply-applied and readily-effective reversing mechanism and cut-off.

#### **Railways and Their Accessories.**

CONCRETE RAILWAY-TIE .--- G. S. MILLER, Burlington, Vt. The purpose of the improvement is to provide an economic form of tie in which the devices for seating and securing the rails consist in box structures having chambers to receive spikes and means for removably holding the spikes in said chambers in firm clamping engagement at their heads with the flanges of the rails, it being possible to expeditiously and conveniently replace any damaged spike without disturbing the rails or an adjacent spike.

FOLDING EXTENSION-STEP. — J. s COXEY, Aberdeen, Wash. The intention in this case is to do away with the small tool or box employed to facilitate the landing of passen gers from railway-coaches at stations where there is no convenient platform and to accomplish such result by providing an auxiliary bottom step having folding or swing connec-tion with the lower step of the usual series fixed to the platform of a coach, and to control the movements of the auxiliary steps by means of a series of levers conveniently operated through a hardle member located at the platform of the coach.

VENTILATING MEDIUM FOR CARS.-P. BONNETT, New York, N. Y. The aim of the inventor is to provide means for ventilating cars in a thorough manner and without subjecting the occupants to drafts, and in the construction of the appliance to provide means for regulating the amount of air to be admitted, the said means being conveniently operated from the interior of the car, and further to so construct the upper portion of the car that the foul air will be sucked out from the interior and fresh admitted.

#### Pertaining to Recreation.

APPARATUS FOR INDICATING THE SCORES OF PLAYERS IN SUCH GAMES AS UILLIARDS OR THE LIKE .--- C. S. OAKES and J. A. MANTON, Parramatta, New South Wales, Australia. 'The invention refers more particularly to a mechanical device for indicating the score of players in the game of billiards, and has for its object to provide a simple scoring-board which may be easily read and understood from a distance, so that the players, as well as the onlookers, may be kept advised as to the state of the game as it progresses, while at the same time it is capable of easy and accurate manipulation by the marker.

#### - ----Pertaining to Vehicles.

REELING DEVICE.-C. A. HADLAND, Ben-nington Township, Minn. This device is for use in reeling wire and the like and is designed to be mounted upon a wagon-body, so that the wire may be reeled or unreeled as the wagon moves. The principal objects are to provide means for removably attaching the to the body of a wagon, to provide 101 securing the reel in operative or in inoperative position, and tor manipulating a guide for the and for operating these devices conveniently from the seat. HITCHING-WEIGHT HOLDER. - H. Н. TOTHILL, Lockport, N. Y. This invention has reference to improvements in devices for supporting a horse-hitching-weight on a deliverywagon or other vehicle, an object being to provide a supporting device of simple construction by means of which the weight when not in use may be suspended from the footboard or other portion of a vehicle in such manner as to be readily lowered to the ground or raised by a person sitting in the vehicle.

with a row of small circles, the whole giving a very clean and pretty ornamental effect.

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Co., Chicago.

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Adding, multiplying and dividing machine, all in one. Felt & Tarrant Mfg. Co., Chicago.

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throughout the world. Tatem Mfg. Co., Buffalo, N. Y. Inquiry No. 7083.-For manufacturers of small springmotors, such as used in toys and novelties.

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and other purposes made by P. F. Turner, 46th Street and Packers Avenue, Chicago, Ill.

Inquiry No. 7086.-For makers of "Buffalo' stock whips.

Manufacturers of patent articles, dies, metal stamp ing, screw machine work, hardware specialties, wood fiber machinery and tools. Quadriga Manufacturing Company. 18 South Canal Street, Chicago.

Inquiry No. 7087 .- For makers of face masks.

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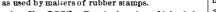
Manufacturers of all kinds sheet metal goods. Vende ing, gum and chocolate, matches, cigars and cigarettes, amusement machines, made of pressed steel. Send samples. N.Y. Die and Model Works, 508 Pearl St., N.Y. Inquiry No. 7089.-For manufacturers of road-making machinery, rock crushers, etc.

WANTED .- To buy ideas or patents for new articles populace. Briefly give full particulars. F. Raniville o., Grand Rapids, Mich.

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(9699) L. F. P. says: In your highly esteemed journal I notice with interest the development of motive power from the windmill. Would you be kind enough to answer the following through your columns: Is it necessary that rudder area should be greater than blade area? If not, why would not the mill turn around on the transmission shaft? Am I not right in stating that the rudder has to hold the mill against the wind, and also  $against\ its\ own\ force,\ and\ consequently\ the$ rudder area plus its leverage must be greater than blade and power area? We will assume there is a five-horse wheel and five horse-power is being consumed through the transmission shaft. What holds the mill against the transmission shaft? If it is the rudder, does not this rudder exert the five horse-power thrust? A. Windmills are constructed in a great many ways, some transmitting the power from the windmill by crank and connecting rod motion. others by means of gears in such a way that there is no reaction from the driven shaft, tending to move the windmill out of a plane at right angles to the wind. Such windmills require very small rudders, as the force of the wind is balanced on the vanes of the mill, and the rudder is only necessary to turn the mill, so that it will always face at right angles to north magnetic pole now located? A. The the direction of the wind. Where, however, the power is transmitted to a vertical shaft by means of a single pair of beveled gears, there is a reaction tending to turn the mill from the plane at right angles from the wind equal to the force tending to rotate the mill multiplied by the leverage. In such a case, the force of the wind on the rudder multiplied by its leverage must be sufficient to balance it.

(9700) K. H. L. says: Will you please give me the numbers of your recent papers that have an explanation of the Edison three-wire system of electric lighting? Also the numbers that have its history and recent application? Will you please also give me the numbers of papers that deal with the subject of electrical heating? A. We can furnish you with two papers, SUPPLEMENT Nos. 309 and 737, containing valuable articles about the Edison three-wire system. We do not know any recent application of this system. It is being very rapidly superseded by the alternating-current systems of lighting, since it cannot be used very far from the central station. The number of articles relating to electric heating is very large. We name SUPPLEMENTS 825, 1037, 1059, 1077, 1112, 1182, 1374, 1375, 1419, 1420, 1421, 1472, 1502. All papers are to manufacture as a side line. Will consider all propo-sitions. but prefer articles commonly used by the furnished at ten cents each. New SUPPLEMENT Catalogue sent on request.

> (9701) H. B. M. asks: Is there any way that one can change an alternating current of 110 volts to 20 or 25 direct suitable to run small motor? A. Alternating current can be transformed to direct by means of a rotary transformer, wound to give any voltage desired; or a Cooper-Hewitt mercury arc converter can be used. 2. What changes would have to be necessary in a magneto generator to furnish current to operate an induction coil giving a 1-inch spark? A. The changes needed to fit a magneto to run a 1-inch induction depend upon what the magneto is. We do not think the ordinary telephone call magneto can easily be made to do this. 3. How j many times does an ordinary door bell make and break with three dry batteries? A. We can only guess how many times a bell strikes a second when three dry cells are attached to the circuit. We guess three times. If you will count a bell for a quarter of a minute, you can find out if we have guessed right. 4. What is the best interrupter for induction coils? A. F'or small coils a vibrating interrupter is always used. For large coils a rotary interrupter is sometimes used, and sometimes an oscillating arm dipping into mercury is used. tell me through your paper whether the  $zinc \mid join$  hands, the outer persons taking the zinc tubes or cups used in making the dry battery described in the SUPPLEMENT No. 1387, August 2, 1902, on page 22225, can be used more than once, that is, can it be refilled? A. In the action of a dry cell, the electricity is produced by the solution of the zinc in the sal-ammoniac. If there are no holes eaten through the zinc when the other materials are exhausted, the zinc cup of a dry cell may be refilled and used

(9703) J. L. W. asks: Will you kind ly inform me as to the relative speed of light and electricity? A. Electricity travels in space with the speed of light. Indeed, light is simply an electromagnetic disturbance of the ether of space. In wires and through matter electricity travels with other lower velocities. See Watson's "Physics," price \$3.50; Thompson's "Electricity and Matter," \$1.25, or Thompson's "Elementary Electricity," price \$1.50.

(9704) H. A. K. says: I have a hollow cylinder 1¼ inches diameter by 3 inches high. How many cubic inches of air will be compressed into it at 100 pounds pressure per inch? At 200, at 300, at 400, at 500? If the height of the cylinder is cut in half, how many cubic inches will it contain at the same pressures? What is the rule for finding the volume of air compressed into a given space at a given pressure? What books treat on the subject. A. Your cylinder contains 3.68 cubic feet of air at atmospheric pressure. At 100 pounds pressure it will contain 3.68 times 114.7

= 28.8 cubic inches. At 200 pounds per 14.7

square inch it will contain 53.8 cubic inches. At 300 pounds per square inch it will contain 78.8 cubic inches. At 400 pounds per square inch it will contain 103.8 cubic inches. At 500 pounds per square inch it will contain 128.8 cubic inches of air at atmospheric pressure. If you halve the height of the cylinder, you will halve the amount of air that it will contain. The pressure of the atmosphere on an average is about 14.7 pounds per square inch. the pressure is increased, the volume of each cubic inch of air is decreased in the same ratio that the pressure is increased above 14.7. In working these problems it is necessary to remember that pressures as ordinarily meas ured by gages are pressures above the atmos pheric pressure. To obtain the absolute pressure or true pressure, it is necessary to add 14.7 to the pressure given by the gages, as has been done in working the examples above. We recommend and can supply you with the following book relating especially to the subject you refer to: "Compressed Air; Its Production, Uses, and Application," by Hiscox, price \$5 postpaid.

(9705) L. H. N. asks: Where is the north magnetic pole was found by Ross in 1831 to be on Boothia Felix near Hudson's Bay. This must be considered an approximate determination. It is not probable that the same point is the pole now. 2. Is it moving, and if so, in what direction and how fast? A. The pole is probably not at rest, though little can be said definitely on the point, and nothing is known as to the rate of its motion. An expedition is now engaged in making a new survey to determine the north magnetic pole. 3. How many degrees east or west of a line running north and south does the compass needle point for central lower Michigan? A. In 1902 the needle pointed 2 minutes west of true north in Michigan. In 1896 it pointed 26 minutes west of true north at your place. The line of no variation passed into Michigan almost in the center of the southern boundary of the State in 1902. 4. Is there any easy method by which a person can tell the time to within a few seconds where telegraphic service cannot be had? A. The time of day can be best determined by a sundial in the absence of the telegraph and the railroad.

(9706) O. D. asks: In the type of open-circuit battery listed in catalogues as "National No. 2," how much black oxide of manganese should be put in the porous cups with the pulverized carbon to make the cel! give the best results? In mixing the sal ammoniac solution in quantities, how much sal-ammoniac should be used for each gallon of water? A. For all sal-ammoniac cells with porous cup use granular and not pulverized peroxide of manganese and coke broken into small lumps. A mixture of equal parts may be used. For the electrolyte take from 1 to 2 pounds of sal-ammoniac to a gallon of water. A saturated solution is not desired, since any crystals left in the bottom of the jar tend to cause a deposit of crystals on the zinc, and will weaken the action of the battery.

(9707) M. A. asks: 1. Will a primary uninterrupted galvanic current pass over or through any part of the human body? The writer has failed to detect such passage with a delicate galvanometer, even with twelve or fifteen Samson cells. A. If your galvanometer is sensitive enough, there is no difficulty in detecting a current which passes through the human body. Connect the wires to a piece of zinc and one of carbon or copper. Dip the hands in water, and take the zinc in one hand and the copper in the other hand. The gal vanometer will show a deflection, due to a cur rent produced by the hands. So will it if two pieces of zinc were used as above. Let several (9702) C. C. B. asks: Will you please persons wet their hands in clear water and and carbon, as above, and the galvanometer will show a sensible deflection. You do not need a number of cells. You need a more sensitive galvanometer. 2. If a mixture of gas and air confined in a tight cylinder was fired by electric spark or otherwise, a disastrous explosion would be the result. Why does not the same occur when firing the mixture in a gas engine cylinder? A. If a quantity of gas and air mixed are exploded in a cylinder

## Scientific American

Designs.

DESIGN FOR A BUTTON-RIM,  $c \in \mathbf{G}_{1}$  E. SCHWEIG, New York, N. Y. In the present Sciences New York, N. Y. In the present interpretation of the bitton is present in an analysis of the second structure and attractive scroll work radiates to the science free of air per minute, and it is desired, if nos outer edge of the rim, which edge is dotted whatever voltage might be best.

Inquiry No. 7092.-For dealers in gold leaf for for gilt woodwork.

Inquiry No. 7093.—For makers of painted satin, canvasor perfume boxes or bags.

Inquiry No. 7094.-For makers of town clocks

In quiry No. 7095.—For makers of motor cances, motors, fire engines, or fire pumps, without horse power.

Inquiry No. 7096.-For machinery to cut metal in thin strips like tinsel.

Inquiry No. 7097.-Wanted, wholesale powdered aluminium and barium peroxide.

Inquiry No. 7098.—For the manufacturers of the Fairy Floss candy machine.

Inquiry No. 7099.—Wanted, machinery to manu-facture granular effervescent salts, for druggists' use. Inquiry No. 7100.—For an etching fluid for use with rubber dies, for making polished steel.

Inquiry No. 7101.—For makers of all kinds of him es in large quantities, also for makers of all kinds ٥f of boxes.

Inquiry No. 7102.—For makers of gaseline motor ars for use on interurban lines (on ralls).