

(34) E. H. R. suggests that if J. D. B. (p. 155, current volume) should make his elevator pit of cast iron, the trouble about leakage would be ended.

(35) A. W. asks: How can green cherry lumber be seasoned without checking? A. If it is seasoned by immersion in water, the difficulty you speak of will probably be avoided. Some of the patented processes of seasoning may perhaps be applied to advantage.

(36) J. W. writes: Am I right in understanding that bearings should always be softer than the spindles which run in them? Is that only necessary in case of the oil being forced out? I use hardened steel spindles running in Babbitt boxes (woodworking machinery). As I use refined blacklead and oil as a lubricant, which does not answer so well with soft metals, I am desirous of employing iron or steel in future for bearings. What kind of iron or steel should I use for this purpose? A. The condition you lay down is by no means a necessary one. Cast iron makes a good bearing if plenty of surface is exposed to the pressure.

(37) J. S. S. writes: 1. I have a 10 1/2 x 36 engine with a 10 foot fly wheel; boiler 3 feet diameter and 10 feet long, with 80 flues of 3 inches inside diameter. With this, how much Alabama pine ought I to saw in 10 hours? A. With a first class saw mill you might cut from 8,000 to 10,000 feet of inch boards if the logs are of good size. 2. How much corn ought I to grind in 10 hours with wood fuel, and 3/4 cwt. Esopus stones? A. When the millstones are sharp you should grind from 12 to 15 bushels of corn per hour.

(38) G. S. writes: 1. I wish to put up some telegraph wire. Will common unannealed wire do, or will it have a tendency to act as a permanent magnet? A. It will do. We have not heard of its having a noticeable tendency to act in the way you mention. 2. Would not a 10 gallon jar, with zinc and copper to correspond, give as much electricity as 10 one gallon cells? A. It would be apt to give a greater quantity of electricity, but the tension of the electricity, or its ability to overcome resistance, would be nearly 1/10 of the tension of electricity produced by the battery formed of 10 one gallon jars.

(39) T. C. wishes to stretch a 1 inch iron wire rope a distance of 400 feet, allowing but 10 feet sag in the middle, and carrying on the rope a weight of from 1,500 to 1,800 lbs. With these conditions he desires to know what will be the strain on the rope. A. According to Mr. Trautwine's tables, the strain = 5.08 x (weight of rope + suspended weight).

(40) E. M. asks: What is the best material for a flat roof for a machine shop and foundry? A. Tin will answer very well. Corrugated iron and various patented materials are also frequently used.

(41) W. C. asks: 1. How are ocean cables repaired? A. The ends are hauled up and united. 2. Has a diver ever been to the bottom of the ocean? A. We are not aware of any diver having reached a depth of over 170 feet.

(42) C. E. S. asks: 1. In making an Æolian harp, what kind of strings is preferable catgut or wire? A. Ordinary violin or guitar strings answer very well. 2. How many strings are used? A. There is no particular limit to the number.

(43) M. J. C. writes: Please explain to me the difference between brace, stay, and gusset, and also what is meant by cross-foot? A. A brace supports parts in compression, and a stay, parts in tension. A gusset is an angle piece in a structure, used to stiffen it, and a cross-foot is a casting with three or more feet, used to secure from the outside, covers to holes that bear on the inside of a plate.

(44) H. N. L. asks: How much counter-balance must be put in a crank arm to make an engine run without vibration? A. The vibration cannot be prevented under all circumstances. You will find the principles of counterbalancing clearly laid down in Rankine's "Machinery and Millwork."

(45) T. W. W. asks: 1. Is it practicable to grind common oats into meal or flour suitable for bread on an ordinary country mill? A. They must first be kiln-dried. 2. What is the best dress for 80 inch granite stones, which are intended to grind wheat and corn? A. Furrows of moderate depth.

(46) St. C. asks: 1. What thickness of steel is necessary to resist a bullet fired from an army revolver? A. We think a plate from one eighth to three sixteenths inch thick will answer. 2. Which of the metals, steel or iron, presents the strongest resistance to leaden balls? A. Steel, generally. 3. Would a plate formed by riveting several sheets of steel together be stronger than a solid piece of the same thickness? A. No.

(47) W. T. W. asks: Is it possible to make a horizontal engine reversible using only one eccentric, and that a fixed one? A. Yes.

(48) C. B. asks: Who was the engineer in charge of the construction of the Hoosac tunnel? A. Thomas Doane. What will prevent the falling out of hair from the head of a young person who is otherwise in perfect health? A. It is sometimes beneficial to cut the hair. Consult a physician.

(49) G. J. B. asks: What is the best way to soften thin portions of chilled castings, in order to drill them? A. Anneal them.

(50) F. B. asks for instructions for making a small steam launch. A. Take your pattern from a good rowboat, and put in just as large an engine and boiler as you can conveniently carry. See SUPPLEMENT, Nos. 69 and 81.

(51) J. S. writes: I have one of Landis' domestic steam engines, of 1 1/2 horse power; upright boiler, 18 inches in diameter and 32 inches high, with 15 one-inch flues, full length of boiler. I am using about 60 lbs. of coal and 1 barrel of water per day of, say, 10 working hours. Can I economically substitute gas for coal, and if so, how should the gas be applied? A. We think that the coal would be so much more

economical that its use is advisable, unless there is some other special reason for heating by gas. In case gas is used, some one of the patent heaters in the market might be applied to advantage.

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

J. H. P.—The fragment contains a little copper blende, pyrites, and lead sulphide.—A. R. B.—It is a crystal of smoky quartz, the angles of which have been rounded by attrition.—D. N. LaB.—It is fine asbestos, of some value.—C. W. S. T.—No. 1. Clay containing much carbonaceous matter, iron, and alkaline earths, which renders it quite fusible. It may be used with other clays for earthenware, etc., and (pressed) for some decorative purposes. No. 2. Clay containing much sand. Tempered with other clay it might be employed in brickmaking. No. 3. Similar to No. 2. If washed it might perhaps be used by paper makers. No. 4. Clay slate. No. 5. An ochreous clay, suitable for a cheap pigment if burned and ground. No. 6. Sandstone. No. 7. It is a valuable copper ore—chalcopyrite, etc. Nos. 8 and 9 are chalcidony, of some value. No. 10 is barytes—sulphate of baryta—of good quality.

COMMUNICATIONS RECEIVED.

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

- Telephonic Phenomena. By W. E. G. A Brilliant Meteor. By G. W. S. Snake Cannibalism. By H. R. H. and D. L. Power Required for Velocipedes. By E. B. C. and G. F. S. Nickel Plating. By W. H. F. Darwinian Theory. By E. S. M. Treatment of Inebriates. By T. P. P. Perpetual Motion. By E. R. M. Calculation of Horse Power. By T. J. L. A Leech Barometer. By E. S. C.

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 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 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 19, 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.

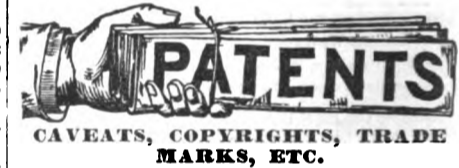
Table listing inventions with patent numbers and dates, including items like Annunciator, electric, T. L. Reed; Axle box, A. A. Freeman; Axle box, J. Stephenson; Axle sleeve, J. Dickens; Bale tie, J. R. Blossom; Bale tie, J. J. Hagins; Bale tie, W. E. Borst; Ballot box, M. D. Williams; Barrel, J. D. McEachren; Bed bottom, E. A. Jeffery; Bedstead, cabinet, J. G. & J. W. Knapp; Bedstead, invalid, J. Kaylor; Bee feeding device, E. Carter; Belting, W. H. Curtiss; Binder, H. E. Thompson, Jr.; Bleacher and dyer squeezing machine, W. Birch; Book rack, A. B. Sherman; Boot and shoe heel plate, L. W. Burton; Boot tree, J. T. Flynn; Bottle register, W. S. Lynn; Bottle stopper, L. Rose; Brick surfaces, wash for covering, Bartlett & Ward; Brush, T. J. Connell; Buckle, W. Bray, Jr.; Buckle, A. E. McConnell; Burglar alarm, G. F. Busby; Butter pressing apparatus, J. Harlan; Button, E. W. McGlaulin; Cabinet, toilet, G. Rivers; Car coupling, M. R. Delay; Car coupling, D. R. Halter; Car draught and buffing apparatus, E. L. Caum; Cars, driving gear for street, J. Bishop; Carburetor, W. H. Reed; Carpet fastener, W. Aldrich; Carriage boot, Dodge & Brown; Carriage seat, shifting rail for, C. Fritschy; Cash washing machine, A. Muntzenberger & Co.; Chair fan attachment, Thompson & Bergstrom; Chair, folding, C. D. Hyde; Chair, sewing machine, F. Chichester; Chair, window cleaning, A. Dormitzer; Chamber vessel, A. M. Rontey; Cheese cutter, J. N. Parker; Cheese manufacture, E. V. Lapham; Churn, B. B. Hess; Churn folding stand, J. McAnespey; Clock movement, A. E. Hotchkiss; Clock striking movement, Davies & Lambert; Clock striking movement, H. D. Northrop; Clutch mechanism, G. Crompton.

Table listing inventions with patent numbers and dates, including items like Cook for steam boilers, stop, J. L. Heald; Cook, gauge, A. H. Jarecki; Coffee roaster, G. H. Downie; Collar, W. M. House; Cooker, feed, Cunningham, Winhofer & Rice; Cooking utensil, Shepard & Adams, Jr.; Copy holder, J. D. Moore; Cord finishing machine, W. Buckton; Corset, C. A. Blohm; Corset, L. H. Foy; Corset manufacture, J. C. Tallman; Dam or dike, C. M. Scott; Dental plate, Fahnstock & Powell; Ditching machine, W. Smith; Egg case, J. L. & G. W. Stevens; Elevator, hay, C. M. Mallory; Envelope, M. J. Duffee; Faucet, J. O. Waddell; Feather renovator, Sanders & Smith; Feed water regulator, C. Mendenhall; Fence, L. P. Judson; Fence wire, C. F. Washburn; Fence wire stretcher, C. S. Davis; Fertilizer distributor, H. P. Underhill; Fire escape, G. W. Foster; Fire escape, W. B. Garoutte; Fire pot, or portable furnace, J. W. Fisher; Foot rest, J. M. Shaw; Foot rest for hot air registers, J. Bonnet; Forge, Morrison, Mildren & Moore; Fruit drier, P. Riley; Furnace for heating links, J. H. Helm; Game apparatus, C. A. Both; Garter, J. L. Moore; Gasoline burner, F. A. Lyman; Gate, F. J. Borgis; Gate, Crisby & Jay; Gate, J. E. Johnston; Gate, W. G. Mentzer; Grain binder, M. A. Keller; Grain separator, J. S. Upton; Grater, S. Barker; Grate, J. M. Lassater; Harness, B. Jones; Harness attaching apparatus, M. H. M. Smith; Harvester, S. Hevener; Hat, E. Copleston; Heater, J. W. Hartwick; Hinge for moulders' flasks, A. Barker; Honey comb, artificial, A. B. Lawther; Horse detacher, N. Johnston; Horse power, W. W. Dingee; Horseshoe, H. J. Batchelder; Indexing books, J. Echols; Inkstand, H. G. Squires; Insect and vermin fumigator, F. Hanson; Insect exterminator, W. T. Daughtrey; Insect trap, Schreiber & Weigand; Ironing machine, T. S. Wiles; Ironing table, S. C. Terry; Journal for car axles, etc., H. Wakeman; Key, C. C. Coleman; Key fastener, R. McCully; Knife, C. Luciters; Knife scourer, S. K. Luce; Knitting machine, G. A. Leighton; Knob shanks, J. W. Haines; Ladder, J. W. Pine; Ladder, J. Flinn; Lamp, F. Carrier; Lamp chimney, E. R. Roswell; Lamps, globe for street, F. L. Senour; Lantern, T. B. Osborne; Leather boarding and graining, L. Townsend; Life boat, G. F. Slevener; Life preserver, D. Ruge; Lighting apparatus, electric, J. King; Lock, C. C. Coleman; Loom, E. Howard; Lubricator, G. H. Flower; Lubricator for shafting, A. D. Hoffman; Meat, preserving, D. C. Link; Mill, B. Whitney; Mill, C. C. Phillips; Mill spindle bush and tram, E. G. Cushing; Motion, reciprocating and rotary, E. Meredith; Motor, J. K. Cummings; Nut lock, J. & J. Collman, Jr.; Oil saver and crating head, E. J. Northrup; Organ, H. F. Graetzel; Organ pipe, A. Gemunder; Overalls, H. F. Woodward; Paddlewheel, L. Shook; Paddlewheel, W. C. Smalstig; Paging machine, E. Gorenflo; Paper pulp machine, W. W. D. Jeffers; Pen, drawing, E. L. Walter; Phonograph or speaking machine, T. A. Edison; Pillow, H. J. Buell; Pin, picket, P. J. Tweed; Picture exhibitor, J. C. Koch; Pitman connection, R. M. Lamson; Planter, H. Timmersmann; Planter, etc., R. B. Warner; Planter, L. J. Corbin; Planter, check row attachment, E. W. Quincey; Plow, V. S. Moon; Plow, H. H. Riggan; Plow, H. F. & G. F. Shaw; Plow, R. C. Buckley; Plow and seeder, P. H. Elliott; Portfolio, J. D. Richards; Post marking and cancelling, R. L. Grinnan; Press for fruits, etc., E. A. Stears; Press, seal, S. Larkin; Printing pills, machine for, W. R. Warner; Punching sheet metal tubing, E. O. Higgins; Rain gauge, Dunne & Richmond; Rake, W. M. White; Rolling metal, J. H. Swett; Ruling machine, J. McAdams; Saddle, J. R. Dempsey; Satchel handle, G. Havell; Saw mill, F. C. Frost; Sawing machine, C. H. Jones; Scales, A. B. Pearson; Scales, C. A. Fredericks; Screen, J. H. Cavanagh; Screw thread machine, Fairbairn & Simon; Seed cleaning machine, I. B. Sandusky; Sewer trap, J. Sargent; Sewing machine embroiderer, G. E. Hart; Sewing machine ruffer, G. W. Burgess; Shingle sawing machine, D. Lane; Shoe tip, E. F. Partridge; Signaling apparatus, D. H. Isenminger; Skate, E. H. Barney; Soldering device, F. B. Davis; Speaking tube, T. J. & G. O. Woolcocks; Spring, G. K. Smith; Spring, D. F. Cooper; Stamp, H. Wickham, Jr.; Stave jointer, T. M. Chapman.

Table listing inventions with patent numbers and dates, including items like Steam generator, W. S. Salisbury; Steamer, A. W. Humphry; Stone sawing machine, H. Young; Stove leg, H. H. Huntley; Stove oven shelf, C. N. Buzzell; Strainer for faucets, etc., A. H. Willoughby; Stuffing box, C. C. Jerome; Tap with turnable outlets, C. G. Fischer; Target, E. B. Bear; Temperature, indicating, etc., E. Armstrong; Terret, C. L. Pond; Thermostat, W. B. Farrar; Thill coupling, D. D. Whitney; Tile laying machine, J. I. & W. J. Mettler; Tin from tin scrap, separating, P. C. Vogellus; Torpedo for oil wells, E. A. L. Roberts; Torpedo for oil wells, G. S. Vaughn; Toy money box, W. H. Lots; Treadle, S. Haas; Truck, J. O. A. Bennett; Tube expander and trimmer, J. E. Minshull; Tubing, armor for flexible, H. Wakeman; Twin hook, H. B. Cole; Valve, balanced rotary, J. S. Glenn; Vapor burner, F. H. Shepherd; Vat, C. Visel; Veneer cutting machine, J. D. McEachren; Vest of paper, etc., Weber & Kruse; Wagon gear and brake, J. J. Pennington; Washing machine, C. H. Horne; Washing machine, J. Metais; Watch case, O. Doman; Watch plate, Hutchinson & Dehouck; Watch and clock escapement, J. M. Hitchcock; Watch, stem winding and setting, O. Doman; Water closet disinfectant, J. F. Naulty; Wells, steam heater for oil, J. Harris; Wheel, car, E. Kaselowsky; Wool washing machine, J. Clegg.

English Patents Issued to Americans, February 9 to February 21, inclusive.

- Axle box.—G. A. Morse, South Egremont, Mass. Glove fastener.—G. Havell, Newark, N. J. Horseshoe.—J. Russell et al., Newark, N. J. Intrenching tool.—J. L. Buskett, St. Louis, Mo. Lamp.—C. Chinnock, Brooklyn, N. Y. Microscope object glass.—E. Gundlach et al., Rochester, N. Y. Mineral waters, etc.—G. D. Dows, Boston, Mass. Mining machine.—F. M. Lechner, Columbus, O. Oil stove.—E. B. Cox, Brooklyn, N. Y. Railway brake.—A. K. Hadley et al., New York city. Refrigerator, J. Lorillard, New York city. Revolver.—O. Jones, Philadelphia, Pa. Rock drill.—A. H. Elliott, New York city. Ship armor.—E. W. Serrell, New York city. Steam and hydraulic press.—J. F. Taylor, Glenville, Conn. Telephone.—G. B. Richmond, Lansing, Mich. Telescope object glass.—E. Gundlach et al., Rochester, N. Y.



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