### Business and Lersonal,

The Charge for Insertion under this head is One Dollar a Line for each insertion. If the Notice exceeds Four Lines, One Dollar and a Half per Line will be charged.

Agricultural Implements and Industrial Machinery for Export and Domestic Use. R.H.Allen & Co., N.Y. For Sale—One Corliss Engine, in good order; cylinder 20 in. diam., 48 in. stroke. Apply to Kelly & Ludwig, 720 Filbert Street, Philadelphia, Pa.

Nicely drilled Index Pulleys, 5 in. diam., 3 in. face. Lathe Gear Cutting and Work Holder Attachments very cheap, to close out a lot. W. P. Hopkins,

Manufacturers of or Dealers in Tray and Bowl Turning Machinery, please send Descriptive Circular and Price List to C. H. Leffler, Elmore Station, Elmore

For Sale—State Rights of Patent Safety Hors Hopples; seils on sight. Address, for terms, etc., J. F. Riesgraf, care of Box 773, New York city.

Hill's Champion Clothes Dryer has taken every First Premium wherever exhibited. Arranged for yard and roofs. Great inducements to agents. Champion Dryer Company, 513 Main Street, Worcester, Mass.

Boiler Punch Lathes, 9 ft. Planer. Brooks & Winebrener, 261 North 3d St., Philadelphia, Pa.

706 Impt'd Chromos, cheap. Box 29, Pittsb'g, Pa R. H. Norris & Co., Steam Gauges and Silk Spool leasuring Machines. Faterson, New Jersey.

Fire Hose, Rubber Lined Linen and Cotton, fines quality. Eureka FireHose Co., 13 Barclay St., New York.
Tool Chests filled with the very best tools are
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Paper Pulley Cover to prevent Belts from slip-ping-Patent for Sale. Address J. de Vries, 114 Woos-ter St., New York.

Split-Pulleys and Split-Collars of same price strength and appearance as Whole-Pulleys and Whole-Collars. Yocom & Son, Drinker St., below 147 North Second St., Philadelphia, Pa.

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For 13, 15, 16 & 18 in. Swing Engine Lathes, address Star Tool Co., Providence, R. I.

The Scientific American Supplement—Any desired back number can be had for 10 cents, at this office, or almost any news store.

Hand Fire Engines, Lift and Force Pumps for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., U. S. A.

More than Ten Thousand Crank Shafts made by Chester Steel Castings Co., now running; 8 years' constant use prove them stronger and more durable than wrought iron. See advertisement, page 285.

See Boult's Paneling, Moulding, and Dovetailing Machine at Centennial, B. 8-55. Send for pamphlet and sample of work. B. C. Mach'y Co., Battle Creek, Mich.

To stop leaks in boiler tubes, use Quinn's Pat-nt Ferrules. Address S. M. Co, So. Newmarket, N.H.

Water, Gas, and Steam Pipe, Wrought Iron. Send for prices. Bailey, Farrell & Co., Pittsburgh, Pa.

For Solid Wrought-iron Beams, etc., see advertisement. Address Union Iron Mills Pittsburgh, Pa. for lithograph, & c. Shaw's accurate and U. S. Standard Mercury

Gauges, Steam, Vacuum, Hydraulic, and Test Gauges &c., 915 Ridge Avenue, Philadelphia. Pa.

Solid Emery Vulcanite Wheels-The Solid Orig inal Emery Wheel-other kinds imitations and inferior Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, New York.

Models for Inventors. H. B. Morris, Ithaca, N.Y M. Shaw, Manufacturer of Insulated Wire for galvanic and telegraphpurposes, &c., 259 W. 27th St., N.Y.

F. C. Beach & Co., makers of the Tom Thumb Telegraph and other electrical machines, have removed to 530 Water Street, New York.

Pat'd Graining Stencils—J. J. Callow, Clevel'd, O

Lathe Dogs, Expanding Mandrels, Steel Clamps, &c., for Machinists. Manufactured by C. W. LeCount. So. Norwalk, Ct. Send for reduced Price List.

Driving Belts made to order, to accomplish work required. Send full particulars for prices to C. W. Arny, 148 North Third St., Philadelphia, Pa.

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Power & Foot Presses & all Fruit-can Tools. Ferracute Wks., Bridgeton, N.J. & C. 27, Mchy. Hall, Cent'l.

Steel Castings, from one lb. to five thousand lbs. invaluable for strength and durability. Circulars free. Pittsburgh Steel Casting Co., Pittsburgh, Pa. For best Presses, Dies, and Fruit Can Tools, Bliss

Hotchkiss & Ball, Meriden, Conn., Foundrymen and workers of sheet metal. Fine Gray Iron Castings to order. Job work solicited.

For Solid Emery Wheels and Machinery, send to

Hydraulic Presses and Jacks, new and second pand. Lathes and Machinery for Polishing and Butting metals. E. Lyon, 470 Grand Street, New York.

Diamond Tools—J. Dickinson, 64 Nassau St., N. Y Shingle, Heading and Stave Machine. See advertisement of Trevor & Co., Lockport, N. Y.



G. D. T. will find a recipe for waterproof glue on p. 43, vol. 32.—A. C. G. should use Indian ink for architectural drawings.-C. A. W. can French polish beechwood. See p. 11, vol. 32. To mend a rubber band, put a piece in with the cement described on p. 203, vol. 30.-F. S. will find directions for making baking powder on p. 123, vol. 31.-F. E. H. will find directions for transfer-

should consult a dentist .- W. T. B. will find directions for making hard soap on pp. 331, 379, vol. 31. -W. O. G. will find directions for cleaning shells ou p. 122, vol. 27.-S. N. C. will find directions for browning gun barrels on p. 11, vol. 32.-C. P. can blue steel work by the process described on p. 123, vol. 31.—W. M. will find directions for silvering mirrors on p. 267, vol. 31.-W. P. will find directions for making a weather glass on p. 75, vol. 30.—P. K. D. will find that the pretended plated diamond is an imposition.-F. H.M. will find directions for softening iron for electro-magnets on p. 123, vol. 31.-H. S. B. will find directions for making Babbitt metal on p. 364, vol. 29.—C. A. H. will find a recipe for a hair restorer on p. 363, vol. 31.—D. A. H. will find complete instruction in the art of mechanical drawing in the SCIENTIFIC AMERICAN SUPPLEMENT .- E. R. G.'s plan for striking the curve of a segment of circle, the chord and altitude being given, is very old.— E. S., W. L. B. J. H., H. C. S., and others who ask us to recommend books on industrial and scientific subjects, should address the booksellers who advertise in our columns, all of whom are trustworthy firms, for catalogues.

- (1) A. W. says: 1. I have an achromatic object glass of 30 inches focus and 1½ inches aperture. I wish to know what eyepiece to use. A. You can use the one described on p. 315, vol. 34, or the one described on p. 203, vol. 35. 2. What advantage has an eyepiece with four glasses over one with only three? A. An eyepiece with four glasses can be better corrected.
- (2) A. G. C. asks: 1. What power is neces sary to drive two circular saws (1 cross cut and 1 rip) of 12 inches in diameter, in 2 inch pine lumps A. About 4 or 5 horse power. 2. What size of boiler would be necessary to furnish steam for an engine 3x6 inches, running at 250 revolutions per minute, cutting off at about % stroke. A. One with about 75 feet, superficial measure, of heating surface. —J. E. E., of Pa.
- (3) A. E.R. says: What would be the dimensions of an air pump to work from an eccentric to give 80 lbs. pressure to the square inch in the shortest time? A. If you have plenty of power to drive the pump, you can get 80 lbs. pressure with a large pump as quickly as with a small one if the action is direct. And in proportioning the size, you need only look to the total pressure which you wish to exert.
- (4) E. D. G. asks: 1. If a balloon has, when filled with gas, a lifting capacity of 100 lbs., would it not have double that lifting capacity if twice the volume of gas could be compressed within its sphere? A. It would have less. 2. A balloon will ascend until it reaches equilibrium, or, in other words, until it reaches an elevation at which the gas and atmosphere are of the same weight. If by a safe process the gas could be heated, would not the balloon attain a greater elevation? A. Yes, if the balloon could expand
- (5) O. J. B. says: Please give me a method of producing the logarithmic spiral, and also state its use in mechanics. A. Draw a circle, divide its circumference into any number of equal parts, and draw radii from these points to the center of the circle. Then divide one of the radii into the same number of parts, increasing the length of the successive divisions, from the center, in geometrical progression. Transfer the points so determined to the successive radii, thus determining points of the spiral.
- (6) R. M. B. says; Can a ladle or suitable vessel be made for melting 2 lbs. of iron in a common blacksmith's forge? If so, of what and how shall it be made? A. There are small plumbago crucibles made for this purpose. ladles would not serve your purpose.
- (7) J.N.W. asks: 1. Who first applied steam power to the propulsion of boats, and is the inventor of steam navigation? A. The Marquis de Jouffroy, of France, used a steam engine in a vessel some years before Fulton. 2. Who first applied steam power to a locomotive on an experimental track, and is entitled to the credit of the invention of railroading? A. It is generally supposed that the first locomotive was built by Cug-not, in France, in 1769. 3. Who made the first rified cannon? A.Rified cannon were first brought into use in 1857. Doubtless many had been invented, and numerous experiments had been made, before that time. We cannot, however state definitely who was the first inventor. Possibly some of our readers can answer the question 4. Was not the Merrimac the first ironclad ves sel ever used or invented? A. Ironclads were used by the French in the Russian war. In this country Captain Eads constructed several, which were in use before the Merrimac appears
- (8) H. S. G. says: Suppose I sour a piece of cloth with 1 lb. sulphuric acid to 40 gallons water for the space of 3 minutes: if I use 80 gallons of water with 2 lbs. sulphuric acid, would the cloth absorb any more of the acid in the same time; A. If we understand you, no.
- (9) J. T. P. says: I visited the Girard College, Philadelphia. An attendant told me that the spiral stone steps were almost self-supporting, or brace themselves about the same as an arch of a bridge. I have spoken about them to a number of friends; they say that the steps run in the wall about 3 feet, while the attendant said that they rested in the wall only about 2 or 3 inches? Was he right? A. The steps are supported essentially on the principle of the arch. They have, in addition, a direct support upon the front edge and on one end of each step; a single step cannot fall withoutturning over backwards, but this is prevented by the weight of the wall upon one end of it. A very little compressive strain, therefore, upon the arch joints, which are at right angles to the under side or soffit, is sufficient to hold it firmly. See Nicholson's "New Director," ring engravings to glass on p. 298, vol. 31.-G. S. edition of 1854, plate XIV, for a similar stairs. placed by being padded out upon the inside with in the form of a globe.

dowels, which bind the whole together.

- (10) B. F. T. says: Are principles estab lished which show the exact or geometric trisection of any angle (except a right angle) to be impossible? A. The construction can be made for any angle, but the strictly geometrical solution is said to be impossible, because the construction cannot be made by the aid of straight lines and circular arcs alone.
- (11) L. C. asks: How can I secure dry walls in the basement of my house? The plastering does not dry. A. It is caused probably by the plastering having been put upon the brick or stone wall without the intervention of furring. It is usual and necessary in such cases to pluster upon lathing nailed to wooden strips placed vertically upon the face of the wall at every 12 inches. This secures the plastering, both from any dampness that may come out of the brick or stone wall, and (by preventing the brick from reducing its temperature) from the condensation of water out of the air of the room upon its surface, either of which is sufficient to destroy it. We cannot suggest any remedy short of the replastering upon lath as here described.
- (12) C. F. S. asks: How large a boiler will it require to run a 31/2 inch stroke boat engine? How large a wheel and how long a boat will be required? How fast would the boat go? A. It is impossible to answer this question definitely, as you do not state the diameter of cylinder. This answer applies to several other queries.
- (13) H. & B. say: In our cooling room, temperature is 42°; when the door is open, it will rise to 50° and fall again. We complain of wet walls, dripping of ceiling, cold damp air, and melting of ice. How can we obtain a cold dry air? A. The dampness arises from the precipitation of water from the air in cooling, and there may be some leakage from the ice melting above. A more free circulation of air would reduce the dampness, but at the same time increase the tem-perature. The ice would keep better in a compact body; but we must allow that the air can be cooled only by a sacrifice of the ice. A good cooling room is made under the mass of ice and with an air passage around the sides; in this case the doorsarenot opposite one another, but open upon the passage at different points. When the ice is used also forother purposes, 12 feet cube is a good size for the body of ice. In this case it will keep for two years.
- (14) W. T. says: The length of a pendulum which vibrates once an hour is very nearly the diameter of the earth. Does a similar relation exist on other planets? A. No.
- (15) G. W. B. says: We wish to build a house 30 x 34 feet, of 3 stories, 26 feet high in all. How shall we construct hollow walls so as to make them damp-proof, and what thickne s shall we make the walls? A. Make the wall 14 inches thick, that is to say, the inside wall upon which the door joists rest 8 inches thick, the outside wall 4 inches thick, and the vacant space between them 2 inches wide. These two divisions of the wall should be tied together with anchors made of hoop iron or other light iron, or with cross ties of the brick itself, at about every 4 feet in hight of the wall, and say 5 feet apart, set in rows and alternating one above the other.
- (16) W. E. S. asks: Can I construct a horseshoe or U-shaped electro-magnet, by tempering so that it will keep its magnetism after the circuit has been broken for abouta half or a minute, more or less, as desired? A. If you make your magnet so that it will retain magnetism for half a minute after the circuit is broken, it will retain the magnetism permanently. There is no halfway work about it. It either holds its magnetism permanently, or gives it up immediately the circuit is broken.
- (17) E. P. S. asks: How can I make a cheap telescope, which will show the rings of Saturn? A. Take a plano-convex lens of 11/2 inches aperture and about 5 feet focus: place the flat side against the end of a tube a little less than 5 feet in length, into which slides another tube. To the end of the small tube fasten the eyepiece, which m ay be either a double convex or double concave lens of about 1 inch focus. The double convex lens gives the largest field, with the image inverted; the other shows the object erect and gives better definition.
- (18) W. G. W. says: 1. A body weighs more at the poles than at the equator. Is any part of the increase in weight due to its being nearer the center of the earth? A. Yes. 2. I think that a person starting at the north pole, and going in any direction, must go south. Is this so? A. If oz.? it were a true pole, and his course were limited to the surface, we think your proposition would
- (19) H. H. M. says: 1. I wish to ask some questions as to the ice house described on p. 251, vol. 31. "Provide a good drain in your icehouse to carry off the water." If I build my icehouse on level clay ground, wili a dry well suffice for drainage, and if so, how large and deep should it be? A. Yes, if located outside of the building. Make it 6 feet in diameter and 6 feet deep, conical, with base at bottom. Provide an opening at top, covered with a stone, so that you can empty it when necessary. 2. "Put a high-pitched roof over the ceiling." Are the ceiling and roof to extend over the exterior wall, and is the roof to join said wall so as to exclude the air from the space between the interior and exterior walls? A. Yes: the roof is to cover every part of the building, and should project well over the eaves. 3. "Make doors lined with canvas." Do you mean tha Do you mean that canvas is to be substituted for boards on inside and outside of doors, and why? A. The doors are to be made as thick as the walls in which they are

- The steps are also doweled together with iron canvas filled with sawdust; this is to make them lighter for use than boarding would be. 4. In a space 6 feet square and 8½ feet high, how can you have "a cube of ice of 7 feet?" A. This was an error of the types; you will find it corrected in No. 41, p. 188, vol. 35.
  - (20) H. D. T. says: A friend of mine, in attempting to alight from a moving train, stumbled, fell, and received some bruises about the face; the latter healed up, but left dark spots caused by coal dust. He was advised to blister, and did so, keeping the blisters open for a week. this did not improve the appearance perceptibly. Can anything further be done in this case? A. Probably nothing short of a surgical operation will remove the spots.
  - (21) J. O'B. asks: How can I keep oroide of gold from being discolored? A. The so-called oroide gold is a variety of brass. If kept well lacquered, it will not discolor.
  - (22) O. R. asks: If a piece of Babbitt metal, weighing 25 or 30 lbs. and containing antimony, be placed in a well, would it hurt the water for house use and drinking purposes? A. Under certain circumstances, it would prove injurious.
  - (23) F. W. W. asks: Why, when alcohol and aqua ammonia are mixed in about equal parts, does the liquid turn a light red? A. If the reagents are pure, this change does not occur.
  - (24) M. V. W. asks: How can I clear sirup of sorghum and molasses? A. The sirup is neutralized with a little lime water and filtered while hot through bone black, which clarifies it perfectly.
  - (25) W. C. B. asks: How can I remove verdigris from apple butter? A. You cannot remove it without injury to the butter.
  - (26) W. asks: How is benzine, such as is sold for cleaning clothes, prepared? A. It is one of the direct products of the distillation of petroleum (specific gravity 60° to 70° B.) It is an intermediate between naphtha and kerosene.
  - (27) O. J. C. says: A c se of poisoning by Paris green happened a few days ago, and there is some controversy among the physicians as regards the proper antidotes which should have been applied. A.Give recently precipitated moist ferric hydrate, best administered in the form of a solution of perchloride of iron with magnesia. Emetics should also be given, and the stomach pump applied. Carbonate of soda is sometimes made to replace the magnesia wholly or in part. 2. What is Paris green made of? What are its proportionate ingredients? A. Paris green (Schweinfurt green) is the aceto-arsenite of copper: (C<sub>2</sub>H<sub>3</sub>O)<sub>2</sub> O<sub>2</sub>+3(CuO, As<sub>2</sub>O<sub>3</sub>). In 100 parts
  - oxide of copper=31.29; arsenious acid=58.65: acetic acid=10.06. 3. In what respect does Paris green differ from Scheele's green? A. Scheele's green is the arsenite of copper, CuO, As2O3.
  - (28) W. H. asks: At what speed ought I to run my water wheel, which is an overshot of 18 feet diameterand 5 feet face, economy of water being the desired object? A. At between 6 and 7 revolutions per minute.
  - (29) E. L. G. asks: 1. Can copper be nickel plated? A. Yes. 2. How can I plate a rim about the size of a pail hoop? A. Use nickel salts and insert the rim to be plated in the bath and proceed as in plating with other metals.
  - (30) J. B. asks: 1. Will electricity, passing through a magnet, change its poles? A. It can be made to do so. 2. Take 100 magnetic needles, fasten each to a piece of small wire, say 2 feet long, and these with the magnets attached to a single wire 5 feet long; now will a strong current of electricity, passing through this wire, change the poles of all these magnets? A. No.
  - 31) J. C. W. says: We have had a discussion on the merits and demerits of upright and horizontal engines and boilers. Is there much difference as to the durability and efficiency of either when the same care is taken of them? A. Not much, but it is a little in favor of the horizontal engine. 2. What kind, upright or horizontal, would you advise for six horse power? A. A horizontal one.
  - (32) H. A. P. asks: Are cast iron turnings as good for a ground connection for a lightning rod as wrought or scrap iron? A. Yes. You cannot err by having too much surface exposed to the wet ground; and the more iron turnings you use, the better.
  - (33) E. M. asks: 1. What size and how much of silk-covered wire do I need to make an electro-magnet capable of lifting a weight of 1 The cores are 1/4 inch in diameter and 5/4 inch long. A. Cover your core with No. 20 cotton-covered copper wire to the thickness of ¾ of an inch. 2. What kind of a battery, and how large, must it be? A.Use two cells of Lockwood's
  - (34) E S. asks: Can you give me a formula for reducing the area of a pipe in feet to its diameter in inches and decimals of inches: that is to say, if the area of the pipe is 0.663 feet, then what is its diameter in inches? A. Divide the area in square feet by 0.7854, extract the square root of the quotient, and multiply the result by 12.
  - (35) C. asks: What pressure per square inch will first class steel pipes stand, % inch outside diameter, 1/8 inch thick, making 3/4 inch inside diameter? A. The bursting strain per square inch would be about two fifths of the tensile strength of the material.
  - (36) A. D. S. asks: If the ancients believed that the world was flat, why is Atlas always represented as carrying a globular world? A. According to some legends, Atlas was a great philosopher who was the first to teach that heaven was

(37) T. J. S. says: Please give us a recipe for a cement that will resist the action of alcohol. A. Melt together equal parts of pitch and gutta percha. Apply hot.

(38) J. A. C. asks: Please name a substitute for lime in a washing compound of sal soda and lime, as the lime will not keep. A. We do not see that the introduction of lime, or any substitute similar in properties, is requisite. A solution of subcarbonate of soda (sal soda) in water is all that is required. The following recipe has lately been introduced in large laundries; it is of German origin: The clothes are simply boiled for about half an hour, with occasional stirring, in water containing about half a pound of common hard soap, ground fine, and 2 ozs. spirits of tur-pentine to the gallon. The clothes, after rinsing as usual in clean water, and drying in the air, do not retain the slightest odor of the turpentine.

(39) A. R. L. asks: Is there any acid used in the manufacture of sirup? Is it injurious, and how can I detect the presence of it? A. If you mean grape sugar sirup, yes, sulphuric acid; but it is all removed by lime. Test a small portion of the sirup with a solution of chloride of barium; the clouding of the solution indicates the presence of sulphuric acid.

(40) R. L. C. savs: I have made an ink by mixing 5 gallons water, 1/2 lb. logwood, 1/2 oz. bichromate of potassa, and ½ oz. prussiate of potash, but this ink will not mix with other inks. Why if this? A. Ordinary ink contains gallate of iron, which is precipitated as Prussian blue on the addition of any mixture containing an alkaline ferrocyanide. At the same time a portion of the chromate suffers decomposition.

(41) P. J. B. asks: What substance will re move the gloss from a black coat, so that it will not immediately reappear? The shiny appear ance is probably caused by its rubbing against the back of a wooden seat in a horse car. A. Sponge it regularly with a soap containing considerable alkali. If this does not succeed well. use benzole.

(42) W. W. A.asks: Is there anything injurious in paraffin wax, if mixed with bread? A. There is not, but paraffin is not desirable as

(43) T. L. M. says, in reply to M. H. C., who other: It describes a perfect ellipse.

(44) F. M. P. says, in reply to G. S. P., who asks about artificial egg hatching: Last spring, there were hundreds of chickens hatched in a box 2 feet square by 6 feet long, set on end. The upper half was full of frames like sieves, frames covered with canvas; these were 4 inches apart, on slides. They were filled full of eggs, and at the bottom of the box was a coal oil lamp burning: directly over it was a pan with water in to keep the air damp. The operation was watched, and the eggs were turned every day.

MINERALS, ETC. - Specimens have been received from the following correspondents, and examined, with the results stated:

J. D. B.-It is red jasper.-F. D. B.-All four are flint, containing different percentages of iron. J. B. H.—It contains about 20 per cent of iron.
 H. C. B.—They are crystals of sulphate of lime. -O. H. J.—No. 1 is spiegeleisen. No. 2 is flint. No. 3 is decomposed mica.—J.B.—It is compact quartz rock. The small percentage of iron contained in it may hurt it for the purpose proposed .-- J. H.P. -No. 1 is fibrous sclenite. No. 2 is iron pyrites. No. 3 is hornstone. No. 4 is milky quartz. No. 5 is ferruginous quartz. No. 5 is quartzite. No. 7 is shale. No. 8 is gypsum. No. 9 is iron sandstone. No, 11 is crystalized selenite.—W. M. B.— It contains sulphuric acid, chloride of sodium, carbonate of lime, and a great amount of organic matter. Add lime water, boil, and filter through gravel, sand, and charcoal.

## COMMUNICATIONS RECEIVED.

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

On the Analogy of Light, Heat, etc. By S. A. C. On a Lusus Nature. By J. H. P.
On Spiritualism, etc. By C. A. W.
On Railroad Rails. By P. M. A. and others.

On Flying Machines. By C. C. M.

Also inquiries and answers from the following: J.-T. L. R.-H. S.-H. W. C. T.-C. A. S.-B.

# HINTS TO CORRESPONDENTS.

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; "Who makes japanned tin novelties and toys? Who makes watchmen's time detectors? Who makes spring balances? Who manufactures india rubber?" All such personal inquiries 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 expeditiously obtained.

### [OFFICIAL.]

# INDEX OF INVENTIONS

Letters Patent of the United States were Granted in the Week Ending September 26, 1876, AND EACH BEARING THAT DATE

[Those marked (r) are reissued patents.] A complete copy of any patent in the annexed list, including both the specifications 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. Agricultural boiler, L. & C. Fuller...... 182,520 Arithmetic case, W. F. Baada 182,515
Artificial marble, L. De Planque 182,647 

 Axie lubricator, F. A. Bruns
 182,555

 Axie set and gage, W. C. Carleton
 182,556

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 182,628

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 182,626

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 7,320

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