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W. A.'s query as to radiation does not give sufficient data.—E. C. H. should read our answer to S. O. M., as to supposed diamonds.-J. D. G. will find full information as to the ether ice-ma king process on p. 228, vol. 34.—A. R.'s communi-cation is founded on a misconception. See pp. 195, 228, vol. 33, as to the nature of electricity.-A J. R. will find on p. 120, vol. 33, directions for making muslin uninflammable.-C. W. and others ought to know that the only way to find buried treasure is to dig for it.—X. Y. Z. can copper his cast iron articles by following the directions given on pp. 90, 139, vol. 31 -E. F. M. will find full directions for plating with nickel on p. 235, vol. 33. For plating with gold, see p. 116, vol. 33. For plat-ing with silver, see p. 362, vol. 31.-A. B. can ebonize wood by following the directions given on p. 50, vol. 33.-W. B. J. can gild his clock hands by the process described on p. 116, vol. 33.-A. G. L should proceed in zincography exactly as in lithography. The specimen sent appears to be a pho-to-engraving from a pen and ink drawing.-L. M. M. will find full directions for electro-silvering with a battery on p. 361, vol. 31.-E. D. N. can re-move the rust from his sword by the method given on p. 56, vol. 33.-W. D. should read our article on p. 241, vol. 33, on constructing a windmill.-J. C. H., F. A. H., J. H. G., L. N. B., M. G., J. L., S. H. P. S., G. D., F. G., J. H. M., C. M., G. G., W and others, who ask us to recommend books on industrial and scientific subjects, should address the booksellers who advertise in our column,s all of whom are trustworthy firms, for catalogues,

(1) B. V. P. asks: Please inform me of ome way to harden light common iron wire in quantities. A. Box harden it, by the process de-scribed in No. 5 of "Practical Mechanism," p. 69, vol. 31.

(2) H. J. W. asks: 1. I am running an oldfashioned high pressureengine. The cylinder is 15 by 48 inches stroke, cut off at half stroke. It has a balance wheel of 15 feet diameter, also a pulley attached, 11 feet in diameter. It takes steam through about 15 feet of 3 inch pipe. The governor is an old-fashioned throttle. I have been running 48 turns per minute, and wish to increase it about 8 turns; but I think the latter is rather too much, as the brasses and journals on main shaft are badly worn. Would it be safe to run her so fast? A. You had better not increase the speed if the bearings are worn. 2. Would it use any more steam to speak of? A. If you run your enginefaster, you will use more steam in propor tion. 3. Would I have to run the governor faster or slower? A. Run it slower.

(3) O. M. B., of San Juan Bautista, Mexico If you reduce the speed of your engine you reduce the power, unless, as you propose, you in-crease the steam pressure. It would probably be better to alter the size of the gearing, thus using the same steam pressure and same piston speed and to decrease the speed of the rollers; while their power will be proportionately increased.

(4) W. S. says, in reply to the query: How is it that minus multiplied by minus gives plus, and plus multiplied by minus gives minus? By trigonometry, the cosine of any arc divided by its sine is equal to its cotangent. Take the arc of 135°:

 $\frac{-\sqrt{5}}{2} = -1.$ Clearing of fractions, $-\sqrt{5} = -1 \times \sqrt{5}.$

 $\sqrt{\frac{15}{15}}$ That is, a minus quantity is equal to a minus quantity into a plus quantity, which was to be proved. The secant of any arc is equal to 1 divided by the 1

 $= -\sqrt{2}$ Clearing of fractions,

cosine. $\frac{1}{-\sqrt{5}} = -\sqrt{2}$ Clearing of fractions, $1 = -\sqrt{2} \times -\sqrt{5}$. That is, a plus quantity is equal to a minus quantity into a minus quantity. A. This is an illustration which might possibly be admissible, if at all, only in the higher analysis, but would be obviously out of place for establishing the fundamental principles of elementary an-

How far is the earth from the sun, as estimated recently by the transit of Venus? A. The observers have not got that far, we imagine. Indeed, we noticed that, at the last meeting of the British Association, one of the members stated that he thought they would be doing very well if they worked up the observations in seven years.

veyors determined the astronomical meridian and applied it to the line above spoken of, we should probably be able to predicate the error of one or both.

(7) B. K. A. asks: Will you let us know what is the difference between a high pressure and a low pressure engine? A. A high pressure engine exhausts the steam when the piston has arrived at the end of the stroke. A low pressure engine condenses the steam, and thus has live steam on one side, and a partial vacuum on the other side, of the piston.

(8) E. R. says: I propose to build a yacht 90 feet loug and of 18 feet beam, to draw 12 inches of water when light, and not to exceed 18 inches with all machinery and 6 tuns of coal on board. I intend to use two engines 8 x 10 inches (to work quartering), two uprightboilers of 36 inches diameter, with 75 tubes, 134 inches in diameter and 4 feetlong. Fire grate surface is 21/2 feet x 31/2 feet in each boiler. I will use the best propeller I can find, and fully submerge the same under the boat without loading down the boat. What kind of a sea boat will she be? A. We do not think such a boat would stand rough weather very well; and for smooth water it might be advisable to use side wheels.

(9) M. M. C. says: We are putting in a 50 orse power engine which will run at 85 revolutions of the crank per minute. The drive pulley is 4 feet in diameter; distance to main shaft is 15 feet. What should be the width of the leather drive belt? A. About 12 or 14 inches.

(10) A. C. asks: How many times more wa ter will go through a 3 inch pipe than would through a 1 inch pipe? A. The question is too in definite to admit of a single answer. If the velocity in each pipe is the same, the discharge will be in proportion to the squares of the diameters. If the head is the same for both pipes, and the pipes bave the same length, the velocities will be different and the discharge will vary as the products of the velocities by the squares of the diameters. We give below Weissbach's rule for determining the velocity: Let l=length of pipe in feet, d=diameter of pipe in feet, v = velocity of flow in feet per second, and h = head of water in feet. Then v =

8.02× \sqrt{h} + $\sqrt{1505}$ + $\left(0.01439+\frac{0.017155}{\sqrt{v}}\right)$ ×

(11) J. W. G. asks: What is used in the navy for blacking boilers? A Paint made of common charcoal ground in oil is an excellent article for the purpose.

(12) T. W. R. asks: 1. Will steam after heating a building, return to the boiler, no matter how much pressure you may have in the boiler, that is, will steam return against 20, 40, 60 lbs. of steam? A. It can be made to return, by the use of a suitable trap. 2. Is the pressure equal on all sides of a boiler? A. The pressure is greatest on the bottom, on account of the weight of water in the boiler. 3. In low pressure boilers, could not the return be run half way below the waterline as well as at the bottom of the boiler? A. An arrangement of this kind is not uncommon.

(13) R. S. Jr. asks: Will my engine, the cylinder of which is 234 inches bore by 51⁄2 inches stroke, drive a back-geared engine lathe of 16 inches swing and 5½ feet bed? A. Your engine and boiler are both rather too small for the pur-

(14) J. & C. say: We have a stationary engine of 16 inches diameter,5 feet stroke, using steam from 90 to 100 lbs., and cutting off at 10 to 12 inches on the stroke, as the work requires. The fly wheel is 20 feet in diameter, weighing 18,000 lbs., made in 8 sections and held together at periphery with wrought iron key and links. The center is held by two flanges bolted together through the arms. Would it be safe and economical to run the engine at 35 revolutions per minute? A. Yes if the bearing surfaces of your engine are sufficientlybroad and strong to stand the wear and tear.

(15) W. E. P. says: For extinguishing kerosene flames. I would recommend ashes from the stove. When the flames were 4 feet high, cold ashes from the stove extinguished them immediately.

(16) A. M. T. asks: 1. Has the pump, used on locomotive engines. suction? A. Yes. 2. Are the air pumps, used on ocean steamers, ever made of brass or steel? A. Brass.

(17) W. T. H. asks: Why is it darkest just before dawn? A. The statement to this effect is without foundation.

(18) S. asks: Does cast iron contract or ex-

suppleness to avoid the objectionable tendency to close the duct by creasing, when bentata moderate angle.

What is the best material to use on boots that are exposed in water a great deal? A. Try a solution of india rubber in bisulphide of carbon.

(21) J. W. says: I had occasion to remove piece of mica from a stove, and noticed that, on being crushed, it gave out flashes similar to those noticed on scooping hard sugar with a metal instrument. Can you give an explanation? A. The flashes of light are due to the electrical disturbance consequent upon the forcible disruption of contiguous laminæ. It is a well known phenomenon.

(22) P. asks: What will prevent the pigment permanent white from scaling off parchment? A. Try the following: Reduce to powder and dissolve quickly in cold water a quantity of gum tragacanth. There must be sufficient water to give to the diluted gum the consistence of a jelly. Mix with this your pigments (sulphate of baryta), and, after finishing the work, spray with a little naphtha in which has been digested for sometime a quantity of caoutchouc. The naphtha will soon evaporate, leaving behind the caout choucasan extremelythin and adhesive, but perfectly transparent, film.

(23) A. L. E. says: A friend of mine states that, to be able to run an engine in a small building in New York city, the engineer must have a certificate showing that he has the ability to run the engine. I say that he does not need it. Which is right? A. Your friend's statement is correct.

(24) A. C. McK. asks: 1. Is tellurium valuable? A. Yes. 2 Is it difficult to extract? A. Very. 3. Is there any market for the ore or the metalin America? A. The market will have to be made, since, owing to the scarcity of the metal, it has as yet been little employed in the arts. 4. What is the probable cost of extraction per tun? A. The cost will have to be determined by trial.

(25) R. J. P. asks: Can ordinary Indian ink have anything added to it to make it indelible? A. Try the addition of a little nitrate of silver ust before using.

(26) A. C. McK. asks: How can I extract tellurium from its ore? A. Professor von Schroetler has lately published the following method of separating tellurium in its free state : The finely crushed ore is first digested with strong hydrochloric acid (in order to decompose or dissolve the sulphides of arsenic, antimony, lead, etc.), and separated from the insoluble residue, which is then treated with aqua regia, when gold and tellurium are dissolved, and thus separated from silver. From the solution thus obtained the gold is precipitated by protosulpbate of iron, and the tellurium by metallic zinc. The gold is melted in a graphite crucible with borax, and the tellurium in an iron pot, when both metals are obtained in a pure state, the latter being a white metal of from 6.0 to 6.4 specific gravity and of great fusibility. The present value of tellurium (fused) is about \$200 per lb. avoirdupois.

(27) W. L. S. asks: Can you tell me of a safe way of preventing mildew in cotton duck sails, etc. ? A. We find the following recorded as a good preventive of mildew: Boil the fabric for several hours in a solution consisting of 50 parts common salt, 4 parts lime, and 1 part alum, dissolved in a suitable quantity of clear water.

(28) A. B. O. says: I find the following al loy to answer for repairing the damage to steam chests, valves, etc., which have been eaten out and honeycombed by the use of impure suet, tallow, and other bad oils: First make molds of Russian sheet iron, bent at right angles where surfaces or corners are to be built up, stopped with red mold-er's clay or plaster. Clean the surfaces: and if there is no hold for the alloy, small holes must be drilled in the iron to secure the casting in place. The alloy consists of 2½ parts copper, 1½ parts antimony, and 6 parts tin. Heat the casting in a common ladle to dull red, and file the mold. The alloy cannot be worked down with anything but file and scraper. I have saved with this alloy a couple of steam chests which would have cost \$500 to renew in a short time.

(29) T. H. W. asks: Is there any instrument, similar to a thermometer, for indicating the degree of purity of the air? A. This desirable little instrument has not yet been invented; and from the numerous obstacles to be overcome, it is not probable that anything of practical utility in this line will ever be devised.

(30) M. R. asks: How can I make ink to write blue, and afterwards turn black? A. For olue ink changing to black, take 34 1b. finely pow dered nutgalls, and digest for 2 or 3 days in 1 gallon of cold water: add to this about 6 ozs. each of finely powdered copperas, gum arabic, and sulphate of indigo (chemic or Saxony blue). Heat the whole to the boiling point, and allow to stand with occasional stirring for several days in a warm place. Then filter through a fine linen cloth, add a few cloves, and bottle for use. To make the socalled sulphate of indigo (Saxony blue) : Dissolve well sifted indigo in 5 times its weight of strong oil of vitriol, previously heated over a water bath to about 150° Fah. Neutralize the solution by cautious additions of carbonate of potassa in the form of a fine powder. Collect and dry the precipitate

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All Fruit-can Tools, Ferracute W'ks, Bridgeton, N.J. Baxter Wrenches fit peculiar Corners where no ther wrench answers. Greene, Tweed & Co., 18 Park Place, New York,

(5) R. S. N. says: 1. I have a turning lathe operated by a treadle attached to the shaft of a 36 inch wheel of 4 inches face. The treadle cranks make 6 inches sweep; the bearings are 3/8 x 21/2 inches. The chuck spindle bearings are 7/8 x 21/4. A. Such a lathe will require about 1/2 horse power. 2. What do you think of this arrangement? A It is a powerful lathe to be worked by the foot.

(6) S. M. says: 1. A line joins two fixed points on the earth's surface. Presuming that no earthquake or any other convulsion has affected these points, will time produce any change in the direction of this line? Can it point due north today, and 1° or 2° east or west of north a few years hence? A. No. 2. In other words, if two surveyors state its direction differently, an interval of time intervening, can you predicate error of either or both? A. If we knew by what method the sur-

pand when cooled from a liquid state? A. Iron acts very much, in this respect, like water. Solid iron floats upon the molten metal and is consequently lighter. As molten iron cools, within certain limits, it gradually expands; but when it has reached a certain temperature, it begins to contract, and this it continues to do however low the temperatures may be carried. It is for this reason iron copies so accurately the molds into which it is poured while in a molten condition, and allowed to gradually cool.

(19) J. McC. asks: How are pictures produced on white porcelain glass cone shades? Α. They are for the most part put on by the decalcomanie process.

What is the coloring principle in ruby-stained window glass? A. Purple of Cassius.

(20) J. A. G. asks: What can I use on or in a rubber hose to prevent kerosene oil from rotting it, or what flexible material can I use in place of rubber to draw kerosene from a large tank? A. There are several methods by which the tube may be protected completely or in part; but we should recommend, as liable to give the best satisfaction, the use of a good tube of leather of sufficient

(81) M. C. asks: How can I dress Arkansas diamonds? A. With copper wheels, and emery or corundum.

(32) C. asks: Which is the best soap for the toilet, and which for washing clothes? A. Use for the toilet a good variety of glycerin soap. The common yellow soap answers well enough for laundry purposes.

1. Is there an alloy that resembles gold, and is as hard as 14 carat gold after it is annealed? A

Try the following: Copper 864 parts, zinc 122 parts, tin 1.4 parts. Fusethe copper first, and then add the other metals. 2. Is there a brass solder that will fuse as easily as 12 carat cold solder? A Try 1 part silver and 2 parts brass.

(33) L. L. L. asks: Has the author of arti cles, which have been published in and paid for by literary periodicals, a right to publish the same in book form? Or does the property in said articles vest in the publishers of the periodicals, making it necessary for the author to obtain permission from them to publish such book? A. The right to republish articles in book form depends on the agreement between the author and the publisher.

(34) C. F. asks: Can common red earthen ware be, by any process, glazed white either be fore or after the lead glazing? A. Fabrics of pot-ter's clay are too fusible to admit of being enameled with porcelain. Try the following: Mastic 10 parts, red lead 60 parts, calcined tin (putty pow-der) 26 parts, and common salt 10 parts. Mix them, and calcine and powder the composition three or four times. Apply to the ware (after baking) in the manner of a paint, and place again in the oven.

(35) J. M. savs: I am using a cast iron pot in galvanizing, and have been told that thezinc in connection with the cast iron pot forms more slag by galvanic action than a wrought iron pot would. Isthisso? A. No.

(36) F. P. asks: 1. Can the color of coal tar be changed conveniently to a red or brown, or any other color that would be suitable to paint farm buildings, without changing its nature? A. No. Use red ocher or red lead. 2. How can coaltar be thinned? A. Use naphtha.

(37) E. D. says: I have a pack of playing cards that stick together when affected by the heat of the hand, and seem to get dirty very quickly. Can you inform me of any preparation to prevent their sticking and to give them a gloss? A. The trouble is due to the inferiority of the glazing with which the cards are enameled. We do not think you can overcome the objection without the expenditure of too much time and labor.

(38) J. G. M. & Co. say: In cooking fish for canning, we need a greater heat than 212° Fah. gives us. We have used salt, and then chloride of calcium, heating the water by steam. But the oil from salmon, mixing with the calcium, is hard to clean off the cansafter cooking. Can you tell us of some cheap preparation which we can heat (with steam coils) to 240° Fah.? A. It would be better to heat the water to the requisite temperature by means of a very moderate steam pressure. The temperature of the boiling point might thus be arranged to suit your convenience, and by suitable valves caused to remain constant. Saturated saline solutions are objectionable.

(39) J. M. A. and others.-It is a popular idea that the sunflower will prevent disease, but we have no reliable authority for the statement It is not used in medicine.

(40) H. W. H. asks: Is it possible to blow glass in the shape of a cylinder, with a very small opening along one side? A. Yes; it is readily done. The molten glass, as it is drawn from the pot, adhering to the end of the punta tube, is blown into a pear shape, elongated by swinging, rolled on a steel slab into the cylindrical form, and slit through length wise, and the cone-shaped bases at both ends removed. It is then placed in the annealing furnace.

(41) M.F., of Gaggenau, Germany, asks: Is there a good gas tight membrane, not affected by heat or water, or by the impurities (acids, etc.) contained in the gas? A.This desirable invention has as yet been very imperfectly realized.

(42) M. W. asks: How are rain gages generally constructed? If a vessel12 inches in diameter above, and 10 inches at the bottom, and 8 inches deep, should be filled with rain water to depth of 3 inches, would 3 inches really have fallen, or more? A. Less. If the vessel employed as the receiver is not a uniform tube, it should be carefully graduated before using.

What will remove the marks of so-called indelible ink from linen? A. Use a strong solution of cyanide of potassium in water. As the cyanide is very poisonous, it is necessary to avoid contact ores or cuts in the flesh.

Do the crossheads of a locomotive make a re trograde movement when the engine is going either forward or backward, unless the driving wheels slip? A. No.

(43) H. J. asks: Willoil evaporate into the airanddryaway, whether on the surface of water or not? Can water evaporate into the air when its surface is covered with oil? A. The ap-

(45) W. S. H. asks: Is it possible to beme sufficiently advanced in architecture with out a tutor, to enable one to complete the study in a short time under instruction? A. It is neces sary to take an extended course of study in the office of an architect of experience, where you will have access to his library.

(46) S. M. O. and others.—The diamond oc curs in the form of rounded pebbles covered with a brownish crust. Its crystals are in the form of the regular octohedron, but their faces are often a little convex. It has the most remarkable refractive and dispersive action upon light, is a nonconductor of electricity, and is not acted upon by acids or alkalies. If the stone is a diamond, if will easily scratch corundum and quartz, and will have a specific gravity of from 3 52 to 3 55. The specific gravity of quartz crystals is from 2 50 to 2.66, while that of corundum, true sapphire, etc., is from 39 to 416. A diamond dealer alone could give a valuation, based on personal examination.

(47) F. S. & S. ask: What is the best mode of cleansing the feathers of an eagle, which are discolored by fly dirt and dust? A. Use freshly prepared lime water. It may require several applications and an exposure of several days to perfectly cleanse the feathers.

(48) A. H. S. asks: Does nitro-glycerin lose any of its explosive force when combined with earth to form dynamite? A. The nitro-glycerin itself remains unaltered in the mixture, but, as might be expected, the dynamite is a much weaker explosive, volume for volume, than good nitroglycerin.

(49) A. H. asks: Will it injure the burning properties of kerosene, or make it any more or less explosive, to filter it through cloth or bibulous paper to remove sediment? A. It will alter neither its illuminating nor its explosive qualities

(50) C. B. F. W. asks: How can I test laun dry soaps for adulterations, such as silex, silicate of soda, soapstone, etc.? A. Dissolve a small quantity of the soap completely in a large excess of boiling water, and filter through clean white filtering paper. Observe whether or not any insoluble inorganic residue remains behind on the filter; if so, examine it with a strong magnifying glass, and, if the particles appear to be homogeneous in character and transparent or translucent the adulterant may safely be presumed to consist of quartz sand. If opaque, and of a pearly or dark color, it is probable that the material consists of talc, chalk, soapstone, barytes, or some of the other numerous and common adulterants. In order to be sure that part, at least, of the residue does not consist of resinous or other organic matterials, the residue should be heated to bright redness for some time before examination with the glass. To test for the presence of water glass, add (to the filtrate from the above experiment) a small quantity of muriatic acid, heat to boiling, and allow to stand for some time. If a precipitate forms, wash it several times with clean water heat it, and examine it as before.

(51) G. J. B. says: What effect on the acoustic qualities of a room would a cove in a ceiling have, the room being $90 \ge 47$ feet, and 27 feet high? The cove is 4 feet out from the side walls. A. It is not likely that so small a cove would affect the acoustic qualities of the room.

(52) F. P. says: I read that Governor Bagley, of Michigan, suggests that all land owners shouldplanta tree during this our centennial year What kind of tree would be most suitable as a shade and ornament tree, an evergreen being preferred? A. The Norway spruce fir is a good evergreen for this purpose; the scarlet maple or the sugar maple is a good ornamental shade tree among the class not evergreen. The elm is also one of the noblest trees of the latter class

(53) F. R. asks: How many Bunsen cells are necessary to effect the decomposition of water, with moderate rapidity? A. Two or three cells will evolve has readily from acidulated water.

(54) C. K. M. asks: 1. Will ½ lb. No. 16 cotton-covered copper wire, for a primary coil, and 1 lb. No. 23 cotton-covered wire for the secondary coil, and 1 cup of Callaud battery, do for giving electric shocks? A. Yes. Stronger shocks would be obtained if smaller wire were used for the secondary. 2. How thick ought the bundle of iron wires to be for such a coil? A. About 1/2

(55) J. L. W. asks: In taking a gun barrel and holding it perpendicularly, and taking a compass, holding it on the side of the same and lower-

(57) J.B.J. says, in answer to several corres ondents who ask as to how the variation of the magnetic meridian is reckoned: There is a secular change, increasing or diminishing the declination from 1' to 7', annually, according to locality. There is an annual change, affecting the needle about twice as much in summer as in winter. There is a diurnal change, during which the declination attains its maximum or minimum about 2 P. M., according as itis W. or E.; and there are also irregular changes, depending upon the condition of the atmosphere, magnetic storms, etc., as well as local attraction, proximity of iron, ore, steel, etc. It must be evident to any one conversant with the subject that it is practically impossible definitely to locate a line with a given bearing from the meridian, with a surveyor's instrument, unaided by some external object. The only reliable method of determining the angle, if any, between the line in question and a true meridian, would be to set up a surveyor's instrument over, say, the south end of the line, sight to the pole star at its extreme elongation, and drive a stake in the range thus found as far off as can be observed conveniently and repeat the process for the extreme western elongation: midway between the two stakes is the true meridian from the instrument. The distance from the midway point to the line in dispute, divided by the distance from that point to the instrument, will be the line of the angle between the line and true meridian. As the operation will doubtless be performed after sunset, the sights or crosshairs of the instrument will need to be illuminated by light of lamp reflected upon them from a white object. A lamp or candle may be used to determine points at which to drivestakes.

(58) W. M. R. says, in reply to P. A. K. who asks who invented the first railroad sleeping car: In 1938, when I was chief engineer of the Cumberland Valley Railroad, between Harrisburgh and Chambersburgh, Pa., we had sleeping cars built, which ran for some years. One end of the car was arranged in the ordinary way, with day seats; the other end was fitted up with eighteen leeping berths, forthe night, which were changed, for the day's running, so as to make omnibus seats on each side of the car. There were three lengths of berths and three tiers on each side. The top tier of berths hoisted on a hinge, and was secured by rope supports to the ceiling of the car. The middle tier consisted of the back of the omnibus seat, hinged and supported in the same manner. The lower tier was the day seat along the side of the car. At that period, there were two coach loads of passengers arriving by turnpike road nightly from Pittsburgh; and they were very glad to have the benefit of the sleeper during the four hours then occupied between Chambersburgh and Harrisburgh, on the old plate rail. There was no charge for sleeping accommodations.

(59) A. H. says, in answer to C. E. A.'s uery as to a difficulty with his alarm bell: I think it arises principally on account of the brevity of the contact between the hammer and bell. If so, he can ascertain the fact by pressing the hammer against the bell by hand; to this the armature ought to respond. In such case, the remedy would be to place the wire now attached to the bell in contact with a piece of metal, so arranged that the hammer will bein contact with it, at each vibration, a length of time sufficient for the magnet to act.

J.S. J. says: Water is forced into all parts of our building by its own pressure, through iron pipes. Frequently is heard a loud singing noise like air escaping slowly; but after the spigot is opened and the water runs freely, the noise continues about a minute. What is the noise ?-E M.H. asks: I nave an open buggy of 5 feet track, front wheels 3 feet 11 inches high, and hind wheels 4 feet 1 inch. What is the necessary under axe?

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects :

- On the Aeroscope. By W. S. H. On French Apartment Houses. By N. L. D.
- On Life and Blood. By J. F. G. M.
- On a Telescopic Eye. By —. On a Book on Geology. By E. K.
- On the Hidden Forces of Nature. By H. F. G.
- Or Public Works. By J. C. W.
- On the Financial Question. By W. H. Also inquiries and answers from the following:
- J. H. H.-S. F. S.-L. S. W.-M.-W. H. H.-J. M.M. J. S. T.-B. B.-F.-F. W.-R. B. G.-Q.-N. W.-I. J.-E. R. G.-R. McM.-W. L. S.

HINTS TO CORRESPONDENTS.

[OFFICIAL.]

INDEX OF INVENTIONS FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

March 14, 1876, AND BACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specification and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city

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Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson. Churn, rotary, I. Solt. Cigar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann. Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith. Corset steel, J. A. Farr. Cot, folding, E. W. Fyler. Cultivator, T. W. Kendall. Cultivator, J. C. Leidy Curry comb, M. Sweet Currian fxture, W. P. Haines Dental plate, Q. A. Scott. Digger, potato, F. A. Wuetig. Dovetalling machine, J. E. Haskell. Drills, valve for rock, J. Brandon Elevator, P. Hinkle (r)	$\begin{array}{c} 174, 6679\\ 174, 6841\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 586\\ 174, 863\\ 174, 701\\ 174, 863\\ 174, 701\\ 174, 863\\ 174, 719\\ 174, 719\\ 174, 719\\ 174, 714\\ 174, 736\\ 174, 617\\ 174, 618\\ 174, 668\\ 174, 766\\ 174, 668\\ 174, 66$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson. Churn, rotary, I. Solt. Cigar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann. Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith Cot, folding, E. W. Fyler. Cultivator, A. S. Baker Cultivator, J. C. Leidy Curry comb, M. Sweet. Curtain fixture, W. P. Haines Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig Dovetailing machine, J. E. Haskell Drills, valve for rock, J. Brandon Elevator, F. Rochow.	$\begin{array}{c} 174, 669\\ 174, 841\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 586\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 711\\ 174, 838\\ 174, 701\\ 174, 736\\ 174, 736\\ 174, 736\\ 174, 736\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 684\\ 174, 686\\$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson Clurn, rotary, I. Solt. Cigar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw. Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith. Corset steel, J. A. Farr. Cot. folding, E. W. Fyler. Cultivator, A. S. Baker. Cultivator, J. C. Leidy Curry comb, M. Sweet. Curtin fxture, W. P. Haines Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig Dovetailing machine, J. E. Haskell Drills, valve for rock, J. Brandon Elevator, P. Hinkle (r) Elevator, J. B. Sweetland	$\begin{array}{c} 174, 669\\ 174, 841\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 768\\ 174, 863\\ 174, 863\\ 174, 701\\ 174, 863\\ 174, 701\\ 174, 838\\ 174, 701\\ 174, 736\\ 174, 617\\ 174, 716\\ 174, 716\\ 174, 618\\ 174, 668\\ 174, 684\\ 174, 686\\ 174, 686\\ 174, 809\\ 174, 859\\ 174, 859\\ 174, 859\\ 174, 859\\ 174, 859\\ 174, 859\\ 174, 859\\ 174, 859\\ 174, 678\\ 6, 993\\ 174, 678\\ 6, 993\\ 174, 671\\ 174$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson. Churn, rotary, I. Solt. Cigar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw. Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann. Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith. Corset steel, J. A. Farr. Cot, folding, E. W. Fyler. Cultivator, A. S. Baker. Cultivator, J. C. Leidy Curry comb, M. Sweet. Curtian fxture, W. P. Haines Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig. Dovetailing machine, J. E. Haskell. Drills, valve for rock, J. Brandon Elevator, F. Rochow. Elevator, J. B. Sweetland Elevator, S. asfey stop, P. F. King.	$\begin{array}{c} 174, 6679\\ 174, 641\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 526\\ 174, 863\\ 174, 526\\ 174, 863\\ 174, 701\\ 174, 863\\ 174, 719\\ 174, 714\\ 174, 736\\ 174, 612\\ 174, 612\\ 174, 612\\ 174, 624\\ 174, 656\\ 174, 709\\ 174, 800$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson. Churn, rotary, I. Solt. Cigar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw. Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann. Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith. Corset steel, J. A. Farr. Cot, folding, E. W. Fyler. Cultivator, A. S. Baker. Cultivator, J. C. Leidy Curry comb, M. Sweet. Curtian fxture, W. P. Haines Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig. Dovetailing machine, J. E. Haskell. Drills, valve for rock, J. Brandon Elevator, F. Rochow. Elevator, J. B. Sweetland Elevator, S. asfey stop, P. F. King.	$\begin{array}{c} 174, 6679\\ 174, 641\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 526\\ 174, 863\\ 174, 526\\ 174, 863\\ 174, 701\\ 174, 863\\ 174, 719\\ 174, 714\\ 174, 736\\ 174, 612\\ 174, 612\\ 174, 612\\ 174, 624\\ 174, 656\\ 174, 709\\ 174, 800$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson Clurn, rotary, I. Solt. Cligar makers' board, J. L. Montejo. Cligar makers' board, J. L. Montejo. Cligarette former, A. B. Shaw Clistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Coopy holder, H. B. Smith. Corset steel, J. A. Farr Cot, folding, E. W. Fyler Cultivator, A. S. Baker. Cultivator, J. C. Leidy Curry comb, M. Sweet. Curtain fixture, W. P. Haines Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig Dovetailing machine. J. E. Haskell Drills, valve for rock, J. Brandon Elevator, F. Rochow Elevator, F. Bochow Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, Safety stop, P. F. King Engine, fire, C. W. Clapp	$\begin{array}{c} 174, 669\\ 174, 641\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 661\\ 174, 736\\ 174, 661\\ 174, 662\\ 174, 662\\ 174, 663\\$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton. Chimney cleaner, etc., M. C. Beymer Churn, V. L. Peterson. Churn, rotary, I. Solt. Cigar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw. Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann. Coal breaker, D. Clark. Cooler, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith. Corset steel, J. A. Farr. Cot, folding, E. W. Fyler. Cutitvator, A. S. Baker. Cutitvator, J. C. Leidy. Curry comb, M. Sweet. Curtin fixture, W. P. Haines. Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig Dovetailing machine, J. E. Haskell. Drills, valve for rock, J. Brandon Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, S. Sakey Stop, P. F. King Engine, fre, C. W. Clapp Engine governor, steam, W. Yates. Engine, traction, C. R. Shiveley	$\begin{array}{c} 174, 669\\ 174, 841\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 536\\ 174, 838\\ 174, 701\\ 174, 838\\ 174, 701\\ 174, 838\\ 174, 701\\ 174, 716\\ 174, 716\\ 174, 716\\ 174, 716\\ 174, 716\\ 174, 668\\ 174, 709\\ 174, 684\\ 174, 684\\ 174, 686\\ 174, 709\\ 174, 859\\ 174, 859\\ 174, 859\\ 174, 859\\ 174, 686\\ 6, 993\\ 174, 676\\ 6, 993\\ 174, 662\\ 174, 766\\ 6, 993\\ 174, 663\\ 174, 766\\ 174, 720\\ 174, 831\\ 174, 720\\ 174, 831\\ 174, 720\\ 174, 806\\ 174, 706\\ 174, 706\\ 174, 806\\ 174, 706\\ 174, 806\\ 174, 706\\ 174, 806\\ 174, 706\\ 174, 806\\ 174, 706\\ 174, $
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson Clurn, rotary, I. Solt. Cligar makers' board, J. L. Montejo. Cligar makers' board, J. L. Montejo. Cligarette former, A. B. Shaw Clistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Coopy holder, H. B. Smith. Corset steel, J. A. Farr Cot, folding, E. W. Fyler Cultivator, A. S. Baker. Cultivator, J. C. Leidy Curry comb, M. Sweet. Curtain fixture, W. P. Haines Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig Dovetailing machine. J. E. Haskell Drills, valve for rock, J. Brandon Elevator, F. Rochow Elevator, F. Bochow Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, Safety stop, P. F. King Engine, fire, C. W. Clapp	$\begin{array}{c} 174, 6679\\ 174, 641\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 536\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 874\\ 174, 878\\ 174, 716\\ 174, 736\\ 174, 736\\ 174, 736\\ 174, 736\\ 174, 674\\ 174, 684\\ 174, 809\\ 174, 809\\ 174, 809\\ 174, 808\\ 174, 808\\ 174, 808\\ 174, 808\\ 174, 808\\ 174, 808\\ 174, 808\\ 174, 808\\ 174, 808\\ 174, 706\\ 174, 808\\ 174, 706$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson Clurn, rotary, I. Solt. Cigar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum Coopy holder, H. B. Smith Cort, folding, E. W. Fyler Cutitvator, A. S. Baker Cutivator, J. C. Leidy Curry comb, M. Sweet Cutrain fixture, W. P. Haines Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig Dovetailing machine. J. E. Haskell Drills, valve for rock, J. Brandon Elevator, J. B. Sweetland Elevator, J. B. Sweetland.	$\begin{array}{c} 174, 669\\ 174, 841\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 768\\ 174, 863\\ 174, 764\\ 174, 863\\ 174, 701\\ 174, 863\\ 174, 701\\ 174, 838\\ 174, 761\\ 174, 764\\ 174, 766\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 684\\ 174, 668\\ 174, 684\\ 174, 686\\ 174, 768\\ 6, 993\\ 174, 859\\ 174, 859\\ 174, 688\\ 174, 688\\ 174, 688\\ 174, 768\\ 6, 993\\ 174, 688\\ 174, 678\\ 174, 688\\ 174, 706\\ 174, 715\\ 174, 758\\ 174$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton. Churn, V. L. Peterson. Churn, W. L. Peterson. Churn, rotary, I. Solt. Cigar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw. Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann. Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith. Coret steel, J. A. Farr. Cultivator, A. S. Baker. Cultivator, T. W. Kendall. Cultivator, J. C. Leidy. Curry comb, M. Sweet. Curtian fxture, W. P. Haines. Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig. Dovetailing machine, J. E. Haskell. Drills, valve for rock, J. Brandon Elevator, P. Hinkle (r) Elevator, J. B. Sweetland. Elevator, J. B. Sweetland. Elevator, S. Baker stop, P. F. King. Engine, fore, C. W. Clapp Engine, fore, C. W. Clapp Engine, fore, C. R. Shiveley. Engraving and chasing, R. R. Atchison. Equilar, J. C. R. Shiveley. Engalize, pressing woven, Nussey & Leachman.	174, 6679 174, 6679 174, 6640 174, 7744 174, 7626 174, 6400 174, 7444 174, 5863 174, 8631 174, 6748 174, 6748 174, 6748610 174, 6748610 174, 6748610 174, 6746610 174, 6746610 174, 6746610 174, 674610 174, 72000 174, 720000 174, 720000 174, 72000000000000000000000000000000000000
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson Churn, rotary, I. Solt. Clagar makers' board, J. L. Montejo. Cligar makers' board, J. L. Montejo. Cligarette former, A. B. Shaw Cligarette former, A. B. Shaw Clamp, joiner's, G. A. Naumann Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith Cot, folding, E. W. Fyler. Cultivator, A. S. Baker Cultivator, J. C. Leidy Curry comb, M. Sweet. Curtian fixture, W. P. Haines Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig Dovetailing machine, J. E. Haskell Drills, valve for rock, J. Brandon Elevator, F. Rochow Elevator, J. B. Sweetland Elevator, S. Safety stop, P. F. King Engine, fore, C. W. Clapp Engine governor, steam, W. Yates Engine, traction, C. R. Shiveley Equalizer, draft, H. C. Baldwin Equalizer, draft, H. C. Baldwin Equalizer, draft, H. C. Baldwin Equalizer, pressing woven, Nussey & Leachman Fan, exhaust, E. E. Hargreaves	$\begin{array}{c} 174, 669\\ 174, 641\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 617\\ 174, 736\\ 174, 736\\ 174, 617\\ 174, 668\\ 174, 768\\ 6, 993\\ 174, 684\\ 174, 768\\ 6, 993\\ 174, 684\\ 174, 768\\ 174$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton. Churn, W. L. Peterson. Churn, V. L. Peterson. Churn, rotary, I. Solt. Cigar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw. Cistern, strainer, and cut-off, A. D. Parker. Clamp, joiner's, G. A. Naumann. Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Cooler or heater, milk, H. A. Hannum. Coopy holder, H. B. Smith. Coret steel, J. A. Farr. Cot, folding, E. W. Fyler. Cultivator, A. S. Baker. Cultivator, J. C. Leidy Curry comb, M. Sweet. Cutari fixture, W. P. Haines Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig Dovetailing machine. J. E. Haskell Drills, valve for rock, J. Brandon Elevator, F. Bochow. Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, F. Rochow. Elevator, J. B. Sweetland Elevator, J. B. Sweetland Elevator, F. Rochow. Elevator, J. B. Shiveley Engine, fre, C. W. Clapp Engine, governor, steam, W. Yates Engine, traction, C. R. Shiveley Engine, traction, C. R. Shiveley Engine, traction, C. R. Shiveley Engine, traction, C. R. Shiveley Engine, fare, C. W. Clapp Engine, traction, C. R. Shiveley Engine, traction, C. R. Shiveley Engine, traction, C. R. Shiveley Engine, traction, C. R. Shiveley Engine, fare, C. W. Clapp Engine, traction, C. R. Shiveley Engine, traction, C. R. Shiveley Engine, fare, C. W. Chapp Engine, fare, C. W. Chapp	$\begin{array}{c} 174, 669\\ 174, 641\\ 174, 762\\ 174, 664\\ 174, 744\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 661\\ 174, 674\\ 174, 661\\ 174, 662\\ 174, 662\\ 174, 662\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 663\\ 174, 673\\ 174, 663\\ 174, 673\\ 174, 663\\ 174, 673\\ 174, 673\\ 174, 673\\ 174, 673\\ 174, 673\\ 174, 673\\ 174, 673\\ 174, 673\\ 174, 673\\ 174, 673\\ 174, 673\\ 174, 674\\ 174, 706\\ 174, 715\\ 174, 673\\ 174, 674\\ 174, 673\\ 174, 674\\$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton. Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson. Churn, rotary, I. Solt. Clayar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw. Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann. Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell. Cooler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith. Corset steel, J. A. Farr. Cot, folding, E. W. Fyler. Cultivator, T. W. Kendall. Cultivator, T. W. Kendall. Cultivator, J. C. Leidy. Curry comb, M. Sweet. Curriain fxture, W. P. Haines Dental plate, Q. A. Scott. Digger, potato, F. A. Wuetig. Dovetalling machine. J. E. Haskell. Drills, valve for rock, J. Brandon Elevator, P. Hinkle (r). Elevator, S. Saket stop, P. F. King. Engine, free, C. W. Clapp Engine, free, C. W. Clapp Engine, free, C. W. Clapp Engine, gotenn, Steam, W. Yates. Engine, traction, C. R. Shiveley. Engraving and chasing, R. R. Atchison. Equalizer, draft, H. C. Baldwin. Eyeplass, I. Alexander. Fabrics, pressing woven, Nussey & Leachman. Fan, exhaust, E. E. Hargreaves. Fence wire, barbed, E. M. Crandal Fertilizer distributer, J. B. Henry	$\begin{array}{c} 174, 6679\\ 174, 641\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 526\\ 174, 863\\ 174, 701\\ 174, 863\\ 174, 701\\ 174, 863\\ 174, 674\\ 174, 684\\ 174, 684\\ 174, 684\\ 174, 684\\ 174, 686$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton. Churn, V. L. Peterson. Churn, W. L. Peterson. Churn, rotary, I. Solt. Cigar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw. Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann. Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell Coler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith. Corset steel, J. A. Farr. Cultivator, A. S. Baker. Cultivator, T. W. Kendall. Cultivator, J. C. Leidy. Curry comb, M. Sweet. Curtiain fxture, W. P. Haines. Dental plate, Q. A. Scott Digger, potato, F. A. Wuetig. Dovetailing machine, J. E. Haskell. Drills, valve for rock, J. Brandon Elevator, F. Rochow Elevator, F. Rochow Elevator, S. Safety stop, P. F. King Engine, fire, C. W. Clapp Engine, fire, C. W. Clapp Engine, fire, C. W. Clapp Engine, fire, C. R. Shiveley Engine, traction, C. R. Shiveley Engine, pressing woven, Nussey & Leachman Fabrics, pressing woven, Nussey & Leachman Fan, exhaust, E. E. Hargreaves. Fence wire, barbed, E. M. Crandal Fertilizer distributer, J. B. Henry Fifth wheel, vehicle, C. Gormann	$\begin{array}{c} 174, 6619\\ 174, 641\\ 174, 762\\ 174, 640\\ 174, 744\\ 174, 536\\ 174, 863\\ 174, 863\\ 174, 863\\ 174, 874\\ 174, 874\\ 174, 874\\ 174, 736\\ 174, 617\\ 174, 617\\ 174, 617\\ 174, 617\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 668\\ 174, 684\\ 174, 684\\ 174, 684\\ 174, 684\\ 174, 688\\ 174, 688\\ 174, 688\\ 174, 688\\ 174, 688\\ 174, 688\\ 174, 688\\ 174, 688\\ 174, 688\\ 174, 688\\ 174, 688\\ 174, 888\\ 174, 688\\ 174, 706\\ 174, 888\\ 174, 706\\ 174, 758\\ 174, 758\\ 174, 681\\ 174, 684\\ 174, 664\\ 174, 813\\ 174, 664\\ 174, 813\\ 174, 664\\ 174, 804$
Chair, rocking, R. S. Imelli. Chandeller, S. S. Newton. Chimney cleaner, etc., M. C. Beymer Churn, W. L. Peterson. Churn, rotary, I. Solt. Clayar makers' board, J. L. Montejo. Cigarette former, A. B. Shaw. Cistern, strainer, and cut-off, A. D. Parker Clamp, joiner's, G. A. Naumann. Coal breaker, D. Clark. Colter, K. W. Manwaring. Conveyer box, deliverygate, H. W. Caldwell. Cooler or heater, milk, H. A. Hannum. Copy holder, H. B. Smith. Corset steel, J. A. Farr. Cot, folding, E. W. Fyler. Cultivator, T. W. Kendall. Cultivator, T. W. Kendall. Cultivator, J. C. Leidy. Curry comb, M. Sweet. Curriain fxture, W. P. Haines Dental plate, Q. A. Scott. Digger, potato, F. A. Wuetig. Dovetalling machine. J. E. Haskell. Drills, valve for rock, J. Brandon Elevator, P. Hinkle (r). Elevator, S. Saket stop, P. F. King. Engine, free, C. W. Clapp Engine, free, C. W. Clapp Engine, free, C. W. Clapp Engine, gotenn, Steam, W. Yates. Engine, traction, C. R. Shiveley. Engraving and chasing, R. R. Atchison. Equalizer, draft, H. C. Baldwin. Eyeplass, I. Alexander. Fabrics, pressing woven, Nussey & Leachman. Fan, exhaust, E. E. Hargreaves. Fence wire, barbed, E. M. Crandal Fertilizer distributer, J. B. Henry	174, 669 174, 669 174, 664 174, 764 174, 763 174, 660 174, 744 174, 863 174, 863 174, 863 174, 874 174, 876 174, 617 174, 719 174, 736 174, 617 174, 748 174, 668 174, 689 174, 689 174, 689 174, 689 174, 871 174, 681 174, 673 174, 683 174, 674 174, 673 174, 674 174, 673 174, 674 174, 706 174, 715 174, 673 174, 699 174, 813 174, 681 174, 816 174, 816

plication of a film of any of the fatty non-drying oils to the surface of water will prevent its evaporation. The oil itself is not volatile.

(44) F. N. B. says: I have been trying to make a friction match composition by a formula in which there is a large proportion of niter. The niter spoils the composition; the matches are good when first dried, but an exposure to damp causes them to become sticky, so that, when placed in a cellar they will in 24 hours stick to my fingers like tacks to a magnet. When kept in a dry place, the phosphorus slowly burns off, filling the room with a strong garlic odor, and thematch es are worthless. What is the matter? A. After preparing the matches, and while dry, dip the tips into a moderately strong collodion for a moment and allow to dry. This will form a thin protecting film over the friction composition. This film is not affected by moisture or other atmospheric influences, and does not interfere with the ready ignition of the match when required. as the slight abrading influence of the friction is sufficient to remove the film, while in itself it is a very inflammable substance, and aids, by the heat of its combustion, the ignition of even a common wooden plint.

ing it to the breech, the needle will suddenly reverse when lowered about half way; and on raising, it will again reverse at about the same place. What is the cause of this change? A. In such a position the gun barrel is almost in the line of the dip, consequently it will become magnetic from the inductive action of the earth. The lower end will be a south pole, the upper a north pole.

(56) W. H. G. says: I have made an induction coil, 6 inches long by 134 inches diameter, with a half inch core of iron wires, using 2 turns of No. 22 cotton insulated cooper wire for the primary, and about 25 turns of No. 32 cotton insula ted copper wire for the secondary coil, making the latter about 20 times as long as the primary. The vibratoris attracted by the core, and works well I have insulated the two coils from each other with 3 sheets of paper varnished with shellac, and put1 sheet of varnished paper between each two turns of the secondary. With the above I only get feeble shocks on holding the two ends of the secondary wire on my tongue, using 7 cells of the gravity battery in connection with the primary. A. It is quite likely that different convolutions of the secondary touch somewhere, and by this means the greater part of the action is cut off.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket. as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent : "Whose is the best brick-making machine, and what is its price? Who makes coiled springs to order? Who buys sulphate of lead? Who sells wire-straightening machines? Who makesvegetable parchment? Who are the principal lumber dealers in New York city? Who makes bung machines ?" All such personal inquir-ies are printed, as will be observed in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditioualy obtained.

l	Filter, sugar-decolorizing, R. G. Elwes	174,795
	Fire arm, revolving, F. W. Hood	174,731
	Fire arms, implement for, I. Merrill	174,634
	Fire hose, stop nozzle, M. Clemens	
	Fire place, G. W. S. Lucas	
	Fluid trap, A. H. Thorp	
	Fluting machine, J. Broughton	
	Fork, culinary, Turner & Capewell	
l	Fruit gatherer, E. A. Barton	
ļ	Fruit jar, A. W. Brinkerhoff	
ł	Fruit jar, A. P. Brooke	
	Fruit jar, T.G. Otterson	
	Funnel, lamp, W. Bodey	
	Funnel, measuring, D. S. Kooms	
	Furnace, steam boiler, M. Laufenburg	
	Gage, carpenter's, J. Vetterlein	
ļ	Gas lighting apparatus, C. D. P. Gibson	
	Gasretorthead, self-sealing, P. W. Mackenzie.	
	Glassware, making stemmed, A. Sperber	
	Grain binders, H. H. Bridenthall, Jr 174, 615.	
	Grain binder, E. Woodbury	174,886
	Grain screen, J. C. Leeson	
	Grate, J. W. Williams	
	Grinder, hollow ware, E. W. Gunn	
	Gun carriage, L. W. Broadwell	
	Guns, machine, J. P. Taylor 174,872,	
	Gun, magazine, W. Gardner	
	Gun tool combination, A. E. Barthel	
	Harrow, wheel, Bramer & Badger	