RECENTLY PATENTED INVENTIONS.

Engineering.

FURNACE.—Wardell Guthrie, Chicago, Ill. Air pipes arranged alongside the furnace, according to this improvement, have openings into the furnace above the fire surface, and the furnace is fed by a screw conveyor in a trough lengthwise and centrally of the bottom, the fuel being fed back and upward as a projecting crank on the end of the screw is turned. The air is fed by force directly on the surface of the fire, as the fuel is fed up from the bottom. A dump or grate, for removing cinders or ashes, is placed at one or both sides of the feed screw.

DRAG FOR STEERING VESSELS.—Louis Boucher, West Superior, Wis. This is a device designed for use only when a ship's rudder becomes disabled, and it is so made that it may be conveniently stowed away and set up in a very short time when needed. The drag is an air-tight cylinder with pointed forward end, in which is a ring, there being annular flanges or fins on the cylinder. Attached to the ring is a chain which connects with two chains, one leading to each side of the vessel near the stern, where the chains are passed around pulleys in the outer ends of projecting beams, and thence over pulley blocks and a central capstan, whereby the drag may be easily moved to one side or the other in the rear of the vessel.

PROPELLER.—Frank J. Leisen, Woodbridge, N. J. This propeller has cylindrical, spirally formed and diagonally opposing exterior surfaces, and hollow interior formed with two pockets, one pocket visible from each side, and both pockets uniting to form a circular opening at the outer end. There are spiral exterior blades or ribs, each rib above a pocket. This improvement has been practically tested in a 16 inch propeller, demonstrating its superiority to an 18 inch fluke wheel, and a 36 inch pattern has been furnished the owners of Yankee Doodle, of Philadelphia, from which a propeller is to be made and given a public trial on that famous yacht.

Railway Appliances.

CAR COUPLING.—Edward N. and Jacob J. Byers, Cameron, Mo. This invention provides a safety attachment for couplers of the Janney type, whereby, should the drawbar be drawn from its proper seat, the device acts automatically to uncouple the loosened drawhead from the opposing car. An uncoupling lever connected with the drawbar has one end located beneath the coupling pin, and a guide is so connected with a fixed support that the lever will be elevated beneath the pin as the drawbar or drawhead is carried outward from the proper position.

PNEUMATIC SIGNAL.—George V. Steeb, Brooklyn, N. Y. The utilizing of air pressure to operate signals or semaphores is the object of this improvement, which provides for bringing the air pressure into action by the passing of a train over the track. The air under pressure is supplied by a pipe from any suitably located compressing source to a cylinder located in a suitable chamber beneath or adjacent to the track, this cylinder being connected with another cylinder in which is a piston, the movement of which operates the semaphore rod, the action being controlled by a valve in a third cylinder, actuated as the wheels of the car pass over inclined planes at the side of the track. The apparatus may also be used to ring alarm bells, move crossing gates, etc.

Electrical.

CARBON HOLDER.—Clark C. Hill, Newport, R. I. This holder is formed of a cylindrical, longitudinally slotted socket with thickened ends, and having near one end a circumferential groove to which is fitted a circular spring. With this improvement the upper and lower carbons of electric lamps may be held in the position of use without the employment of screw clamps or adjusting screws. The sections of the socket formed by slotting may also be made to clamp the carbons sufficiently without employing the circular spring.

ELECTRIC REGULATOR AND SWITCH.—Walter N. Jones, Jr., Petersburg, Va. This is an improvement for use on electric cars, in which the same adjusting devices serve to regulate the current to both the motor and the brake magnets, without allowing the current to be on the motor and the brake magnet at the same time from any inattention or forgetfulness of the motor man. Combined with two concentric rheostats, and two concentric series of segmental plates leading thereto, is a central shaft with insulated metal tubes bearing separate contact arms playing respectively upon the series of plates, the central shaft and metal tube forming two independent paths for the current centrally through the rheostats. The power increases in the motor by the movement of the crank in one direction, and increases in the brake by the mere reversal of the movement of the crank.

Mechanical.

HOOP SAWING AND SHAPING MACHINE.—Ephraim O. Hall, Marshfield, Oregon. This machine is designed to cut two hoops from a round log each time the log is fed to the machine, the hoops being perfectly formed, their upper sides planed, the edges scarfed, and the under side, in the direction of the heart of the log, left rough, the machine requiring but a single attendant. A diagonal saw at the rear of a vertical saw produces a kerf meeting that formed by the vertical saw, a planer being operated in conjunction with the latter saw, while an adjustable planer and an adjustable saw are also diagonally located, the latter saw being held to cut beneath the surface planed smooth by the planer.

HOOP CUTTING MACHINE.—Alban H. Adams, Fort Meade, Fla. According to this invention a roller cutter is applied to an ordinary rotary veneer cutting machine, to score the log or make longitudinal incisions in it, making also perforations between the incisions, so that when the veneer is turned from the log it will fall apart at the places of the incisions, forming a series of hoops, the grain of which runs lengthwise, and which are already perforated to receive the nails. The hoops thus made are especially adapted for use on orange boxes and similar packages.

PRINTER'S FURNITURE.—Jacob C. Wolfe, New York City. The design in this furniture is to present the maximum of bearing surface with the least weight, while it may be quickly and conveniently cast, and will afford a facing of uniform thickness. It consists of a hollow block with top and bottom recessed to form a marginal rib, the bottoms of the recesses inclining from the side ribs to the center of the block, while it has also a longitudinal central wall and transverse partitions forming pockets in each side.

WIRE BENDING MACHINE.—Cyrus M. Suter, Ashton, Ill. This is a machine for making stays especially adapted for placing the strands of wire fences and holding them the desired distance apart. The construction of the machine is such that the operation of forming a stay is entirely automatic, the stays being made successively from a length or coil of wire.

Agricultural.

CULTIVATOR.—August Leineweber, De Witt, Neb. This invention provides an improvement in cultivators of the disk type, and the cultivator shank is carried by and has vertical adjustment in a slide having movement upon the beam, there being a gear connection between the slide and the shank whereby the latter is revolved. Any desired number of cultivators may be placed upon a beam, and the cultivator disks are of peculiar construction, each disk being more or less cupped or rendered concave upon its inner face and convexed upon its outer face.

Miscellaneous.

APPARATUS FOR LIGHTING BUILDINGS.—John W. Davis, New York City. The lighting of interior rooms, basements and lofts, not readily lighted by windows, is the design of this improvement, the apparatus first condensing the beams of light, then carrying them to the desired locality and diffusing them, by a peculiar arrangement of mirrors operated by clockwork. A concave paraboloidal mirror is supported and adapted to travel above a light conduit, a convex paraboloidal mirror being held at the focus of the concave mirror and adapted to throw beams of light through an aperture in the latter, a plane deflecting mirror being held to receive the beams of light and throw them into the conduit.

VEHICLE BRAKE.—Eugene W. Cleveland, Rounthwaite, Canada. This is a strong and simple device, more especially designed for use on portable engines and other heavy vehicles. It comprises a frame on which is a windlass, chains attached to and wound upon the windlass being extended in opposite directions and hooked upon spokes of the wheels of the vehicles.

GLASS STRUCTURE.—Edgar W. Cunningham, Jersey City, N. J. This improvement pertains to an improved construction of skylights and the roofs and sides of greenhouses or conservatories, combining with aligned panels a joining piece of two metal binding strips having straight abutting sides which are soldered together, and parallel flat upper and lower flanges which closely embrace the adjacent opposite ends of the panels, the lower flanges being extended and curved to form a gutter.

SPIRIT LEVEL AND INCLINOMETER.—James P. Famous, Norristown, Pa. This device comprises an adjustable level tube in an elongated level stock, there being a grade indicating slide block at each end and a fixed transverse level tube on the top of the stock, in combination with a swiveling sight tube on the stock. The implement is adapted to determine whether objects are level, plumb, or inclined, and exactly determine the degree of inclination from a horizontal plane, the device being adapted for use in building and engineering work of all kinds.

ROCK DRILL.—William O. Higgins, Kingwood, Ind. This is an implement which may be conveniently worked by hand and easily handled by one man to place it in the desired position. In a suitable upright frame are mounted a vertically movable drill shaft and a driving shaft, an eccentric on the latter operated by a pivoted lever, there being a sliding ratchet wheel on the drill shaft and a pawl pivoted to a centrally pivoted lever, and a link connecting the two levers. The drill is steadily fed downward, to be able at every stroke to deliver an effective blow.

WRITING TABLET AND MANUSCRIPT HOLDER.—Barton W. Scott, San Jose, Cal. This improvement is more especially designed for the use of stenographers, public speakers, type setters, and others, to permit of readily writing matter on a continuous sheet, and conveniently displaying the written matter. The invention comprises a casing having two winding drums for the paper, a main shaft being journaled in the casing and actuating two gear wheels, which are adapted to be geared with the winding drum.

COAL SCREEN.—Frank L. Sackett, Fredonia, N. Y. To facilitate the screening of broken coal for retail purposes is the object of this invention, and the device provided therefor is simple and inexpensive. It consists of an oblong frame, across which the screen proper is stretched, and having an end wall and discharge opening, and whose bottom slides on side bars of the screen, the hopper being adjustable and removable. The device may be attached to the side of a cart or inclined against an upright support.

BICYCLE WHISTLE.—John F. Hylan and Robert L. Sinley, Brooklyn, N. Y. This is a simple and practical device, which may be readily attached to a safety bicycle, and comprises an air pump, to be actuated by the rotary motion of the front wheel, to afford a copious supply of air, and, on the movement of a lever, blow a loud blast on a whistle connected to the pump. The lever is projected below the handle bar, and the blast may be prolonged for as long a time as the lever is held gripped with the handle bar.

THILL SUPPORT.—Adolph Meyerhoff, New York City. A pair of keepers on the thill or pole is provided for by this improvement, and a slide bolt in the forward keeper has a head engaging the keeper, while a chain secured to the rear end of the bolt runs through the rear keeper, and a hook on the running gear engages the chain. The device is very simple and inexpensive, and may be attached to the thills or pole of any vehicle to hold them at the necessary height for convenience in storing, or to hold them up to take their weight from the horse's back.

FOLDING BED.—Hugh Stevenson, New York City. This is an improvement upon a formerly patented invention, according to which, when the beds are folded, the bedding is suspended, both the covers and mattress, to permit a free circulation of air between the covers, that they may be thoroughly ventilated. The present patent provides an improved construction, whereby, when the bed is folded, the covers may be separated and held perfectly straight, the covers and mattress being also so held that the bed may be very easily made up when necessary.

SHOE.—William T. Loyd, Hiawatha, Kan. The sole of this shoe is formed of a single sheet of metal, with a metallic counter, and a flange around the toe and ball, a flexible top toe piece being fastened to the front flange and a flexible lining at the heel. Beneath the ball and heel are also attached plates having serrated flanges, adapting the shoe especially for use as an ice creeper. The shoe is held on the foot by a strap over the instep.

BOX FASTENER.—Thomas Cole, St. Mary's, Mo. A safe and simple fastener, which will permit crates on which it is used to be packed on top of each other and slid about without disturbing the fastening, has been provided by this inventor. The fastening hasps are secured to staples made with spring coils, and the free ends of the hasps engage pins in recesses of the upper face of the lid, the spring tension holding the fastening firm, while the pressing up of the staple loosens the hold of the hasp on the pin.

Design.

SWEATERS.—William T. Pitchers, Godalming, England. Five design patents have been awarded this inventor on this article of apparel. In the first the sleeves and body are ornamented with panels having adjacent angular figures alternately embossed and in intaglio, and in the second are decorative panels of diamond shape, with sunken body and embossed margin. In the third are intersecting figures of serpentine character, with interposed series of ribs; in the fourth, rectangular figures inclose grouped circular figures, and in the fifth the body and sleeves have a surface finish of embossed ribs arranged spirally or diagonally.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

Business and Personal.

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

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.
References to former articles or answers should give date of paper and page or number of question.
Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.
Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.
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Scientific American Supplements referred to may be had at the office. Price 10 cents each.
Books referred to promptly supplied on receipt of price.
Minerals sent for examination should be distinctly marked or labeled.

(5502) H. E. W. asks how to run a 70 volt motor of ½ horse power on a 110 volt circuit. A. Connect your motor across a pair of 12 light leads or larger, and place in series with it a resistance of 8 ohms. For the latter use No. 15 wire, or if you have them, 30 lamps in parallel with each other and in series with the motor.

(5503) J. R. N. says: Suppose a tank at an elevation of 250 feet in height, 10 feet in width, and 15 feet in height, with a pipe attached to bottom of tank 3 inches in diameter, 250 feet in length, perpendiculars. Suppose said tank to be filled with water. How many gallons of water will flow through said pipe per minute and what horse power would be required to keep this tank full of water, there being a constant discharge 3 inches in diameter? A. The pipe will discharge 1,275 gallons per minute and will require 80 horse power to keep the tank full.

(5504) E. A. S. says: Kindly inform me through the columns of your paper of a process forcuring small skins, such as squirrel, etc. A. Mix bran and soft water sufficient to cover the skins. Immerse the latter and keep them covered for twenty-four hours, then remove, wash clean, and carefully scrape off all flesh. To 1 gallon of water (hot) add 1 pound of alum and ¼ pound of salt. When dissolved and cool enough to admit entrance of the hand, immerse the skins for twenty-four hours, dry in the shade and rub. Stir the liquor again, immerse the skins for twenty-four hours, dry and rub as before; immerse for twenty-four hours in oatmeal and warm water, partially dry in the shade, and finally rub until entirely dry. This leaves the skin like white leather, and fit for immediate use.

(5505) L. M. asks: What is the best method to preserve pneumatic tires for bicycles from one season to another, that is, to keep them from cracking and keep them soft? A. Wash the rubber tires perfectly clean and dry. Warm them by a stove and rub melted paraffine over the surface with a warm cloth. A very thin coat answers the purpose. If rubber cement can be obtained, such as sold by the rubber trade, a thin wipe of it with a woolen rag over the surface of the tires will keep them in good order.

(5506) S. B. W. asks: What the power of an ordinary man would be equal to in horse

power. A. With a horse power equal to 33,000 foot pounds per minute, the power of an average strong man working to the best practical advantage for 10 hours is 4,200 foot pounds per minute. On short spurts can accomplish from two to three times as much, or half a horse power.

(5507) G. W. T. says: In this valley the coal is let down from the opeuings on the hills by wire cables and large drums and the speed is controlled by iron bands or brakes applied to the outside of the drums. Why is it that the bands or brakes wear faster than the iron plating on the drums? They are all the same kind of iron, and the band reaches nearly around the drum, but the plating on the drums will outwear three bands of the same thickness. A. Brake bands are generally much thinner and have less wearing surface than the drum band; besides the motion of the drum band tends to keep it cool, while the friction on the thin brake band makes it hot, and hot iron wears faster than cold iron.

(5508) G. E. P. writes: Can the simple electric motor described in SUPPLEMENT, 641, be run an hour or so a day by three storage battery cells which are charged the rest of the twenty-four hours by six cells of gravity battery? A. Yes; but you will need eight cells or more of gravity batteries for charging.

(5509) W. A. P. asks: How to hard solder one of those aluminum World's Fair sonveuirs and also how to soft solder on the same. A. For hard solder for aluminum, use an alloy of 6 parts aluminum, 4 parts copper, 90 parts zinc. Use Canada balsam for flux. For soft solder, an alloy of 95 parts of tin, 5 parts bismuth, or 5 parts cadmium, 2 parts zinc, 3 parts tin, using paraffine or vaseline for flux.

(5510) M. W. S. asks: In what proportion should air and ordinary illuminating gas be used in a gas engine to produce the best results? A. The constituents of ordinary illuminating gas vary somewhat in different cities and require a variable amount of air for perfect combustion; 8 to 12 volumes of air to 1 volume of a good quality of gas will produce the best result.

(5511) A. C. McG. says: Will you please inform me what chemicals are used to perform the trick of smoking from two clay pipes, by holding the bowl of one over the other? A. Hydrochloric acid and ammouia are used for this purpose.

(5512) W. W. Brown, Culbertston, Neb., writes: Under Notes and Queries (No. 5356) B. C. W. asks if there is any kind of a flux that can be used better than borax. I have a patent on a flux that will do the work he desires and will be pleased to be placed in commuuication with him.

(5513) R. E. B. asks: How is the power determined to drive a boat of a given size at a certain speed? This is for small boats of from 18 feet to 40 feet long. A. So much depends upon the lines and build of boats, together with the varying weight of the power, that computation of the power required for stated speed becomes somewhat complicated. The approximate formula is $\frac{V^3 D^{\frac{2}{3}}}{C} = 2$ H. P. In which V^3 is the cube of the required velocity in knots per hour, $D^{\frac{2}{3}}$ is the cube root of the square of the displacement in tons, C is a coefficient for the water lines of the boat, which for launches and small steam yachts may vary from 500 for medium lines to 530 for sharp lines. The displacement should be computed for the total load, boat, machinery, water, fuel and persons.

(5514) E. S. McI. says: It is stated by the highest engineering authorities that the passage of impure water through sufficient gravel or sand will remove the impurities and make even sewage water wholesome and well tasting. Can you inform me what value as a filterer have the cinders from anthracite coal taken from under a boiler? A. The statement of engineers may be true in regard to the insoluble elements of sewage, but the soluble salts, urates, etc., have been traced a long way through the waterways of the ground, less through the loams and quicksand, but to an almost unlimited extent through the coarser gravels forming the principal underground waterways. When sewage is filtered through thick beds of material, so as to maintain the nitrifying organisms, which are supposed to be supported by a proper supply of sewage, there are possibilities of potable water being a product of such filtration. Gravel bed surface filtration has been found very efficacious in purifying sewage. Drinking the effluent is hardly to be recommended. Clean ashes from under a boiler should make a fairly good stratum in a filter after the soluble salts of the coal and wood are removed. The ash stratum should be protected by sand.

(5515) J. B. says: I am at present experimenting with a toy balloon. For a certain purpose I would like to have this balloon carry a weight from 3 to 4 ounces. The common toy balloon filled with coal gas has no lifting capacity. What I wish to know is whether this same balloon could be filled with some other kind of a gas, to give satisfaction. If this is possible, please let me know. A. If hydrogen gas were used, it would lift more than the coal gas. But it would require a balloon of say 6 cubic feet capacity filled with hydrogen to lift 4 ounces weight.

(5516) B. S. says: Will cedar or cypress tanks (or leach tubs) for tan liquors last the longest without rotting and how long will they last if welltaken care of? A. There is very little difference in the lasting qualities of cedar and cypress for tan bark leach vats.

(5517) C. R. — Clean celluloid collars and cuffs with saleratus and water, using an old nail brush if desired.

(5518) F. De T says: Kindly give rule: How heavy should the joist be under a tank holding 18,000 gallons water, 40 feet from the ground, and are 12 x 12 heavy enough for uprights and plates, if properly braced? A If your tank is circular, 15 feet diameter by 15 feet high, the joists should be 4 x 12, 2 feet apart. Uprights and plates 12 x 12 inches.

(5519) F. M. says: Will you please state the difference of cost (used for cooking and furnace heating) against anthracite coal at $4.75 per ton of 2,000 pounds? Oil can be obtained for 5 cents per gallon or less, delivered in the tank. Would not two barrels of oil contain as much fuel as one ton of coal, taking combustion and advantage in controlling the use in consideration? A. The cost of petroleum at prices named is more than twice as much as coal for a given number of heat units for a constant fire. The only advantage in favor of petroleum at the price named is for the intermittent use of heat, such as for cooking in summer and the generation of steam for sudden and special use.

(5520) J. E. L. Co. asks: In a cylinder 20 inches long by 6 inches diameter, with a piston at one end, we find if subjected to 300 degrees, the volume of air will increase about ⅓. I would like to know the expanding force of the air thus heated, or how much will it move the piston and resist one pound pressure to the square inch? A. By heating the air from 60° to 300° it expands approximately 50 per cent, or 1 volume becomes nearly 1½ volumes, and if confined to the original volume it will have a pressure of 6 pounds per square inch, and will push a piston in a continuous cylinder from 20 inches, as above stated, to 27½ inches under 1 pound pressure per square inch.

(5521) W. A. W.—To make heel ball: Hard suet and beeswax, of each 4 ounces, powdered gum, sugar candy, and Veuice turpentine, of each 1 ounce, ivory black and lamp black, of each 2 ounces. The coloring matter and sugar must be in fine powder. Dissolve the candy in as little water as possible. Melt the suet and the beeswax and add the sirup and the coloring matter, stir thoroughly, then pour into moulds.

(5522) K. S. asks: Is there any difference between an injector and an inspirator? A. There is no difference in principle between an injector and an inspirator. See an interesting illustrated article on injectors in SCIENTIFIC AMERICAN SUPPLEMENT, No. 356.

(5523) J. M. says: I have a cistern that was sunk in heavy clay, then boarded up with inch lumber, leaving a space of 3 inches behind the boards; into this space I packed soft clay and rammed it down tight as I boarded it up. I thought this would hold water and make an inexpensive cistern. I find that it will not hold water. Is there any way in which I can plaster it up with water lime over the boards to make it hold? Or is there anything you could suggest whereby I can fix it to hold in without going to much expense? The cistern is 5×5 and 6 feet deep. To settle a dispute, will you please say how many feet of timber in a stick 12×12 inches at one end and 24×24 inches at other end and 40 feet long, and give figures showing how to obtain the proper answer? A. You cannot do better than to take out the wood and clay tamping of your cistern and make the bottom and sides of Portland cement concrete, 1 part of cement, 3 parts clean sharp sand, then plaster the entire inside surface with pure Portland cement. Your cistern must be circular. For the taper timber. Rule: To the sum of the areas of the two ends add four times the area of the center and multiply this sum by one-sixth of the length. The piece of timber as stated contained 93·26 cubic feet.

(5524) D. F. V. asks: What would be the temperature at points 10, 20 and 40 feet below surface of ground in ordinary soil and does it vary much winter or summer? Also what force per square inch will air confined at ordinary temperature exert if heated from 300° Fah. to 600° Fah.? If compressed to 15 pounds per square inch before heating, would pressure be doubled when heated? A. The temperature of the earth at from 10 to 20 feet below the surface is nearly the same as the mean annual temperature on the surface. In mid-latitudes from 50° to 60° Fah., according to the condition of the surface soil. The increase of temperature downward is also variable, due to the nature and structure of the soil and rocks, the rate varying from 50 to 65 feet in depth for each degree of rise in the thermometer.

(5525) P. J. L. says: I wish to experiment with a hot water radiator for heating a room, and wish to know what kind of the following metals will give off the most heat, cast iron, steel, or copper, with hot water at 212°. Also, what amount of radiator surface is needed for a room 12 x 12 x 9, both for water and steam, and what quantity of water would radiator hold? What degree of heat would be shown on surface of radiator? Would it be possible to heat a radiator of the required size with a center draught lamp or with a gas burner? A. A copper radiator will be the most efficient in heating surface. Your room will require 12 square feet of heating surface for either hot water or low pressure steam. The capacity depends upon the plan of construction. The outside surface should be from 210° to 211° Fah. A large lamp or gas stove will heat the radiator.

(5526) C. P. asks: 1. How can a magnetized watch be demagnetized? Is there any machine for doing same, and where can I get description of it? A. A strong horseshoe magnet is required for demagnetizing watches. See an article on this subject in SCIENTIFIC AMERICAN SUPPLEMENT, No. 668. 2. What would be the size of the smallest boiler to generate enough steam for working the steam turbine described in No. 17 of this journal, at the rate of 30,000 revolutions? A. A 25 horse power boiler might produce the number of revolutions you mention.

(5527) E. E. asks if it would be possible to read messages that were being transmitted through an ocean cable by inductive means, after grappling the cable and lifting it to the deck of a vessel. A. We think this would be impossible, on account of the use of a very weak current in the cable for transmitting messages and the ability of the metallic protecting covering of the cable to absorb practically all of the inductive impulses.

(5528) P. G. asks: 1. What would be the power of dynamo described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 161, if changed into a motor? A. About one man power, if supplied with sufficient watts. 2. What different connections are made to change a dynamo into a motor? A. No changes are requisite. The size of wire for winding depends on the potential that is available. 3. Would current enough to run a 6 candle power lamp run the above motor? A. It might run it if the motor was well constructed, but with very little power.

(5529) A. B. C. says: I have a motor like the one described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 759, with the exception that the field magnet is of the horseshoe style instead of the consequent pole type, as shown in that paper. It runs finely with six cells of plunge battery. I would like to rewind it for use on a 220 volt motor circuit. Should it be wound series or shunt? What size of wire and how many layers should I use on the magnet and armature? If it could not be wound for that high voltage, could I wind it for 110 volts and run in series with a 110 volt 16 candle power lamp? A. Wind your motor in series, with enough wire to give a safe current at 220 volts. We cannot do the calculation without knowing the size of your motor. If to be used with the lamp, it may be wound with enough No. 26 wire in field and No. 29 in armature to give 110 ohms resistance. In the calculation take the armature as wound in parallel, giving one-quarter the resistance of its winding.

(5530) W. A. M.—For information in regard to sterilizing milk, see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 811 and 872.

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November 14, 1893,

AND EACH BEARING THAT DATE.

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