RECENTLY PATENTED INVENTIONS.

Pertaining to Apparel.

ARCH-SHANK FOR SHOE-SOLES.—T. F. EATON and C. E. EATON, Brockton, Mass. The invention consists of an arch supporting shank of sheet metal, having tongues stamped therefrom to secure the shank to the shoe sole, with the tongues arranged near the opposite ends of the shank, and the points thereof as stamped out, directed outwardly, and longitudinal ribs pressed in the shank from its under side and respectively arranged at the opposite sides of the tongues.

GARMENT-HANGER. — A. WILKIN, New York, N. Y. The device serves to support a number of articles of clothing, and in general consists of a hanger bar adapted to support a coat or waist, and a resilient clamp secured to the bar, this clamp being adapted to support trousers, or the like, between its two lower portions, which constitute the clamping members of the device.

FOLDING STORM-LEGGING.—T. D. MILLER, New York, N. Y. The more particular purpose in this case is to provide a legging suitable for folding in order to be readily carried in the pocket or in a case when not being worn, and further provided with various details for construction whereby its general efficiency is improved. Provision is made for partially supporting the legging upon a shoe top.

Electrical Devices.

APPARATUS FOR AUTOMATICALLY THROWING OUT THE RESISTANCE IN CHARGING STORAGE BATTERIES.—G. PATTBERG, New York, N. Y. The invention resides in the adaptation of a single magnet for closing the motor circuit preparatory to the change of battery resistance and interrupting the said circuit after the change of the battery resistance is completed; a circuit breaker and controller therefor, adjustable to throw out the circuit breaker and cut off the source of supply when the battery is charged to a degree corresponding to a predetermined point along the resistance.

RELAY.—H. C. RICE, Denison, Texas. The idea in this case is more particularly to produce a relay normally actuated by weak currents, and adapted when abnormally energized by heavier currents to shift the local circuit from one connection to another in order to prevent the relay armature from sticking.

Of Interest to Farmers.

CORN HARVESTING AND HUSKING MACHINE.—F. W. WELLENSIEK, Syracuse, Neb. The machine is designed to positively remove the ears of corn from the stalks as it moves over the field, provision being made for the lateral yielding separation of the picking rolls by which the harvesting is accomplished thus preventing the choking of the rolls when in operation.

BALING APPARATUS.—P. PILON, Silver Bay, New York, N. Y. In this open-ended box form leaves are packed for baling, preferably tapering from bottom to top, with the enlarged end at the bottom, and a handbarrow forming the bottom of the form. In the form, before filling in the leaves, is placed one or more flexible ties, and also corner bars, the latter resting on top of the ties. The form is then filled and well trodden down, and the ends of the ties drawn taut and joined after corner bars are seated on the top.

MOWER.—H. NORMAN, Fowler, Kan. The cutter bars are carried ahead of the team, and has a main frame mounted on wheels and driven by horse power, and on this is mounted a rocking platform which carries an engine such as a small gasolene engine, with a pair of cutter bars in front and driving devices or gearing at the middle line of the machine, between the inner adjacent ends of the bars and the engine, whereby the engine drives the cutters.

GUARD.—D. D. OGILVIE, Lee, Nev. The guard is such as used on mowers, reapers, headers, and the like, in which the ledger plates can be readily detached from the guard, to be ground. The invention provides for the continuous and gradual cutting of the grass, etc., instead of simultaneously cutting it in bunches, as the usual practice, this latter manner of cutting causing vibration and often breaking the knives.

ADJUSTABLE WHEEL FOR CORN-PLANTERS.—J. A. MUSSETTER, Wilmington, Ohio. This improvement is upon the wheel for which Mr. Mussetter formerly received Letters-Patent of the U. S. Such wheel is made in two parts, which are adjustable toward and from each other, whereby the two-part oval rim may be broadened or narrowed as conditions require. The bar braces used as the principal means for holding the halves of the wheel in different adjustments relative to each other are now dispensed with, and he substitutes means applied to the hub and to the spokes adjacent to the rim.

CATTLE-GUARD.—J. A. LEE, Salt Lake City, Utah. The cattle guard is for use along a railroad track at a crossing. The device will readily yield to any dragging material, such as connecting hose, and at the same time form a complete guard against the trespassing of live stock of all kinds.

Of General Interest.

WELL-SCREEN.—W. A. ARCHER, Topeka, Kan. The discovery has been made by Mr. Archer that a matting consisting of woven cocoanut fiber, when sunken into a well and properly mounted, permits percolation of water through it and at the same time effectively prevents all silt, whether in the shape of fine grain sand or of quick-sand, from entering the well. It keeps out of the well mud which would easily pass through the meshes of almost any other screen. A screen made in this manner is practically indestructible and immune from the deleterious influences which cause so many other screens to become useless.

BURIAL-VAULT.—E. D. MILLHOUSE, Wabash, Ind. When in use, after the box is placed within the vault, plastic material is placed upon the ledge, and the cover is lowered into place. The weight of the cover forces the free edge of the flange into the plastic material, which is forced into all the crevices, thus effectually sealing the vault. The weight of the cover is supported by the free edge of the box, and the fresh plastic material is prevented from displacement by the overhanging outer edges of the flange, and of the rib.

PRINTING-PRESS CHASE.—E. KARL, Litchfield, Conn. The chase is constructed with the usual frame and slidably supported in its longitudinal and transverse inner edges, bars, each bar consisting of a number of longitudinally spaced members rigidly connected together, and with the members of the bars running in one direction passing through the spaces between the members of the bars running in the opposite direction whereby both the longitudinal and transverse bars extend substantially the full depth of the frame.

CABINET.—F. A. HAYDEN, Pilot Point, Texas. The casing is provided on its side walls with a plurality of horizontal series of alined slots, a pair of brackets secured to the inner wall of casing at each slot, the members of the pair being arranged at each slot end, a reel journaled between each pair of brackets, a cross piece connecting brackets between the reels, a shaft journaled in the side wall of casing and in cross piece adjacent to each reel, a pinion on the inner end of the shaft, and a crown wheel on the reel with which the pinion meshes, the outer end of shaft being provided with a gearing.

BABY-JUMPER.—G. T. GILSON, Lewiston, Idaho. The seats are hung from an overhead support, and the purpose of the invention is to provide a construction for a device, that affords a safe, comfortable seat for a small child, whose natural motions will cause an elastic jumping movement of the seat and its occupant.

DRINKING-CUP.—AUGUSTA DACUS, San Antonio, Texas. An object of the invention is to provide a collapsible cup, in which the cup proper is secured to the bottom part of an inclosing casing and the upper half of the casing, as well as the lower half are fastened together, the fastening means in turn being secured to a hook that can be attached to the belt of the user or to the waist button or other part of the clothing.

HAIR-DRYING APPARATUS.—W. A. SOLES, New York, N. Y. The aim is to provide in this instance an apparatus for private or hairdressers' use, and arranged for convenient attachment to the wearer's head, to serve as a valuable therapeutic agent for the hair, and to properly dry it without danger of bleaching or otherwise injuring the same.

COMBINATION TENT-BAG.—A. L. STRAWN and F. C. SPENCER, Monte Vista, Colo. The side pieces of the tent are of such length relative to the floor cloth as to form a cover in the use of the device as a sleeping bag. Before turning the sides in over the cover the latter is brought forwardly over the floor cloth and folded back, after which the sides are brought in and secured, the fastening which secures the sides together being arranged midway between the edges of said sides so that the latter are also doubled when in a folded position.

ATTACHMENT FOR PLUGS OF OIL OR GREASE CUPS.—J. TOWERS, Albuquerque, New Mexico. The oil or grease-cups applied to locomotives or other engines, or compressors, are commonly provided with a screw-plug which is adjusted by rotating it for the purpose of expressing oil or grease as required. The constant jar or vibration to which the parts of the engine may be subjected tends to loosen the plug so that it rises more or less in the cup and thus fails to perform its function. The attachment prevents this result.

PORTABLE DARK ROOM FOR PHOTOGRAPHIC PURPOSES.—C. BURR and H. F. THOMAS, Natrona, Pa. In the present invention the improved dark room is adapted, like stationary ones, for use in loading plate holders, developing negatives and printing photos, and is so constructed as to be collapsible and thus easily portable and adapted to occupy small space when out of use.

ORE-SEPARATOR.—R. M. CLARK, Webb City, Mo. The invention is embodied in an attachment for jiggers, the same comprising a metal box of the form and construction adapted for insertion and use in a jig box, and having a horizontal top forming the overflow line and a series of horizontal slots, and a slidable gate provided with corresponding slots and a nut and screw for adjusting such gate to vary the size of the openings through which ore is discharged.

HORSESHOE.—J. H. FAWKES, Detroit, Mich. An object of the inventor is to produce a horseshoe of light weight, yet strong and durable. A further object is to make a shoe that is provided with hardened non-slipping devices and a softer wearing part so that the non-slipping devices are always exposed, thereby rendering the shoe always sharp.

MOUNTING FOR EMBLEMS OR MONOGRAMS.—G. A. SCHLECHTER, Reading, Pa. The aim of this invention is to produce means for securing an emblem or monogram to a watch, watch fob, or similar article. The general purpose is to enable a person wearing an article, to attach to it, an emblem of a society of which he may be a member, or a plate simply carrying his monogram or initial.

TRAP.—N. FROST, Bloomington, Ill. In the present patent the object of the inventor is to provide a new and improved trap for urinals, range closets, and the like, which is very effective in operation, and arranged to permit convenient removal of the traps for cleaning, repairing, and other purposes.

BOOK-MARK.—A. EBERLE, New York, N. Y. —The invention relates more particularly to a book-mark in which a ribbon is employed, one end of the ribbon being adapted to be attached to the book while the opposite end hangs free between the pages. An object is to provide a combined book-mark and page-cutter in which the cutter may serve either as a clamp for fastening the end of the ribbon to the book or as an anchor for holding the lower end of the ribbon in position.

PRESS-BOX.—R. CARLIN, Opelousas, La. The invention is an improvement in press boxes such as are used in extracting oil from cotton seed, and is designed to prevent the flanges from being forced off the press plates by reason of the accumulation of meal on the extended portions of the press blocks, as in the case of the conventional press box.

POLISHER.—I. L. DUNN, New York, N. Y.— The polisher is adapted for use in applying material to shoes and rubbing the same until it acquires a gloss, although the polisher is equally adaptable for use on brasswork, stoves, or any surface, the difference being in the character of material employed and possibly the texture of the surface being polished.

Hardware.

KEY-LOCKING DEVICE.—W. FINN, New York, N. Y. The invention refers to door locks and its object is to provide a key-locking device for convenient attachment to the lock as a keyhole cover, and arranged to securely hold the key against turning from the outside and unlocking of the door by unauthorized persons.

COMBINATION-TOOL. — J. F. O'MALLEY, Avoca, Pa. In this case the invention has reference to a combination tool, and the object of the improvement is to produce a tool of simple construction which can be used as a wrench or hack saw. In its construction the device is embodied with a pair of pliers which also constitute a wire cutter.

SAFETY-RAZOR.—L. B. PRAHAR, New York, N. Y. The object in this instance is to provide a plate with which the blade has sliding engagement, and having end guides or lugs to hold the blade in engagement with the plate as the latter is slid into place, stops to limit the forward movement of the blade, and a spring movable below the plane of the plate and adapted to automatically lock the blade against return movement when the blade reaches the desired position.

Heating and Lighting.

FURNACE-DOOR OPERATOR.—C. A. ANDERSON, Altoona, Pa. While stoking in operating, the door is lifted during the insertion of a shovel full of fuel, and immediately lowered. As the fireman walks from the fuel supply to the furnace with a supply of coal, he depresses the treadle, which opens the door to permit the insertion of fuel, after which the door is immediately dropped. While cleaning the fire, the door may be retained in its uppermost position by means of the pin.

Household Utilities.

UTENSIL-HANDLE.—DE WITT C. HOWARD, Helena, Mont. An object here is to provide a handle for vessels, which can be easily attached to the same in order to convert them into scoops or dippers. The handle can be applied to the vessel, without interfering with the cover or bail of the latter, and can be rapidly and easily attached or detached.

WATER-CLOSET.—N. FROST, Bloomington, Ill. One purpose of the inventor is to provide a direct-acting valve, automatically operated by the raising and lowering of the closet seat, water being received in a tank from a source of supply when the seat is pressed down, and released from the tank to flush the bowl when the seat is free from pressure.

FREEZING APPARATUS.—W. DEGENER, JR., New York, N. Y. The invention relates more particularly to apparatus in which the congealing of liquids by means of cold can be effected, and which includes means controlled by the change of volume of the liquids, due to the congelation, for operating the apparatus to discharge the congealed liquid and replace it with uncongealed liquid.

ATTACHMENT FOR BEDSTEADS.—W. W. ATKINSON, Savannah, Ga. The purpose of the improvement is to provide means for rigidly connecting and supporting the head and front portions of a metal bedstead for the purpose of displaying the same in a window or elsewhere, to enable a free inspection of these portions of a bedstead that is thus exhibited for sale.

BED-RAIL FASTENER.—T. O. BERRY, Big Spring, Texas. Provision is here made for a construction for a bed rail fastener, which affords a secure connection of the ends of the side rails of a metal bedstead with the head and foot posts of the bed; which is inexpensive and that permits the side rails to be changed in their connection with the posts, so as to turn either surface of the rails uppermost and outward, as may be desired.

LEMON-JUICE EXTRACTOR.—W. F. EASLEY, New York, N. Y. The invention relates to lemon juice extractors, and has for its object to provide means simple in construction, effective in operation, and adapted to completely extract the juice from a lemon and separate said juice from the pulp and the seeds of the lemon.

CURTAIN-POLE RING.—F. BARTHOLOMAE, New York, N. Y. The object here is to provide a ring having anti-friction rollers carried in bearings attached to flattened portions of a tubular ring in a very simple and efficient manner, thus permitting convenient and quick assembling of the parts without requiring the employment of highly skilled labor.

FIREPLACE.—T. J. HARPER, Atlanta, Ga. The particular design of the invention is to heat two rooms with a single fire, its object being to produce a fireplace which will thus economize the use of fuel, one which shall consist of two parts and one which can be readily applied, removed, or repaired.

Machines and Mechanical Devices.

LEATHER-SEWING MACHINE.—G. J. MARTIN, Edgewater, N. J. The machine consists of a supporting bar carrying the sewing table, a needle bar connected with the supporting bar by crossed levers, one of the levers having an operating handle for laterally moving the needle bar to and from the supporting bar, and means actuated by the levers to give the shuttle a forward and return movement and to feed material forward as the needle bar moves from the supporting bar.

MECHANICAL MOVEMENT.—DE WITT O. MAKEAN, Binghamton, N. Y. This movement is especially applicable to laundry machines known as extractors, and employed for the speedy separation of the water from the goods after washing and the movement is also applicable for driving felt extractors and other machines, and centrifugal separators for cream, sugar, honey, and like substances.

DISPENSING-MACHINE FOR POST-CARDS AND THE LIKE.—W. D. EVANS and J. T. MARSHALL, Eupora, Miss. The main features here relate to the mechanism whereby a card may be taken from any one of a series of piles by a single dispensing device; whereby a predetermined number may be withdrawn upon the insertion of but one coin; for lifting a card from a pile and conveying it to the delivery opening; for releasing the card from the conveying mechanism and forcing it outward through the delivery opening, and for restacking the cards in each pile after a card has been withdrawn.

VENDING-MACHINE. — W. ASBURY, New York, N. Y. One object of the invention is to provide a machine for selling postal cards and other such merchandise. Another is to provide a machine for selling postal cards and postage stamps at a profit, by means of advertising on or in the envelops containing the stamps or cards. Another is to provide a machine with mechanism by means of which a practical two-coin machine is produced.

ADDING ATTACHMENT FOR TYPE-WRITERS.—H. H. BURTON, Los Angeles, Cal. Some of the more important objects here are to facilitate attachment and detachment of the adding device to and from the numbered key-bars of the typewriter; to provide for adjustment of the device in respect to the numeral key-bars, whereby any numbered wheel may be rotated to different extents by the operations of different key-bars and these amounts accurately determined and controlled; to improve the numeral wheels whereby the numerals may be printed on a larger scale.

WATCH MECHANISM.—R. L. MARSHALL, Elizabethtown, Ky. Mr. Marshall's invention relates to improvements in watch mechanism and more especially to the provision of means for mounting the spring, its arbor, spring box with click and winding wheel made integral or attached thereto and the main driving-wheel of the going train, and for retaining the same in position.

MECHANICAL MOVEMENT.—P. T. MCNALLY, Mandan, N. D. The movement converts simple reciprocating motion into a modified reciprocating motion alternately in two different planes, for various uses in the arts, and it consists in the construction and arrangement of the stationary frame provided with guides for the reciprocating member, in combination with a shifting switch acting automatically to direct the movement.

BORING-MACHINE.—R. WINKLER, Covington, Ky. The invention relates more especially to those machines which are designed to be used in boring holes in the sills of freight cars and similar locations. The primary object is to provide a machine which is free from clamps or levers, which would conflict with the brake connections, chamber rods and floating levers such as are customary in freight cars. It may be held in position by the knees or legs of the operator sitting under-

neath the car, thereby enabling him to use both hands to drive the bit, or else use one to drive the bit and one to produce lever pressure. It has removable handles and removable pressure-sustaining devices so that one side may be free from any lateral projections.

CRANE.—J. A. SUESS, Shreveport, La. This crane will operate to raise a load to a considerable height, and includes an auxiliary lifting device which can be released independently of the main lifting device so as to enable the load to descend a short distance. In this way the convenience of the crane in raising and depositing objects in a shop or factory is greatly enhanced. It is especially useful in ice plants for raising the cans and for moving them to the dump, and then to the vaults.

LOADER.—V. LANDHOLM, Westpoint, Neb. The purpose of this inventor is to provide means which may be adjusted to the fly wheel of a loader of the normal type, by which a drum may be shifted to be rotated by the fly wheel to lift the load or which may be moved against a stationary member which serves as a brake either to hold the load suspended or to permit it to descend slowly.

EXPANSION CUTTER-HEAD FOR BORING-BARS.—C. M. BUCK, Huntington, W. Va. The cutter head is such as used on boring bars and similar devices for performing boring operations. It is intended especially to be used in boring the hubs of car wheels, though it is capable of use for other purposes. The object of the invention is to produce a head having simple means for mounting and adjusting the cutters therein.

POLISHING AND CLEANING MACHINE. M. FORSBERG, New York, N. Y. The machine is for use in hotels, restaurants, shops and other establishments, designed for grinding or cleaning and polishing various articles and implements such as knives, forks, spoons and the like and arranged to permit minute adjustment of the polishing and cleaning wheels according to the nature and form of the articles under treatment.

Musical Devices.

LEAF-TURNER.—J. F. YOUNG, Morristown, N. J. An object of the inventor is to provide a simple music or other leaf turner which is inexpensive to manufacture, and in which the leaf turning arm is provided with a magnet adapted to engage metal clips carried by the leaves, whereby the danger of tearing or injuring the leaves in turning is obviated.

PICKER FOR STRINGED MUSICAL INSTRUMENTS.—E. J. SCARLETT, Chickasha, Okla. Mr. Scarlett's invention relates to attachments for use in stringed instruments whereby the playing of such instruments is facilitated, without detracting in any manner from the quality of the musical sounds produced thereon, and it consists in means that enable an unskilled person to produce results expected by ordinary methods after considerable practice.

STRINGED MUSICAL INSTRUMENT.—S. W. BUERCKLIN, Prague, Okla. The device comprises a hollow resonant body, a sound body at the smaller end of the resonant body, a bridge supported by the sound box and provided with an extending portion engaging the side of the box, means for adjusting the extended portion with respect to the box, a tail piece and a neck supported by the body on opposite sides of the bridge and strings connecting the neck and tail piece and resting upon the bridge.

Prime Movers and Their Accessories.

VALVE-GEAR.—H. LENTZ, 123 Kurfürstendamm, Halensee, Germany, and C. BELLENS, 43 Rue de Chézy, Neuilly, Seine, France. The valve is operated by a cam shaft, and it is characterized particularly by the fact that the shaft is located in a fixed casing, formed with sockets having an external diameter equal to or slightly greater than the largest diameter of the cams to allow of the passage of the same, to the end that by fitting and introducing the shaft into a tubular sleeve it is rendered oil, steam, and dust tight, without assistance of stuffing boxes or like devices.

VALVE-GEAR.—E. L. BOWEN, McComb, Miss. The invention pertains to locomotive engines and other double reversing engines, and its object is to provide a gear arranged to utilize the motion of the cross head of one engine to positively actuate the valve of the other, to provide a constant lead independent of the main traveling movements of the valves, to reduce the effects of angularity to a minimum and to allow of conveniently applying the gear to double reversing engines of different styles.

Pertaining to Vehicles.

LAP-ROBE.—H. T. VON FRANKENBERG, New York, N. Y. The invention relates to lap robes or lap coverings, and more particularly to a robe extensible at the lower portion so that even though the upper portion be tightly folded about the body, the lower portion will permit a certain amount of freedom of movement of the feet to facilitate the operation of the brake, clutch, or the like, of a motor vehicle.

NOTE.—Copies of any of these patents will be furnished by Munn & Co, for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

Notes and Queries.

Kindly write queries on separate sheets when writing about other matters, such as patents, subscriptions, books, etc. This will facilitate answering your questions. Be sure and give full name and address on every sheet.

Full hints to correspondents were printed at the head of this column in the issue of March 13th or will be sent by mail on request.

(12086) J. C. says: If two equal currents flow in the opposite direction in the same circuit will there be any work done? By this I mean, for instance, if I have two cells connected in a circuit with an electric bell, and the wires connecting these cells are from zinc to zinc and from one carbon through the bell to the other carbon, will the bell ring? A. If two equal currents flow in opposite directions in the same circuit, no external work will be done. The resultant current will be zero. If two cells are connected oppositely to the same circuit there will usually be a slight current in the external circuit because the two cells do not exactly balance each other, that is, one of them has a little more electromotive force than the other and also a different resistance from the other. Very rarely two cells are exactly alike. The difference may not be enough to ring a bell, but it would be indicated upon a sensitive galvanometer.

(12087) B. C. H. asks: Please advise me if in your opinion two cogwheels can be made of different sizes with equal number of cogs in each, the smaller to drive the larger. Say the smaller wheel is 12½ inches in diameter and the larger one 13 inches in diameter, with 36 cogs in each. Can the 12½-inch wheel be made to drive the 13-inch wheel? Could it be done with pinion between them, as indicated by the sketch herewith inclosed? It is intended to run very light machinery. A. We should say that it would be quite impossible to make two intermeshing cogwheels of different diameters with the same number of teeth on each, for the reason that the teeth must necessarily be of different sizes, so that the tooth on one wheel could not fit the space between the teeth on the other. Even with a small pinion between them, as shown in your sketch, the same applies. If the teeth of the pinion meshed satisfactorily with those of one wheel, they would not with those of the other. It is difficult to imagine any mechanical effect which could be obtained by such an arrangement, supposing it were possible, which could not be better obtained otherwise.

(12088) C. C. S. says: Will you kindly help me out of the following difficulty? I wish to electrically operate a set of twenty small bells, using an electro-magnet to each bell, and the number of bells to be sounded at one time varying with the style of music to be played. Can I accomplish this with an electric current from one source of supply, or must I use a separate battery for each bell? Even if the current would equalize through, say, four coils, the E. M. F. necessary for their proper operation would to my mind then be too strong in case of one coil. In case one battery would be sufficient, is it possible to introduce a resistance coil in some way into the circuit to overcome the above difficulty? A. The best arrangement for your bells is to use one current for all with an E. M. F. sufficient for one bell. All the magnets should be wound alike or nearly so, or at least each magnet should be wound to take current enough to ring its bell. Connect all the bells in multiple as lights are connected to a multiple or parallel circuit. The keys or switches to bring a bell into action should be in the circuit from the line to the bell. There will be as many circuits as there are bells. One battery will be sufficient, but it must be strong enough to ring as many bells as will be called for at one time. A keyboard like that of an organ would be very simple and enable one to play any music which does not extend beyond the range of the bells.

(12089) I. W. H. says: 1. How far will the electrolytic wireless **receiver** described in SCIENTIFIC AMERICAN, volume 94, No. 26, receive messages? A. Any wireless receiver will receive signals from any distance, if they are strong enough to be heard upon it. The electrolytic receiver is very sensitive. 2. How does an operator at the sending station call the operator at the receiving station, with a receiving instrument like this, or any other where a telephone receiver takes the place of a telegraph sounder? A. Every wireless station in regular business has its own call letter which is used when it is wanted. Any one who has the list of stations can tell what station is being called. 3. (a) In the illustration at top of page I notice a "switch" mounted on the base. What is this for? (b) Are the binding posts on the base for connecting the telephone receiver? A. A switch is used with the receiver so that the aerial can be cut out and connected to the transmitter for purposes of sending messages. 4. Are there any parts of this receiver that need renewing after being used awhile? A. The wire used in the electrolytic detector is slowly worn away and will need renewing as well as the zinc and the acid. 5. How is the zinc amalgamated? A. Zinc is amalgamated by dipping it into dilute sulphuric acid and then into mercury. 6. Is Wollaston wire cheaper than platinum wire? A. Wollaston wire is extremely fine platinum wire covered with silver. It costs more than plain platinum wire, but is far better for an electrolytic detector. Coarse wire cannot be used for this purpose. 7. What size wire is used in making the connections for this receiver? A. Any convenient size of copper wire can be used for the connections for this detector. No. 14 will do. 8. How is a "pony" telephone receiver made? A. A pony receiver is one in which the magnet is bent so that both poles are used and have coil of wire upon them. It is more compact and can be attached to a spring and worn on the head. Its resistance may be very high, and it may be very sensitive. This quality is produced by the large number of turns of very fine wire which are wound into its coils.

(12090) R. A. B. says: Please to explain how the velocity of light (186,300 miles per second) was determined, and how this applied in calculating the distance of the sun (499 x 186,300 miles with a possible error of 25 seconds). How is the distance of the moon measured? How far? Is it always the same, and if not, is it known for each day of the month, and what is the mean distance? A. The velocity of light is found by measuring the time required for light to pass over a measured distance. The first determination was made by Romer, who found that light required 499 seconds to come from the sun to the earth. This was done by observing the eclipses of the moons of Jupiter. This work is described in the text books of astronomy. See Moulton's "Astronomy," which is sent for $1.75 postpaid. The best determinations of the speed of light were made in America by Prof. Michelson, and by Prof. Newcomb, independently. They found results differing by only five miles a second. A distance of some six or more miles was used, and the light passed over this distance twice, out and back. There is little doubt that the velocity of light is known to a much greater certainty than 25 miles a second. The velocity of light multiplied by 499 will give the distance of the sun from the earth. The velocity of light may be taken as 186,330 miles per second, which, multiplied by 499, gives the mean or average distance of the earth from the sun. For the experimental determination of the velocity of light see our SUPPLEMENT No. 557, price ten cents. The average distance of the moon from the earth is found to be 238,840 miles. Its distance varies from 221,600 miles to 252,970 miles. The distance of the moon from the earth is determined by simultaneous observations taken at two observatories as far apart north and south as possible. The Cape of Good Hope and Greenwich are observatories thus situated. The method employed may be found in the text books of astronomy. The calculation involves the knowledge of the radius of the earth. Since the shape of the moon's orbit is now known, the distance of the moon from the earth at any hour can be calculated for any time in the future.

(12091) G. S. O'B. says: About four years ago I read the description in the SCIENTIFIC AMERICAN, or its SUPPLEMENT, of a contraption (the name I have forgotten), which would so magnify sound, so it stated, that a fly walking over it sounded like a horse walking on a board floor. My recollection is that it was constructed out of a dry-goods box. It may be that George M. Hopkins was the contributor. I desire to get full description of this sound magnifier. Have you it in SUPPLEMENT form? A. The device about which you inquire is the microphone. It is found in every telephone transmitter and has for many years been used for transmitting speech. It depends for its action upon the fact that the resistance of carbon varies with the pressure upon it. If two pieces of carbon are pressed together the resistance is reduced and more electric current can flow. The sound waves in the voice press upon the carbon in the transmitter and the current fluctuates so as to cause the receiver to reproduce the sounds at the other end of the line. We have published many articles upon the microphone, and can send you any number up to ten for 10 cents each.

(12092) C. A. H. asks: On two occasions I have come across brief references to a device in the form of a tube fitted with a polarizer of tourmaline, whereby the glare of reflected light from water may be eliminated, or at least considerably reduced, so that hidden rocks or other obstructions may be seen when traveling toward the source of light, as when the sun is nearing the horizon. It appears to me that such a device would be very valuable to those who, like myself, run a motor boat in waters obstructed by reefs and shoals. If it is a legitimate request, may I ask you to kindly let me know the address of some firm who could supply the article, and the approximate price of each? A. We do not know any apparatus employing tourmaline for cutting off the glare of sunlight shining from a point dead ahead, nor do we see how polarizing the light could help in that way. Light from the sky at an angle of 90 deg. from the sun is polarized, and tourmaline would disclose that fact and cut down the seeing power, but this is not the case near the sun. It seems to us that smoked glasses would be quite as efficient as polarizing apparatus.

NEW BOOKS, ETC.

THE WAY OF THE WOODS. By Edward Breck. New York: G. P. Putnam's Sons, 1908. 16mo.; 436 pages. Price, $1.75.

Dr. Breck's book is a practical field manual, intended to form a part of the kit of every camper, fisherman, and hunter. It contains concise yet thorough and authoritative information on every subject connected with life in the North Woods, such as outfitting, fishing, shooting, canoeing, tenting, trapping, photography, hygiene, the protection of nature, etc. A unique feature of the volume is that the author tells his readers not only what they should have, but where to find it and what it costs.

SHORT CUTS TO CARPENTRY. By Albert Fair. New York: Industrial Publishing Company, 1908. 90 pp.; 12mo.; ill. with sketches and working drawings. Price, 50 cents.

Much of the matter of this book has appeared in the "Practical Carpenter," where its popularity led to its reproduction in book form, revised and considerably added to by the editor. He starts with the aim of explaining the principle of each of the short cuts explained, generally mathematical but most simply explained, so that the young carpenter may learn the reason for the method and more successfully apply it to "jobs" a little different from the illustrations. The best methods of performing practically every operation required in the carpentry of building and fitting a house are clearly described, and the book should be found very useful either by professional beginner or amateur.

PHRENOLOGY, OR THE DOCTRINE OF THE MENTAL PHENOMENA. By J. G. Spurzheim, M.D., of the Universities of Vienna and Paris, and Licentiate of the Royal College of Physicians of London. With an introduction by Cyrus Elder. Revised Edition from the Second American Edition, in Two Volumes, published in Boston in 1833. Philadelphia and London: J. B. Lippincott Company. 8vo.; pp. 459.

Whether or not we agree with Dr. Alfred Russel Wallace that phrenology "should take its place among the recognized sciences," thereby elevating it to the dignity of a science, we must admit that whatever there may be of science in the study of the conformation of the human head was certainly brought out by Dr. Kaspar Spurzheim. Whether or not we take phrenology seriously, the new edition of this authoritative book seemed more or less necessary, inasmuch as it had been out of print in England for sixty years. Mr. Cyrus Elder has endeavored to remove what he considers prejudices against phrenology in an analytical introduction, in which he replies to criticisms made long ago by Spencer. To us it seems that the physiological psychologists, whatever Mr. Elder may think of them, are more likely to add to the science of the human mind than a serious study of Spurzheim's book, inasmuch as whatever is really scientific in phrenology has been incorporated in physiological psychology.

HANDBUCH FÜR HEER UND FLOTTE. Enzyklopädie der Kriegswissenschaften und verwandter Gebiete. Unter Mitwirkung von Zahlreichen Offizieren, Sanitätsoffizieren, Beamten, Gelehrten, Generalleutnant Z. D. Mit zahl- Herausgegeben von Georg von Alten, Generalleutnant Z. D. Mit Zahlreichen schwarzen und farbigen, Tafeln, Tabellen, Karten, Planen, und Textillustrationen. Berlin, Leipzig, Stuttgart, Wien: Deutsches Verlagshaus, Bong & Co.

This is the third installment of the Handbook of the Army and Navy, which we have previously had occasion to mention. The present volume starts with *Adlerflügel*, and ends with a biography of *Eugen Albori*.

DESIGN AND CONSTRUCTION OF INDUCTION COILS. By A. Frederick Collins. New York: Munn & Co., 1909. 8vo.; pp. 295; 160 illustrations. Price, $3 net.

Collins's "Design and Construction of Induction Coils" is a timely work. Until the discovery of the Roentgen ray in 1896, the coil was chiefly employed for the exhibition of high-voltage effects—beautiful, but of no practical value. Many colleges did not possess one of any considerable size. The Roentgen ray was closely followed by the invention of wireless telegraphy, and thus other new demands were made upon the induction coil. It was also found that these new duties required new forms and proportions. The induction coil is the result of experiment. The new demands **required** new experiments to develop a coil which could fulfill these requirements. This book is the result of several years of work in such experiments. No one can turn the pages without being impressed with its practical character. The paper is firm and soft so that it takes the ink perfectly. The type is large and distinct, the print open and well-spaced, the typography is in every way attractive. Closer examination only confirms the first impression. The book commends itself to the mechanician and the scientific man alike. It does not proceed by the deduction of mathematical formulas for the calculation of the