



(37) R. C. S. says: 1. A spring is situate on a hill several hundred feet high, and nearly a mile from where we wish to use the water. One half of the required length of pipe is 1 1/2 inches, and the rest 1 inch in diameter. In order to get the best head and largest flow of water, how shall the pipe be used? With the largest size near the spring, or vice versa? A. The larger pipe should be placed nearest to the spring, as in this case its contents will act as a head to force the water through the smaller pipe, in which, on account of the greater velocity, there will be the greater friction. 2. Does water in a pipe, under pressure, flow with less friction in coming downhill than on a level or in being forced up hill? A. No. The friction depends upon the velocity without regard to the power. If you remove the power of gravity, water may be forced up hill as easily as down. 3. Is the friction greater when water is forced through a pipe than it would be if it were drawn through the same pipe by suction? A. No. It is forced through the pipe in either case. Where suction is employed, the pressure of the atmosphere is simply removed from one end, and allowed to exert its full force at the other.

(38) S. T. asks: What ingredients can be mixed with aniline red to turn it black without injuring its quality? A. Use hydrochloric acid and chloride of potassa. Aniline black may be made more economically directly from the aniline oil (crude) by means of the above reagents.

(39) M. M. F. asks: Please give me a recipe for annealing steel very soft? A. Heat it a cherry red, and let it cool in lime.

(40) H. C. D. asks: 1. How is a fine varnish finish put on wood, to be perfectly smooth and glossy? A. First rub down the surface of the wood with pumice powder. Then give three good coats of copal varnish (commonly called furniture varnish), allowing each to dry before applying the next. Rub this down perfectly smooth with pumice powder and water, and finally give the work a good flowing coat of strained varnish. 2. How is a white finish put on wood to represent marble, that will not scratch? It is used on coffins. A. The wood is given several good coats of zinc white, and then rubbed down with pumicestone. It is then flowed with a lacquer of gum aniline, and baked at a temperature of about 300° Fah. 3. What can I use to fill the pores of walnut before varnishing? A. Common oil size is sometimes used; but the best material for this purpose in use is a rough varnish composed of rosin, oil, and turpentine. It is known in the trade as scraping varnish. Several coats of it are applied to the wood and then scraped off with an iron or steel scraper and fine sandpaper, leaving the pores of the wood evenly filled.

(41) W. D. M. says: When do fishes sleep? In my aquarium my gold fish and minnows seem always on the alert. A. Such fishes rarely sleep, unless in very cold water.

(42) J. L., of Manchester, England, asks: How are the castings of zinc figures or statues made in France and Germany? The mode of procedure is, I believe, casting the zinc in brass moulds, with the pattern engraved inside the mould; but I cannot arrive at the way in which they cast them hollow, for by the appearance of the metal no sand core is used. A. The moulds are built in pieces, and the sand is faced all over, for both the inside and outside of the statues, leaving no sand or parting marks on the castings.

(43) S. asks: 1. What is the greatest perpendicular height to which water can be lifted by a steam pump? A. From 30 to 32 feet. 2. Which can lift the highest, a piston or a rotary engine? A. If the two forms of pump are equally tight, there will be no difference in favor of either.

(44) A. E. B. says: 1. I wish to construct a footpower jig saw. The saw blade is to be stretched in a frame after the fashion of the gate saw. A. A man can comfortably make about 120 strokes of the treadle with the foot per minute. This will turn your driver 120 times per minute. 2. How large a driving wheel must I have to attain 800 strokes a minute, and of what size should the pulley be? A. The driver pulley may be from 1 1/2 to 2 inches in diameter, and you can make your own calculation for driver. 3. How large shall I make my flywheel, and will it make any difference whether I have it on the shaft with a pitman pulley or on the same shaft as the drive wheel? A. It is better to attach a pitman to the shaft which carries the driver, because it is more direct and saves the friction of intermediates.—J. E. E., of Pa.

(45) W. H. D. asks: 1. How can I construct a hand pump for the purpose of pumping oxygen gas from a bag into a cylinder, to compress it for a calcium light? A. If you are entirely unacquainted with the details, we think it will be more satisfactory for you to purchase the pump from a maker of philosophical instruments. 2. In making oxygen gas in a cylinder over the fire, how is the pressure gauge made, and what kind of liquid does it contain? A. A pressure gauge can be made of a bent tube containing water. 3. What is a Bunsen burner? A. It is a gas burner in which the gas is mixed with air before being burned. 4. What is the expansive capacity of hot air to the square inch? A. If the volume is constant, the pressure increases about 1/10 for each 1° Fah.

(46) E. P. B. asks: 1. Will the salt in oil made from butter be injurious to machinery or leather? A. It is better to extract the salt. 2. Is there any cheap way of removing the salt? A. The salt may be extracted from the butter by agitating the same with a large quantity of water just hot enough to fuse it. On allowing the water to stand for a few minutes, the fatty oil will rise to the surface.

(47) J. McT. asks: What is the substance called breeze, mentioned in a recipe for making concrete? A. Small ashes and cinders, sometimes used instead of coal for burning bricks. Is there danger of a balloon frame rotting when filled in with concrete, the inside of the studs being exposed? A. No, especially if the ends of the studs are not covered with the concrete. Which is the best to apply to wood, crude petroleum

or coal tar? A. Coal tar is best for coating wood underground or where subject to dampness.

(48) R. C. G. says: Our western coal has a great deal of sulphur in it, which makes it very troublesome to work; and as I am a blacksmith, it gives me much trouble. Is there anything that will remedy the evil? A. This cannot be obviated, as the sulphur in the fuel exists in combination with iron as pyrites.

(49) F. S. asks: Is there anything which will take smoke stains from white marble? A. If you do not succeed with soap and water, try rubbing with a little prepared chalk moistened with benzole.

(50) W. B. asks: How can I color brick-work black? A. Use a paint or varnish made from Brunswick black, oil, and turpentine.

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

B. B. T.—The material contains nickel, cobalt, arsenic, and sulphides of these metals. After solution, the arsenic may be separated by sesquioxide of iron. Neutralize and precipitate with lime, dry the precipitate, and dissolve it in very dilute oil of vitriol. The iron may then be separated by neutralizing with lime and a little carbonate of lime (chalk). Crystallize the nickel solution, and decompose by roasting.—A. E. F.—No. 3 appears to contain gold, but it would require a quantitative analysis of the ore to determine the amount. We can give no opinion as to the probable value of the ore from the small fragment which you send.—A. E. L.—No. 1 is galena—sulphide of lead. Nos. 2 and 3 consist principally of iron pyrites and marcasite. See p. 7, vol. 36.—C. J. D.—It contains iron, nickel, cobalt, and arsenic.—A box from Mobile city (no letter with it) contains guano of good quality.—O. P.—It contains galena and iron pyrites. See p. 7, vol. 36.—H. C. M.—It is an aggregation of small crystals of smoky quartz. Its occurrence is not necessarily indicative of the close proximity of any valuable metal. See our advertising columns for addresses of dealers in scientific books, who will send you catalogues on application.—A. R. R.—No. 1 is hornblende. No. 2 is galena—sulphide of lead. No. 3 appears to be erubescite—a double sulphide of copper and iron. No. 4 is clay containing a large percentage of carbon. It is not a natural formation. No. 5 is mica schist.—S. M. W.—It is an iron ochre—clay colored with oxide of iron. It is used to some extent, mixed with oil, as a paint for outside work and for floors.—M. S. H.—It appears to contain British gum (dextrin), gum arabic, shellac, borax, soap, glycerin, and some perfume. Shellac may be rendered soluble in water by adding borax.—A specimen contained in small yellow box, with no name on it, appears to be a piece of slag or scoria from some furnace.—C. J. L.—It is a piece of furnace slag.—S. G. McM.—It is sesquioxide of iron.

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 Bourdon Pressure Gauge. By A. B. W. On the Attraction of Atoms. By D. P. B. On Home-Made Philosophical Instruments. By J. P. On the Telephone. By H. H. Also inquiries and answers from the following: L. H.—A. B.—T. A. K.—E. B., Jr.—W. W.—A. J. B.—G. B.—C. A. F.—N. J. W.—J. T. R.

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.

Inquiries 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 sells small distilling apparatus? Where can agricultural steam engines be bought? Who sells electro-magnetic motors? Who sells the best microscopes? Whose is the best work on watchmaking?" 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

FOR WHICH

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

March 6, 1877,

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.

Table listing various inventions such as Air gun, spring, H. M. Quackenbush, Air, heating, D. McAllister, Air, moistening, C. R. Merrill, Animal substances, etc., preserving, F. S. Barré, Annealing castings, J. S. Robinson, Annealing furnace, J. Ives, Bag fastener, C. Lazarevitch, Bale band tightener, J. L. Sheppard, Bale tie, cotton, J. L. Sheppard, Baling press, N. H. Collins, Balusters, making, P. M. Haas, Barrel, T. Hanvey.

Table listing various inventions such as Barrel carrier, N. Oak, Barrels, constructing, E. J. Granger, Bath for tempering steel, A. Kalstrom, Bed bottom, spring, J. O. Burch, Bed slat, A. Watson, Beer on draught, treating, J. Klein, Binding books, G. P. B. Hoyt, Bird cages, awning for, S. P. Burton, Blowing machine, T. S. Disston, Boats, detaching, W. M. Bell, Boats, detaching, J. Carpenter, Boats, sliding outrigger for, D. Harrington, Boiler feeder, H. L. Traphagen, Bolt and rivet cutter, J. Hellwig, Bone black kiln, W. R. Elmenhorst, Bone black retort, E. E. Quimby, Book carrier and holder, E. W. Smith, Book support, G. S. Bailey, Boot and shoe tip, D. K. Cross, Bosom, over, H. C. Holmes, Bottle stopper, T. Hipwell, Breech loading fire arm, J. S. Edge, Jr, Bridge, truss, L. W. Densmore, Broom machine, G. W. Chodrick, Brush and cane cutter, O. Pickering, Brush, wire, J. F. Haskins, Bustle, T. C. Barclay, Button and stud, sleeve, G. Pitts, Button fastening, J. C. Teters, Calendar, H. Gram, Can top, F. C. Wilson, Car axle box, H. C. Feger, Car axle box, J. A. Picard, Car brake, J. Johnson, Car coupling, J. B. P. Mohan, Car seat, J. L. Mitchell, Car stove, R. Hale, Car wheel, A. F. Cooper, Car wheel, E. Longstreth, Card rack, F. Hayek, Carriage button, A. I. Lenhart, Caustic soda drums, head for, J. Simpson, Chair, convertible, French & Hunting, Chimney top, G. Lemme, Clover huller, A. Miller, Coffee pot, R. L. Nelson, Coffee pot, J. B. Smith, Coffee roaster, G. Fisher, Collar and hame, combined, E. Stroud, Combs, open work in, S. A. Tisdale, Concrete under water, laying, J. C. Goodridge, Jr, Corn planter, H. McQuinnif, Corset, S. B. Ferris, Corset, J. P. McLean, Cotton cleaning, etc., Miles & Robinson, Cranberry separator, J. C. Hinchman, Crank and crank shaft, R. P. Houston, Culinary steamer, O. W. Wren, Cultivator teeth, J. R. Colt, Cutter head, Washburn & Walker, Dead bodies, preserving, T. Holmes, Dermopathic instrument, C. B. Tucker, Dog collar, N. Elmore, Door plate, W. Tracy, Door sheave, S. H. & E. Y. Moore, Dovetail tenon and mortise joint, R. B. Cantrell, Drain tiles, laying, C. B. Kline, Dredging bucket, J. B. Curtis, Drier and smoke house, R. Sabin, Dye from naphthaline, Wolf & Botley, Earth closet, A. W. Thompson, Engine, hydraulic, A. J. Stott, Engine shafts, lining, L. H. Hall, Excavating and loading, B. Judy, Explosive compound, J. Goetz, Feed water heater, G. Steele, Fence, I. & E. Saltzman, Fence post, D. Moyer, Filter, R. S. Jennings, Filtration, artificial, J. D. Cook, Fire telegraph bell striker, C. H. Pond, Fire telegraph repeaters, C. H. Pond, Fire telegraph signal box, C. H. Pond, Fire place heater, L. A. Seltz, Fire pot and grate, H. L. McAvoy, Fire shovels, making, P. Kiefer, Fruit bag, A. Larkin, Fruit grinder, H. Kelly, Fruit press, hand, A. V. M. Sprague, Furnace, iron finishing, W. D. Wood, Furnace for treating ores, M. D. Brett, Furnace, hot air, E. Varney, Gas and water regulator, Leavitt & Thurston, Gate, automatic, M. Miles, Gate hinge, G. M. Simpson, Gate, swinging, L. G. Woolley, Glass melting pot, A. Harcum, Glazier's diamond holder, J. E. Karselen, Glue stock, treating bones for, W. Adamson, Grain binder, G. F. Green, Grain binder, G. A. Houston, Grain binder, D. McPherson, Grain binder, L. A. Scovill, Grain separator, Harrison & Buchanan, Grain separator, Kline & Mason, Grain separator, J. S. Upton, Grinding mill, T. D. Powers, Gyroscope top, H. Beesley, Hame fastener, T. H. Poland, Harness, breast collar for, B. Boyden, Harness for horses, plow, A. B. Coleman, Harness trimming, I. N. Just, Harvester, C. H. Chadbourn, Harvester reel, G. W. McCallom, Harvester truck, D. J. Cashman, Hay elevating device, G. A. Dickson, Hay elevator, G. A. Dickson, Hook and clasp, suspension, F. Anderson, Horse collar, A. Rutherford, Horse collar, J. N. Schmitz, Horseshoe machine, J. W. Channing, Jr, Hub to axles, attaching, D. A. Johnson, Ink, cancelling, Van Der Linden & King, Iron and steel, refining, J. E. Sherman, Iron, refining, J. E. Sherman, Iron, cutting, J. L. & E. W. Backus, Kaolin, artificial, A. D'Estampes, Key for locks, T. Hendricks, Knife and fork polisher, P. M. Ogg, Knitting machine needle, O. F. Tripp, Lamp burner, T. Silver, Lamp chimney cleaner, C. P. Palmer, Lamp, fountain, E. J. M. Becker, Lamp, street, J. Irwin, Lamp support, T. Boudren, Lamps, electric lighting for, W. H. Zimmerman, Lathe gear, J. N. Tannahill, Lathe cutter holder, F. D. Hazelton, Lifting jack, M. Durnell, Line fastener, A. S. Goodrich, Link for chains, W. D. Ewart, Links for drive chains, W. D. Ewart.

DESIGNS PATENTED.

Table listing various designs such as 9,770.—MATCH HOLDER AND MAT.—P. L. Davis, San Francisco, Cal., 9,771.—CARPETING.—E. Fisher, New York city, 9,772 to 9,783.—CARPETING.—J. Fisher, New York city, 9,784 to 9,795.—CARPETING.—J. L. Folsom, Brooklyn, N. Y., 9,796 to 9,810.—CARPETING.—O. Heinigke, New Utrecht, N. Y., 9,811.—TYPE.—J. Herriet, New York city, 9,812 to 9,821.—CARPETING.—H. Horan, East Orange, N. J., 9,822.—MATCH HOLDERS.—W. W. Lyman, West Meriden, Conn., 9,823 to 9,829.—CARPETING.—E. J. Ney, Lowell, Mass., 9,830 to 9,834.—CARPETING.—E. J. Ney, Dracut, Mass., 9,835 to 9,838.—CARPETING.—H. Nordmann, N. Y. city, 9,839.—GAS REGULATOR.—O. Pressprich, N. Y. city, 9,840 to 9,842.—CARPETING.—C. W. Swapp, Lowell, Mass., 9,843 to 9,845.—INKSTAND, ETC.—O. F. Fogelstrand, New Britain, Conn., 9,846.—CENTER PIECES.—S. Kellett, San Francisco, Cal., 9,847.—RUBBER SHOES.—J. A. Olmstead, Richmond Co., N. Y., [A copy of any of the above patents may be had by remitting one dollar to MUNN & Co., 37 Park Row, New York city.]