RECENTLY PATENTED INVENTIONS. Agricultural Implements.

ATTACHMENT FOR REAPERS OR MOW-ERS .- J. F. SICKENBERGER, Manzanola, Col. l'rovided in this invention is a standing cutter-bar and sickle for grain or grass boards of reapers and mowers and operated through the valve-gear thereof. The object is to construct movement of the main or horizontal sickle, which sickle will cut any tangled hay, grain, clover, grass, or field-peas which may fall over the board and have a tendency to catch in the rakes or choke the machine, thus leaving the path of the grass or grain board unobstructed.

STUMP EXTRACTOR .- O. J. DAHL, Anthony, Wis. 'This extractor can be anchored directly to a stump without the intervention of a cable, be easily shifted around a stump, and readily moved from place to place. Means are provided for readily taking up the slack in the cable by operating the drum by hand and while the sweep is at rest. By simple means the weight of the sweep is sustained when the machine rests, thus dispensing with a sweep-balancing device and relieving the

Electrical Devices.

LOCKING HANGER.-L. STEINBERGER, Brookdependent fastenings for holding a car and for expense prevented.

CIRCUIT-BREAKER FOR STORAGE BAT-TERIES .- II. GARRETT, Dallas, Texas. The improvement in this case consists in the novel construction and combination of the several parts, and relates to a new circuit-breaker for storage-batteries—that is to say, an appliance whereby the circuit is automatically broken when the storage-battery has become fully

Engineering Improvements.

INTERNAL-COMBUSTION ENGINE.—R. D. CHANDLER, Fairhaven, N. J. Owing to the absence of excessive vibration and also to its compact form, this engine is especially applicable to automobile and marine use. By means of this improvement the inventor avoids the use of heavy balance-wheels incident to engines involving the great negative work entailed in the high compression of the charge, and he utilizes the burning gases during the period of expansion. One impulse is imparted to every revolution of the shaft, but means are provided to increase this to two im-

and E. L. HAWN, Olivet, Wis. The invention relates to a rotary engine comprising a casing in construction, cheap to manufacture, very forming a circular passage equivalent to the engine cylinder, in which are arranged two pistons carried on disks loose on the engine-shaft. When the disk moves in one direction the piston is connected with the shaft by suitable olutches, and when it moves in the other di-rection the piston is stopped by connection with the casing. In operation steam is admit $ted\ between\ the\ pistons\ and\ tends\ to\ force$ them in opposite directions. The clutches, however, work oppositely so that the one piston acts as an abutment while the other is in

OSCILLATING VALVE.-G. L. WACKEROW, Mellette, S. D. Novel and useful improvements in this invention provide increased advantages over similar valves as heretofore constructed. The mechanism consists of a peculiar oscillating valve extending from end to end of the cylinder and a special steam-chest the die. and arrangement of steam passages or ports.

HYDRAULIC PRESS.—C. SEYMOUR, Defiance, Ohio. The claim of this improvement tion-clutch comprising a fast and a loose secis the provision of a press, completely under the control of the operator to permit instant struction for connecting them together, so that the control of the operator to permit instant struction for connecting them together, so that Texas. This invention relates to car coupregulation of the pressure to be exerted, and the loose section may be driven from the fast lings of the Janney type and has for its obone more especially designed for pressing axlessection. This is an improvement on a former ject to provide details of construction which one more especially designed for pressing axleboxes upon the hubs of wheels, for pressing patent of this inventor, and is intended for use bands and flanges upon the wheel hubs, and for in automatic knitting machines. various other purposes.

the nature of an air-pump to be operated automatically by the movement of water through the various outlet fixtures of the building, such apparatus is to be located preferably at a point where the street-supply comes in the building, the apparatus working whenever water is drawn and stopping when the flow of water ceases, and the air pressure in the tank is to paratus. be regulated by safety-valves or blow-off appliances at any pressure.

Pa. The object in view in this engine is to provide a new and improved valve-gear arsuccession and according to the speed desired and the load carried.

ROTARY-ENGINE .- F. A. PALLE, New York.

fullest advantage and to allow of conveniently reversing the engine by the operator manipulating a lever. The engine has few parts and is not likely to get out of order.

ECCENTRIC.—J. W. Davis, Salisbury, N. C. The eccentric invented by Mr. Davis is adapted especially for use on locomotives to operate the the eccentric so that it may be fastened to the axle or shaft more securely than heretofore. In locomotives eccentrics are strained until they frequently become loose on the shaft and neces sitate repairs. This invention seeks to overcome this disadvantage.

Hardware.

SAW-FILING GAGE.—S. J. GALLOWAY, Hillsboro, Ore. In the use of this device a frame is fitted over the saw, and means are provided to position the gage-plates properly with respect to the cutting-tooth to be filed. The plates are then adjusted so as to lie at the correct inclination in respect to each other and then the filing may be effected by running the file over the tooth and against the gage-plates. After the first tooth has been filed, readjust the gage so as to cover the next tooth and so on to the end.

WRENCH .-- M. J. FITZGERALD, Salt Lake City, Utah. Novel details of construction are lyn, N. Y. The particular object of this inven-provided in this case for a combined nut and tion is to produce a hanger provided with in- pipe wrench that adapt the tool for service as a parallel plain-jawed wrench or as a pipe wrench securing the parts rigidly together. The cap, having serrated faces on the jaws for biting yoke, and cone, lock firmly together, irrespectupon a pipe or bolt body to turn it. It is so tive of the clip. Thus the swaying of the made that the working parts of the wrench may trolley-pole cannot loosen the hanger parts, be quickly changed in adjustment to adapt the whereby lost time is avoided, and trouble and implement for use as a nut-wrench or a pipe-

Heating and Lighting Apparatus.

FLUE-STOPPER.-M. L. GREENSTREET, Owensville. Mo. This invention comprises a collar with a number of pivoted sector-like sections arranged on its inner side, so that when these sections are thrown out into inactive position they lie back of the collar and do not appear. These sections are so constructed and arranged that they may be readily moved inward completely over and close the central opening of the collar.

LANTERN .-- E. F. WEIDIG, New Orleans, La. This invention relates to oil-lanterns of the tubular type: and its object is to provide a new and improved lantern simple in construction, cheap to make, and arranged to securely hold the chimney in place by wires secured to the base and engaging the crimped top of the chimney

FEED-WATER HEATER.—F. L. PATTERson, Brooklyn, N. Y. The apparatus in this patent is for heating feed-water for steamboilers by the use of exhaust steam; and the ROTARY-ENGINE.—F. A. PALLE, New York, | object of the new improvement is to provide a feed-water heater which is simple and durable effective in operation, composed of compara-tively few parts and not liable to easily get out of order.

Mechanical Tevices.

LIFT-CUTTING AND HEEL-BUILDING APPARATUS.—D. M. BECK, Cincinnati, Ohio. In carrying out this invention, Mr. Beck employs a series of cutting-dies differing only in size, for which he provides an anvil. On this blows are given by a mallet to force the die into and through the leather. In connection with the die-head an attachment drives a nail through the several lifts held in the die and then ejects the lifts from the die. Means are provided to support the heel-lifts while the nail is driven through them, it being then retracted to allow the lifts to be ejected from

FRICTION-CLUTCH.—G. W. RUTH, Norristown, Pa. This invention relates to a fric-

ICE-CUTTER .- J. DUCHARME, Roseton, N. AIR-PUMP-OPERATING DEVICE .- R. D. Y. One purpose of this invention is to pro- $\mathbf{A}_{\mathrm{LBRIGHT}}$. Reynoldsville, Pa. This device is in | vide a machine motor-propelled and in which the saw is driven from the motor. Another, is to mount the forward portion of the machine upon runners and to provide such portion drawhead to be cracked or broken. as urinals, water-closets, washstands, etc. The with toothed supporting wheels for engagement with the ice, and means for raising the forward portion and turning the ice-cutter around. Another, is to furnish means for elevating the saw, which is at the back portion of the ap-

CABLEWAY FOR HOISTING AND CON-VEYING .- B. H. HARDAWAY, Columbus, Ga. VALVE-GEAR.—J. T. FENTON, Philadelphia, In the present invention improved means are provided which obviate the traversing movement of fall-line carriers with a carriage by ranged to enable the operator to quickly reverse fixedly attaching the carriers to the equivalent the engine, to cut off the admission of the mo- of the button-line and by providing an imtive agent to a nicety, to control the admission proved construction and arrangement of deof the agent to and from the cylinders in proper vices wherein the carriers are opened and closed on the approach and passage of the carriage with the fall-line.

WASHING-MACHINE .-- O. H. LARSON, Fort N. Y. This inventor claims for his object the provision of a new and improved rotary engine case belongs to the roller-and-bed-type, and the cue to make it strike the head on an indicator traction of the sap without danger of forming arranged to utilize the motive agent to the object in view is to provide the apparatus and cause it to revolve, at the same time to ree in the bore or causing the formation of sour

kind thoroughly and expeditiously.

HAT-SEWING MACHINE.—E. G. O'Don-NELL, Fall River, Mass. This machine is adapted for sewing sweat-bands into hats; and it provides means for holding the hat and allowing it to be fed properly and also for holding the band in position to be sewed into the hat. It is used especially in connection with stiff felt hats using a "beveled sweat" with a reed and cloth backing.

CAM-RACE PIN FOR COTTON-COMBERS, ETC.—A. C. AREY, JR., Utica, N. Y. The purpose of the device is to so construct the pin that it will not be inclined to wear to any appreclable extent the center stud or the cam-race in which it travels, no matter at what speed the cam may be driven. Another purpose is to furnish a pin comprising an inner cupsleeve for attachment to the stud and an outer shell-section, between which two parts, balls are loosely mounted and guided, and an adjustable cone for the shell-section.

COPY-HOLDER FOR TYPEWRITING MA-CHINES .- E. C. PRICE, Goshen, N. Y. This copy-holder is adapted to book typewriting machines, such as, for example, the Elliot & Hatch machine, but also to the frame of any typewriter. The holder may be adjusted so that the member receiving the copy will be provided with a clamping arm, which serves not only to hold the copy in place, but also to mark the alinement of the matter to be copied.

KEY-ACTUATED MUSICAL INSTRU-MENT.-V. BESSIER, Brooklyn, N. Y. This attachment is designed for instruments such as pianos and organs, to play these by pneu-matic action controlled by note-sheets. The intention is to provide an attachment for pianos, or like instruments arranged to actuate the keys with comparatively little power and to allow the performer to manually play the keys independently whether the device is in action or not.

WASHING-MACHINE.—I. MARKS, York, N. Y. The claim of this inventor is that he has in view the provision of a simple, cheap, and efficient contrivance adapted to be fastto fit tightly around a stovepipe or to extend ened in place on a suitable vessel and to be operated by hand for the purpose of subjecting the fabrics to a rubbing action in order to eliminate dirt therefrom.

> MACHINE FOR BALING FIBER.-J. J. DAVENPORT, New York, N. Y. With a transverse action this mechanism winds fiber into compact bales. It winds hemp in open slivers so that when carried to a hackling-machine the fiber is presented straight and comparatively untangled. It will not pull the slivers apart while being wound and means are applied to give the bale a very small core, very compact, packing the greatest amount without injury in a small space. The bale stick in the core is easily drawn out, and guides for the tale and sticks are so made that sections of the guides may be readily placed to produce a track on which the completed bale may roll.

Railway Improvements.

ADJUSTABLE HOUSING FOR CARS.—J. A. DE MACEDO, Leventhorpe Hall, County of York, England. The object claimed by this inventor is to protect the outside passengers on cars from rain and rays of the sun; and the invention consists in a quickly adjustable housing adapted to wholly or partially inclose the upper portion of the car and to be conveniently and quickly extended for protection or withdrawn as the weather conditions change.

CAR-BRAKE.—C. A. KLEINER, New York, N. Y. The purpose in this claim is to provide an auxiliary brake, which is adapted to have bearings on the wheels diametrically opposite the ordinary brake and also upon the rails. Another purpose is to so construct the brakeshoes of the brakes that the braking surfaces of the shoes can be readily removed and replaced if they should become unduly worn.

CAR-COUPLING .- J. C. YEISER, Austin, will greatly facilitate the connection of two car-couplings having the improvements and by means of a spring to adapt the knuckle of the coupling to automatically swing open when free to do so. The spring holds the coupling open and also binds the pin so that it cannot creep. There are no latches or locks in the

Vehicles and Their Accessories.

VEHICLE-JACK .- H. P. F. REPPENHAGEN, New York, N. Y. The purpose of this improvement is to provide a jack which can be attached to and carried by the axle of a vehi- ment, has for his object the provision of simcle without interfering with the wheels and to ple means in the cup for holding the soap cake so construct the jack that it will have a wheelcarrying base and clamping devices connected with the lifting-bar, whereby the jack may be substituted for a broken wheel and serve as a roller-support for the vehicle.

Miscellaneous.

HOCHWALT. Dayton, Ohlo. In play, the cue proved sap-spout arranged to allow the use of ball is placed on a spot near the lower end but one spout in the bore of a tree during the

indicated with novel details, which afford a try and send the sphere through one of the very light-running machine that is highly effi-pigeon holes. Should it pass through a hole, cient in operation, washing fabric of any it enters the outer space and passes down one of the alleyways by gravity and out an exit toward the pockets at the bottom. If after striking the indicator-head the ball fails to pass through one of the pigeon holes, it rolls down toward the pockets and probably passes through one of the wickets. A scoring method is provided.

> COLLAPSIBLE BOX .-- L. A. McCord, Laurens, S. C. This contrivance is an improvement in pasteboard boxes such as are commonly used by milliners for holding ladies' hats and bonnets and especially in collapsible or knockdown boxes intended for such purposes. It is a strong and practically rigid box, at the same time one readily foldable.

> BOTTLE ATTACHMENT.-W. J. LOWEN-STEIN, Statesville, N. C. The purpose in this case is to furnish means for utilizing the label of a bottle for holding a corkscrew or other tool, thereby dispensing with rubber bands, strings, wires, etc., for this purpose. The invention consists, essentially, in providing a bottle on the side to which the label is to be attached with a recess suitable for receiving, partly beneath the label, the corkscrew or other tool used with the bottle.

> HOOK AND EYE .- J. F. SCHOEPPL, Baltimore, Md. The invention in the present case has reference to a hook-and-eye or like connecting device, and has for its object the provision of improvements in devices that may be classified as intended more especially for use in trousers-fasteners at the waistband.

> CLOTHES-LINE .- A. L. RICHARD, Denison, Iowa. To this metallic clothes-line clothes can be readily and conveniently secured without the use of pins or fastening devices, the means for fastening being such that the separate pieces cannot overlap or even contact with each other at points where they are secure to the line. This latter feature prevents the pleces of clothing from freezing together on the line in cold weather.

> PADDLE-WHEEL .- J. ROURKE, New London. Conn. Mr. Rourke in this invention has designed improvements bearing on paddlewheels for vessels; and his object is to provide a paddle-wheel of the feathering-blade type so constructed that the friction on the blades upon entering and leaving the water will be reduced to a minimum.

> BOILER-CLEANING COMPOUND.-J. D. SCOTT, South Shields, and H. P. SCOTT, Poplar, London, England. Means are embodied in this invention for preventing and removing incrustations or like deposits from steam-boilers. The compound is inexpensive and efficient and will not involve the risk of corroding and otherwise injuring the plates, tubes or mountings of the boiler. The compound is storable in compact form and readily put in condition for use, thus making it especially adaptable to marine purposes.

> WATER-CLOSET .- F. SCHUH, Albany, N. Y. The object in view in this case is to provide a flushing water-tank in direct connection with and forming part of the bowl, thus dispensing with the usual overhead tank. The valve is so constructed that upon relieving the closet-seat of pressure a thorough flushing of all parts of the bowl takes place.

> COAT .- J. G. WEIMER, New York, N. Y. This invention relates to outer garments, more particularly to rain and storm coats, such as worn by car-drivers and the like. The coat is simple and durable and permits the user to quickly and conveniently slip the garment on or off to protect against weather without interfering with his duties.

> BELT-BUCKLE.—B. WILENTSHIK, York, N. Y. The object of this invention is to provide a new and improved belt-buckle arranged to permit adjustment for wearing the belt either straight around the waist in the usual manner or with a dip at the front to produce the so-called "French" effect.

> INGOT-MOLD .- T. DIXON, McKeesport, Pa. This ingot-mold relates to separable molds employed for casting into form ingots of steel or other metal, and has for its object to provide novel means for preventing the molten metal from burning out the bottom of the twopart mold when the metal is poured into the mold to be shaped as an ingot.

> SCAFFOLDING-SUPPORT.—A. SKI. New York. N. Y. In this case the invention relates to a scaffolding and support thereto, applicable in many branches of the building art, as will be apparent to persons skilled therein, and especially useful in connection with the building construction disclosed in another invention of Mr. Menczarski's.

> SHAVING-MUG.-W. G. RIVERS, Attleboro, Mass. Mr. Rivers in making this new improveout of contact with the water, but the arrangement is such that the soap may be forced into the water and be wet preparatory to forming a lather.

SAP-SPOUT.-G. H. GRIMM, Rutland, Vt. This invention has reference to the gathering of sap from trees, such as sugar-maples and the like, and consists of certain novel features GAME-TABLE .-. J. L. PATTON and A. F. and combinations providing a new and im-

sap liable to contaminate the fresh sap. By boring but one hole and in avoiding blazing the tree by cutting off bark, Mr. Grimm's method secures the great advantage of prolonging the life of the tree.

TROLLING-HOOK .- A. H. SMITH, Tremont, La. The barbs of this hook may be made to enter openings in the shank when not required for use, enabling the hook to be carried in the pocket without danger. The hook may be placed in a receptacle without the barbs becoming entangled with objects. The hook is so constructed that when taken by a fish it will fasten strongly in position, but may be quickly released without the introduction of fingers into the mouth.

PAINT OR PROTECTIVE COMPOSITION. -E. G. BERTRAND, 22 Rue Legendre, Paris, France. The present invention refers to a paint, and is intended mainly for the painting of houses and windows, its special property consisting in preventing to a great extent the passage of heat-rays, while at the same time letting the light-rays pass. It is applied like whitewash or grained or with a pad or dabber, and packed in a tub, box or barrel.

MANHOLE-COVER .-- C. E. BURNEY, New York, N. Y. This cover is more particularly of the type employed in that part of a ship known as the "tank." Very little labor and skill is needed in the operation. By placing the lid upon the lower side of the casing-that is, placed toward the water-little pressure is needed to hold it in place, the idea being that if the manhole-cover were subjected to excessive water-pressure this pressure would serve to make the joint still tighter.

DOOR FOR BOOKCASES OR THE LIKE.-O. O. Buice, Montgomery, Ala. The intention in this patent is to provide for bookcases, showcases, and like holders a new and improved door, simple and durable in construction, easily applied, and readily moved into a closed or open position completely out of the way of the user of the case.

CUFF-HOLDER.—J. H. and A. I. DWORK, New York, N. Y. This device for holding cuffs is attached to the sleeves of one's shirt, and it is of that general class in which is provided a shank with an attaching device at each end, one device being adapted to engage the shirt and the other to engage the cuff.

CHAIR HEAD-REST .- R. S. GIBSON, New York, N. Y. The present invention may be classified as relating to improvements in headrests for barbers' chairs or the like, the object being to provide a new and clean bearing-surface or rest for each customer, thus reducing the danger of spreading scalp diseases or the

FOR TRUING STRINGS .- C. A. GRAHAM, Columbus, Ohio. Strings for musical instruments formed of catgut and the like are generally of nonuniform diameter, and this defect impairs the accuracy of their notes. This invention overcomes the defect, and the end is attained by providing a grinding device to the action of which the string is subjected, so that the surface of the string is cut or ground down into

BOTTLE-CLOSURE.—C. J. GUSTAVESON, Salt Lake City, Utah. The object in view in this case is a novel construction of bottle-cap, label, and connections between the label and the cap whereby the latter cannot be removed or displaced without marring the label in such manner as to indicate that the bottle has been

SPRING-FRAME.-F. A. HALL, JR., Montclair, N. J. Heretofore it has often been a disadvantage that frames for woven-wire springs are liable to rupture, slight strains being suf ficient in some cases to make the frame useless. This weakness is mainly present in the connection between the side-bars and the brackets, and this invention resides in forming on these parts interengaging wedge-like surfaces bound firmly together, to prevent twisting or working movements of the parts.

Designs.

DESIGN FOR A CUP.—R. L. JOHNSON, Hanley, Staffordshire, England. In this design the upper portion of the cup is plain and cylindrical. The portion leading to the bottom flange is vertically fluted. The cup has a ringhandle. Leaf decorations appear at the bot tom of the knuckles on the body, and between each group of leaves a bar-scroll is introduced.

DESIGN FOR A COVERED DISH .-- R. L. JOHNSON, Hanley, Staffordshire, England. The cover of this design is decorated at its center by a cluster of leaves, from which rises the handle. Depressions, a scroll and clusters continue the decoration. The body is vertically fluted, and lead to vanishing effects. A harscroll is formed near the upper edge, and at the upper knuckle are clusters of leaves. Stemhandles are at the ends. The base is flared and decorated with clusters of leaves.

SHOE .- C. F. KLEIN, New Orleans, La. The invention in the present patent is in the nature of an improvement in shoes, having reference especially to the reinforcing of the vamp at the lower end of the front opening of the shoe and also preventing the external tip above the toe from becoming distorted or torn by the laster.

DESIGN FOR A STATUETTE.-R. F. OUT-CAULT, New York, N. Y. The design completes and ammeters for battery circuits having a prises a base supporting the representation of scale of ito 10 volts or more.

a nondescript dog, appearing with a smiling face and sitting on its haunches alongside a mischievous boy, the latter appearing in an erect standing position.

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Inquiry No. 4260.—For parties engaged in making buttons from milk.

Special and Automatic Machines built to drawings on contract. The Garvin Machine Co., 149 Varick, cor Spring Streets., N. Y.

Inquiry No. 4261.—For makers of a pneumatic carpet sweeper or beater.

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Inquiry No. 4262.—For manufacturers of a coil spring fine cleaner. 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. 4263.—For manufacturers of bydraulic rams.

'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.

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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. 4265.—For makers of cast iron kettles of 250 gallons capacity.

Contract manufacturers of hardware specialties, ma chinery, stampings, dies, tools, etc. Excellent marketing connections. Edmonds-Metzel Mfg. Co., Chicago.

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Claud S. Payne, R. R. No. 4, Salem, Ind.

In quiry No. 42 67.—For makers of safety of lamps for railroad cars, which extinguish automatically in case of collision or accident.

WANTED.—Some novelty to manufacture. Ample capital. Must be article that will meet ready sale throughout the United States. Address Box 52, Titus-

luquiry No. 4268.—For the manufacturers of the WANTED.-Cheap novelties in large quantities for

advertising purposes. Address John H. N. Davis, Secretary United States Insurance Adjusting Company, 324 Dearborn Street, Chicago, Ill.

Inquiry No. 4269.—For castings and materials for building a one-balf horse power dynamo.

Successful salesman of high-class specialties (" for 14 years in Southeastern New England") desires connec tion with a progressive firm, as

Address Eastern Representative. P. O. Box 10, Providence, R. I.

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ELECTRICAL TESTING .- If you wish to know the pro perties of any electrical instruments, materials or appa ratus, the utility of an invention or the practicability of an idea, tests by us might be of great value to you New York Laboratory, Lamp Testing Bureau, No. 14 Jay Street, New York. 8th Floor.

Inquiry No. 4271.-For manufacturers of sunflower, castor and other vegetable oils.

FOR SALE .- Patents on two valuable inventions. One adapted to handle by shop rights, the other a useful novelty suitable for hardware trade, novelty stores. or agents. Chas. B. Post, New London, Ohio.

Inquiry No. 4272.—For makers of peanut butter

Inquiry No. 4273.—For makers of cordage fabrics of sisal and other coarse vegetable fiber. Inquiry No. 4274.—For manufacturers of house boats.

Inquiry No. 4275.—For moulders of rectangular glass battery jars for storage batteries.

Inquiry No. 4276.—For makers of spring steel 1/8 inch in width.

Inquiry No. 4277.—For makers of automatic electrical clocks for closing circuits, having 24 figures on dial.

Notes

and Queries.

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(9044) D. G. E. asks: In what re-

spect, if any, do the magnetic properties of

nickel, cobalt, etc., differ from those of iron?

Can these metals be used for cores of electro-

magnets? A. While it would be possible to use

cobalt or nickel for the cores of an electro-

magnet, the power required to magnetize the

cores would be much greater, and the cost

would be very much greater. These metals are

(9045) W. D. C. says: Can you

please inform me what per cent of the entire

earnings of the railroads of the United States

is from passenger traffic, what per cent is from freight, what per cent is from mail, and

what per cent is from express? A. In 1901

passenger earnings were \$360,702,686; freight earnings were \$1,126,267,653; express and

mail not reported in detail, but the miscel-

know what is the process for etching on glass.

A. This preparation may be made by mixing

sulphate of barium and fluoride of ammonium

to one part of the latter, with sufficient sul-

phuric acid to decompose the ammonium, and bring the mixture to the consistency of rich

tacle of lead and kept in a bottle of the same

(9047) W. E. B. says: Please give

me a good formula for making chloride of gold,

as commonly used in toning photographs. A.

Dr. John H. Janeway, an amateur photograph-

er, suggests the following method: Dissolve a

\$2.50 gold piece in 6 drachms of chemically

nure muriatic acid, 3 drachms chemically pure

nitric acid, and 3 drachms distilled water.

Put the gold in a large graduate, pour on the

acids and water, cover the graduate with a piece of glass to shut off or retard the escape

of fumes, and set in the sun or in a warm

bonate of soda very gradually, stirring with

place. When the gold is dissolved add bicar-

The mixture should be made in a recep-

in the proportion of three parts of the former

(9046) A. B. B. says: Please let me

laneous returns were \$125,478,488.

material or of gutta percha.

inferior to iron in permeability.

a glass rod at each addition, until effervescence has ceased and the froth subsided, and the carbonate of copper which has been formed is deposited as a green precipitate. Now add 6 ounces of water, and let the whole settle for not over thirty minutes, and then very carefully filter the solution. To the clear golden liquid which has passed through the filter add carefully enough nitric acid, chemically pure, to turn blue litmus paper decidedly red, then add enough pure water to make the solution measure 32 fluid ounces. The solution will keep for any length of time, and 1 ounce will tone four sheets of paper. 2. Please tell me where I can procure pure gold for this purpose. Is it necessary to use pure gold for this purpose? A. Nearly pure gold must be used. 3. Can I procure books which will enable a person of ordinary intelligence to master assaying without a teacher? Is a course of home study without aid, except such as can be gotten from textbooks, a practicable way of getting a good practical, working knowledge of the subject? Where can one procure the needed books and apparatus? A. We can supply "The Assayer's Guide," by Lieber, price \$1.50; "A Manual of Assaying," by Brown, price \$2.50. You can study assaying the state of the subject of the subject

ing at home. We have mailed you the address of parties handling supplies. (9048) A. W. writes: During my late residence in the highland of Bolivia, a discussion arose among a number of people, including some engineers, upon the following question: Would a rifle fixed in a vise at right angles to the line of gravitation on the seashore, carry a longer or shorter distance than the same rifle fixed under same conditions at 13,000 feet above the sea? I take it that the density of the atmosphere is the only variant in the question, as the difference in attraction of gravitation would be so small as to be not worth consideration. A. At 13,000 feet the air, being much less dense, will resist the ball less than at the sea level. Hence we think the ball would be sent further by a given energy of the powder than at the sea

(9049) W. B. G. says: Where are some of the largest flywheels? Give diameters ature? A. It has been stated that the difand number of revolutions per minute. State ference in temperature of the water above and why a small wheel can safely revolve faster below the falls of Niagara is in the neigh-

than a large one. Does the diameter of a wheel figure as much in the possibility of highrevolution as does the style and make-up of the wheel, that is, will not a 20-foot wheel weighing ten tons and having a heavy center revolve more rapidly and with less danger than a wheel of the same diameter and weight with heavy rim? A. The larger flywheels are from 25 to 30 feet diameter, and in special plants much larger, making from 60 to 80 revolutions per minute. Small flywheels can run faster than large ones. The strain increases with the rim velocity. The strength of the wheel against its destruction by work and centrifugal force is the main item in its construction. A proper proportion between hub, arms and rim due to its proposed velocity is necessary for safety in its design.

(9050) F. M. A. says: Will you please answer the following: 1. A formula for making water paint for painting outside of buildings, and can oil color be used for coloring water paints? A. The basis of the cold-water paints is casein. This is mixed with lime and dry mineral coloring matters in accordance with the color desired. Powdered barium hydroxide has also been suggested instead of the lime. The mixture of casein, lime or barium hydroxide and coloring matter is mixed with water to the desired consistency. 2. Which is best, alternating or direct current for incandescent lamps, and which above current is used for street car system? A. The alternating and the direct are equally adapted to the incandescent lamp. In America the direct current is employed for street car use. 3. About how many years do permanent horseshoe magnets keep their power, or do they always keep their power when a piece of iron is kept on or about 1-32 inch from their poles? A. A horseshoe magnet does not lose its power if a piece of iron about the size of the magnet is kept across the poles.

(9051) W. C. R. asks: Will you please tell me through your paper what the effects of electric currents are on a compass needle? If a certain battery current flowing over a single wire, parallel with needle and a half inch above it, will deflect needle 10 deg., will a battery four times as strong turn needle same distance, if current wire is four times as far away (or two inches)? Will ordinary electric light currents affect needle in same way and in same proportionate distance and strength of current? I want to find out in a general way if the effect on a magnet or compass needle is in proportion to strength of current, and also in proportion to distance from magnet, and about what the proportion is? I took a compass needle, and arranged on blunt pivot that had just friction enough so one cell of battery moved the needle a little. I then tested with a 220-volt electric current, and could not get that immensely stronger current to move it at all. What was the trouble? A. A law can hardly be stated for so crude an arrangement as a needle on a pivot and deflected by a single straight wire laid above it. The general law is that the strength of current varies as the tangent of the angle of deflection. By strength is meant the amperes. The volts are the pressure, not the current strength. It may be that you had far less amperes with the 550 volts than you had with the cell of battery, due to the much higher resistance of the circuit in the former case. The distance of the wire from the needle affects the deflection as the square root of that distance. That is, a wire removed to twice the distance would, other things being equal, produce one-fourth the effect. At four times the distance the effect will be one-sixteenth as great. You will find the matter fully treated in textbooks of electricity. See Thompson's mentary Lessons."

(9052) R. McC. says: Will you kindly answer the following questions: 1. How many ampere turns will it take to saturate a horseshoe magnet %-inch by 1 inch by 14 inches so it will have about a 2-pound pull? A. Taking the problem of the number of ampere turns for a given lifting power of an electromagnet as you state it, about 350 ampere turns are necessary. The core will then be far from saturated. We fear that you have not taken the return circuit of the magnetic lines into account. So little information is given in the question that you had better magnet and try it, then change the winding till you get what you require. This is the best way under any circumstances. 2. How large a current will 32 magnets the same size use, saturated 3,000 times in one minute, the magnets to have about a 2-pound pull? A. The current used by these magnets will depend entirely upon the winding, and not at all upon the number of times the interrupter acts in a minute. If one ampere flows around each magnet 350 times, each one will take 1 ampere. If you wind so that 2 amperes flow around 170 times, then 64 amperes will be used. The watts required will be the same in any case. It will be better to wind for rather a small number of amperes, since the loss by heating will be less.

(9053) T. F. says: What is the difference in temperature of the water of Niagara above and below the falls? How much coal would it take (per minute) to raise that amount of water to the difference in temper-