RECENTLY PATENTED INVENTIONS. Electrical Devices,

ELECTRIC ILLUMINATION FOR RAIL-ROAD CARS .- M. BUTTNER, Deutsch Wilmersdorf, Germany. The object of the improvement is to provide certain new and useful improvements in electric illumination of railroad-cars whereby the incandescent lamps burn uniformly at a predetermined candle-power irrespective of the varying speed of the train and without the use of electromagnetic regulators.

ELECTRIC SIGNAL.-H. L. LEE, Timpas Col. In this case the invention relates particularly to electric signals for railways, designed to notify a telegraph-operator of the approach of a train, the object being to provide in connection with the signal a circuit-closer of simple construction that may be readily attached to a railway-rail at any desired point remote from the operator's station, and designed to be closed by a passing train.

Engineering Improvements.

SAND-DISCHARGING SPOUT.—A. M. Howery, Eastbank, W. Va. In this patent the invention relates to improvements in devices for sanding railway-rails, an object of the invention being to provide a sand-discharge spout so constructed as to spread sand evenly on the whole width of the rails either on curves or straight lines.

SAFETY-CATCH FOR ELEVATORS ..-GENISIO, Duquoin, Ill. The present invention pertains to improvements in safety-catches for elevators, particularly elevator-cages used in mining shafts; and the object is to provide a safety-catch of simple construction that will quickly and automatically operate to prevent the falling of the cage should the cable break.

EQUALIZING-DRAFT HOISTING-GEAR.-J. G. DELANEY, New York, N. Y. Mr. Delaney's invention relates to a hoisting-gear, and his object is more particularly to produce a neat, simple, and efficient means for rendering the load substantially equal when the device is actuated in connection with a hoisting-bucket whether the bucket is leaded or empty.

CRANE.-A. P. VAN TUYL, Brooklyn, N. Y. The object in view is to produce a self-supporting crane provided with a windlass or ropepulley attachment for hoisting or lowering articles of moderate weights perpendicularly or at an incline-as, for example, out of or into a well-hole, cellar, or stairway.

Hardware.

NUT-LOCK.-T. MCCABE, JR., Homestead, Pa. One of the principal objects of this invention is to provide a device which shall be simple in construction, positive in operation, durable, and at the same time capable of securely retaining a nut against movement, thus preventing the nut from "working off" or leaving the belt.

ADJUSTABLE WRENCH.-E. F. HIRST, Richmond, Ind. The object of this improvement is to provide details of construction for wrench which afford a considerable range of adjustment for the movable jaw of the wrench, adapt the jaw for quick, convenient, and reliable adjustment toward or from the fixed jaw, and provide means for reliably securing the movable jaw at a desired point.

Household Utilities.

FOLDING BED .- A. W. PYLE, Hopkinsville, Ky. Mr. Pyle's invention relates to improve | irregular feed of meat, because it is gripped ments in beds of that class wherein a non- or held against displacement on the movement collapsible bed-frame is pivotally supported in a cabinet; and the primary object in view is the provision of a portable structure which may the cutter. be easily taken apart to facilitate storage and transportation and which may be assembled together for the several parts to occupy a solid firm relation to each other.

Machines and Mechanical Devices. BRUSH DEVICE FOR CLEANING EOLT ING-CLOTH.-C. W. MANN, Greenville, S. C. The purpose of the improvement is to provide a brush which is made to travel with a circular motion in engagement with the bolting-cloth, movement being imparted to the brush through the gyratory movement of the bolting machine. Means are provided whereby the brush will be made to take a course parScientific American

idly than is possible by ordinary methods. PERMUTATION-PADLOCK.-T. A. DINS-

MORE, Cameron, W. Va. Mr. Dinsmore's invention refers to improvements in locks, being particularly applicable to padlocks, its object being to provide a lock which can be opened without the use of a key, thus doing away with the annoyance of having to supply several persons with a key and the consequent liability of loss of the keys.

WOOD-CARVING MACHINE .--- A. W. H. RAETTIG, New London, Wis. This invention relates to improvements in wood-carving machines designed to be manipulated and guided by hand in a way to rapidly and accurately impart a desired shape to irregular pieces of wood of all kinds, such as crooked stair-rails, crooked moldings, straight work, and, in fact, an unlimited variety of carving and woodwork. The casing of this device is made in a form and of such advantageous dimensions as to be always under the direct control of the opera-The machine can be used for offhand or tor. carving work or worked to a drawing on wood or other material.

EXHIBITING APPARATUS.-E. BARTHÉ LEMY, 34 Rue Caitbout, Paris, France. This is particularly an improvement in a mechanism for producing the successive movement of several screens in a perfectly safe manner, thus Murdoch's invention is an improved carrying mechanical playing of the game of base-ball, preventing the order of their succession and fattachment for bicycles for supporting an um and the object is the provision of a board so the full accomplishment of their movements brella, luggage, and baby-seat, or any of said arranged that a rolling ball employed will indiuntil they come, respectively, into their po-devices from the frame of the bicycle; and cate the various plays, that may be recorded in sitions of rest from being interfered with save the improvement consists in certain novel con-the usual manner, thus making the game insitions of rest from being interfered with save in case of stoppage of the main motor.

BREECH MECHANISM .- J. B. MOORE, Washington, D. C. The claim for an object, among others, in this case, is the provision of a mechanism in which the threads between the block and the breech of a gun will be uninterrupted and cylindrice.] in general form and multiple, together with means for operating the moving parts of the mechanism in adjusting the breech-block into and out of position for closing the breech of the gun.

LUBRICATING-CUP .-- J. M. STAPP, Alamogordo, New Mex. The primary object in view in this improvement is the provision of a simple and cheap contrivance for use on revolving or oscillating parts of machinery for the purpose of automatically feeding oil thereto when the part is in motion, while the feed is effectively cut off on the stoppage of the part, thus overcoming the waste of the lubricant.

MACHINE FOR COVERING LITHOGRAPH-IC-PRINTING ROLLERS .--- C. WAGNER, New York, N. Y. In this patent the improvement relates to the manufacture of printing-rollers fish-plates, and the like, and to prevent sagging for lithographic-printing machines; and the ob. of the track-rails and spreading thereof. ject is to provide a new and improved machine for drawing the leather, skin, or cover over the filling in a very simple, quick, and effective manner without requiring skilled labor.

CRUSHER.-T. E. HURLEY, Butte, Mont. This invention is of that class which relates to improvements in machines for crushing rock and the like; and the purpose intended is the provision of a crusher with its pitman-bearings of novel construction so arranged that friction will be reduced to a minimum.

MEAT-CUTTER.-A. W. JOHNSON, New Brunswick, N. J. This invention may be classified as relating to cutters which employ a trough-shaped bed and a suitable type of cutter mechanism arranged to operate in a way to cut thin slices from dried beef or other meat placed on a bed. The improvement overcomes the of the cutter, the improvement allowing the free or uninterrupted movement of the meat toward

Of Interest to Farmers.

WIRE-STRETCHER.-H. S. WORKMAN, Ba-Wyoming. The wire-stretcher improvesin, ment has for an object, among others, to provide a construction which can be readily utilized for taking out the slack of wires stretched along posts, can be used in stretching wires in erecting a fence, and can be used in taking out the slack at any point between posts. FERTILIZER-DISTRIBUTER AND SEED-DROPPER.-S. S. CUDD, Kelton, S. C. The invention in the present case is an improvement in fertilizer-distributers and seed-droppers and the inventor has for his object in view the provision of a distributing and dropping maallel with and at each side of a line drawn chine which is especially adapted for planting

no way interfere with the folding of the box.

DEVICE FOR PREVENTING SIDE DRAFT IN HARVESTERS .- G. A. SMITH. Cottonwood. J. E. PHILLIPS, Minneapolis, and J. P. SMITH, Cottonwood, Minn. The object of the inventors rail is an object-retainer which fixes the point is to relieve the "side draft"—that is, the for placing the rolling object, the latter to be tendency of the machine to draw sidewise when propelled by a cue. pulled by horses, and so increase the work of dragging it forward. In machines of this kind some part of the frame projects laterally forward, and it is this part which carries the operative mechanism. Pulling is done at a disadvantage on this account. Their idea is to quicken the speed of the part of the frame in question, by drawing the grain-wheel by means of a train of gearing, while leaving the wheel free to overrun its connections.

FLY-TRAP.-F. J. LAMPTON, Weir City, Kan. In this patent the invention relates to improvements in devices for removing flies or similar winged insects from cows or other animals and trapping them, an object being to pro-vide a contrivance for this purpose that shall be simple and durable in construction and comparatively inexpensive.

Pertaining to Vehicles.

CARRYING ATTACHMENT FOR BICY-CLES.-L. MURDOCH, Washington, D. C. Mr. structions and combination of parts that enable the devices to be conveniently applied to and removed from the bicycle whenever desired.

Railways and Their Accessories.

TICKET-CASE .--- R. A. EDGAR and W. W. TOBEY, Iola, Kan. These inventors have made an improvement in that class of ticket-cases in device which will support and clamp a broomwhich the tickets or cards are held flatwise head and at the same time restore and preserve in a series or column and are pressed to the the normal shape of the head. front by a spring-follower in rear of the col-umn, and one ticket from the front of the column is discharged at a time by a springplunger moving in the plane of the front ticket and pushing it out endwise from the fling or hobbling horses and for connecting the column into reach of the ticket-seller.

MILLER, Brooklyn, N. Y. Mr. Miller's inven-tion relates to the construction of railwaytracks; and its aim is to provide a new and improved rail-joint arranged to allow of joining the rail ends without the use of bolts, separate

ROADWAY AND VEHICLE FOR TRAVEL-ING THEREON .- J. B. HANSLER, Newburgh, N. Y. This invention relates to bicycle-tracks, such as shown and described in a former patent granted to Mr. Hansler. The object is to provide a roadway for vehicles especially designed for use by automobiles and other similar power-propelled vehicles, and arranged to properly Bardstown, Ky. By means of this invention a steer the vehicle without the aid of an operator in charge of the vehicle and to allow of safely running it at a high rate of speed.

Miscellaneous.

Pittston, Pa. The aim of this inventor is to pushed up by pushing the lower section up so produce a simple, compact, and strong con- it can be taken hold of by the upper end. struction wherein mail-matter of different classes and articles useful to the operator may be safely carried and arranged in such a way that access may be obtained without loss of time to any desired class of mail or other articles contained in the bag. Designed for use by letter-carriers, it may be used by other persons for other purposes.

BRIDLE-BIT .- W. T. TEMPLE, Trenton, N. The object of this new and improved device is to provide a riding or driving bit which may be used on such animals as have tender mouths or the reverse and afford means for the control of the animal in case it becomes fractious and is hard in the mouth, but that will ordinarily serve to guide without hurting the mouth.

COAT-LINING.-M. WEBER, Brooklyn, N. Y. In the present invention the object is to provide a new and improved coat-lining having integral shoulder pads to insure proper and smooth fitting of the outer garment material without danger of creating undue ridges,

ly on all parts and much more easily and rap- food receptacles, so arranged that they shall in for a rolling object. The pockets are in two series, reversely inclined to each other and converging toward the buffer, and at the mouth of each pocket is a deflector. At one end is a rail having pockets. In front of this rail is an object-retainer which fixes the point

ADJUSTABLE REGULATOR FOR PIC-TURE-FRAMES.-F. C. BROWN and W. E. CHENERY, Framingham, Mass. The improvement of these inventors relates to an adjustable regulator for picture-frames and the like -that is to say, to mechanism for adjusting and maintaining the level of frames used for the display of pictures and for analogous purposes. The device is simple, cheap, and easily handled,

CHIMNEY-COWL.—F. W. STEIN, Jersey City, N. J. The object in view in this case is to provide a cowl which will insure an effective draft through the flue. This end is attained by providing a cowl with means forming an air-duct leading upward from the back of the cowl, over the top thereof, thus causing the gases or smoke to be drawn upward through the flue and out of the cowl with the beforementioned current of air.

GAME-BOARD.-H. FRANK, New York, N. Y. This game-board is particularly adapted for the teresting, and in the playing of it considerable skill may be acquired.

COMBINED BROOM-HEAD HOLDER AND SHAPER.—T. MCE. GILL, Mexico, Mo. In the present case the invention relates to an improvement in broom bolders and supports designed to be attached to a wall or other locality, and has for its aim the provision of a

STRAP GRIP OR BUCKLE .- J. H. WAL-LACE, The Brake, Fife, Scotland. A former patent granted to Mr. Wallace related to an improved strap grip or buckle for use in snafolumn into reach of the ticket-seller. RAILROAD-TRACK CONNECTION.—W. F. present invention is embodied in an improved form of grip or buckle adapted to secure a strap by its automatic action, a tongue such as is usually employed in buckles being dispensed with.

FASTENING FOR SHOES. ETC.-F. PAS-CHEN and J. DUCKRO, Tampa, Fla. The inventors have made an improvement in that class of shoe-fasteners in which buttons, hooks, or lacings usually employed are dispensed with. More particularly the invention is an improvement in that class of fastening in which a slidable member engages opposite guides secured to opposite edges of the slot in the shoe-upper.

PENCIL-HOLDING CASE .- A. G. BLINCOE, pencil can be carried in the pocket with perfect safety without any danger of the point becoming broken, and there is provision whereby the case can be adjusted to suit the length of the pencil, and the lower end of the case is covered by a removable cap, and if the pencil MAIL-DELIVERY BAG .- JANE F. STROH, slips through the springs at top it may be

> HAIR-BRUSH.-D. M. NEWBRO and E. E. GALLOGLY, Detroit, Mich. In carrying out their improvement these inventors have particularly in view as an object the provision of a brush which will possess certain sanitary features and advantages. The article provided performs the functions of the ordinary bristle brush, the brush being manufactured only of such substances as are non-absorbent and capable of rapid and effective sterilization.

ROPE-CLAMP.—A. A. NEWELL, Mellette, S. D. The object claimed by this inventor is to provide details of construction for a clamp which adapt the clamp for the support of material which may be connected by the clamp to a rope whereon the clamp is mounted and also to enable the convenient change in posi-tion of the clamp on the rope and a hooked connection of the clamp with a ring on a chain or an equivalent fixture on a rope whereon the clamp is mounted.

HOOF-PAD .- J. CAMPBELL. New York, N. Y. this patent the

| hand-out-all- through a monthly of the contour | · · · · · · · · · · · · · · · · · · · | . – . – . | in this patent the invention feates to paus |
|--|--|---|---|
| horizontally through a portion of the center and a course parallel with the ends of the | | creases, or humps, as is so frequently the case | for use with horseshoes to act as cushions, and |
| - | ODAIN LOADED D DADNES Astall For | when using the ordinary separate shoulder- | more particularly to Pads of the type employed |
| frame, and means to prevent the brush from | This device is equipped with means to cut off | pads. | with shoes terminating at the quarter. The ob- |
| moving backward. | the discharge of grain from the vehicle should | GAME APPARATUSJ. N. ARRIAGA, Mex- | ject is to provide a pad of the type indicated |
| HAT-FORMING MACHINEG. W. CHAM- | the team start to pull the vehicle away from | | which will tend to expand the hoof and will |
| BERLAIN, Atlanta, Ga. This invention per- | an elevator during the loading process, thus | of a chart having a series of starting di- | yield in a downward direction to the pressure |
| tains to improvements in machines for forming | saving the loss of grain. Means are also pro- | visions and a plurality of succeeding divisions | of the frog as the latter grows. A further ob- |
| shoddy or other felt hats, the object being to | vided to regulate the quantity of grain flow- | arranged in order, the starting divisions bear- | ject is to combine with solid heel portions a |
| form them directly from a roll of material | ing to the elevator and provision is made for | ing symbols, which appear in contrasting | pneumatic front portion and provide an arrange- |
| cut to the proper width instead of cutting | ready access to an end-gate of the vehicle for | colors and each subdivision having similar sym- | ment for renewing the air in the hollow of the |
| the material into squares, as is the usual | lifting the gate subsequent to the application | bols. With the chart is associated a number | hoof. |
| practice, thus simplifying the operation, re- | of a part of the loading apparatus. | of dice having symbols in contrasting colors to | DEVICE FOR FASTENING METAL, ETC., |
| ducing the waste, and saving labor. | FOLDING-CRATEE. G. SOLOMON, Omaha, | those in the initial divisions, a number of | TO STONE. T. P. HICKS, New York, N. Y. |
| WORK-HOLDER FOR ENAMELING S. H. | Neb. This crate or box may be folded into a | ordinary dice, and a number of chessmen, | Mr. Hicks in his invention provides a novel |
| FRIST, Chattanooga, Tenn. The improvement | very compact form for convenience in shipping | which are placed in the initial divisions and | socket and means whereby it may be secured in |
| is in machines for holding work to which | when empty, while the sides and ends of the | moved into or through the subdivisions of the | a stone or in a wall for receiving a bracket |
| enamel is to be applied, such as washbowls, | crate, which are hinged or joined to the base | chart. | or other suitable device for attaching to the |
| | thereof in such manner that they may be folded | | stone or wall any desired article of wood or |
| | inward upon the base, are provided with means | | metal. |
| which the work while applying the enamel may | for supporting the removable top of the crate | bodies a table having at one end a violduble | FAUCET W T NIGHOLS Homostood N V |
| be rotated axially and vertically or in two | when the box is in its erected or extended posi- | buffer fashioned to produce a plurality of | The object in view in this invention is to pro- |
| planes substantially at right angles to each | tion. When used for shipping poultry the | carom-surfaces, and along both sides of the | vide a new and improved fancet which is sim- |
| other, so that the enamel may be applied even- | crate is provided with stationary water and | table are pockets which afford track-surfaces | Dle and durable in construction very effective |
| · · · | | unord frace surfaces | pro and datable an construction, very enective |

in operation, and arranged to prevent leakage as the valve proper is held to its seat by the pressure-supply and opens against the latter when manually actuated.

Designs.

DESIGN FOR A WHISK-BROOM HOLDER.

-M. A. SKAIL, New York, N. Y. In the pres-ent case the ornamental design relates to a whisk-broom holder. The upper part of the holder comprises three hinged mirrors. The lower part consists of an ornamental tapering broom holder. DESIGN FOR COFFEE-POT OR SIMILAR ARTICLE.—E. PIEPENBRING, Washington, D. C. This design is for a coffee-pot or the like of symmetrical form elongated vertically and narrowing toward its upper and lower ends, -M. A. SKAIL, New York, N. Y. In the pres-

the spout and the handle being correspondingly elongated and the spout uniting with the ingly elongated and the spout uniting with the body near the lower end thereof and extending upward alongside of and conforming to the Books referred to promptly supplied on receipt of curvature of the body to a point near the upper end of the spout where the latter is curved outwardly.

Norre.-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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inches diameter. The Cleveland Distributing Co., Oleveland, O.

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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. 4452.-For the name and address of the builders of the "Essex" hot air engines. The celebrated "Hornsby-Akroyd" Patent Safety Oil

Engine is built by the De La Vergne Refrigerating Ma-chine Company. Foot of East 138th Street, New York. Inquiry No. 4453.-For makers of electric motor wheel chairs.

Contract manufacturers of hardware specialties, machinery, stampings, dies, tools, etc. Excellent market-ing connections, Edmonds-Metzel Mfg. Co., Chicago. Inquiry No. 4454.-For makers of lumber planers and matchers.

WANTED.-Canadian agent to sell patent on the only practical lace curtain rack ever invented. A paying proposition. Address Standard Mfg. Co., Xenia, Ohio.

inquiry No. 4455.-For makers of adding ma-chines.



HINTS TO CORRESPONDENTS

the same. Special Written Information on matters of personal rather than general interest cannot be expected

Minerals sent for examination should be distinctly marked or labeled.

(9110) T. W. A. asks: 1. A railroad train going at a rate of over 60 miles per hour rounds a sharp curve. Will the train if it should leave the track be likely to fall outward, or does the raising of the outside rail overcome this tendency and make it likely to fall inward? Grant the following: If the track were level, the train would fall outward, now if the outside rail is raised, will it fall inward? A. A railway train rounding a sharp curve at a high speed cannot under any sup posable conditions fall over in the inner side of the track. The elevation of the outer rail is made such as to overcome the tendency to overturn to the outward side of the track, and the train goes round the curve as if on a level, when it moves at the speed for which the ele vation of the outer rail was calculated. If the velocity of the train very much exceeds the velocity for which the outer rail has been elevated, the train would leave the track on the outer side of the curve. The tracks for bicycle racing are made very steep at the turns in order to enable riders to go round the turns at full speed, and when rounding a turn the rider feels in equilibrium while leaning far in toward the center. To him he is as if rid-ing on a level. The centrifugal force is neutralized by the elevation of the track or rail. What nationality was the captain of the "Columbia" in the last cup races? A. Capt. Barr commanded the "Columbia" in the cup races. He was born in England.

sunshine is there at the equator than at the Sawmill machinery and outfits manufactured by the north pole during the year? Where are the longest days—at the equator or the North Pole? We have a great argument over this question. A school teacher and others contend that the sun shone longer at the North Pole than at the equator, and I thought it absurd, so we decided to leave it to your good judgment. At the equator the sun rises and sets at six the entire year. All days are twelve hours long, and all nights of the same length. Disregarding the effects of refraction and cloudy weather, the sun is above the horizon at any place on the equator and shines just half of the year. This half-year of sunshine is divided into equal parts of twelve hours each. At either Bargain, 300.000 feet seamless steel tubing, 5-16 to 2 pole the sun is above the horizon for six months and below it for six months of the year. There is but one day of six months' duration and one night of the same length in a year. You will see from this that there is the same duration of sunshine at the poles as at the equator. The same is true for any place on the earth. Add the length of sunshine for all the days in a year in our latitude, and the sun will be just a half year. The longest day is at the pole, and it is six months long.

> (9112) E. R. says: Would you please oblige me by answering a few questions concerning the motor given in SUPPLEMENT No. 1210, under the heading "How to Make a Scwing Machine Motor Without Castings," by Cecil Poole, for about \$5, with the labor? The wire alone cost me \$6.66-3 pounds of No. 21 wire on each field coil, 27 layers deep, and 66 turns wide. Why must the field have so many ampere turns? Would this motor work as a generator with an adjustable rocker arm? Would it light nearly two 110-volt lamps? A. of SUPPLEMENT No. 1210, for 1/4 horse power, and connect it in shunt, you will probably be able to light two 16-candle 110-volt lamps with it as a dynamo. As to the figure of cost given by Mr. Poole (\$5), while this was true in 1899, it can hardly be expected to remain true indefinitely. Prices of material are very much higher now than they were then. gases of combustion and decomposition from a is exercised in its use at all points. small room. Passing the air through a liquid remove the solid particles by passing the air through cotton; the moisture and ammonia and germs, by passing through sulphuric acid; the sulphur, by passing through a solution of lead acetate. Pass now through calcium and argon remain.

the high lights will be clear glass and the shadows dense enough for the lime light? I print by contact, and have used for developing hydroquinone, metol-hydroquinone and pyro, small coil, using cotton-covered wire in the and an acid fixing bath, yet there always is a secondary when silk was advised, and the slight veil over the high lights. A. The only mode in which lantern slides can be produced with no development in the sky and high lights a large coil if built in a number of sections. is to have a negative which is opaque in the high lights. 2. Can you give a simple method by which an amateur could color lantern slide as it would give me some confidence in cotton. transparencies? A. To color slides requires A. We do not advise the use of cotton-covered artistic sense and knowledge of the mixing and applying of color. We think that is all that is required. Much assistance can be had from the chapter on coloring slides in Hopkins' "Experimental Science." This book also gives instructions for making slides as well as cameras, and an exhaustless amount of scientific experimenting. 3. Why is it that water when flowing through a funnel or into a small outlet always whirls, producing a depression or an opening over the outlet? Why is the whirling always counter-clockwise? A. There is probably something in the shape of the outlet of a funnel or wash basin which determines the course of the liquid as it runs out. A loss of equilibrium is soon seen, and the water whirls. Centrifugal force is produced, causing the opening into the pipe below. We would try to explain why the whirling is always counterclockwise if it were so. We have just tried a wash basin, and found the motion always clockwise when left to itself. By a motion of the hand it could be made in either direction. Probably some inequality in the orifice determines the matter.

(9115) A. M. says: 1. In answer to query 8996 in the issue for May 9, you clearly explain the working of a radiometer. Please tell me why it will not work as well in open air as in a vacuum. A. The radiometer only works at a particular degree of vacuum. Too little gas in the tube, and there is not enough energy to the radiation to rotate the disks; too much gas, and there is too much resistance to the motion for the feeble energy of radiation to start the disk. 2. Why will a singlephase alternating electric current not start a direct-current motor, if the relative polarity of field and armature be the same, whatever be the current phase? A. An alternating current will only run a direct-current motor when the alternations exactly coincide with the change of the brushes from one segment of the commutator to the next. This is the case when the speed of the armature is in step with the alternations. For this reason the motor must first be brought up to speed by some outside motor and the current then switched on. 3. (9111) A. H. S. asks: How much more will the precession of the equinoxes put the seasons, after a time, in different months, for example, summer in October or November? A The calendar is adjusted so that the year will always correspond with the season. Winter will be as now and summer in the same months as now forever.

> (9116) O. D. says: Kindly inform me whether or not there is a substance which will resist the lines of force of an electric magnet, I mean to resist them, not screen them as iron will. A. There is no known material which will present resistance to the passage of magnetic force. It must be apparent that a force which has passed through the earth and the air will not be retarded any more by passing through materials the same as it has already passed through. The screening action of iron upon lines of magnetic lines of force is perhaps not understood. It screens a space from magnetic force because iron furnishes an easier path for the magnetic lines than any other naterial. Hence the magnetic lines leave that space and pass through the iron. Iron presents less resistance to the passage of magnetism than any other known material.

tell me where I can get a complete report of If you would turn the current upon a large the findings or extracts from the report of shunt-wound motor, we think you would see the the delegation which came to this country fire fly or the fuses blow. Your dynamo did several years ago from Russia, and which not start from rest in a proper sense. You made a tour of investigation of our scientific say you had to set the armature to make it schools? A. If you write to the United start. The usual way to run a direct-current States Commissioner of Education, Washing- motor on an alternating current is to have ton, D. C.; we think that he will be able to the armature turning rapidly when the current tell where you could obtain the report you desire.

(9118) J. B. M. asks: Can a single

would do well enough, especially if it is soaked in paraffine. And other precautions taken to thoroughly insulate the windings. I made a coil worked well, so I am thinking that cotton-covered wire would work successfully with If you know of coils being built by using cotton-covered wire, would like to know of it, wire in a coil built to give a spark as long as

6 inches. The reason for using silk is not that silk is a better insulator. No porous insulation is any better, of course, than the same thickness of air. Silk is used because it does not occupy as much room as cotton and more turns can be put into the same space. It is most important to bring the turns as near the primary as possible where the induction is strongest. With silk insulation this is best secured. We do not doubt that a coil can be constructed from cotton-covered wire to give a long spark. More wire per inch will be required if cotton-covered wire is used.

(9120) A. B. S. writes: As a long reader and subscriber of your publications, I desire to ask if there is any secret in the preparation of fluoroscopic screens for Xradiance, or if the high price is due to the high-priced material—platino-barium-cyanide (or tungstate of calcium). Where can they be procured? A. There is no secret in making a fluorescent screen for X-ray work. Skill only is required to distribute the crystals with perfect evenness and to attach them to the cardboard by the adhesive employed. crystals must also be of uniform size, sifted through a sieve of rather a fine mesh. We should buy rather than try to make one. The cost is in the material used. It is advised that barium-platino-cyanide only will be satisfactory, since tungstate of calcium is fluorescent for quite a time after it is excited. It is cheaper but poorer, and is little used now.

(9121) J. B. S. says: I want to excavate earth and move the same to make a fill of about 60,000 cubic yards. If you know of any machinery that will do this, I would be pleased to hear from you. I do not want to go to the expense of a steam locomotive excavator. A. The only suggestions that we have to offer you for excavating earth are a steam shovel or to use hydraulic means in case there is a sufficient supply of water in the vicinity.

(9122) F. H. says: In Notes and Queries of June 13, 1903, No. 9056, C. B. C. asks: "What would happen if a direct-current motor were connected with an alternating current dynamo?" You answer : "If the alternating current were sent through a direct-current motor at rest, it would be heated and burn out." The theory here may be all right, but in practice it does not work. I had a No. 2 Porter motor, and a 110-volt direct-current dynamo, which I ran with a 110-volt alternating current. The dynamo would run as a motor with the full current, but the Porter motor required to have some assistance put in the circuit, or else it would burn out the one ampere fuse which I used. Both motors would start from a standstill, but the armature of the dynamo had to be placed in a certain position, or else it would stick and emit a buzzing sound. What was the cause of the noise? It seems to me that as you can reverse a direct current, and have the motor go, just the same, an alternating current which simply reverses back and forth, continually, would run the motor just as well as the direct current. The dynamo which you say will stand an alternating current of 110 volts is probably series-wound, and so has the benefit of the entire resistance of its coils to act by their (9117) C. K. B. N. writes: Can you self-induction in cutting down the current. is thrown on. The "sticking" of which you speak is the refusal to turn. There is no sticking in the ordinary sense. The buzzing

sound you hear is the note produced by the wire carry a current to produce electric light, alternations of the current in the wire of the hines. Matthews Torpedo Launches. Matthews & Co., Bas-if you build the motor according to the last om, Ohio, U, S. A. Builders of high grade power boats. Matthews of high grade power boats. Baragraph of the description on page 19394 Struments, and a telephone service, all to be hamp and coils generally when an alternating Your reservice the service of the part of the service of the se in use at the same time, and with perfect current is passing through them. Your reasafety to the operator? A. We suppose the soning about reversing a direct current and same current can be used for all the purposes still having a motor go, and applying this to you name and for all others at the same time. an alternating current, is not correct. When a direct current is reversed in a motor, both to have the various motors and instruments the field and armature has the current re-We versed in them, and the resulting polarity is the same. Two reversals leave the current the same as before. This is of course not the case with an alternating current. (9123) T. C. G. says: Can you give me reliable rules for finding the sets of elliptical and spiral car springs? Also the length a bar should be to make a spiral car spring of a given free height? Do you know where I could buy a book dealing with car springs? question of calculating elliptical and spiral car springs to give definite results is an exceedingly complicated one, and one that requires considerable experience as well as theoretical knowledge. You will find quite a complete dis-

Inquiry No. 4456.—For makers of a light die press which will bolt to the bench, and will punch out sinch round checks of thick press board, cardboard, light brass and heavy tin.

WANTED .- Some one who is able to give United States patent No. 705,896 a practical test and develop same on equitable basis. J. W. Wehmeyer, 2241 Warren Street, St. Louis, Mo.

Inquiry No. 4457.—For machinery for rolling out gum or manufacturing chewing gum.

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

WANTED,-Philadelphia seiling agency for leading manufacturer. Building materials preferred. Box 2734, Station J, Philadelphia Pa

WANTED.-Patent Office draughtsmen: only thoroughly experienced men need apply. Must show specimens of natent drawings. Munn & Co., SCIENTIFIC AMERICAN office, 361 Broadway, New York,

car Send for new and complete catalogue of Scientific and other Books for sale by Mann & Co., 361 Broadway, New York. Free on application.

It is done all the time. It is only necessary wound for the voltage of the current. gher now than they were then. (9113) G. T. asks: How to remove Electric service is safe if ordinary caution

(9119) A. F. S. says: I am building would not be objectionable. A. To purify air, a Ruhmkorff induction coil to give a 6-inch spark and write for some advice, for which I would be very grateful. I propose to make the coil in eight sections insulated from each other with hard rubber disks and paraffine. chloride or soda lime to remove last traces is No. 36 B. & S. Now what I desire to of moisture, etc. Only pure oxygen, nitrogen, know is this: Can a coil of this size be made (9114) F. C. F. asks: 1. What is the to operate successfully by using single cotbest method to produce lantern slides in which coils boiled in parafine? I think that cotton cussion of the theoretical side of this subject