

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York. 50,000 Emerson's Hand Book of Saws. New Edition. Free. Address Emerson, Smith & Co., Beaver Falls, Pa. Gould & Eberhardt's Machinists' Tools. See adv., p. 236. Barrel, Keg, Hogshead, Stave Mach'y. See ad., p. 236. The Lehigh Valley Emery Wheel Co., Lehighton, Pa., sell a new Stone Plate Grinder, with traverse motion, and an Automatic Planer Knife Grinder, with a cup wheel. Cuts and descriptions sent upon application.

Upright Self-feeding Hand Drilling Machine. Excellent construction. Pratt & Whitney Co., Hartford, Conn. For best low price Planer and Matchner, and latest improved Sash, Door, and Blind Machinery, send for catalogue to Rowley & Hearnance, Williamsport, Pa.

Steam Pumps. See adv. Smith, Vaile & Co., p. 237. The Porter-Allen High Speed Steam Engine. South-work Foundry & Mach. Co., 430 Washington Ave., Phil. Pa. Hoisting Engines. Friction Clutch Pulleys, Cut-off Couplings. D. Frisbie & Co., Philadelphia, Pa.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

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 do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at the office. Price 10 cents each

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) H. H. writes: I see in your reference book that 403° of heat give 240 pounds pressure. Will be pleased to know the degrees of heat with the pressure (steam) at 300, 400, 500, and 600 pounds. A. At 300 pounds total pressure or 285 pounds by gauge, temperature 417.5°; at 400 pounds total pressure, 445° Fah.; at 500 pounds total pressure, 467.5° Fah.; at 600 pounds total pressure, 487° Fah.

(2) H. B. S. writes: Will you please let me know about what power will be required to force a steel shaft 2 inches diameter into block of cast iron 4 inches square, bored the proper size to make a very tight fit. These blocks of iron are 24 inches long, and the shaft goes through, having a bearing at each end of about 6 inches; if the shaft is turned 2 inches diameter, what should the bore be? Or, in other words, what should the difference be between the shaft and the bore? A. We know of no experiments or tests approximating the case you present; it can only be determined by experiment. The following case of actual practice may be a guide: Iron shaft or pin 3 inches diameter and 4 inches length of bearing; allowance for difference of inside and outside diameters one-sixty-fourth inch; pressure required to force together, 600 to 800 pounds per square inch; the former if the hole be rough bored, and the latter when the surfaces are very true and smooth. Another case from actual practice is upon a 7 inch diameter shaft, an allowance of one one-hundredth inch between inside and outside diameters.

(3) A. S. writes: Please give me a receipt for type metal and black printer's ink. A. Lead 3 pounds, antimony 1 pound; or lead 9 pounds, antimony 2 pounds, bismuth 1 pound. 2. Boil 1 1/2 gallons linseed oil to a thick varnish; while hot stir into it 6 pounds powdered rosin, 1 1/2 pounds dry brown soap in shavings, then 2 1/2 ounces indigo, 2 1/2 ounces Paris blue, and 5 pounds best lamp black. Let it stand a week. There is considerable danger of fire in boiling the linseed oil. Every ink factory has its own secrets.

(4) E. S. M. asks: What sized engine would be required to run a boat 15 feet long and 4 feet wide, and how many miles per hour would it run? A. For a propeller yacht, engine 3 inches cylinder by 3 1/2 inches or 4 inches stroke. Boiler with about 40 feet free surface. Propeller about 18 inches diameter; probably get a speed of about 6 miles per hour.

(5) J. M. E. asks: 1. How can I ebonize pine or poplar for cheap furniture? A. Dissolve coppers in cold water by shaking; paint the wood with it two or three times. After it has dried apply two or three coats of a strong decoction of logwood. When this too has dried wash off the wood, and when dry oil and polish it. 2. Give directions for making walnut stain. A. (a) 1 quart water, 1 1/2 ounces washing soda, 2 1/2 ounces Vandyke brown, one-quarter ounce ochromate of potash. Boil for ten minutes and apply with a brush either hot or cold. (b) Permanganate of potash dissolved in water gives a good brown stain.

(6) D. S. writes: Will you please advise me whether "storm glasses" (camphor and nitrate of potash) should be hermetically closed or not? Some authorities close hermetically with plaster of Paris, others with cork, perforated. A. They should have a very fine aperture in their tops for admission of air. Plaster of Paris alone will not close hermetically, as it is porous.

(7) P. D. writes: Will you please tell me what flavor is used in flavoring the ordinary bottled soda water or "pop," the proportions, and the pro-

cess? A. Various flavors are used, principally lemon and sarsaparilla. For the first a lemon sirup is made as follows: Simple sirup, 1 gallon; extract of lemon, half an ounce; fruit acid, 1 ounce. For sarsaparilla sirup the following is the formula: Oil of anise, 15 drops; oil of wintergreen, 15 drops; oil of sassafras, 15 drops; fluid extract sarsaparilla, 2 ounces; simple sirup, 5 pints; powdered extract licorice, half an ounce. A sufficiency of the sirup is mixed with the water and the whole is then charged with gas.

(8) J. A. K. writes: I have a telephone line, 250 rods. Instruments are intended to work without battery; wire No. 18 annealed iron, tight as could draw with hands, put up as directed. Don't work. Can you please tell me through your valuable paper if the distance is too great, or what is wrong? A. If you are using a magneto telephone similar to Bell's, we are unable to say—without further particulars—where the trouble is; but if your instrument is an acoustic or mechanical telephone, your wire is too large and its tension is too great. Use a fine twisted wire cable cord and suspend it with strings, so that it will be free to vibrate en masse.

(9) S. T. N. writes: Would you please state in your paper what will prevent white cast iron from blowing when poured around wrought iron? A. To prevent cast iron from blowing when poured around wrought iron: Clean the wrought iron free from scale with muriatic acid, wash free from acid and heat to 300°, put in the mould hot and pour at once.

(10) V. E. St. C. writes: Will you please answer the following in the SCIENTIFIC AMERICAN? When there is 100 pounds steam pressure in a boiler, is not the pressure equal at top and bottom of the boiler shell? A. The pressure is not quite even at the top and bottom of a boiler at any pressure; the difference is due to the weight of the water, which amounts to one pound in 27 inches from the water line down.

(11) S. C. writes: 1. Please inform me if possible about what height the common 1 pound and 2 pound rockets attain. A. Rockets are very variable in the height of their flight; a 1 pound rocket will carry to a height of from 300 to 500 feet, a 2 pound rocket from 400 to 800; much depends upon the clean finish and shape of head and stick. 2. What plan would you suggest for increasing the warmth of a country house, built of wood? I have been advised to take off the outside boards, and cover the house with tar paper, and then replace the boards. Would there be a strong odor of tar through the house in summer? A. For making your house impervious to winds, cold, heat, and moisture, take off the clapboards, fill in between the studding with brick, flat or edge as convenient, tight laid with mortar, then cover the studding with felt paper well lapped, and clapboard. If the paper is lightly tarred, it will give off a little odor the first year and will be waterproof, but not warmer than the felt paper. The tar odor is healthy.

(12) E. L. P. asks how to make a solution of oxide of copper for depositing iridescent colors on metals; also what kind of a solvent it is best to use. Is it practical to solder aluminum? If so, what is the best solder to use and what kind of flux is best? A. 1. Sulphide of arsenic is said to be used for the purpose, probably in solution in sulphide of ammonium. It may be applied by heat. 2. Many alloys are given for aluminum solder. They range as follows: Zinc, 80-84 parts; copper, 2-8 parts; aluminum, 4-12 parts. The more zinc the less of the other metals is required. For flux use 3 parts copaiba balsam, and 1 part Venice turpentine. The operation is the same as that of brazing.

(13) D. D. S. asks what is the best kind of wire to use for an acoustic telephone, with a rawhide diaphragm, containing sixteen square inches, on a line of about 300 feet. Have tried copper, but it stretches in a few days, so that it does not work well? A. Twisted iron or steel cable cord is the best for this purpose. It does not continue to stretch like copper wire, and is free from the "ring" of a single wire.

(14) F. H. W. asks for a receipt for nickel plating. A. Use the double cyanide of nickel and potassium; plate the article in a bath of the double salt, using a battery; for positive electrode a plate of nickel must be employed. The metal is extremely hard to melt. There are many practical points in all electroplating which can only be learned by experience.

(15) M. J. B. asks: What will take the black off and clean a copper pan, such as is used in boiling sorghum molasses? A. If scrubbing it with sand will not do, try dilute nitric acid on it. Oxalic acid might be recommended, but is a violent poison.

(16) C. T. J. writes for a receipt for an alloy that is fusible by steam. A. 3 parts by weight of cadmium, 4 parts tin, 8 parts lead, 15 parts bismuth melts far below the temperature of boiling water.

(17) C. K. asks how to obtain the extract from sumac, and what is the cheapest way, and at the same time will give greatest percentage of tannin. A. Soak it out with successive additions of very hot water, pouring off after each addition and finally filtering the united decantations.

(18) C. A. R. asks how to determine the amount of soda ash in a gallon of (soda ash) liquor of any given degree; or some work on the subject. A. You will find the process given in detail in the chemistries and cyclopedias. Your best plan is to have a chemist give you practical instruction in the process. We cannot undertake to explain it at length here. In all chemical operations practice is most essential.

INDEX OF INVENTIONS For which Letters Patent of the United States were Granted October 2, 1883, AND EACH BEARING THAT DATE. [See note at end of list about copies of these patents.] Alarm. See Fire alarm. Alloying iridium. J. Holland. 285,895 Axle boxes, dust guard for car, N. M. George. 285,994

Axle, carriage, W. Jones. 286,139 Axle, lubricator, car, J. F. Webb. 286,098 Axle nut, carriage, D. S. Hall. 286,131 Bag. See Feed bag. Bag fastener, F. H. Ludington. 285,908 Bake pan and steamer, A. C. Kasson. 285,905 Bale tie, wire, J. R. Ashley. 285,947 Bar. See Grate bar. Battery. See Secondary battery. Bell for bicycles, alarm, H. Serrell. 285,933 Bell pull, J. B. Boyle. 285,961 Belt fastener, L. A. Roberts. 286,072 Bicycle, W. Klahr. 285,821 Bicycle saddle, H. B. Hart. 285,891 Block. See Pulley block. Boat. See Folding boat. Boiler. See Steam boiler. Bolt cutter, E. Amelotte. 285,868 Bolt forging machine, O. C. Burdick. 285,876 Book, E. L. Burwell. 285,794 Book, album, etc., Hoppin & Brown. 285,897 Book, blank or composition, F. Bowman. 286,111 Book, hymn and music, R. D. Robertson. 286,152 Bottle wrapper and cushion, E. O. Berninghaus. 285,872 Box. See Butter box. Miter box. Brake. See Car brake. Broiler, O. Whyte. 285,864 Butter box, A. Sweet. 286,157 Butter, making artificial, S. H. Cochran. 285,878 Butter mould, D. C. Spitzer. 285,851 Butter package, H. P. Barber. 285,950 Butter package fastening, W. H. Roberts. 286,073 Button press, G. O. Schneller. 286,079 Button setting instrument, J. F. Atwood. 285,782 Buttons, etc., attaching, J. F. Atwood. 285,781 Can. See Color can. Car brake, automatic, Fuller & Salvadge. 286,187 Car coupling, W. B. Bessey. 285,787 Car coupling, K. S. Blanchard. 285,789 Car coupling, L. G. Hedlund. 286,001 Car coupling, L. Herrman. 285,813 Car coupling, I. J. Merrick. 285,913 Car coupling, Morgan et al. 286,054 Car coupling, R. T. Payne. 286,061 Car coupling, C. P. Searles. 286,080 Car coupling, automatic, M. Kennedy. 285,906 Car guard, J. Craig. 285,975 Car, sleeping, H. S. Hale. 285,890 Car spring, T. J. Mayall. 286,042 Car wheel and axle, J. Findlay. 285,984 Carding machine, J. Potter. 286,065 Carriage, child's, C. S. Strowbridge. 285,985 Carriage shells, machine for making metallic, Ring & Bradshaw. 286,151 Cartridges, holder for packing, J. Gardner. 285,992 Cartridges, machine for greasing, E. Parker. 286,039 Cash carrier systems, stop or brake mechanism and wire support for, J. R. H. Hinton. 286,133 Caster, furniture, D. C. Meehan. 285,912 Cement, fluid, T. J. Mayall. 286,040 Cement for the manufacture of memorandum blocks and tablets, rubber, W. E. Doud. 285,980 Chandeler, extension, J. Brannen. 285,963 Check registering and printing apparatus, Kendall & Kruse. 286,019 Checks and other negotiable papers, blank for, C. H. Uhler. 286,159 Cheese vat, S. B. Ferguson. 285,803 Chill, H. R. Allen. 285,779 Churn and like apparatus for use in the manufacture of artificial butter, etc., S. H. Cochran. 285,973 Churn or mixer for use in the manufacture of artificial butter, etc., S. H. Cochran. 285,974 Cistern cover, T. Cubbins. 285,801 Clamp. See Stonework clamp. Clamp for hand power dumb-waiters and other purposes, E. Lange. 286,024 Clevis, R. A. Rouse. 286,075 Clevis, plow, E. L. Bracken. 285,962 Closet. See Water closet. Cloth, machine for applying cement and flock to, T. J. Mayall. 286,038 Clothes pounder, Remington & Riter. 285,933 Clutch for elevators, friction, W. Winkless. 285,836 Clutch, friction, G. L. Barnes. 285,870 Clutch, friction, R. Wels. 285,940 Coal, apparatus for loading, W. G. Barnard. 285,952 Cook, compression, J. S. Barr. 285,933 Coffee pot, J. Cochran. 285,972 Coffee roaster, Rees & Smith. 285,929 Collar and hame, combined, M. Humber. 286,010 Collieries, method of and apparatus for the treatment of spoil heaps of, L. H. Armour. 285,945 Color can, J. C. Jessup. 286,015 Colter, caster, B. C. Bradley. 285,790 Concentrator, G. A. Metcalf. 286,050 Condenser, jet, E. Korting. 285,822 Condenser, steam jet, Schutte & Goehring. 285,846 Condensing steam and heating fluids, apparatus for, E. Theisen. 285,936 Cooking utensil, Simpson & Wilson. 286,082 Coupling. See Car coupling. Thill coupling. Cultivator, wheel, L. C. Chapin. 285,797 Curtain roller, H. Lobdell. 286,027 Curtain roller attachment, H. Lobdell. 286,026 Curtains, window pole for, W. J. Flickinger. 285,886 Cut-off valve, T. W. Heermans. 286,002 Cutter. See Bolt cutter. Vegetable cutter. Door hanger, L. A. Smith. 286,085 Draw plate, J. Holland. 285,896 Dredging machines, etc., friction compressor for, A. H. Fisher. 285,883 Drier. See Fruit drier. Drying sugar and other substances, machine for, G. M. Newhall. 286,056 Dumping platform, Savage & Love (r). 10,389 Dust-pan, F. W. Carpenter. 285,877 Elastic fabric for goring, T. J. Mayall. 286,037 Electric alarms, portable circuit closer for, A. Wiswall. 286,100 Electric circuit changer, automatic, C. J. Van Depoele. 285,859 Electric cut-off, J. A. Tupper. 286,158 Electric motor, C. J. Van Depoele. 285,887 Electric switch, W. Adams. 286,078 Electrical conductor for oil tanks, H. W. Spang. 286,086 Electrical or galvanic currents to beds, couches, etc., applying, R. Stilwell. 285,853 Elevating and carrying apparatus, I. Bishop. 285,973 Elevator. See Hod elevator. Ice elevator. Elevator, C. H. Bidwell. 285,788 Elevator safety appliance, W. Pintard. 286,064 End gate, E. H. Seibert. 285,848 Engine. See Gas engine. Oscillating steam engine. Road engine. Rotary steam engine. Steam engine. Excavating foundations, pneumatic apparatus for, M. J. O'Connor. 285,834 Fabric. See Elastic fabric. Farm gate, W. B. Miller. 286,058 Faucet, lock, J. Sargent. 286,077 Feed bag for horses, Eey & Verdin. 285,814

Feed water for steam boilers, air supply to the, W. L. Fitch. 285,884 Fence, D. Overhuls. 286,057 Fence barb, J. M. Oliver. 286,147 Fence, barbed wire, A. Gunderson. 286,130 Fence, portable, S. W. Fish. 285,882 Fence post, J. Johnson. 286,074 Fencing, support and guard for, T. H. Dodge. 285,979 File and other tools having tapering tangs, J. F. French. 285,989 Files and other tools, handle for, J. F. French, 285,987, 285,988, 285,991 Filter, W. J. Burgess. 285,965 Fire alarm, R. S. Finch. 285,983 Firearm, breech-loading, W. Gardner. 285,993 Firearms, lock for revolving, D. B. Wesson. 285,862 Fire escape, T. H. Foster. 285,806 Fire escape, Galivan & Manning. 285,803 Fire escape, W. L. Murphy. 285,832 Fire kindler, Wood & Dorrell. 286,103 Fireplace and cooking stove, combined, J. Overton. 286,058 Floor covering, T. J. Mayall. 286,043 Flooring jack, J. Himelberger. 285,894 Folding boat, C. M. Douglas. 285,981 Folding table, F. Gesking. 285,995 Foot power machine, A. B. Kittson. 285,820 Foot power mechanism, A. B. Kittson. 285,819 Fruit drier, F. S. & J. B. Belcher. 285,957 Furnace. See Metallurgic furnace. Smoke consuming furnace. Furnaces, cutter for revolving puddling, S. T. Wellman. 285,861 Gas engine, S. Marcus. 286,030 Gate. See End gate. Farm gate. Railway gate. Gate, C. J. Moore. 285,830 Gate, T. Urie. 286,092 Generator. See Magneto electric generator. Glass bowls for water closets, manufacture of, G. E. Hatch. 286,000 Glass, manufacture of, H. Frank. 285,888 Glassware, manufacture of covered, T. Walton. 286,140 Glove, aquatic, G. Ashman. 286,106 Governor, steam engine, C. S. Haskell. 285,892 Grafting tool, K. McLennan. 285,910 Graining tool, J. Hammerl. 285,939 Grate, J. Kroupa. 286,140 Grate bar, Smith & Hutchinson. 286,083 Guard. See Car guard. Rein guard. Guide and sign boards, making, W. A. McCool. 286,045 Hame, adjustable, C. Roehl. 284,944 Hand rake, W. F. Drew. 286,120 Hand rest for books, C. H. Metz. 286,051 Handle. See Tool handle. Hanger. See Door hanger. Harness attachment, S. Hemphill. 286,004 Harrow, P. C. Romkey. 286,154 Harvester, cotton, C. T. Mason, Jr. 286,032 Harvester, cotton, J. & J. E. Myers. 286,055 Harvester, cotton, G. N. Todd. 285,856 Hatchway, self-closing, D. Humphreys. 286,186 Heater. See Sad iron gas heater. Heating the air in heat flues of buildings, apparatus for, A. P. Howard. 286,134 Heel filing machine, W. Gordon. 285,997 Hod elevator, S. Dale. 286,119 Hod elevator, A. T. Hill. 286,009 Hoisting apparatus, J. H. Miller. 285,915 Hoisting apparatus for wagon derricks, etc., Jackson & Bonds. 285,908 Holder. See Pen holder. Rein holder. Sash holder. Shade holder. Spittoon holder. Hook. See Snap hook. Horseshoe nails, machine for rolling, E. Croft. 285,890 Hose reel, I. W. McGaffey. 286,046 Ice and producing cold, machine for making, F. H. Day. 285,879 Ice elevator, Clapp & Baker. 286,116 Ice harvesting and loading machine, M. Breckheimer. 285,791 Indicator. See Steam boiler indicator. Stock indicator. Insulated electric conductor, T. J. Mayall. 286,036 Insulation of wires for telegraph lines, T. J. Mayall. 286,035 Iron and steel, producing ingot, J. Reese. 286,067 Iron, treating, B. Woodruff. 286,104 Iron with carbonic acid gas, purifying, J. F. Bennett. 285,786 Jack. See Flooring jack. Joint. See Universal joint. Kiln. See Lime kiln. Knitting machine, J. Hegnthothom. 286,003 Ladder, step, Baker & Abbott. 285,949 Lamp, C. Hoffmann. 286,006 Lamp and gas fixture, convertible, C. A. Holbrook. 286,007 Lamp, electric, C. J. Van Depoele. 286,093 Lamp, electric arc, R. R. Moffatt. 286,144 Lamp, electric arc, C. J. Van Depoele. 286,094 Lamps, globe for incandescent electric, G. P. Bartlett. 285,784 Lantern, F. Dietz. 285,880 Lantern, J. B. Stetson. 286,087 Lathe, turning, F. H. Richards. 285,831 Leather folding machine, J. E. Lawton. 285,823 Lifter. See Transom lifter. Lime kiln, P. McCon. 285,911 Links, die for forming, H. A. Iddings. 286,013 Liquors, apparatus for purifying alcoholic, G. Fleury. 286,126 Lock. See Trunk lock. Loom picker staff check, Whitney & Jackson. 285,941 Loom, power, R. Simon. 286,081 Lubricator. See Axle lubricator. Lubricator, R. J. Hoffman. 286,005 Magneto electric generator, M. S. Conly. 285,799 Mattress, electric galvanic, R. Stilwell. 285,852 Mattress spread, electric, R. Stilwell. 285,854 Meal or flour and process of making the same, compound, J. & M. Masters. 286,083 Measuring the areas of surfaces, machine for, W. A. Sawyer. 286,078 Medical appliance, electro, J. W. Dennis. 285,977 Metallurgic furnace, E. D. Wassell. 285,860 Metallurgic furnace, S. Bissell. 286,110 Milk skimming apparatus, J. Besley. 285,958 Mill. See Windmill. Miter box, W. Wassung. 286,097 Mould. See Butter mould. Monkey wrenches, blank for, M. E. Campfield. 285,796 Mortising machine, I. W. Johnson. 286,016 Motion, transmitting reciprocal to rotary, D. J. Ames. 285,948 Motor. See Electric motor. Mower and tedder, combined, J. M. Burdick. 285,792 Music sheet for mechanical musical instruments, J. Bailey. 286,108 Nail plate feeder, J. H. Dunbar. 286,121 Nautical signal, M. D. Porter. 285,841 Oil safe, W. D. Chapman. 285,867 Ore concentrating table, Clark & Cone. 245,970

Ores, obtaining precious metals from refractory, G. T. Lewis..... 286,025

Oscillating steam engine, G. Gregory..... 285,998

Oven, bake, W. Marvin..... 286,142

Pad. See Truss pad.

Paint for metallic surfaces, composition, H. R. Clothier et al..... 286,117

Pan. See Bake pan. Dust pan.

Paper bags, merchant's stand for, J. E. Williams..... 286,099

Paper barrels, machine for the manufacture of, J. F. Sieberling..... 285,847

Paper fastener, G. W. McGill..... 286,113

Paper for carpet linings, etc., Pember & Bird..... 285,839

Paper machine, T. P. Barry..... 285,954

Paper machine, Pember & Bird..... 285,838

Paper pulp, boiler for digesting wood for, G. E. Marshall..... 286,031

Pen holder, J. Reckendorfer..... 286,066

Pepsin, manufacture of, C. L. Jensen..... 286,138

Piano actions, pivot joint for, F. L. Becker..... 285,785

Pick, W. C. Ferguson et al..... 285,804

Pipe. See Tobacco pipe.

Piping, S. S. Spear..... 285,850

Pitman, Huber & Strobel..... 286,008

Planter and cultivator, combined corn, G. W. Giffard..... 285,889

Planter and fertilizer distributor, combined seed, McKenzie & Powell..... 286,047

Planter, seed, J. Reynolds..... 286,068

Plaque, H. Craighead..... 286,118

Plastering compound, J. F. Thompson..... 286,165

Platform. See Dumping platform.

Plow, gang, J. M. Fix..... 285,835

Plow, rotary, S. S. Gardner..... 285,809

Pool ball rack, J. Carr..... 286,114

Post. See Fence post.

Post driver, H. E. Fairman..... 285,881

Pot. See Coffee pot.

Press. See Button press. Printing press.

Printing press, T. McIlroy..... 285,826

Propelling wheel, B. Powell..... 286,149

Protractor, P. Kennelly..... 285,907

Puller. See Stump puller.

Pulley, H. R. Allen..... 285,780

Pulley, W. J. Innis..... 285,816, 285,818

Pulley and drum sheet metal, N. Macbeth..... 286,028

Pulleyblock, P. King..... 286,021

Pulley wheel, E. L. Babcock..... 285,869

Pump tubing, well, J. Marsden..... 285,909

Pumps, utilizing the exhaust of steam, Robie & Lyons..... 286,074

Pumping and measuring machine, adjustable, M. H. Richards..... 286,070

Punch, ticket, R. Woodman..... 285,867

Rack. See Pool ball rack.

Railway, cable, McCall & De Vry..... 286,044

Railway, electric, C. J. Van Depoele..... 285,858

Railway gate, Ballard & Craig..... 285,951

Railway metallic cross tie and trough, G. L. Putnam..... 285,842

Railway signal, H. H. Bartherton..... 286,122

Railway signal, automatic electrical, D. H. Applegate..... 285,944

Railway tie, C. Fisher..... 285,986

Railway tie and stringer, J. Newton..... 285,833

Railway time signal, Swayze & Lane..... 286,156

Railways, gripping and carrying apparatus for cable, H. Root..... 286,163

Rake. See Hand rake.

Reel. See Hose reel.

Refrigerator, Smith & Blake..... 286,084

Refrigerator room, J. Hess..... 285,893

Register. See Watchman's register.

Regulator. See Watch regulator.

Rein guard for whiffletrees, N. C. Moody..... 286,145

Rein holder, J. K. Craig..... 285,976

Road engine, J. S. Woolsey..... 285,942

Roaster. See Coffee roaster.

Roller. See Curtain roller. Skate roller.

Roof and sidewalk for constructing basements, etc., to buildings, vault light, T. Hyatt..... 286,137

Rotary steam engine, A. B. Wood..... 286,102

Rubber veneer and enamel, ornamenting, T. J. Mayall..... 286,034

Sad iron gas heater, I. M. Seamans..... 286,155

Safe, burglar-proof, E. Stockwell..... 286,088

Sash fastener, J. Outhwaite..... 285,919

Sash holder, J. Felt..... 286,125

Saw, drag, O. Pachmon..... 285,982

Sawmill dog, C. E. Clark..... 285,969

Sawmill dog, W. J. F. Liddell..... 285,824

Sawmill set works, F. J. Korte..... 286,022

Sawtooth, insertible, T. J. Thompson..... 286,091

Saws, kerfing gauge for, W. C. Jones..... 286,018

Scale, weighing, F. I. Hitchcock..... 285,815

Scraper, road, L. D. York (r)..... 10,390

Secondary battery, Planté's, S. L. Fox..... 285,807

Seeding machine, Rude & Swope..... 285,845

Sewing machine needle, H. M. Jenkins..... 286,014

Sewing machine presser foot, E. T. Thomas..... 285,937

Sewing machine trimming attachment, T. C. Robinson..... 286,158

Sewing machine trimming mechanism, W. A. Neely..... 286,146

Sewing machine trimming mechanism, T. C. Robinson..... 285,164

Shade holder, O. N. Perkins..... 286,083

Shade ornament, Hull & Hoadley..... 285,135

Shade support, J. Brannen..... 285,964

Shaft, C. E. Gibbs..... 285,810

Sheet metal spinning machinery, J. Chaumont..... 286,115

Shirt, R. H. Hutchinson..... 286,011

Shoe, Grist & Patin..... 286,129

Shutter bower, W. Butterfield..... 286,795

Side bar spring, J. Taylor..... 286,089

Signal. See Nautical signal. Railway signal. Railway time signal. Torpedo signal.

Skate roller, E. F. Ballou..... 285,783

Skate roller, E. W. Otis..... 285,836

Smoke consuming furnace, P. W. Frain..... 285,887

Snap hook, Bassford & Mahan..... 285,956

Soap, manufacture and preparation of potash, W. J. Menzies..... 286,049

Soaps, manufacture of medicated and antiseptic, W. J. Menzies..... 286,048

Soda, grinding caustic, F. P. Harned..... 286,132

Soie and heel edge burnishing machine, W. Gordon..... 286,128

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Spittoon holder, W. E. Burk..... 286,113

Spring. See Car spring. Side bar spring.

Spring plates, machine for bending the eyes of elliptic, J. S. Pessenger..... 285,922

Stamp, pocket hand, P. J. Patterson..... 285,837

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Steam boiler, A. A. Plummer..... 275,923

Steam boiler, base burning, J. Rowe..... 286,076

Steam boiler indicator and alarm, E. J. Coffin..... 285,798

Steam engine, J. Kaiser..... 285,904

Steam engine for mining purposes, B. Yoch..... 286,105

Steam engine reversing gear, M. E. Hershey..... 285,812

Steam generators, fuel magazine for, G. Mehring..... 285,828

Steam washer, Smith & Johnson..... 285,934

Steering apparatus, C. G. Otis..... 285,885

Stock indicator, B. A. Fiske..... 285,805

Stocking and making the same, G. W. Landenberger..... 286,141

Stone sawing machines, automatic sand and water feeding device for, W. T. Ripley..... 286,071

Stone work clamp, J. O'Connor..... 285,918

Stones, manufacture of artificial, G. Lancon..... 286,023

Stool ovens, turn table for, E. L. Maranville..... 286,029

Stove, gas, A. H. P. S. Wortley..... 286,160

Straw stacker, K. K. Parker..... 286,060

Stump puller, R. J. Hosner..... 285,898

Sugar cane, etc., machine for defecating and clarifying the juices of, Weber & Scovell..... 285,938

Sugar producing plants, defecating the juices of, Weber & Scovell..... 285,939

Superheaters, maintaining pressure in, D. Renshaw..... 285,843

Switch. See Electric switch.

Syringe, M. Dittenhoefer..... 285,978

Syringe education tube, T. J. Mayall..... 286,041

Table. See Folding table. Ore concentrating table.

Tag fastener, G. N. Buck..... 286,112

Telegraphic repeater, W. E. Athearn..... 286,107

Thill coupling, I. Elding..... 286,123

Ticket, railway, J. W. Womeldorf..... 286,101

Tie. See Bale tie. Railway metallic cross tie. Railway tie.

Tobacco pipe, J. O. Kilroy..... 286,020

Tool handle, C. M. Fairbanks..... 285,802, 286,124

Tool handle, J. F. French..... 285,990

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Tricycle, W. Asbury..... 285,946

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Truss pad, E. Thompson..... 286,090

Tube. See Syringe education tube.

Twist drills, die for forming, Godley & Boldon..... 285,996

Twist drills, machine for making, F. H. Richards..... 286,150

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Type writing machine, A. H. P. S. Wortley..... 286,161

Universal joint, G. Carlisle..... 285,966

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Valvegear, steam engine, R. W. Peck..... 286,162

Valve grinder, J. D. Waldran..... 286,095

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Vat. See Cheese vat.

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Washer. See Steam washer.

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Wheel. See Car wheel. Propelling wheel. Pulley wheel. Wind wheel.

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DESIGNS.

Brush handle, J. B. Edson..... 14,391

Carpet, A. L. Halliday..... 14,392, 14,393

Carpet, G. W. Piggott..... 14,342

Fire screen, W. H. Hoyt..... 14,388

Handkerchief and scarf, E. Jansen..... 14,339

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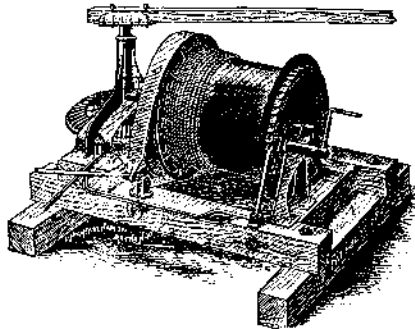
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