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tant, that users should have prices of these first class goods. American Twist Drill Co., Meredithville, N. H. Silhouette.-I want a Silhouette Instrument. Address

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chinery, address H. A. Crossley, Cleveland, Ohio. For Middlings, Mill and Mill Furnishing, see adv. p.348.

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Wright's Patent Steam Engine, with automatic cut. off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

Presses. Dies. and Tools for working Sheet Metal. etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y. office. Price 10 cents each. Bradley's cushioned helve hammers. See illus. ad. p. 334.

Rollstone Mac. Co.'s Wood Working Mach'y ad. p. 300. be an advantage.

Instruction in Steam and Mechanical Engineering. A thorough practical education, and a desirable situation Institute of Steam Engineering, Bridgeport, Conn. For particulars, send for pamphlet.

For Mill Mach'y & Mill Furnishing, see illus. adv. p.317. get them from manufacturers of vermilion,

Forsaith & Co., Manchester, N. H., & 207 Centre St. Y. Bolt Forging Machines, Power Hammers, Comb'd Hand Fire Eng. & Hose Carriages, New &2d hand Machinery. Send stamp for illus. cat. State just what you want

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 816. For Separators, Farm & Vertical Engines, see adv. p.316.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box423, Pottsville, Pa. See p. 817.

Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Large knife work a specialty. Also manufacturers of Soloman's Parallel Vise. Taylor. Stiles & Co., Riegelsville, N. J.

For Alcott's Improved Turbine, see adv. p. 234. For best Portable Forges and Blacksmiths' Hand

Blowers, address Buffalo Forge Company, Buffalo, N. Y. For Standard Turbine, see last or next number.

For Power Paper, Lard, Cider Presses, see adv. p. 348. Burgess' Non-conductor for Heated Surfaces; easily applied, efficient, and inexpensive. Applicable to plain or curved surfaces, pipes, elbows, and valves. See p. 284

Eagle Anvils, 10 cents per pound. Fully warranted. Steam Hammers, Improved Hydraulic Jacks, and Tube

Expanders. R. Dudgeon, & Columbia St., New York. Wanted-The address of 40,000 Sawyers and Lumbermen for a copy of Emerson's Hand Book of Saws. New

edition 1880. Over 100 illustrations and pages of valuable information. Emerson, Smith & Co., Beaver Falls, Pa. Eclipse Portable Engine. See illustrated adv., p. 349.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 349. Elevators, Freight and Passenger, Shafting, Pulleys and Hangers. L. S. Graves & Son, Rochester, N. Y.

Telephones repaired, parts of same for sale. Send stamp for circulars. P.O. Box 205, Jersey City, N.J. For Wood-Working Machinery, see illus. adv. p. 348.

Telephones.-Inventors of Improvements in Telephones and Telephonic Apparatus are requested to communicate with the Scottish Telephonic Exchange, Limited, 34 St. Andrew Square, Edinburgh, Scotland. J. G. Lorrain, General Manager.

Pat. Steam Hoisting Mach'y. See illus. adv., p. 348. ${\bf Milling, Profiling, Cam\ Cutting, Revolving\ Head\ Screw}$ Machines. Pratt & Whitney Co., Hartford, Conn.

C. J. Pitt & Co., Show Case Manufacturers, 226 Canal St., New York. Orders promptly attended to. Send for illustrated catalogue with prices.

4 to 40 H. P. Steam Engines. See adv. p. 348.

For best low price Planer and Matcher, and latest improved Sash, Door, and Blind Machinery, Send for catalogue to Rowley & Hermance, Williamsport, Pa.

Diamond Engineer, J. Dickinson, 64 Nassau St., N.Y. The only economical and practical Gas Engine in the arket is the new "Otto" Silent, built by Schleicher. Schumm & Co., Philadelphia, Pa. Send for circular.

Elevators.—Stokes & Parrish, Phila., Pa. See p. 348. Mackenzie Cupola and Blower. The very best apparatus for melting iron; and with water bosh for smelting

lead, silver, or copper ores. Send for pamphlet. Smith & Sayre Manuf. Co., 21 Courtlandt St., New York. Ore Breaker, Crusher, and Pulverizer. Smaller sizes un byhorse power. See p.365. Totten & Co., Pittsburg.

Penfield (Pulley) Block Works. See illus. adv. p. 348

NEW BOOKS AND PUBLICATIONS

THE SUGAR BEET. An illustrated quarterly paper, devoted to the cultivation and utilization of the Sugar eet. Philadelphia: Henry Carey Baird & Co. Price 50 cents per annum.

It is seldom that a new industry, or even an old and well established industry, is favored with so handsome and able an exponent. The Sugar Beet would seem to be indispensable to every one interested in the raising of beets and the production of sugar from them. The editors say that the curse of American beet sugar making is amateurism and experimenting. Better stick to the successful plans and processes of the French and German leaders in this industry.



HINTS TO CORRESPONDENTS

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

Names and addresses of correspondents will not be

Werenewour 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 chloride, wash in plenty of water. 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 obtain such information without remuneration.

Any numbers of the Scientific American Supple-MENT referred to in these columns may be had at this

(1) W. O. D. asks: 1. Will a pump work-Electrical Indicators for giving signal notice of ex- ing water from a heater into a boiler work in air if the tremes of pressure or temperature. Costs only \$20. At- supply is not sufficient to keep the pipes full? A. Yes. tached to any instrument. T.Shaw, 915 Ridge Ave. Phila. 2. Will the air do any harm? A. No, it would rather

(2) A. P. W. asks: 1. Would a cylinder, 3 inches diameter, 41/2 inches stroke, run a side wheel s competent, can be obtained at the National boat, 12 feet long, 3 feet wide, working direct from the shaft (oscillating cylinder)? A. Yes, probably at a speed of about four miles per hour. 2. Can you tell me Hydraulic Jacks, Presses and Pumps. Polishing and where to obtain the mercury flasks used in making the of the Flirt be purchased, if at all? How much would Buffing Machinery. Patent Punches, Shears, etc. E. boiler described in Sufficients. No. 182? A. Any drug- an engine not plated, the size of the Flirt's, cost, not into Lyon & Co., 470 Grand St., New York. gist can obtain mercnry flasks for you. You may also cluding the shaft, propeller, and boiler? A. Complete

(3) J. W. C. writes: I have a battery of 32 cells (about one pint each) composed of carbon and zinc, but I cannot find the proper solution to make it work properly. I have just amalgamated the zinc very carefully, and used a solution made of the following: 1 gallon sulphuric acid, 3 gallons water, then dissolved 6 lb. of bichromate of potash in 2 gallons of boiling water, mixing the whole, and using when cold. I find that I get a very powerful spark, but not the burning heat that is required when one takes hold of handles attached to the two poles of the battery. And also, I find that theamalgamating substance has entirely disappeared. The bat tery, I understand, is a modification of Storms' element Please tell me whether you think I have used the proper solution or not. The zinc and carbon are suspended in the cell about three-eighths of an incb apart. A. Your solution contains too much sulphuric acid. The following will be better: Dissolve 2 lb. bichromate of potash in 10 quarts of hot water. When cold add slowly and carefully 14 lb. of sulpburic acid. By using an interrupter you will be likely to feel the effects of the current from your 32 cells. By employing a small induction coil ha ing an interrupter, in connection with a single cell of your battery, you will get a secondary current that ca be felt without any difficulty.

(4) H. C. B. writes: 1. I have constructed a pantograph as described in Scientific American Sui PLEMENT, No. 158, page 2506. I have no trouble i copying any drawing, either enlarged or reduced in size but I have not been able to make a drawing the sam size as the original. Will you have the kindness to te me how to arrange the tracing point and pencil, so a that I can make a copy of the same dimensions as th original? A. Change places with the pivot and tracin point; that is, put the tracing point in the center of th middle bar. The tracing will be inverted, 2. Can yo give me a good receipt for ebonizing wood? I would like the one which is now used byfurniture makers. A See p. 19 (18), Vol. 40, Scientific American. 3. Wha is the best wood to use for small articles, such as hang ing cabinets, which are to be ebonized? A. Mahogany holly, maple, black walnut, in fact almost any woo

(5) T. M. asks: 1. What is the velocity o steam under some certain pressure? A. Velocity flow ing into the atmosphere at 30 lb. pressure above atmo sphere, 1,400 feet per second; 50 lb. pressure above at mosphere, 1,429 feet per second; 70 lb. pressure above atmosphere, 1,444 feet per second, 2. Is there any differ ence in the velocity of steam through different size pipes? A. No difference except that due to difference of friction in pipes.

(6) H. D. writes: I have a side whee steamboat here that is geared up; the wheels are 1 feet diameter, buckets 11x30 inches, dip 14 inches; th engine is geared up to make 41/2 revolutions to the wheel's one; the large gear wheel bas wood teeth. Ther seems to be a good deal of back lash and noise. I wan to stop it, or help it, if raising up the buckets would make any difference. A. Raising the buckets would re lieve but not remedy the difficulty. Put a fly wheel or the crank shaft of the engines, or fit the gearing closer

(7) E. G. S. asks how to test his steam boiler by hydraulic pressure. A. Fill the boiler entirel full of water by any convenient means, then with a fore pump increase the pressure to the desired degree. Use a pressure gauge on the boiler to indicate the pressure oduced within the boiler. Place an air cock in the highest part of the boiler, and be sure all the air bas been expelled before you close it.

(8) A. K. E. writes: 1. I desire to make an induction coil 8 inches long with 34 inch iron wire; core in center wound round with about 7 layers of No. 18 cotton covered wire; and have a large spool to slide over this wound up with about 18 layers of No. 36 silk covered wire, and use a single Grenet battery such as is used in all electrical medical machines, and would like to know how many persons could be charged with this size of coil and receive a reasonable charge. A. Two or three layers of No. 16 wire would be better for the primary than seven layers of No. 18. Such a coil would be altogether too large for giving shocks. It would, if well made, give shocks that might prove dangerous. You will find full instructions for making induction coils in Supplement 160, 2. How could I make a shocking attachment for same? A. The arrangement of the interrupter is shown in the article referred to. 3. What Drying and preserving by cold air, apparatus for, acids are used for making brass black and how used? A. See p. 371, Vol. 40, Scientific American. 4. I have often heard that 9 or 10 bells (electric) can be made to ring on the same circuit. Is it true, and if so, how are the connections made? A. Use single stroke bells.

(9) A. S. P. asks for M. Pellet's method of producing blue lines on white by photoprocess. A. Chemically pure ferricyanide of potassium, 1 oz.; citric, acid, 20 grains; dissolve in 5 ounces soft water. Immerse the paper in this, dry in the dark, expose under a negative, develop in a dilute aqueous solution of ferric

(10) J. T. W. writes: 1. I have just read your article in the Scientific American Supplement descriptive of the steam yacht Flirt. As you kindly consent to supply further information upon application, I make bold to submit a few queries. The text says: that would bring the grate to the top of furnace. A. This is evidently an error or misprint, as the drawings show. 2. Does the stuffing box of the pump serve for guides, or are there guides besides that? A. The stuffing box is the guide. 3. About how much fuel and what kind does she consume? A. With sharp draught it might burn 25 to 35 lb. per hour less with the ordinary draught. The grate surface, 1 square foot, and heating surface 34 feet, seem small for the quantity of steam consumed. Are these the correctfigures? A. We would advise you to increase the boiler 25 per cent. 5. What would the completemachinery (boiler, engine, shaft, propeller, and connections) such as that of the Flirt cost (leaving out the nickel plating)? For how much could the machinery about \$280, without shaft and propeller about \$240.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

May 4, 1880,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, 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. We also furnish copies of patents granted prior to 1866; but at increased cost, as the speci-

m v-	fications not being printed, must be copied by han	nd.
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