the soldering tips cheaply replaced. The core for the coil is so constructed that acid from the sealing tip cannot reach it to scale off the metal and short-circuit the wire wound adjacent to the core. A mica insulation is furnished between the layers of the coil.

WATER COOLER OR HEATER.—J. H. Rose, Shreveport, La. The inventor claims in this device an improvement in apparatus for cooling and heating water and the like, and the invention relates particularly to coolers and heaters in which the heating or cooling medium is placed within an air-tight can and the can immersed in the liquid to be heated or cooled.

SHUTTER-WORKER.—J. H. Rose, Shreveport, La. Mr. Rose in this case makes an improvement in that class of shutter-workers which are adapted to be operated from the inside of a building. The apparatus is very easily operated for opening or closing the shutter and it consists of few parts, which are not liable to get out of order. It may be easily applied to window-frames and shutters by boring through the window-sill and then applying the several parts.

PACKING-BOX.—J. H. Rose, Shreveport, La. The purpose of this invention is to complete an improvement in the covers and cover-fastenings of packing or shipping boxes. The covers are preferably constructed of sheet metal for the sake of economy in manufacture and of space in the box and also reduction of weight, and the invention relates in particular to the construction of the cover proper, whereby the fastening is formed.

BOTTLE CLOSURE.—C. W. Scott and H. Hughes, Saratoga, Wyo., and C. E. Shipley, Denver, Col. The closure consists of a plug having an interior chamber with outlet at the bottom. A ball-valve operates in the chamber and normally closes this outlet; but when the bottle is tipped the valve opens, permitting the contents of the bottle to flow into the chamber, whence they pass out of the bottle through a discharge passage in the plug.

SUSPENDERS.—M. Gluckauf, New York, N. Y. In these shoulder straps the web is in one piece. A specially constructed back-piece holds the web so that a strap will be in position over each shoulder. When the strap or web passes over the plate the suspenders will be flat and comfortable. Means are provided which serve the dual purpose of a buckle for the web when used as a belt, and for connecting the front suspender-ends with the webs. These means are concealed in the button loops through which the ends pass and have play. The suspenders may be readily converted into a belt.

SILK-HOLDER.—S. V. Luallen, Alva, Oklahoma Ter. The purpose in the present improvement is to provide means especially adapted to be attached to tooth-brushes and by which silk or the like may be held taut, so as to be useful in cleaning the teeth. The invention comprises means for carrying the silk in or on the handle of the brush or other supporting part and a bow for holding a part of the cord extended in position to be used.

SHADE-HOLDER.—C. J. Kusche, Oshkosh, Wis. Comprised in this invention is a certain specially-formed gripper for engaging a lamp. The gripper carries an adjustable arm, which in turn supports a frame or holder for the shade. This shade may consist of a cardboard or material of any degree of opacity. It may be either plain or ornamented, and owing to the construction provided, the shade may be made to occupy exactly the position desired.

PERPETUAL CALENDAR.—W. M. Finch, Willow, Cal. By a novel construction and combination of parts, Mr. W. M. Finch is to provide a simple formation of a perpetual calendar which can be easily read and operated and which can be adapted to a pen holder, a pencil, or other cylindrical support or which can be used flat, as desired.

CANVAS-STRETCHER.—W. J. Dorgan, Chicago, Ill. The object in view in this invention is to provide a canvas-stretcher perfectly true, not liable to get out of shape, requiring no truing up before or after mounting the canvas thereon, and maintaining the canvas after the painting is finished, in the proper shape, thus requiring no remounting previous to securing the painting and its stretcher in a suitable frame.

BOTTLE.—H. De Rocco, Buenos Aires, Argentina. In this construction of a bottle certain novel valve devices render refilling impracticable after the orginal contents have been extracted. A sectional plug is employed in which a tortuous passage is formed, this passage constituting the outlet for the liquid. In such passage are placed valves which open outward, so that the liquid may be withdrawn, but which will seat to prevent any introduction. This plug is held in place by a cap fastened by cement in the extreme mouth of the bottle.

SCENIC APPARATUS.—F. W. Thompson, New York, N. Y. In this invention the underlying aim is to provide a device comprising a rocking platform having wings to represent an aerial ship, in connection with scenic effects so arranged as to give passengers the illusion of gradually ascending and descending through the air.

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.**

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READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. **In every case it is necessary to give the number of the inquiry.**

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Marine Iron Works. Chicago. Catalogue free.

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Autos.—Duryea Power Co., Reading, Pa.

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For mining engines. J. S. Mundy, Newark, N. J.

Inquiry No. 4086.—For a reversible marine clutch for explosive engines.

Morgan Emery wheels. Box 517, Stroudsburg, Pa.

Inquiry No. 4087.—For makers of steam turbines of 11 to 20 or 30 h. p.

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Handle & Spoke Mchy. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

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Mechanics' Tools and materials. Net price catalogue. Geo. S. Comstock, Mechanicsburg, Pa.

Inquiry No. 4092.—For blue prints of one horse power stationary engines.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 18, Montpelier, Vt.

Inquiry No. 4093.—For a large gasoline stove for heating a one horse power boiler.

Let me sell your patent. I have buyers waiting. Charles A. Scott, Granite Building, Rochester, N. Y.

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Patent for Sale.—The smoothest cork extractor ever invented. No screw. R. M. Prather, Clarendon, Tex.

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American Institute of Inventors Co., Inc'd., Buffalo, N. Y., U. S. A. Patents sold, placed on royalty and companies formed.

Inquiry No. 4097.—For makers of machinery for making potato starch.

Wanted at Once.—Circulars and pamphlets of gold mining and refining machinery. L. H. Daloz, 38 Pleasant Street, Dorchester, Mass.

Inquiry No. 4098.—For makers of self-cleaning curry combs.

Manufacturers of patent articles, dies, stamping tools, light machinery. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.

Inquiry No. 4099.—For advertising novelties suitable to advertise medicines.

Crude oil burners for heating and cooking. Simple, efficient and cheap. Fully guaranteed. C. F. Jenkins Co., 1103 Harvard Street, Washington, D. C.

Inquiry No. 4100.—For makers of gas fixtures, chandelier hangings, etc.

The largest manufacturer in the world of merry-go-rounds, shooting galleries and hand organs. For prices and terms write to C. W. Parker, Abilene, Kan.

Inquiry No. 4101.—For machinery for cutting gloves.

Experienced mechanical draughtsman wanted. Permanent employment assured to rapid and accurate draughtsman. Mill Work. Box 773, New York.

Inquiry No. 4102.—For makers of table tennis supplies, such as balls, rackets, etc.

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

Inquiry No. 4103.—For dealers in glassware to make a special bottle.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, $5. Munn & Co., publishers, 361 Broadway, N. Y.

Inquiry No. 4104.—For a machine for ripping stitches in seams and hems of bags.

Contract manufacturers of hardware specialties, machinery stampings, dies, tools, etc. Excellent marketing connections. Edmonds-Metzel Mfg. Co., 778-784 W. Lake Street, Chicago.

Inquiry No. 4105.—For full information of motor cars, wagons and busses, as to size, capacity, weight, power, speed, cost, etc.

Wanted—Revolutionary Documents, Autograph Letters, Journals, Prints, Washington Portraits, Early American Illustrated Magazines, Early Patents signed by Presidents of the United States. Valentine's Manuals of the early 40's. Correspondence solicited. Address C. A. M., Box 773, New York.

Inquiry No. 4106.—For makers of benzine-cleaning machines.

NOTICE TO TUNNEL CONTRACTORS.

Sealed proposals marked "Bid for Tail Race Tunnel" will be received by the undersigned until noon, May 11, 1903, for the construction of a tail race tunnel for the Toronto and Niagara Power Co., of Toronto, Ontario. Plans and specifications for this work are on file, and can be seen after March 30, 1903, at the company's offices at Home Life Building, Toronto, Ontario, and Niagara Falls, Ontario, or office of F. S. Pearson, No. 29 Broadway, New York, Room 220. The right is reserved to reject any or all proposals. Frederic Nicholls, Vice-President and General Manager, Home Life Building, Toronto, Ontario.

Inquiry No. 4107.—For a bicycle, getting power from a dynamo driven by the sprocket wheel.

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HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

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Minerals sent for examination should be distinctly marked or labeled.

(8964) F. R. asks: I have a small battery motor which runs perfectly on one or a number of dry cells, or a sulphuric acid battery, and I put four gravity cells on, so it would be on closed circuit, and it would not move it. What is the trouble? A. We do not know why your motor would not run with four gravity cells when one dry cell will run it. The fault would naturally be sought in the gravity battery. 2. Can you give me a formula for making a good battery that would drive this motor for three or four hours or on closed circuit, other than bluestone? A. For a good battery to drive a motor see Supplement, No. 792, in which plans and drawings are given for such a battery. 3. How long will a Mesco dry battery last closed? A. A dry cell does not last long on closed circuit.

(8965) H. P. D. asks: Could you, or any of your readers, please explain the following results, obtained with an electric light with a broken filament, and an induction coil giving one-fourth-inch sparks? When the current was too weak to produce any light in the globe, the approach of a strong horseshoe magnet caused a light in the tube, varying in intensity with the position and strength of the magnetic field. When only one terminal was connected to the coil, a faint light was produced. On touching the globe with my hand, the light greatly increased, and the place touched was surrounded by a bright spot, a dark band, and then a brighter band. A slight spark could be obtained from my finger to the glass if the other hand touched the other terminal of the coil. A. The experiments you describe are due to the fact that an electric light bulb is a vacuum tube, either a Geissler or a Crookes tube, according to the perfectness of the exhaustion. When brought into the field of a electro-magnetic coil, the tube fills with light, as you have observed. All lamps will not act in this manner. In the early days of the use of X-rays, some lamps were found which could be used for taking photographs by X-rays. These had a very high vacuum.

(8966) W. D. A. says: Can you give me any information concerning a water telescope? A. A water telescope consists of a tube of wood or of metal, closed at one end water-tight by a plate of glass. Plate or good window glass will answer the purpose. This is placed in the water, open end down, and by looking through the glass top of the box, one can see very distinctly to quite a depth; hence the name, water telescope. The apparent opacity of water is largely due to the ripples upon its surface, which break up the waves of light and prevent their accurate transmission from below. The surface of the water within the box is smooth and the glass top is smooth; for both reasons the light comes up through the box to the eye undisturbed. Such a box to be held over the side of a boat may be three or four feet long and six inches square in section, so that both eyes can look into it at once with ease.

(8967) F. I. G. says: Do heat rays other than those from the sun pass through glass? It is admitted that the heat from the sun does pass through glass, but "A" contends that the rays of heat from an oil lamp or an open wood fire will not pass through glass. If sun heat only passes through glass, why? I do not wish to know if glass conducts or radiates heat, but whether glass is transparent to artificial heat, and in what degree. A. Heat rays of all wave lengths may pass through glass, but not equally. The longer wave lengths are cut off by glass much more than are the shorter wave lengths. Heat from any luminous source passes easily through glass. The contention of "A" that heat from an oil lamp cannot pass through glass is not well taken. He cannot say that he never felt heat which had passed through a lamp chimney, or that a thermometer would not rise if held near the glass chimney of an oil lamp. A window pane in the same way cannot cut off all the heat of a wood fire.

F. I. G. writes further: Your kind favor of the 13th is at hand and the answer is as I supposed. "A," however, is not satisfied. He **says the heat from a lamp chimney is radiated.** He also states that you do not dare publish the answer and query in the Scientific American.

Your friend "A" is certainly very poorly informed upon the literature of this subject, if he supposes that our answer to your inquiry so differed from the text books and commonly received opinion of scientific men that we *dared not print* it in our columns. A very small portion of the hundreds of letters received and answered each week can be printed. The Scientific American would be filled with letters, should all be inserted. Only those are published which seem to have general interest. However, for the satisfaction of "A" we publish both inquiries. He will find in Ganot's Physics, 15th edition, price $5, page 425, the power of heat to pass through bodies "differs greatly with the radiation from different sources. Rock salt is here stated to transmit all kinds of heat with equal facility, and is the only substance which does so. Fluor spar transmits 78 per cent of the rays from a lamp, but only 33 of those from a blackened surface at the boiling point of water. A piece of plate glass one-tenth of an inch thick, and perfectly transparent to light, is opaque to all radiation from boiling water, transmits only 6 per cent of the heat of copper at 850 deg. Fahr. and 39 per cent of that from an oil lamp without a chimney." These results were attained by Melloni, who died in 1854. They have never been disproved nor doubted by scientific men. With higher degrees of temperature than can be given by a lamp, Tyndall carried the subject much farther. These researches may be found in his book "Heat as a Mode of Motion," price $2.50. The general subject is "diathermancy." We have many times lighted a match by heat rays which had passed through several lenses of the stereopticon and through iodine dissolved in carbon bisulphide, none of which were made hot by the heat rays. They were brought to a focus by the lenses and the heat without light was able to set the match on fire. This beautiful experiment we owe to Prof. Tyndall. It is not true that these heat rays were absorbed by the lenses and radiated on their farther side.

(8968) E. G. A. gives the following recipe for removing indelible ink stains: If the base of the ink is nitrate of silver, which is generally the case, the following is certain and easy. Paint the ink stains with tincture of iodine, and after a minute or two wash out the stain, iodine and all, with stronger ammonia or a strong solution of hyposulphite of soda. The iodine simply creates iodide of silver, which is easily soluble in either of the above solutions. It works especially well in nitrate of silver stains upon the flesh.

(8969) H. D. H. writes: 1. Please inform me how to make a liquid glue suitable for mounting photographs which have a "glace" finish. The directions say: "Brush the backs with a very thin solution of pure white glue." I would like to know how to prepare such a solution that would remain liquid. A. The mountants for photographs which do not affect the gloss of the front are usually made of gelatine or of white glue. They do not remain fluid, but are placed in a dish of warm water and melted before use. The warm glue is applied rapidly with a brush, and the print must be in its place before the glue sets. 2. Is Sirius, the great dog star, variable? I notice this winter it does not appear nearly so large and bright as it did last year. A. Sirius is not a variable star in the sense that one can with the eye tell that it is dimmer this year than it was last. It has a dark companion. The system revolves once in 52 years. This companion was first seen by the late Alvan Clark, Jr., since which time it has not been classed as a dark star, though it gives less than one ten-thousandth as much light as is given by Sirius.

(8970) E. A. W. asks: Is there any extra wear on either rail of a double track, if the trains run respectively due north and south? If so, on which rail? Should trains travel north or south on a single track, would there be more wear on one rail than on the other, and why? A. On a railroad track laid due north and south, the car wheels bear against the east rail when running north and against the west rail when running south on a single-track railway. On a double-track road the wheel thrust is constantly on the outer rails of the double track. This effect is greatest at very high speed, and at 50 to 60 degrees north and south latitude, gradually decreasing to nothing at the equator. This is caused by the differential velocity of the earth's surface, which a train meets and which bears the track against the wheels on the west side when running south; on the contrary, when running north, the train is running toward a decreasing velocity of the earth's surface, and is borne against the east rail.

(8971) C. M. E. asks: 1. How can I make a good, strong baking powder that will not cake in tins? A. For baking powder, mix 80 parts dry bicarbonate of soda and 180 parts of cream of tartar. To the mixture add about 20 per cent to 25 per cent of starch; the object of the starch is solely to prevent caking and deterioration. 2. What is the formula for a strong liquid bluing? A. For liquid bluing: a. Dissolve indigo sulphate in cold water and filter. b. Dissolve Prussian blue by digesting with one-eighth its weight of oxalic acid in water solution. c. Dissolve 1½ parts of indigo carmine in 15 parts of water; **add ¾ part gum arabic.**

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