

(about 300° Fah.), immerse quickly in a bath of melted tin. Remove, and drain. To obtain a thicker coat of tin submerge again in the tin bath, heated but little above the melting point.

(37) H. W. makes this suggestion with regard to leaky skylights, in response to the inquiry of B. P. L.: My practice has been to put on a good stiff coat of paint and sand it. The paint should set hard on the glass and the sand be thoroughly dry. I sometimes have to repeat it, but not often. However, a second coat of paint and sand renders it much more durable.

(38) E. C. H. writes: I wish to increase the draught of my engine. If I introduce the exhaust a foot or two from the top of the chimney, will it be likely to injure the chimney, and will it increase the draught? The chimney is 22 feet high, brick, square, and 2 feet in clear. A. We think the exhaust will not injure the chimney, and will increase the draught.

Will you please give me number of threads per inch of a 3/4 inch pipe tap? A. Eighteen.

(39) W. H. T. asks: What is the best and cheapest method of annealing small castings? A. Heat them for 6 hours inclosed in a box and surrounded with lime, and allow them five or six hours to cool, by covering the box (after extraction from the fire) with sand.

(40) I. K. asks: What is the pulling or pushing force of the average locomotive? A. About one sixth of the weight on its driving wheels.

Will a single lens, double convex, answer for a camera to view landscapes, etc.? A. Such a lens will answer.

Will a boiler of the following dimensions furnish steam sufficient for a 3 horse engine; height 48 inches, diameter 22 inches, with 30 tubes 2 inches in diameter and 36 inches long? A. It probably will, if the engine is well designed.

(41) W. T. R. writes: Can you suggest any way of preventing brass stencil plates from affecting the color of the paint used? A. Lacquering the plates may answer, but nickel plating would doubtless be preferable. Varnish would probably soon wear off.

(42) "Inquirer" writes: Please give me a recipe for making mucilage. A. Dissolve gum dextrin in hot water with the addition of a little acetic acid.

What will keep washing blue from settling? A. Agitate the water.

(43) R. E. B. asks for a recipe for a ladies' shoe polish? A. Borax, 1 part; shellac, 4 parts; dissolve by continued boiling in a small quantity of water, and color with soluble aniline black or black ink.

(44) G. W. & Sons write: We are troubled a great deal with organic matter in water used in our brewery. Could we remedy it by first precipitating the organic matter and clayey parts of the water with potassium permanganate and alum, and then filter through sand and bone charcoal? We think that the filter would require less cleaning by first precipitating the organic matter and clay. A. Yes; but sulphate of alumina is preferable to alum. Dr. Crookes recommends the following mixture: Calcium permanganate, 1 part; aluminum sulphate, 10 parts; fine clay, 30 parts. The potassium permanganate may be used in place of the lime salt. He finds that one part of this mixture will purify almost instantly 5,000 parts of foul ditch water or sewage; it settles quickly, and the supernatant liquid may after fifteen minutes be drawn off without filtration.

(45) S. B. asks: How much will a well seasoned stick of timber (Southern pine or oak), 50 feet long, vary in length by a change in the temperature of 100° Fah.? A. There is no absolute formula for such cases, the change in dimensions depending upon a variety of elements, such as the grain of the wood, the nature of seasoning, etc. Not timber is absolutely dry, and will consequently continue to shrink irregularly as further portions of moisture are evaporated; while the same stick changes character from day to day as the humidity of the air varies. Alterations in shape are therefore rather due to hygroscopic than thermal variations, and hence wood cannot be classed, in regard to expansion and contraction, with substances which, like the metals, have a definite coefficient of expansion. The change in length will be usually less than one third the alteration in cross section. In practice it is disregarded.

(46) A. B. asks: How may pencil marks be removed? A. We believe that rubber or a steel eraser are the only means.

(47) L. D. asks how to purify impure well water. A. Reduce separately to fine powder and mix thoroughly 30 parts fine clay, 10 parts sulphate of alumina, and 1 part of permanganate of lime. Add this to the impure water in the proportion of 10 to 30 grains to the gallon (depending of course upon its impurity), agitate, and allow to settle for half an hour. Less must be used if detected in the taste or color of the water after settling. Permanganate of soda or potassa may be used if the lime salt cannot be obtained.

(48) E. S. wishes to know the number of pounds of chloride of calcium required to bring a cubic foot of water to a density of 30° Baumé. A. About 23 lbs., under ordinary conditions.

(49) J. T. asks: What will restore hard rubber goods when tarnished? A. Sometimes repolishing; often nothing.

(50) G. S. asks: What was the fastest run of the Jarrett & Palmer "Centennial" train? A. Ninety miles in 99 minutes, Jersey City to West Philadelphia, without stop.

(51) E. D. R. wishes to know whether isinglass is identical with mica. A. Isinglass is the name given to a gelatin properly prepared from the sounds or air bladders of fish. The name was also applied by Hill, in 1771, in his work on "Fossils," to large sheets or plates of muscovite (the most common of the mica group) to distinguish it from the small particles constituting mica schist. The name is, however, properly restricted to fish gelatin.

(52) F. J. O. writes: I have been experimenting in transferring printing and lithographs on wood for engraving. I find certain kinds of hard varnish printing and lithograph inks I can make no impression on. I have used strong solutions of caustic potash and alcohol, strong potash lye, glycerin, all to no purpose. Can you give a recipe for a solution that will loosen these hard inks and yet not destroy the picture? A. Try the following: carbon disulphide, 95 parts; absolute alcohol, 5 parts.

(53) E. L. B. asks for a recipe for a preparation to put on plow castings after they are polished, so as to retain the polish and keep the metal from rusting. A. Cover with a mixture of white lead and tallow when not in use.

(54) F. A. S. writes: Having learned by experience what a nuisance a leaky stovepipe, like that of A. H. J. (p. 75, current volume), may become, let me prescribe a remedy which I have found successful. In the first elbow from the stove I cut out a strip of the iron 2 1/2 x 4 inches, and had a sliding cover for the opening. I open it some every day, and always at bedtime, and leave it till morning. The pipe has never dripped since I began this treatment, and is as clear and dry as when put up.

(55) H. A. F. writes: I have a gold pen which has too coarse a nib. Is there any way in which I can sharpen it without sending to a manufacturer? A. We doubt whether you can alter it successfully, if you have no experience.

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

R. H.—It is an excellent quality of asbestos.—E. P. B.—It is zinc blende—zinc sulphide. Of some value.—Mrs. S. C.—It appears to be the dried bark of the black willow (salix nigra).—A. R. C.—Brick clay is not quoted in the market; it could be bought at about \$2 or \$3 per ton; fire clay, \$5 to \$7 a ton. J. F. H. & Bro.—It is a ferruginous shale—composed principally of silicate of alumina or clay and silicious sand, colored by sesquioxide of iron.—S. J.—The sample is an excellent guano. An analysis would determine its value.—L. G.—The platinum sand is of value. The clayey asbestos might be used by paper makers. Sample of diamond earth not received.—D. V.—It is a ferro-cupric sulphide in quartz gangue.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure the receipt of original papers and contributions on the following subjects: The Phonograph. By J. C. D. Velocipede Travel. By T. B. and W. E. G. "Mulum in Parvo." By L. S. B. The Orohelograph. By G. B. S. Mechanical Adjustment by Mirrors. By A. S. C. An Astronomical Myth. By W. I. L. The Rail Puzzle. By H. G. U., D. J. C., and "Vulcan." Electrical Phenomena. By A. E. H. A New Motor. By H. S. M. The Safety Valve. By T. J. L. Snake Cannibalism. By F. N. P. Mind Reading. By J. L. Gravitation. By G. V.

HINTS TO CORRESPONDENTS.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

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 writers 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.

OFFICIAL.

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending February 26, 1878,

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 inventions such as Ale or beer measure, Anchor, Spedden & Stafford, Ax machine, C. L. Jeffords, Axle, car, G. W. Millington, Axle, car, G. W. Millington, Baby jumper and carriage, M. P. Gillen, Bale tie, F. Cook, Bale tie, Cook & Shaw, Bale tie, A. E. Kimberly, Bale tie, J. C. Riethmuller, Bale tie, Shaw & Cook, Bale tie, N. W. Speers, Barometer, R. M. Lowne, Barrel trussing machine, H. W. King, Bending machine, sheet metal, C. Brombacher, Bending tubular sockets, J. H. Alker, Binder, J. F. Tapley, Bit brace, H. L. Pratt, Boat knee, D. True, Boat, portable folding, N. A. Osgood, Bobbin and spool, R. C. Fay, Bottlers, domestic, T. & L. James, Book and cover, J. W. H. Reisinger, Bookbinder's beveling machine, H. W. Rokker, Book shelf, S. A. Smith.

Table listing inventions such as Boot and shoe holder, N. Lyon, Bottle stopper fastener, G. F. Outten, Bracket, R. B. Sanderson, Bracket for book shelves, S. A. Smith, Brake, car, W. L. Card, Breweries, washing shavings in, F. Hinckel, Broiler, J. McConnell, Brush for scrubbing, G. W. Lee, Buggy top, I. Z. Merriam, Bustle and pannier, S. Dixon, Button fastener, H. Burtley, Candlestick, J. McCarthy, Cans, casing for, A. F. Tripp, Car coupling, W. N. Patteson, Car, dumping, M. Van Wormer, Car, stock, W. H. Hayes, Chain making machine, J. J. White, Chair, rocking, Willershausen & Rhoner, Charcoal kilns, operating, W. A. Miles, Clasp and buckle, J. R. Judd, Clasp for garments, W. B. Walker, Clay machine, G. D. Goodrich, Clock case manufacture, N. Allen, Cloth, gigger for napping, Woelfel & Massey, Coal, purifying, P. F. Morey, Coffee and spice mill, T. Strobridge, Collar and hames, J. R. Gorby, Copper sheet manufacture, A. O'Neill, Cornice mould, etc., device, Glenn & Fern, Corset clasp, T. C. Candlish, Cotton cleaner, W. Herrmann, Cotton gin, A. L. Stietenroth, Cradle, J. Sprengard, Cultivator, S. L. Allen, Cup and other vessels, H. Berry, Dental plate mould, G. F. Reese, Door plate, B. A. Wilson, Draught equalizer, J. A. Stephens, Draught equalizer for horse powers, L. Dodge, Drill, rock, C. Burleigh, Egg carrier, C. E. Dutrow, Electric machine, E. Weston, Enameling sheet iron, F. G. & W. N. Niedringhaus, Engine, gas motor, N. A. Otto et al, Engine, reciprocating steam, C. Hunter, Fan, automatic, I. Zettli, Fence, E. Densmore, Fence barb, L. T. L. Wing, Fifth wheel for carriages, W. W. Grier, File, bill, S. Thompson, Filter, J. Foley, Fire alarm, A. S. Hickey, Firearm, A. Ball, Firearm, O. Jones, Firearms, rearsight for, A. Roda, Fire escape, H. J. Bowman, Fire escape, T. F. Carpenter, Fire escape, D. Ottinger, Fire extinguisher, T. E. Connelly, Fireman's hat, J. M. De Celis, Flour manufacture, C. S. Marple, Freezing water, mould for, W. R. Close, Fruit basket, L. W. Beecher, Furnace, steam blast, E. R. Stege, Gas lighter and extinguisher, G. S. Dunbar, Gas works, by-pass for, H. G. Morris, Gate, R. Gray, Gate, J. D. Hagaman, Gun, accelerating, A. S. Lyman, Halter, A. Henkell, Hammers, power mechanism for, B. Murphy, Harrow, rotary, S. Hartman, Harvester, R. Emerson, Harvester reel, McCormick & Baker, Hat and bonnet box, A. B. Rice, Hat holder, J. M. Castillo, Hides and skins, drench wheel for, I. Wells, Hinge, W. Hull, Horses, administering medicine to, H. Hartman, Horses, driving, E. Wilder, Horses, hitching, E. Repp, Horses, toe weight for, H. Satterwhite, Hub attaching device, F. C. Lee, Hub for carriage wheels, J. Raddin, Hydrant sewer trap, W. C. Amish, Injector, G. H. Little, Instep holder, J. H. Woodbury, Iron from refuse, separating, O. D. Woodruff, Ironing table, P. Dunbar, Ironing table, M. S. Prescott, Jibs, reefing, E. Rowell, Keyboard, C. A. Agren, Label holder, C. M. Bright, Lamp burner, A. T. Nord, Latch, T. P. W. Magruder, Lead, manufacture of white, G. L. Irwin, Leather skiving machine, C. Amazeen, Liftingjack, N. Hill, Lime bin, C. A. Lawton, Lock, sliding door, J. W. Schoonmaker, Lock, combination, R. Beachman, Loom shuttle, G. C. Mills, Lubricator, J. T. Meyer, Manure distributor, Jordan & Barron, Manure from night soil, manuf. of, C. M. Kimball, Match safe, G. R. Taylor, Meat and vegetable cutter, W. H. Goodchild, Metal plates, securing, W. G. Hyndman, Mill, grinding, D. Hess, Motor, water, J. S. Williams, Name plate, E. A. Webster, Ore mill, J. W. Foules, Ore separator, Wetmore & Rice, Oven, M. Nichols, Padlock, King & Pierce, Paper bag machine, A. B. Glover, Paper collar, S. Bates, Peg cutter, C. A. Corman, Photograph frame, A. Griffin, Piano forte sound board, G. W. Lyon, Pie turner, N. P. Macdocks, Planter, cotton seed, Nix, Stone, & Anderson, Planters, self dropper for, J. Butterfield, Plow, Knoblock & Bissell, Plow, W. J. Pirkle, Plow clevis, D. A. Kennedy, Plow, corn, P. Brannan, Plow, sulky, N. Elmer, Plowshare and point, C. M. French, Pocket book clasp, L. Messer, Potato digger, C. O. Seamans, Press, cotton, Ivens & Dorand, Printing apparatus, K. Gray, Printing, autographic, J. Pumphrey, Pump, J. M. Willis, Pump reel, sand, Brawley & Morris, Radiator, W. H. Brown, Railway track, G. Lehlback, Recarburetor, Hunt & Wendel, Refrigerator, J. L. Alberger, Refrigerator, S. P. Miller, Register, Bendor & Pond, Rolling blanks for axle clips, Clapp & Van Patten, Saw frame, buck, A. Holbrook, Sawing machine, T. F. Osburn, Scales, spring, J. A. & J. S. George, Scales, platform, S. J. Austin, Scales, spring, W. B. & J. S. Ross, Scissors, forceps, etc., L. A. Pichon, Screw driver, R. Munroe, Seeding machine sweeper, M. Barbour, Sewing machine shuttle, P. Diehl, Sewing machines, marking in, H. W. Fuller, Shaft, reverse motion counter, Guild & Clark, Shoe exhibitor, T. E. Lewis, Shoulder brace and suspenders, A. P. Fuller, Sirup, flavored, Walker & Patterson, Spoke tenoning machine, Barnes & Miller, Spoke tenoning machine, R. W. Eaton, Spoon and ladle, J. Scheider, Spring, car, H. Gardiner, Square, try, H. Owen, Stamp, postage, J. Dewe, Staples, inserting and clinching, D. M. Somers, Stove, cooking, G. G. Wolfe, Stove door, cooking, B. F. Clement, Stove, gasoline cooking, H. Wellington, Stove, oil, Shields & Liddle, Stove, safety, C. J. Smith, Stove, self extinguishing, W. F. Condon, Stove, culinary attachment, Dwyer et al, Tailor's measuring tool, E. O. Thompson, Telegraph relay, Allan & Brown, Telephone, J. Trobridge, Tether, W. B. Mathews, Thill coupling, H. Howell, Tile or brick kiln, R. G. McCullough, Tire setting machine, J. B. West, Tobacco curing, D. V. Davis, Toy carriage, H. Groth, Transom lifter, A. F. Pfeifer, Truck, car, J. G. Divoll, Tug link, W. P. Riley, Tug, spring draught, A. T. Nichols, Umbrella runner, H. S. Frost, Valve, check, J. F. Whitney, Valve for steam engines, G. A. Haworth, Valve gear for steam engines, G. W. Ziegler, Valve, rotary, D. W. Jones, Vegetable cutter, J. F. Rote, Vehicles, clip for, D. Kirk, Vessels, cleaning hulls of, H. J. Cole, Vessels, pin rail for, T. W. Hyde, Wagon box fastening, C. G. Conkling, Wagon gearing, etc., C. Baumgaertner, Washing machine, W. H. Nicholson, Washing machine, J. F. Pond, Washing machine, T. C. Welch, Watch balances, gauge for, J. Kinehan, Water meter, T. Walsh, Whip socket, A. Searls, Window cleaning device, E. P. Hall, Window hanging and fastening, J. Q. Ingham, Yoke fastener, A. W. Comstock.



CAVEATS, COPYRIGHTS, TRADE MARKS, ETC.

Messrs. Munn & Co., in connection with the publication of the SCIENTIFIC AMERICAN, continue to examine Improvements, and to act as Solicitors of Patents for Inventors.

In this line of business they have had OVER THIRTY YEARS' EXPERIENCE, and now have unequalled facilities for the preparation of Patent Drawings, Specifications, and the Prosecution of Applications for Patents in the United States, Canada, and Foreign Countries. Messrs. Munn & Co. also attend to the preparation of Caveats, Trade Mark Regulations, Copyrights for Books, Labels, Reissues, Assignments, and Reports on Infringements of Patents. All business intrusted to them is done with special care and promptness, on very moderate terms.

We send free of charge, on application, a pamphlet containing further information about Patents and how to procure them; directions concerning Trade Marks, Copyrights, Designs, Patents, Appeals, Reissues, Infringements, Assignments, Rejected Cases. Hints on the Sale of Patents, etc.

Foreign Patents.—We also send, free of charge, a Synopsis of Foreign Patent Laws, showing the cost and method of securing patents in all the principal countries of the world. American inventors should bear in mind that, as a general rule, any invention that is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Five patents—embracing Canadian, English, German, French, and Belgian—will secure to an inventor the exclusive monopoly to his discovery among about ONE HUNDRED AND FIFTY MILLIONS of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The expense to apply for an English patent is \$75; German, \$100; French, \$100; Belgian, \$100; Canadian, \$50.

Copies of Patents.—Persons desiring any patent issued from 1836 to November 26, 1867, can be supplied with official copies at reasonable cost, the price depending upon the extent of drawings and length of specifications.

Any patent issued since November 27, 1867, at which time the Patent Office commenced printing the drawings and specifications, may be had by remitting to this office \$1.

A copy of the claims of any patent issued since 1836 will be furnished for \$1.

When ordering copies, please remit for the same as above, and state name of patentee, title of invention, and date of patent.

A pamphlet, containing full directions for obtaining United States patents sent free. A handsomely bound Reference Book, gilt edges, contains 140 pages and many engravings and tables important to every patentee and mechanic, and is a useful hand book of reference for everybody. Price 25 cents, mailed free.

Address MUNN & CO., Publishers SCIENTIFIC AMERICAN, 37 Park Row, N. Y. BRANCH OFFICE—Corner of F and 4th Streets Washington, D. C.