Business and Lersonal.

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. Godfrey & 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 Haven, Conn.

Presses, Dies, and Tools for working Sheet Metals, etc. Fruitand other Can Tools. E.W. Bliss, successor to Biss & 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 !!ammers. 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 machinist, 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 Scroll 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 Valves and 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, 1'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 Industria! Processes. Park Benjamin's Expert Office. 50 Astor House, N. Y. For the best Stave. Barrel. Keg. and Hoeshead Ma-

chinery, address H. A. Crossley, Cleveland, Ohio.

National Steel Tube Cleaner for boiler tubes. Adjustable, durable. Chalmers-Spence Co., 40 John St., N. Y.

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. Forepaugh, Jr., & Bros., 531 Jefferson St., Philadelpbia, 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 enterpolic course.

Wright's Patent Steam Engine, with automatic cut off. 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 in Steam Engineering, and a good situation when competent. Sendfor pamphlet.

Nickel Pating.—Sole manufacturers cast nickel anodes, pure nickel salts, importers Vienna lime, crocus, etc. Condit. Hanson & Van Winkle, Newark, N. J., and 32 and 34 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. Cylinders, all sizes, bored out in present positions.

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

and Hangers. I. S. Graves & Son, Rochester, N. Y. For Heavy Punches, etc., see illustrated advertisement 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 purposes Greene, Tweed & Co., 118 Chambers St., New York.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsvifle, Pa. See p.125. For best low price Planer and Matcher, and latest improved Sash, Door, and Blini 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 \$59. 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 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 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 cementthat will cement cloth or felt to iron? A. See marine glues, page 2510, No. 158, SCIENTIFIC AMERICAN SUPPLEMENT.

(4) G. F. H. asks: How can I drill a one-sixteenth 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 thinnin printer's inks, both common and fine inks? A. Printer's varnish, or a thinner printer's ink. The varnish is prepared by inflaming boiling 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 bought at 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 engines 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 lay across 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 burn rapidly.

(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 firnace coal? A. It depends upon the prices of the different kinds of coal in your market; but as 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 giver quantity of water determined: 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 *omake it suitable for raising steam? A. Consult our advertisit: 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 pressure

(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 water, and stop the leak? A. See the thirtieth cement in the list, page 2516, No. 158, SCIENTIFIO 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 so-called meerschaum in the market is manufactured—not 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 the boiler.

(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 passengertrains 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 line from Jersey City to Buffalo.

(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 inchship 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 1½ 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, February 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 ungalvanized.]

(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 1½x4 inch, exhaust 2¼x4 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? A. Your openings are rather small. Valve should have 3 inch travel, 1½ 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-