Business and Versonal.

The Charge for Insertion under this head is One Dollar a line for each insertion, about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue,

For Sale.-Valuable HayFork Patent. Simple, cheap, and efficient. J. M Boyd, Oak Center, Wis.

If you have a cold or cough, you can cure it by using Van Beil's "Rye and Rock."

See "Abbe" Bolt Forging Machine notice, page 140.

For Thrashing Machines, Engines, and Horse Powers, see illus. adv. of G. Westinghouse & Co., page 125.

Parties interested in the manufacture of delicious Cider, and desirous of obtaining the largest results from their apple crop, will study their own interest by writing to Messrs. Boomer & Boschert, No. 15 Park Row

for illustrated circular with prices. Buy the Buffalo Port. Forge. Have no other.

Putnam Engine, 13 x 36; Corliss Engine, 8 x 24. Bullard, 14 Dey St., New York.

For the manufacture of metallic shells, cups, ferrules blanks, and any and all kinds of small press and stamped work in copper, brass, zinc, iron or tin, address C. J. God-frey & Son, Union City, Conn. The manufacture of small wares, notions, and metallic novelties a specialty. See advertisement on page 92.

The Inventors' Institute, Cooper Union, New York Sales of patent rights negotiated and inventions exhibited and advertised for subscribers. Send for circular.

A large manufacturing concern desires to enter into correspondence with reliable houses doing business in sinking artesian wells. Please address Drawer 81, New

Presses, Dies, and Tools for working Sheet Metals etc. Fruit and other Can Tools. E. W. Bliss, successor to Bliss & Williams, Brooklyn, N. Y.

Hartshorn's Self-Acting Shade Rollers, 486 Broadway, New York. No cords or balances. Do not get out of order. A great convenience. Sold everywhere by the trade. See that you get Hartshorn's rollers. Makers and dealers in infringing rollers held strictly responsible.

Street Sweeper, Smith's patent, for sale. Machinery Exchange, 261 N. 3d street, Philadelphia.

Second hand large size Wood Planer, R. Ball & Co. make, for sale cheap, by Wm.M. Hawes, Fall River, Mass Wm. Sellers & Co., Steam Hammers. See ad., p. 108.

The Practical Papermaker; a complete guide to the manufacture of Paper, by James Dunbar. \$1.00. Mail free. E. & F. N. Spon, 446 Broome street, New York.

Wanted-An experienced and thoroughly capable ma chinist, competent to design, build, and set up in working order light, special machines in a manufacturing business; also to superintend repairs in shop connected with the factory; must furnish best reference as to character, habits, and ability. Address P. O. Box 539. Baltimore, Md.

Rollstone Mac. Co.'s Wood Working Mach'y ad. p. 92. Abbe Bolt Forging Machines and Palmer Power Hammer a specialty. S. C. Forsaith & Co., Manchester, N. H.

L. Martin & Co., manufacturers of Lampblack and Pulp Mortar-black, 226 Walnut St., Philadelphia, Pa.

Large Slotter, 72" x 18" stroke. Photo on applica tion. Machinery Exchange, 261 N. 3d St., Phila.

List 25 .- Descriptive of over 2,000 new and second

hand machines, now ready for distribution. Send stamp for same. S. C. Forsaith & Co., Manchester, N. H. Books for Engineers and Mechanics. Catalogues free

E. & F. N. Spon, 446 Broome St., New York.

4 to 40 H P. Steam Engines. See adv. p. 93. Send to John D. Leveridge, 3 Cortlandt St., New York, for illustrated catalogue, mailed free. of all kinds of Scroli Saws and Supplies, Electric Lighters, Tyson's Steam Engines, Telephones, Novelties, etc.

Pure Oak Lea Belting. C. W. Arny & Son, Manufac turers. Philadelphia. Correspondence solicited.

Eclipse Portable Engine. See illustrated adv., p. 93.

Within the last ten years greater improvements have been made in mowing machines than any other agricultural implement. It is universally acknowledged that the Eureka Mower Co., of Towanda, Pa., are making the best mower now in use, and every farmer should write to the manufacturers for catalogue, with prices.

Jenkins' Patent Valvesand Packing "The Standard." Jenkins Bros., Proprietors, 11 Dey St., New York.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. Wood-Working Machinery of Improved Design and Workmanship. Cordesman, Egan & Co., Cincinnati, O. The "1880" Lace Cutter by mail for 50 cts.; discount

to the trade. Sterling Elliott. 262 Dover St., Boston, Mass. Experts in Patent Causes and Mechanical Counsel Park Benjamin & Bro., 50 Astor House, New York.

For Mill Macb'y & Mill Furnishing, see illus. adv. p.108. Corrugated Wrought Iron for Tires on Traction Engines, etc. Sole mfrs., H. Lloyd, Son & Co., Pittsb'g, Pa.

Malleable and Gray Iron Castings, all descriptions, by Erie Malleable Iron Company, limited. Erie, l'a. For Machinists' Tools, see Whitcomb's adv., page 73. Power, Foot, and Hand Presses for Metal Workers.

Lowest prices. Peerless Punch & Shear Co. 52 Dey St., N.Y. Recipes and Information on all Industrial Processes Park Benjamin's Expert Office, 50 Astor House, N. Y. For the best Stave, Barrel, Keg, and Hogshead Ma

chinery, address H. A. Crossley, Cleveland, Ohio. National Steel Tube Cleaner for boiler tubes. Adjust-

able, durable. Chalmers-Spence Co., 40 John St., N. Y. Wren's Patent Grate Bar. See adv, page 109.

Best Oak Tanned Leather Belting. Wm. F. Fore paugh, Jr., & Bros., 531 Jefferson St., Philadelphia, Pa. Saunders' Pipe Cutting Threading Mach. See p. 109.

Stave, Barrel, Keg, and Hogshead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

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

Peck's Patent Drop Press. See adv., page 109.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys Yocom & Son's Shafting Works, Drinker St., Philadelphia. Pa.

Blake "Lion and Eagle" Imp'd Crusher. See p. 109. Silent Injector, Blower, and Exhauster, See adv. p. 124. SUPPLEMENT.

The Brown Automatic Cut-off Engine; unexcelled for workmanship, economy, and durability. Write for information. C. H. Brown & Co., Fitchburg, Mass,

National Institute of Steam and Mechanical Engineering, Bridgeport, Conn. Blast Furnace Construction and Management. The metallurgy of iron and steel. Practical Instruction inSteam Engineering, and a good situation when competent. Sendfor pamphlet.

Nickel Plating. - Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna lime, crocus ondit. Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

The American Electric Co., Proprietors and Manufacturers of the Thomas Houston System of Electric Lighting of the ArcStyle. See illus. adv., page 125.

See Bentel, Margedant & Co.'s adv., page 125.

Machine Diamonds, J. Dickinson, 64 Nassau St., N. Y. Steam Hammers, Improved Hydraulic Jacks. and Tube

Expanders. R. Dudgeon, 24 Columbia St., New York. 50,000 Sawyers wanted. Your full address for Emerson's Hand Book of Saws (free). Over 100 illustrations and pages of valuable information. How to straighten saws, etc. Emerson, Smith & Co., Beaver Falls, Pa

Peerless Colors—For coloring mortar. French, Rich ards & Co., 410 Callowhill St., Philadelphia, Pa,

For Pat, Safety Elevators, Hoisting Engines. Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 126. Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p.126.

L. B. Flanders Machine Works, Philadelphia, Pa. Blake's Belt Studs. The strongest fastening for leather and rubber belts. Greene, Tweed & Co., N. Y. Elevators, Freight and Passenger, Shafting, Pulleys

Cylinders, all sizes, bored out in present positions

and Hangers. L. S. Graves & Son, Rochester, N. Y. For Heavy Punches, etc., see illustrated advertise ment of Hilles & Jones, on page 125.

Steam Engines; Eclipse Safety Sectional Boiler. Lambertville Iron Works, Lambertville, N. J. See ad. p. 125 Best Band Saw Blades. See last week's adv., p. 125.

Reed's Sectional Covering for steam surfaces; any one can apply it; can be removed and replaced without injury. J. A. Locke. & Son, 40Cortlandt St., N. Y.

Linen Hose and Rubber Hose suited for all purpos Greene, Tweed & Co., 118 Chambers St., New York,

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p.125. For best low price Planer and Matcher, and latest improved Sash, Door, and Blint Machinery, Send for catalogue to Rowley & Hermance, Williamsport, Pa.

The only economical and practical Gas Engine in the market is the new "Otto" Silent built by Schleicher. Schumm & Co., Philadelphia, Pa. Send for circular.

Penfield (Pulley) Blocks, Lockport, N.Y. See ad. p. 124 Tyson Vase Engine, small motor. 1-33 H. P.; efficient and non-explosive; price \$50. See illus, adv., page 124.

Use Vacuum Oil Co.'s Lubricating Oil, Rochester, N.Y. Lightning Screw Plates and Labor-saving Tools, p. 125.

Hotchkiss' Mechanical Boiler Cleaner, 84 John St., N. Y., has imitators; meritorious inventions do; beware of them, they are all infringements. Engineers make ten per cent selling other parties than employers.

Clark Rubber Wheels adv. See page 109.



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 given to inquirers.

We renew our request that correspondents, in referring to former answersor 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 Supple MENT referred to in these columns may be had at this office. Price 10 cents each

(1) R. L. W. asks: How much water evaporated from 212° is a horse power? Some say 21 lb., others 27 lb., 30 lb , and some as high as 36 lb ; if there is a rule, I would like to know it. A. It depends upon the perfection of the machine or engine through which the steam is used. 21 lb. per horse power would be deemed an excellent result. It is a very good engine that uses less than 24 or 25 lb.; a very poor engine may not only use 36 lb., but even more

(2) J. B. V. inquires: Has there ever been so early a winter as the present? What is the cause of the polar waves or cold snaps? Can you send a record of the weather for the past fifty years? Can a person prestell what kind of a winter we will have? Can accurate predictions be made as to what kind of weather we will have a day, week, morth, or year in advance? Have you published anything about the weather in the SCIENTIFIC AMERICAN OF SUPPLEMENT? If so, please refer to the number A. There are certain things that are quite unknown to any one on the staff of the Scientific American, and the ability to give an "accurate prediction" of the weather daily, monthly, or a year in advance. is a fair type of those matters that transcend their powers. Our correspondent will have to propound his queries to some of those entities which are said to be hovering about in mid air, and who may thus be assumed to be cognizant of such matters, for to answer them is clearly beyond the province or powers of ordinary mortals.

(3) A. and E. ask: Can you tell us of a cerine glues, page 2510, No. 158, SCIENTIFIC AMERICAN

(4) G. F. H. asks: How can I drill a onesixteenth inch hole through Arkansas stone? A. Use a very hard steel drill with slow speed, or a copper or oft iron drill with emery or diamond dust and higher velocity.

(5) R. F. M. asks: What is used for thinnine printer's inks, both common and fine inks? A. Printer's varnish, or a thinner printer's ink. The varnish is prepared by inflaming holling linseed oil and stirring it while it burns until a black "varnish" of the proper consistence is obtained. The flame is extinguished by placing a tightly fitting cover over the pot.

(6) F. L. B. asks: 1. Do the directions given in Scientific American, of January 25, 1881, No. 35, under Notes and Queries, make a similar pad to that advertised as the hektograph? A. Yes. 2. Would not a tin trough or plate answer as well as one of zinc ? A. Nearly as well. 3. Will Cox's gelatine, such as can be boughtat the grocers (used in cooking), do for the gelatine part? A. Yes. 4. When you say, "parts" do you mean by weight or bulk? A. Parts by weight.

(7) W. E. J. asks: 1. Are oscillating en gines used now and for what? A. Yes, for many purposes. 2. Would there be any value in an engine with similar valves to an oscillating toy engine, but with stationary cylinder, thus saving the power required to move the latter? Would such an engine make a good motor? A. We think it would not be desirable for actual use.

(8) A. J. C. asks: Will wood 3 feet long in a stove a little over 3 feet high and 2 feet wide last longer than wood cut short enough to lavacross the stove? A. In either case, its slow or rapid burning depends upon the manner it is laid. If the sticks are laid parallel and close, they will burn slowly; if laid partially crossing each other, so as to be open, they will

(9) F. L. S. asks how much more power a steam engine would have if there was no dead center or, in other words, with the full force of crank for full revolution. A. The difference would hardly be appreciable, using the same amount of steam.

(10) A. S. L. writes: We have a boiler and furnace connected with our establishment; is it cheaper to run both with pea coal, or to run the first with pea and the latter with fifrnace coal? A. It depends upon the prices of the different kinds of coal in your market: butas a rule the pea coal is most economical.

(11) C. J. H. writes: I have a quantity of granulated test lead carrying, say, one ounce silver to the ton. How shall I desilverize the lead and reduce to absolutely pure metallic lead? If reduced to a nitrate how shall I desilverize and manipulate the resultant salt after evaporation? A. For small quantities the following will answer. Dissolve in a small quantity of bot nitric acid diluted with half its volume of water and evaporate by heat nearly to dryness. Decompose with an excess of dilute sulphuric acid (acid 1, water 2). Let stand (in the dark) with the liquid several hours then decant the latter (which contains the silver), wash the white lead sulphate with fresh dilute sulphuric acid, dry, heat to low redness then intimately mix with dry bicarbonate of soda and powdered charcoal in the proportion of 1 oz. lead sulphate, half an ounce bicarbonate of soda, and 40 grains of charcoal. Charge into a clay crucible, cover, and fire at a bright red for fifteen minutes. Pour, or cool and break. Assayers rarely desilverize their lead; it is preferable to determine accurately by assay the amount of silver present in a given quantity, and allow for this in calculating results.

(12) D. P. asks: 1. Can you tell me how the paint used in painting window curtains or shade cloth is made. mixed, and applied ? A. Consult "The Painter's and Gilder's Companion." See addresses of book dealers in our advertising columns. 2. How can I perforate heavy paper for transferring designs? The perforations in postage stamps is what ${\bf I}$ want on manila paper. A. The perforations in postage stamps are effected by passing the sheets between two cylinders, one above the other, and provided with a series of raised bands which are adjusted to a distance apart equal to that required between the rows of perforations. Each ring on the upper cylinder has a series of cylindrical projections or punches which fit corresponding depressions in the bands of the lower cylinder; by these the perforations are punched out. An endless band separates the perforated sheet from the rolls. The sheets require pressing to remove the roughness caused by the perforating machine. The machine was invented and patented in 1852, ov Mr. Archer, of England.

(13) A. B. asks (1) for a simple test by which to distinguish alkali water from pure water. A. Add to the water a small quantity of strong neutral tincture of litmus. If the water is alkaline the litmus will change in color to a deep purplish blue. 2, How is the quantity of alkali in a given quantity of water determined t A. The quantity of alkali in a water is most readily determined by titrating a measured sample with a standardized solution of acid. Consult Thorp's Chemical analysis. 3. What is the best filter I can use to purify water that contains foreign matter, so as to make it suitable for raising steam? A. Consult our advertisir · columns for filters.

(14) E. H. L. asks (1) whether a lawn sprinkler would revolve if worked in a vacuum. A. Yes. 2. The query is, what produces the revolution? Is it the difference of pressure of the water on the inside and at the openings, or is it the resistance of the air to the small streams? A. It is the difference of pres-

(15) A. Y. F. asks for the process by which the ribbons used in type writers, hand stamps, etc., are made and prepared. A. Saturate the ribbon with a strong solution of one of the soluble aniline dyes in hot glycerine.

(16) W. S. R. writes: I have a Wedgwood sirup cup that is cracked and leaks, although the crack is only visible on the inside. Can you give me a receipt for some varnish, or cement that can be used as a varnish, that will be insoluble in hot sirup or mentthat will cement cloth or felt to iron? A. See ma- water, and stop the leak? A. See the thirtieth cement in the list, page 2516, No. 158, SCIENTIFIC AMERICAN SUPPLEMENT.

(17) J. L M. asks: Is meerschaum a manufactured article? Is it manufactured from sea foam? A. True meerschaum (Ger., seafoam) is a native mineral, a hydrous silicate of magnesia. Much of the socalled meerschaum in the market is manufacturednot from sea foam, but from waste chips and powder of meerschaum cemented together, or from a composition of magnesia, water, silicate of soda, sulphate of magnesia, etc.

(18) J. F. S. asks for some simple way of rendering horns soft and pliable (without destroying their original shape). Have tried steam at 80 lb. without any satisfactory result. A. Digest them in pure hydrochloric acid diluted with three volumes of water until softened.

(19) G. B. S. writes: I have a small sawmill engine 10 inches by 20 inches, and the connecting rod is only 34 inches. I think it a very poor proportion. Give me a better one, and give dimensions the fly wheel should be, also the speed? A. A connecting rod in length 2½ times the stroke is considered a good proportion. According to the usual proportions your wheel should be about 6 feet 6 inches diameter and weigh 3,000 lb. If your engine is well balanced it may run from 130 to 160 revolutions per minute, or even faster if the work requires it.

(20) E. A. C. writes: In putting up the feed water pipe on one set of boilers, which of the two valves must be near to the boiler, the stop valve or the check valve? A. The stop valve should be placed next

(21) J. D A. asks: What ingredient can be mixed in the manufacture of tinner's solder (half and half) which will be harmless to use and give a quick flow to the solder? Should such solder be moulded hot or cool? A. Try a small quantity of bismuth; mould cool.

(22) C. H. H. asks: 1. Do freight trains on N. Y. L. E. & W. R.R. haul broad and standard gauge cars indiscriminately on same train? A. Yes. 2. If so, how are draw bars arranged? A. Draw bars for passenger trains by special link and distance block, and for freight trains by three-link coupling. 3. Are some trains made up of broad and others of standard gauge cars? A. Yes; but all one gauge if possible. 4. Do they use broadgauge passenger coaches? A. Yes, on branches running through to Jersey City. 5. Is there a third rail whole length of road; if not, between what stations? A. Yes, on all the main linefrom Jersey City

(23) H. J. C. asks: Will the thickness of a belt run over the same size pulleys make any difference in speed, other things being equal? A. No, if there is no slip of belt.

(24) W. S. wants to know how much a one and one-eighth inch ship cable chain will sustain and what size hook it will take. A. Ultimate strength 19.7 tons to 21.5 tons; proof test 15.2 tons to 15.75. Should not be worked regularly over one-fourth the ultimate strength. Opening of link for hook or pin 11/2 inch.

(25) H. S. asks: 1. Would a half-inch board hold up a piece of earth 10 feet thick? A. It would depend entirely on the area of the board. 2. What sized battery (Bunsen's) would be required to light a room 10 feet high, 15 feet long, and 12 feet wide? A. 20 to 25 quart Bunsen cells.

(26) P. writes: Scientific American, Feb. ruary 12, 1881, page 106, Notes and Queries, No. 19, Should be thicker than if vulcanized "ought to read galvanized. There is no such thing as vulcanized iron. [Clearly a mistake of the typo. Our correspondent is also mistaken—it should have been ungalvenized.

(27) C. P. T. asks; 1. Does the pitch of a propelling screw increase or decrease its resistance to the motive power? A. Increased pitch requires more power, and decreased less. 2. Does a sharp pitch propel at a greater speed than a less pitch? A. It propels at a greater speed, if you have the power to drive it at the same velocity as the wheel with less pitch. 3. Supposing I had sufficient power, so that the question of necessary power was not considered, what pitch would give the greatest speed? A. There is no fixed pitch, for it depends upon many conditions, and each case must be determined by its own conditions. 4. Would a shaft 20 feet in length, upon which were four pairs of wings, 5 teet apart, give more propelling power than a single pair-that is, supposing the wings or screws to be all of the same pitch and diameter? A. We think

(28) W. R. H. writes: With a 10x24 engine running 100 revolutions, steam ports 11/4x4 inch. exhaust 24x4 inch, bridges seven-eighths inch, valve steam lap half an inch, exhaust lap one-quarter inch, what would be the right travel of valve, and are the steam ports too small for the speed of engine? Your openings are rather small. Valve should have 3 inch travel, 11/2 inch each way. Reduce the exhaust lap to one-sixteenth inch scant

(29) G. R. asks: Does the strain on belt driving an emery wheel increase with an increase of speed? If so, in what ratio? A. Not appreciably, the amount of work done by the wheel remaining the same per revolution.

(30) D. E. T. asks. 1. What number of Callaud cells is required to work bell calls, ordinary single stroke, on a half mile line of No. 12 wire, one at each end? A. It will require five cells. 2. How is a relay constructed, and what purpose does it serve? A. A relay is much the same as a sounder. Its magnet is wound with finer wire, and its armature lever, which is very light, 18 made to open and close a 10cal circuit. It is used in lines it; which the current is too weak to work a sounder 3. In the transmitter described by Mr. Hopkins, in Scientific American of May 8, why could not the bottle be constructed with a cork in the top with small piece of glass tube for the carbon, and the platinum wire inserted at the side of the small tube and save the glass blowing, which seems to be the only part of any difficulty for amateurs with limited facilities to make? A. The experimental transmitters of this kind were made in the way you suggest. There is no objec-

tion to the plan, provided the ends of the glass tube are fused to remove the sharp edge. By attaching a small platinum point (about the size of a pin's head) to the diaphragm instead of the carbon button the effective ness of the instrument will be increased. 4. What size should the platinum wire be? A. It is immaterial; copper wire will answer just as well if used in the manner proposed by you.

(31) J. H. writes: 1. Our mechanic has made a dynamo machine as designed in Supplement. No. 161, which did not work before it was connected with a battery, and after it was disconnected from the battery about an hour it began to work, and has done so ever since. Now, will a dynamo machine work without it being charged with a battery? A. Iron is usually more or less magnetic, and the slightest degree of magnetism in the iron of your field magnet would have been sufficient to start a current in the armature, THE LOGICAL-MATHEMATICAL DEVELOPwhich would have increased rapidly until the maximum current was reached. It seems that your field magnet must have been neutral. After having been charged by the battery it retained sufficient magnetism to start the current. It has been found that when the field magnet is neutral sufficient magnetism to start the machine may be imparted to it by placing it on the earth's magnetic meridian. 2. Can you give us a design of a dynamo machine which is strong enough to magnetize a piece of steel in the form of a norsestice magnet which is 12 inches long, 11/2 inch wide, and 1/2 inch thick? A. For this purpose you would need a large machine such as the Edison, Maxim, Brush, Weston, or Siemens, all of which have been described in our columns.

(32) J. P. E. writes: 1. In a late edition of your valuable paper you give directions for building an upright, single-acting rocking valve engine. Please tell me how I can get up a cheap, effective, steam supply for an engine on that principle, having 2 inch bore, and 21/2 inch stroke. Would a copper boiler, 11 inches in diameter and 22 inches long, tested to stand 150 lb. to square inch, with 4 4-inch wicks burning good refined petroleum, be at all effective and efficient? A. Such a boiler should have 20 to 25 1-inch tubes. You would hardly get the full power of the boiler with the four wicks. 2. Would a grate burning fine coal be better than the oil supply? A. Yes, much better. 3. What should be bore and strokefor a pump for engine of given dimensions. A. A pump having a piston onequarter inch in diameter and 1 inch stroke would be the several parts are colored as in the objects themsufficient to supply the boiler. It would be well to make either the speed or strokeof the pump variable.

(33) P. S. writes: I would like to make an induction coil, but I think the one in SCIENTIFIC AMERICAN SUPPLEMENT, No. 160, too large, and in the SCIENTIFIC AMERICAN, vol. xxxix., page 203, No. 14, too small. Would you please answer me the following questions. 1. Would a coil 41/2 inches long on inside, by 216 inches diameter, be too large to give shocks, using small battery power? A. It would not be too large, as you can regulate the strength of the current as maybe required. 2. If not, please give diameter of core, weight, and number of primary and secondary wire? A. Diameter of core, five-eighths inch. Three layers of No. 18 silk covered wire for a primary, and 12 to 14 layers of No. 36 silk covered wire for the secondary. 3. Would a thin brass tube covering the wires of core. which draw out to regulate the current, keep the coil from working? A. It would modify the action somewhat, but it would not entirely prevent its working.

(34) F. S. P. asks (1) how the connections are made in a "Gramme electro-magnetic" machine. SMITHSONIAN MISCELLANEOUS COLLECTIONS. After having wound the soft iron ring armature with a number of lengths of insulated wire, how are the ends of these coils of wire connected to the copper strips upon the axis? A. The inside terminal of one coil is connected with the outside terminal of the next, and both together are connected with one of the copper strips, and so on throughout the entire series of coils and strips. 2. What position do these strips of copper have upon the axis as the coil passes from north to south pole of the magnet? A. The strips are parallel with the axis, and the collector brushes which press upon opposite sides of the commutator cylinder should be adjustable, so that they may be moved from the neu-

(35) S. R. M. asks: Could a telegraph message be sent over a wire of any length, one end being AMERICAN SANITARY ENGINEERING. By well grounded in the earth, the other in a large water Edward S. Philbrick, C.E. New York: tank or lake of any size which was well insulated from the earth? A. No; a complete circuit is required

(36) H. B. writes: Referring to an article in your paper some time since, "How far can cannonading be heard?" would say many of us (I among them) distinctly heard, two days (and think three) in succession, at Lynchburg, Va., while prisoners in the rebel lines, the sound of the guns of McClellan's battles on the Peninsula. It was clearly heard towards close of the afternoon, days bright and clear sky. It sounded like a bucket being dropped inverted in water. Whatever the distance is, there is no mistake

(37) S. R. asks: What is the longest railway bridge in the world? A. It is said that the railway bridge over the estuary of the Solway, near Annan, i the longest in the world, being 1,940 yards in length, The next longest to it is that built for the Orenberg railway over the Volga near Syzrau, which is a few yards short of 1,624 yards.

(38) A. B. M. inquires: How is pyroligneousacid (wood vinegar) made? A. It is obtained by distilling wood in iron retorts, resembling those used for making illuminating gas. The condensed products of the distillation contain, with tar and numerous other bodies, crude pyroligneous acid or wood vinegar, amounting in a well conducted distillation to about 7 or 8 per cent of the wood employed. The gas that accompanies the with lime, evaporated to dryness, roasted at a moderate temperature so as to free it from volatile matters, and decomposed in a retort, having a helm of copper and a condenser of tin or silver, with hydrochloric acid (90 to mitigate.

parts acid to 100 acetate of lime), and the acetic acid

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

D. R. Y .- No. 1. Hornblende schist. No. 2. Red sandstone. No. 3. Dolerite. No. 4. Cherty flint.

COMMUNICATIONS RECEIVED.

On Parhelia. By U. F. G. On a Simple Experiment with Polarized Light. By E. G. H

Ona Singular Atmospheric Phenomenon. By H. B. C.

NEW BOOKS AND PUBLICATIONS.

The logical-mathematical development of the causes of the principal phenomena of nature, such as gravity, fications not being printed, must be copied by hand. elesticity, light, color, heat, electricity, chemical combinations, etc., from a single fundamental principle. By Theodor Wiesemann. Brussels 1879. Paper, 63

THE PHOTOGRAPHIC TIMES.

The Photographic Times, which was formerly issued, as an addendum to the Philadelphia Photographer, began the new year of 1881 as an independent publication, with an able editor-Mr. J. Trail Taylor, formerly of the British Journal of Photography. The January number of the Photographic Times, now before us, contains a large amount of matter of interest and value to practitioners of the art beautiful. \$2 a year. Single copies 25 cents. Scovill Manufacturing Company, publishers, 419 Broome street, New York

Johnston's Illustrations of Electricity. SHEET 5. ELECTRO DEPOSITION OF METALS. WITH HAND-BOOK. By Alexander Watt. Edinburgh and London: W. & A. K. Johnston. 10s. Size 50x 42 inches.

One of a series of charts in color for use in teaching natural philosophy. The illustrations of apparatus, etc., are large, so as to be readily seen by a class, and selves. The sheet before us pictures twenty-three forms of voltaic battery, dynamo-electric machines and their elements, thermo-electric apparatus, and apparatus for electrotyping, electroplating, gilding, nickel plating, etc. The hand book briefly describes the objects figured and their uses. The charts would seem to be admirably adapted for use in schools unprovided with a physical laboratory; and if the price were reasonable, say fifty cents or less a sheet, they might find a wide acceptance among our common and private schools

A TEXT BOOK OF ELEMENTARY MECHANICS FOR THE USE OF SCHOOLS AND COL-LEGES. By Edward S. Dana. New York: John Wiley & Sons.

Though specially designed for use in schools this elenentary treatise seems well adapted for individual study. Its scope is limited to the mechanics of solids. It would add much to the practical value of the mathematical courses in our schools if a treatise like this could take the place occupied by surveying, navigation, or mathematical astronomy.

James Smithson and his Bequest. By William J. Rhees. Washington: Published by the Smithsonian Institution.

This is the first authentic account of the man who has laid the United States and the world at large under such great obligation by his bequest to found the insti-tution which bears his name. Though barred by law from claiming the family name and honors of his father, the Duke of Northumberland, Smithson sought a higher fame in the discovery and propagation of scientific truth. In one of his manuscripts was found this memorable prophecy following a reference to his relationship to England's noblest families: "My name shall live in tral point to the point where the maximum current is the memory of manwhen the titles of the Northumberlands and the Percies are extinct and forgotten.' The prophecy bids fair to come true.

> The Sanitary Engineer. 8vo, cloth, pp. 129.

 \boldsymbol{A} dozen lectures covering in \boldsymbol{a} peculiarly suggestive and practical manner the subjects of ventilation, house and town drainage, sewerage, and the like. The matter is presented in a way well calculated to command attention from home makers as well as house builders and sanitary engineers. The methods and appliances recommended have been chosen for their fitness to meet the conditions of our climate, our modes of life, and more obvious sanitary needs. The fect of the book is the lack of an index.

DEBAUN'S PRACTICAL CALCULATOR, No. 1. New York: Bicknell & Comstock. Folio. 50 cents.

A multiplication table extended to 100x100; and very compactly arranged, so that one can readily find at a glance the product of any two numbers within the limit. Obviously it can be used as a division table with equal readiness, and with slight figuring extended to products and quotients of larger numbers.

CIRCULARS OF INFORMATION OF THE BUREAU of Education. No. 4. Rural School Architecture. No. 5. English Rural Schools. Washington: Government Printing Office. 1880.

The Bureau of Education is doing good service in preparing and distributing information of the kind given liquefiable distillates is conducted to the furnace under in these circulars. They should go not only to all the retort, and serves to continue the distillation with- school officers or communities intending to build schoolout other fuel. In purifying the acid, it is first saturated houses, but to every school district in the land, for the instruction of school trustees, teachers, and parents. There is a vast amount of barbarism in .and about our country school-houses which these circulars will help [OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

January 25, 1881, 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-

| Air compressor, J. R. Cushier | 236,992 | |
|--|--|---|
| Air engine, A. S. Lyman Axle lubricator, vehicle, J. R. Rochelle | 236,954 | |
| Bale bands, splicing. L. Miller | | |
| Bale tie buckle, H. D. Starr | 236,988 | |
| Bedstead. folding, S. S. Burr | 236,981 | |
| Beehive, J. Mills Beer, etc., apparatus for cooling, H. J. Handwerck | | |
| Bench clamp, J Murphy | 237,041 | |
| Book, scrap, C. Sneider | 237,061 | |
| Bottle, dose measuring, J. M. Dodge | | |
| Bracelet, J. Barclay | 236,975 | |
| Brush fly, Braddock, Pack, & Jeffs | | |
| Buckle. J. B. Noyes | 236,908 | |
| Buggy gear, side spring, Thompson & Hayward Burglar alarm and door fastening, C. F. Crary | | ļ |
| Button fastener, R. B. Banister | 236.973 | |
| Cables, machine for compressing, J. Brady | 236,860 | |
| Candlestick M. Brassill | 236,873 | I |
| Car brake and starter, E. & J. E. Dawson | | I |
| Car coupling, C. Gifford | | I |
| Car coupling, W. C. Kelly | 236,893 | I |
| Car, dumping, C. H. Shepler | | I |
| Car, stock, J. W. Paul | 236,909 | : |
| Cars, cooling and ventilating, I. H. fridenberg Caramels, manufacture of liquid, A D. Curran | 237,009 | i |
| Cardboard, machine for making, R. Shackleton | 237,055 | l |
| Cards, apparatus for blacking borders of, H. A. McAfee | 236,902 | I |
| Carding machines device for raising the under | | I |
| flats of, W. H. Gould | 237,079 | I |
| Cement, bituminous, E. J. Desmedt | 236,995 | ١ |
| Christmas tree decoration, T. C. Knauff | 236,891 | |
| Churn, S. L. Nelson | | |
| Clock, F. A. Lane | 237,028 | |
| Clothes rack, F. T. Wing Coffee roaster, C. L. Hall | 237,073 236,888 | |
| Coffee roaster, C. Hendrie | 237,018 | ı |
| Coke oven, A. M. Chambers | | |
| Cooker. steam, I. B. Olmsted | 237,042 | |
| Corn shelling machine, F. M. Kent | | |
| Covers to earthen and other vessels, attaching. | | |
| T. W. Brown | 236,931 | |
| dead centers, mechanism for moving the, J. F. Holloway | 227 020 | |
| Cultivator, hand, H. B. Sherwood | 237,057 | |
| Cultivator, cotton, R. G. S. Austin | | |
| Damper, stovepipe, W. Scully | 236,913 | |
| Door check, F. V. Phillips | 9,544 | |
| Earring, A. Claude | 236,935 | |
| Easel and back rest, picture frame, C. E. Kellogg. Electric circuits, switch board for, E. F. Frost | 236,953 236,884 | |
| Electricity, electroplated insulated conductor of, | 990 986 | |
| T. & J. Cochran | | |
| rell | 237,071 | |
| gas, apparatus for, J. I. Faesch | | |
| Evaporator, F. S. Harman | | |
| Farm gate, J. Bovee | 236.934 | |
| | 236,872 | |
| Fence, J. Kinney | 236,872 | |
| Fence barb former, wire, Poofer & Jones (r) Fence, portable, C. F. Bahnson | 236,872 237,024 9,543 236,971 | |
| Fence barb former, wire, Poofer & Jones (r) Fence, portable, C. F. Bahnson | 236,872 237,024 9,543 236,971 236,892 | |
| Fence barb former, wire, Pooler & Jones (r) Fence, portable, C. F. Bahnson | 236,872 237,024 9,543 236,971 236,892 236,900 | |
| Fence barb former, wire, Pooler & Jones (r) Fence, portable, C. F. Bahnson 2 Fence, portable, J. M. Keller 2 Fertilizer distributers, feed cup for, W. Marks 2 | 236,872 237,024 9,543 236,971 236,892 236,900 237,080 | |
| Fence barb former, wire, Pooler & Jones (r) Fence, portable, C. F. Bahnson | 236,872 237,024 9,543 236,971 236,892 236,900 237,080 236,889 236,952 | |
| Fence barb former, wire, Pooler & Jones (r) | 236,872 237,024 9,543 236,971 236,892 236,900 237,080 237,080 236,889 236,952 236,998 236,988 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Fence, portable, J. M. Keller. 2 Fertilizer distributers, feed cup for, W. Marks. 2 Fertilizers, machine for disintegrating and drying. G. Mercer. 2 Fire kindler, Hammer & Gremer. 2 Fire service harness, R. Hudle. 2 Flord gate, W. Donnan. 2 Form, dress, J. Hall. 2 Game, A. O. Hall. 2 | 336,872 337,024 9,543 336,971 336,892 336,900 337,080 336,889 336,952 336,952 336,952 336,952 336,952 336,952 336,952 336,952 336,952 336,952 336,952 337,012 337,012 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Fernce, portable, J. M. Keller 2 Fertilizer distributers, feed cup for, W. Marks 2 Fertilizers, machine for disintegrating and drying, G. Mercer 2 Fire kindler, Hammer & Gremer 2 Fire service harness, R. Hudle 2 Flood gate, W. Donnan 2 Form, dress, J. Hall 2 Game, A. O. Hall 2 Game board, puzzle, C. J. Schumaker 2 Gas regulator, Merritt & Ford 2 | 236,872 9,543 9,543 336,971 336,892 336,900 337,080 336,889 336,889 336,889 336,889 336,887 337,083 37,083 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Ferce, portable, J. M. Keller. 2 Fertilizer distributers, feed cup for, W. Marks 2 Fertilizers, machine for disintegrating and drying, G. Mercer. 2 Fire kindler, Hammer & Gremer. 2 Fire service harness, R. Hudle. 2 Flood gate, W. Donnan. 2 Form, dress, J. Hall. 2 Game, A. O. Hall. 2 Game board, puzzle, C. J. Schumaker 2 Gas regulator, Merritt & Ford. 2 Gas retrot lid, W. J. Dooley, 2 Gas retrot lid, W. J. Dooley, 2 | 236,872 9,543 9,543 336,971 336,892 336,900 337,080 336,889 336,952 336,952 336,952 337,063 37,063 37,063 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Fernce, portable, J. M. Keller. 2 Fertilizer distributers, feed cup for, W. Marks 2 Fertilizers, machine for disintegrating and drying, G. Mercer 2 Fire kindler, Hammer & Gremer 2 Fire service harness, R. Hudle 2 Flood gate, W. Donnan 2 Form, dress, J. Hall 2 Game, A. O. Hall 2 Game board, puzzle, C. J. Schumaker 2 Gas regulator, Merritt & Ford 2 Gas retort lid, W. J. Dooley, 2 Glove, O. Guittard 2 Grain binder, J. F. Steward 2 | 236,872 9,543 9,543 336,971 236,892 336,900 337,080 337,080 337,080 337,080 337,080 337,080 337,080 337,080 337,083 337,083 337,083 337,083 337,084 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Ferce, portable, J. M. Keller. 2 Fertilizer distributers, feed cup for, W. Marks. 2 Fertilizers, machine for disintegrating and drying. G. Mercer. 2 Fire kindler, Hammer & Gremer. 2 Fire service harness, R. Hudle. 2 Flood gate, W. Donnan. 2 Form, dress, J. Hall. 2 Game, A. O. Hall. 2 Game board, puzzle, C. J. Schumaker 2 Gas regulator, Merritt & Ford. 2 Gas retort lid, W. J. Dooley, 2 Glove, O. Guittard. 2 Grain drill, Elam & Boggs. 2 Grain drill cleaner, D. J. Shults. 2 | 236,872 237,024 237,024 236,971 236,892 236,900 237,080 237 | |
| Fence barb former, wire, Pooler & Jones (r) | 236,872 237,024 237,024 236,971 236,972 236,990 237,080 237 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Ferce, portable, J. M. Keller 2 Fertilizer distributers, feed cup for, W. Marks. 2 Fertilizers, machine for disintegrating and drying, G. Mercer 2 Fire kindler, Hammer & Gremer 2 Fire service harness, R. Hudle 2 Flood gate, W. Donnan 2 Game, A. O. Hall 2 Game, A. O. Hall 2 Gas regulator, Merritt & Ford 2 Gas retort lid, W. J. Dooley, 2 Glove, O. Guittard 2 Grain drill, Elam & Boggs 2 Grain drill, Elam & Boggs 2 Grain drill cleaner, D. J. Shults. 2 Grate bar, C. W. Withenbury 2 Griddle, cake, S. C. Schoffeld 2 | 336,872 337,024 9,543 336,971 336,892 336,989 337,080 337,0 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Fercie, portable, J. M. Keller. 2 Fertilizer distributers, feed cup for, W. Marks. 2 Fertilizers, machine for disintegrating and drying, G. Mercer. 2 Fire kindler, Hammer & Gremer. 2 Fire kindler, Hammer & Gremer. 2 Fire service harness, R. Hudle. 2 Flood gate, W. Donnan. 2 Form, dress, J. Hall. 2 Game, A. O. Hall. 2 Game, A. O. Hall. 2 Gas regulator, Merritt & Ford. 2 Gas regulator, Merritt & Ford. 2 Grain drill. Elam & Boggs. 2 Grain drill. Elam & Boggs. 3 Grain drill cleaner, D. J. Shults. 2 Grate bar, Stevens & Borthwick. 3 Grate bar, C. W. Withenbury. 2 Griddle, cake, S. C. Schoffeld. 2 Grinding mill. T. Michaut. 2 Griddle, cake, S. C. Schoffeld. 2 Grinding mill. T. Michaut. 2 | 336,872 337,024 9,543 336,971 336,892 337,080 337,080 337,080 336,989 336,985 336,988 337,033 337,033 337,033 337,034 337,011 337,064 337,011 336,963 336,965 336,965 336,965 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Ferce, portable, J. M. Keller 2 Fertilizer distributers, feed cup for, W. Marks. 2 Fertilizers, machine for disintegrating and drying, G. Mercer. 2 Fire kindler, Hammer & Gremer 2 Fire service harness, R. Hudle. 3 Flood gate, W. Donnan. 2 Form, dress, J. Hall. 2 Game, A. O. Hall. 2 Game, A. O. Hall. 2 Gas regulator, Merritt & Ford. 2 Gas retort lid, W. J. Dooley, 2 Glove, O. Guittard. 2 Grain drill, Elam & Boggs. 2 Grain drill, Elam & Boggs. 2 Grain drill cleaner, D. J. Shults. 2 Grate bar, Stevens & Borthwick 2 Grate bar, C. W. Withenbury 2 Griddle, cake, S. C. Schofield. 2 Grinding mill, T. Michaut. 2 Halter, Mauk & Perry. 2 Harrow and cultivator frame, flexible, B. Ban- | 286,872 9,543 36,900 9,543 36,900 9,543 37,024 36,900 9,543 37,011 37,014 37,011 37,014 37,011 37,014 37,011 37,014 37,011 37,015 37,013 37,01 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Fercie, portable, J. M. Keller. 2 Fertilizer distributers, feed cup for, W. Marks. 2 Fertilizers, machine for disintegrating and drying, G. Mercer. 2 Fire kindler, Hammer & Gremer. 2 Fire kindler, Hammer & Gremer. 2 Fire service harness, R. Hudle. 2 Flood gate, W. Donnan. 2 Form, dress, J. Hall. 2 Game, A. O. Hall. 2 Game, A. O. Hall. 2 Gas regulator, Merritt & Ford. 2 Gas retort lid, W. J. Dooley, 2 Glove, O. Guittard 2 Grain drill, Elam & Boggs. 3 Grain drill, Elam & Boggs. 3 Grain drill cleaner, D. J. Shults. 2 Grate bar, Stevens & Borthwick 2 Grate bar, C. W. Withenbury. 3 Griddle, cake, S. C. Schoffeld. 3 Grinding mill, T. Michaut. 3 Halrow and cultivator frame, flexible, B. Bannister 3 | 283,872 2837,024 9,543 336,971 136,593 36,963 37,031 386,994 487,051 37,061 386,993 37,063 37,063 37,063 37,063 37,063 37,063 37,07,07,07,07,07,07,07,07,07,07,07,07,07 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Ferce, portable, J. M. Keller 2 Fertilizer distributers, feed cup for, W. Marks. 2 Fertilizers, machine for disintegrating and drying, G. Mercer. 2 Fire kindler, Hammer & Gremer 2 Fire service harness, R. Hudle 5 Flood gate, W. Donnan. 2 Form, dress, J. Hall. 2 Game, A. O. Hall 2 Game board, puzzle, C. J. Schumaker 2 Gas regulator, Merritt & Ford 2 Gas retort lid, W. J. Dooley, 2 Glove, O. Guittard 2 Grain drill, Elam & Boggs 2 Grain drill cleaner, D. J. Shutts. 2 Grate bar, Stevens & Borthwick 2 Grate bar, C. W. Withenbury 2 Gridelle, cake, S. C. Schofield 2 Grinding mill. T. Michaut 2 Halter, Mauk & Perry 2 Harrow and cultivator frame, flexible, B. Bannister 2 Harvester binder, S. D. Locke 3 Hat block and chuck, G. F. Larkin. 2 | 283,872 237,024 29,543 236,972 236,972 236,992 236,992 236,992 236,995 236,995 236,995 236,995 236,995 236,995 236,995 237,034 236,937,034 237,037 237 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Ferce, portable, C. M. Keller 2 Fertilizer distributers, feed cup for, W. Marks. 2 Fertilizers, machine for disintegrating and drying. G. Mercer. 2 Fire kindler, Hammer & Gremer 2 Fire service harness, R. Hudle. 2 Flood gate, W. Donnan. 2 Game, A. O. Hall. 2 Game, A. O. Hall. 2 Game, A. O. Hall. 2 Gas regulator, Merritt & Ford. 2 Gas reductor, Merritt & Ford. 2 Grain fill, Elam & Boggs. 2 Grain drill cleaner, D. J. Shults. 2 Graid drill, Elam & Boggs. 2 Graid drill, Elam & Boggs. 2 Graid drill, Elam & Boggs. 3 Grate bar, C. W. Withenbury. 3 Grate bar, C. W. Withenbury. 3 Griddle, cake, S. C. Schofield. 2 Griddle, cake, S. C. Schofield. 2 Halter, Mauk & Perry. 2 Halter, Mauk & Perry. 2 Harrow and cultivator frame, flexible, B. Bannister 1 Hat block and chuck, G. F. Larkin. 2 Hat block and chuck, G. F. Larkin. 2 Hat block and chuck, G. F. Larkin. 2 Hat pressing machine, Tyrrell & Kearns 2 | 283,872 237,024 29,543 236,971 236,893 237,080 237,080 237,080 237,080 237,080 237,080 237,080 237,081 237,083 237,083 237,083 237,083 237,083 237,093 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Ferce, portable, J. M. Keller 2 Fertilizer distributers, feed cup for, W. Marks. 2 Fertilizers, machine for disintegrating and drying, G. Mercer. 2 Fire kindler, Hammer & Gremer. 2 Fire kindler, Hammer & Gremer. 2 Fire service harness, R. Hudle. 3 Flood gate, W. Donnan. 2 Form, dress, J. Hall. 2 Game, A. O. Hall. 2 Game, A. O. Hall. 2 Gas regulator, Merritt & Ford. 2 Gas regulator, Merritt & Ford. 2 Gas retort lid, W. J. Dooley, 2 Glove, O. Guittard. 2 Grain binder, J. F. Steward. 2 Grain drill. Elam & Boggs. 2 Grain drill. Elam & Boggs. 2 Grain drill. Elam & Boggs. 2 Grate bar, Stevens & Borthwick. 3 Grate bar, C. W. Withenbury. 2 Gridele, cake, S. C. Schoßeld. 2 Grinding mill. T. Michaut. 2 Halter, Mauk & Perry. 2 Harrow and cultivator frame, flexible, B. Bannister. 2 Hat block and chuck, G. F. Larkin. 2 Hat pressing machine, Tyrrell & Kearns. 2 Hats, machine for finishing felt, House & Wheeler 2 Hats, machine for finishing felt, House & Wheeler 2 Hats, machine for finishing felt, House & Wheeler 2 Hats, machine for finishing felt, House & Wheeler 2 Hats, machine for finishing felt, House & Wheeler 2 Hats, machine for finishing felt, House & Wheeler 2 | 283,872 237,024 29,543 236,971 236,893 237,080 237,080 237,080 237,080 237,080 237,080 237,080 237,081 237,083 237,083 237,083 237,083 237,083 237,093 | |
| Fence barb former, wire, Pooler & Jones (r). Fence, portable, C. F. Bahnson 2 Fercie, portable, J. M. Keller. 2 Fertilizer distributers, feed cup for, W. Marks. 2 Fertilizers, machine for disintegrating and drying, G. Mercer. 2 Fire kindler, Hammer & Gremer. 2 Fire kindler, Hammer & Gremer. 2 Fire service harness, R. Hudle. 2 Flood gate, W. Donnan. 2 Form, dress, J. Hall. 2 Game, A. O. Hall. 2 Game, A. O. Hall. 2 Gas regulator, Merritt & Ford. 2 Gas regulator, Merritt & Ford. 2 Gas regulator, Merritt & Ford. 2 Grain drill. Elam & Boggs. 2 Grain drill. Elam & Boggs. 3 Grain drill. Elam & Boggs. 3 Grain drill cleaner, D. J. shults. 2 Grate bar, Stevens & Borthwick. 3 Grate bar, C. W. Withenbury. 3 Griddle, cake, S. C. Schoffeld. 2 Grinding mill. T. Michaut. 2 Halter, Mauk & Perry. 2 Harvow and cultivator frame, flexible, B. Bannister. 2 Harvester binder. S. D. Locke. 3 Hat block and chuck, G. F. Larkin. 2 Hat pressing machine, Tyrrell & Kearns. 2 Hats, machine for finishing felt, House & Wheeler 2 | 236,872 2,954,262,263,263,263,263,263,263,263,263,263 | 1 |

| 1. | |
|---|--------------------------------|
| Incubator heat regulator, F. Meyer | 237,035 |
| Ironing board, M. Miles Jewel setting tool, L. Schuler Journal box, J. H. Allen | 237,052 |
| Journal box, lubricating, G. W. Fisher | 236,882 |
| Knitting and other light machines by power, driing, W. H. Caswell | 236,932 |
| Lamp, J. M. Dexter | 236,996 |
| Latch, T. Kirwan | 236,895 |
| Lighting and extinguishing device, W.D.Doremu Liquid cooler, M. F. Capps | |
| Loom, Crompton & Wyman Loom, Dawsen, Myers, & Smith | 236,990 |
| Metal shaping machine, W. H. H. Sisum | 237,059 |
| Miter machine, J. R. Bodeli | ., 236,978 9• |
| versing, C. M. Fairbanks | 236,941 |
| Nail plate feeder, E. C. Taylor | 236,966 |
| Needle polishing machine, V. Milward Optometer, F. Scharpf | |
| Packing, piston, J. L. Collyer. | 286,987 |
| Paint mills, apparatus for feeding, H. Meinsen. | 237,033 |
| Paint, mineral, D. E. Goodell Pants, S. C. Ferriss | |
| | . 236,951 |
| regulator for, R. Hutton | . 237,021 |
| Paper machines, wire cover for rolls of, C. B. Ric Pen, fountain, J. S. Purdy | |
| Pen, stylographic fountain, C. H. Downes | . 236,877 |
| Pencil, B. A. Fiske | . 236,959 |
| Photographic camera, J. Suder | 236,916 236,957 |
| Planter and cultivator, comb'd corn, J. C. Sebrin | g 236,914 |
| Planter, hand corn, W. L. Sebring Plow, J. Finnegan | . 236,881 |
| Plow carriage, O. E. Goodell | . 237,01 0 . 236,907 |
| Plows, revolving harrow attachment for, Ker | 1 - |
| nedy, Preston, Morand, & Kennedy Printing press, J. Till | 237,067 |
| Pump, W. S. Laney | 237,029 |
| Pump, force, P. Breidenbach | 236,930 |
| Punching device, G. E. Nuebling | |
| Railway chair and splice bar, Fox & Burgett Razor guard, P. L. Fontaine | |
| Refrigerating butter box, Mosler & Ladewig | . 236,906 |
| Rock drill bar, H. W. Hammond | |
| Rowing apparatus, boat, E. Heyde | . 237,019 |
| Saddle, harness, Glover & Smith | |
| Salt purifying apparatus, J. H. Duncan Sample exhibiting stand, W. P. Yeoman | . 236,878 . 286,969 |
| Saw, C. H. Douglas | . 236,876 |
| Saw handle, J. R. Woodrough | . 236,968 |
| Saw set, A. Rush | . 237,049 |
| Scarf ring, B. F. Brown | . 236,874 |
| Screw driver, N. Stow | |
| Sewer trap, H. Textor | |
| Sewing machine, J. F. & W. F. Webster | . 237,070 |
| Smoke consuming furnace, C. Smith | |
| W. Wright Soldering iron, C. E. Ball | |
| Sole and welt trimmer, F. A. Dunham | 237,000 |
| Sole trimming knife, W. R. Barton | 9.545 |
| Spinning machine flier, J. F. Foss | |
| Stamp, canceling, L. Tilton | 237,068 |
| Station indicator, automatic, H. E. Bissell | . 236,977 |
| Steam engine, I. F. Davis | . 236,875 . 236,920 |
| Stirrup, I. Hillen | 237.082 |
| Stove, S. Shepard | 236,921 |
| Stovepipe thimble and cover, M. B. Scribner Tag, A. N. Clark | 236,912 |
| Tanning compound, J. Foley | 237,007 |
| Tea and coffee pot, J. B. Daniel Teeth, treating, P. A. Pulmer | 237,043 |
| Telephonic receiving apparatus, C. A. Randall Tire tightener, J. R. Bell | |
| Tool handle, I. W. Heysinger | 236.890 |
| Tool or implement, hand, E. T. Starr | |
| Truss, L. Westinghouse | |
| Undervest, J. L. Copp | 236,989 |
| Vaginal dilating pipe, N. Mayer Valve, balanced slide, J. B. Matthews | 236,901 |
| Valve, check, F. Lunkenheimer Vegetables and fruit, apparatus for and process | |
| of drying, A. J. Emery | 237,003 |
| Vehicle spring, E. J. MooreVehicle spring, H. G. Steenburgh | 236,917 |
| Vehicle spring, J. Tilton (r) | 9,542 236,927 |
| Watch case opener, Heyse & Tuerlingx Watch key, A. N. Clark | 236,948 |
| Water closet, H. C. Meyer | 237,036 |
| Water closet, C. H. Moore | 237.060 |
| Whiffletree and double tree, R. W. Davis Wind motor, turbine, M. De La Torre | 336,993 |
| Windows, dust and wind guard for, R. M. Brun- | |
| dige Wood bending machine, E. L. Buckingham | |
| Wood borders, making, G. C. Setchell | 236,980 |
| —————————————————————————————————————— | 236,980 |
| DESIGNS. | 236,980 237.054 |
| | 236,980 237.054 |
| DESIGNS. | 236,980 237.054 |

English Patents Issued to Americans.

From January 21 to January 25, 1881, inclusive Axle bearings, J. E. Maynadier, Boston, Mass. Feed water heaters, J. H. Dane, San Francisco, Cal. Ice machine, A. J. Rossi et al., New York city. India.rubber waste, restoration of, H. A. Clark, Boston,

Lawn mowers, Lloyd, Supplee & Walton, Phila., Pa. Ore separator. J. F. Halbrook et al., Palmer, Mas Vinegar, manuf. of, O. F. Boomer et al., Brooklyn, N. Y.