

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 & Hermance, 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 fire 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, 80-94 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

Table listing various inventions and their patent numbers, including items like Axle carriage, Axle lubricator, Bag fastener, Bake pan, Bale tie, Bar, Battery, Bell for bicycles, Belt fastener, Bicycle, Bolt cutter, Bolt forging machine, Book, Book album, Book blank or composition, Book hymn and music, Bottle wrapper, Box, Brake, Broiler, Butter box, Butter making artificial, Butter mould, Butter package, Button press, Button setting instrument, Buttons, Can, Car brake, Car coupling, Car guard, Car sleeping, Car spring, Car wheel and axle, Carding machine, Carriage, Cartridge shells, Cartridges, Cash carrier systems, Caster furniture, Cement, Chandeleir, Check registering and printing apparatus, Checks and other negotiable papers, Cheese vat, Chill, Churn and lift apparatus, Churn or mixer, Cistern cover, Clamp, Clamp for hand power dumb-waiters, Clevis, Clevis plow, Closet, Cloth machine, Clothes pounder, Clutch for elevators, Clutch, Coal apparatus for loading, Cook, Compression, Coffee pot, Coffee roaster, Collar and hame, Collieries, Color can, Colter, Concentrator, Condenser, Condenser steam jet, Condensing steam and heating fluids, Cooking utensil, Coupling, Cultivator, Curtain roller, Curtain roller attachment, Curtains, Cut-off valve, Cutter, Door hanger, Draw plate, Dredging machines, Drier, Drying sugar, Dumping platform, Dust-pan, Elastic fabric for goring, Electric alarms, Electric circuit changer, Electric circuit cut-off, Electric motor, Electric switch, Electrical conductor for oil tanks, Electrical or galvanic currents, Elevating and carrying apparatus, Elevator, Elevator C. H. Bidwell, Elevator safety appliance, End gate, Engine, Excavating foundations, Fabric, Farm gate, Faucet lock, Feed bag for horses, Feed water for steam boilers, Fence, Fence barb, Fence barbed wire, Fence portable, Fence post, Fencing support and guard, File and other tools, Filter, Fire alarm, Firearm, Firearms lock, Fire escape, Fire escape Galivan & Manning, Fire escape W. L. Murphy, Fire kindler, Fireplace and cooking stove, Floor covering, Flooring jack, Folding boat, Folding table, Foot power machine, Foot power mechanism, Fruit drier, Furnace, Furnaces, Gas engine, Gate, Generator, Glass bowls for water closets, Glass manufacture, Glassware, Glove aquatic, Governor, Grafting tool, Graining tool, Grate, Grate bar, Guard, Guide and sign boards, Hame, Hand rake, Hand rest for books, Handle, Hanger, Harness attachment, Harrow, Harvester, Harvester cotton, Harvester cotton G. N. Todd, Hatchway, Heater, Heating the air in heat flues, Heel filing machine, Hod elevator, Hoisting apparatus, Hoisting apparatus for wagon derricks, Holder, Hook, Horseshoe nails, Hose reel, Ice and producing cold machine, Ice elevator, Ice harvesting and loading machine, Indicator, Insulated electric conductor, Insulation of wires, Iron and steel, Iron treating, Iron with carbonic acid gas, Jack, Joint, Kiln, Knitting machine, Ladder, Lamp, Lamp and gas fixture, Lamp electric, Lamp electric arc, Lamp electric arc C. J. Van Depoele, Lamps, globe for incandescent electric, Lantern, Lantern F. Stetson, Lathe turning, Leather folding machine, Lifter, Lime kiln, Links, Liguors apparatus for purifying alcoholic, Lock, Loom picker staff check, Loom power, Lubricator, Lubricator R. J. Hoffman, Magneto electric generator, Mattress electric galvanic, Mattress spread, Meal or flour and process of making the same, Measuring the areas of surfaces, Medical appliance, Metallurgical furnace, Metallurgical furnace S. Bissell, Milk skimming apparatus, Mill, Miter box, Mould, Monkey wrenches, Mortising machine, Motion transmitting reciprocal to rotary, Motor, Mower and tedder, Music sheet for mechanical musical instruments, Nail plate feeder, Nautical signal, Oil safe, Ore concentrating table, Ore concentrating table Clark & Cone.