Business and **Personal**.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line.

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45 Cortlandt St., N. Y. Erie City Iron Works, Erie, Pa. Gold after crushed, separately. Joshua Limestonebeing divided Address Davis ville, Pa. ore

Boilers & Engines cheap. Lovegrove & Co., Phila., Pa. Alcott's Turbine received the Centennial Medal.

Vertical Scientific Grain Mills, A.W.Straub & Co., Phila. 35 ft. Bement & Son Lathe; 3 ft. over bed; turns 16

ft.; self-actingcarriage. F. M. Swegan, 287 Water St. \$8.-Morton's Number One Scroll Saw; stand, treadle motion, bevel table, etc. Send for circular. J.D.Foot,

22 Platt St., N. Y. Colorless Lacquer, H. H. Hempler, Washington, D.C. Wanted.-Hydraulic Pump, duplex or single, fill a cylinder 15 in. diameter, 20ft. a minute, 500 lbs. pressure. Hinckley, 321 Dartmouth St., Boston, Mass.

For Sale.-Patent on an article of general utility; original and attractive. Box 539, Pittsburgh, Pa.

Wanted.-Addresses of Lamp Burner and Camp Chair Manufacturers. C. M. Lungren, 708 Lexington St., Baltimore, Md.

For Small Engine Castings, address ঝ. D. Rich, 123 Exchange Place, Philadelphia, Pa.

Union Eyelet Company, Providence, R. L, Manufac. turers of Patented Novelties

small capital to invest in a good business. For particulars, apply to or address W. B. McKeldin, Athens, E. $\frac{1}{2}$ Tenn.

An American gentleman, established over 18 years in Paris, wishes to develop in Europe some American patent or special industry. Best references given and required. Address J. Getz, 5 Petit Carreau Paris, France

Foundry and Machine Shop for sale Now running and in good order. For particulars address Cofran & Bromich, Topeka, Kansas.

Wanted.-2dhand Fan for Cupola, E.L.Black, Gann, O. Entire outfit of Nail Mill, 4, 6, 8, and 10 p., costing over \$3,000, we offer for \$650 to close an account. Apply quick, must be sold. Forsaith & Co., Manchester, N. H.

 $\mathbf{ImprovedWood}\textbf{-}\mathbf{workingMachinery\ made\ by\ Walker}$ Bros., 73 and 75 Laurel St., Philadelphia, Pa.

Skinner Portable Engine Improved, 21-2 to 10 H. P. Skinner & Wood, Erie, Pa.

Self-Feeding Upright Drilling Machine, of superior construction; drills holes from ½ to ¾ inch in diam-eter. Pratt & Whitney Company, Hartford, Conn.

Lansdell's Steam Siphon pumps sandy and gritty water as easily as clean. Leng & Ogden, 212 Pearl St., N.Y.

Machine Cut Brass Gear Wheels for Models, etc. (New List.) D. Gilbert & Son., 212 Chester St., Phila., Pa. Mill Stone Dressing Diamonds. Simple, effective, and

durable. J. Dickinson, 64 Nassau St., N. Y. Bolt Forging Machine & Power Hammers a specialty.

Send for circulars. Forsaith & Co., Manchester, N. H. More than twelve thousand crank shafts made by

Chester SteelCastings Co. now running; ⁸ years' constant use proves them stronger and more durable than wrought iron. See advertisement, page 206.

Galvanized Iron Cornice Machines,-The most Improved, Straight and Circular. Prices reduced. Calvin Carr, Cleveland, O., & Hewes Machine Wks., Newark, N.J. a battery of 50 Grove's cells. 2. Of what should the

For the best Bone Mill and Mineral Crushing Machines—five sizes, great variety of work—address Baugh & Sons, Philadelphia, Pa.

Best Turbine Water Wheel, Alcott's, Mt. Holly, N. J.

Wanted.-A first-class business man with \$10,000 to invest, and capable of assuming the general management of a Machine Shop and Foundry in Western Can ada. Shop now in operation; connections first-class; and security unquestionable. F.W.Glen, Oshawa, Ontario.

For Town and Village use, comb'd Hand Fire Engine & Hose Carriage, \$350. Forsaith & Co., Manchester, N.H.

The Cameron Steam Pump mounted in Phosphor Bronze is an indestructible machine. See ad. back page. Friction Clutches warranted to drive Circular Log Saws direct on the arbor; Upright Mill Spindles, which

can be stopped instantly; Safety Elevators, and Hoisting Machinery. D. Frisbie & Co., New Haven, Conn. Sperm Oil, Pure. Wm. F. Nye, New Bedford, Mass.

For Solid Wrought Iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Walrath's Improved Portable Engines best in market; 3 to 8 H. P. Peter Walrath, Chittenango, N. Y.



a oles & 3 meries

J. D.-You do not send sufficient data, but you can readily make the calculation for yourself, on Portable and Stationary Engines; Boilers of all kinds; the supposition that you will have to supply about 450 cubic feet of water per minute.-E. M.-We do not recommend special manufactures in these columns.-M. & Co.-Ashes will answer quite well.-J. S.-Consult Percy's "Refractory Materials and Fuel," and Svede-lius" "Handbook for Charcoal Burners."—B. L. D.-Wrought iron weighs about 480 lbs. per cubic foot. From this you can make your calculations.—A. C. G. See SCIENTIFIC AMERICAN, vol. 36, p. 203, and p. 155 (25), March 9, 1878.—A.L. -- See SCIENTIFIC AMERICAN, November 10, 1877, p. 299 (S).-W. K. L.-See Scienti-FIG AMERICAN, March 2, p. 139 (23).—A. S.—See SCIEN-TIFIG AMERICAN, March 16, 1878, p. 171.—W. H. A.—It would depend upon the system adopted, and the special circumstances of the case. You should refer the mat-ter to an engineer.—J. R.—See SCIENTIFIC AMERICAN, pp. 33 and 225, vol. 33 .- R. K. S.-See Scientific Am-ERICAN December 27, 1873. You will also find a good method described in Trautwine's "Engineer's Pocket Book."-C. H. M.-The perpetual motion machine described by you has been tried many times with numerous variations; and, it is unnecessary to add, with equal want of success. Consult Dircks' "Perpetuum Mobile."-J. G.-See description of leaching process in Percy's "Metallurgy."-P. P.-Address the inspector of your district. He will furnish information regarding qualifications necessary for obtaining a license. --M. & Co.--There have been many boilers set in the A rare opportunity for a Moulder or Machinist with a manner described, and operated successfully when the draught was not violently forced.-S. R.L.-See p. 698, SUPPLEMENT, October 28, 1876.-L. D.-See answerNo. 45, p. 268, of Scientific American of October 27, 1877. -W. S.-There is a difference between the instrument described and that to which you refer.— F. W.—Sample of oil not received .- B. G. N.-See SCIENTIFIC AMERI-CAN of August 23, 1873 .- C. R. - You will find a good $p_{\rm i}$,ia, and for fuller information you may consult Dussauce's " Treatise on Tanning."

(1) J. H. asks: 1. How may sulphuric acid be detected in vinegar? A. Add to a sample of the suspected vinegar a solution of barium chloride (in dis-tilled or rain water); if a white precipitate forms, which does not redissolve on addition of strong nitric or hydrochloric acid, sulphuric acid is present. It is better to evaporate the sample of vinegar to be tested | nearly to dryness in a clean porcelain dish, and to pour the concentrated fluid into a test tube partially filled with the solution of the barium salt. 2. How is the strength of vinegar commercially determined, and what is meant by "proof," "overproof," etc.? A. A sample of the vinegar is saturated, by agitation, with pure slaked lime, the clear liquor filtered off, and tested with an acetometer, an instrument resembling the hydrometer; sold with instructions by dealers in philosolized sodium carbonate.

What is the quicksilver alloy used on mirrors? An amalgam of mercury and tin.

(2) J. D. C. writes: I have a 5-cell Daniell carpet points for giving off light be made, so as not to be consumed too rapidly? A. Make carbon points of a 1/4 inch square strip or pencil of gas retort carbon, which you may procure at the works where illuminating gas is manufactured.

(3) J. D. writes: I consume an immense 800 tons, but at least one half the coal sold me is dust, which finds its way through the grate bars. 1. How could I burn the dust and not expose myself to such a loss? A. See p. 1295 of SUPPLEMENT, No. 82, vol. 4. 2. of crank, the piston is at a distance from mid-stroke Which is the best and cheapest coal for producing steam? A. Anthracite nut coal is generally preferred if the boilers are large enough to supply abundant steam for the work to be done.

What is the weight of a gallon of cane juice at 10° density of Baumé? A. 10.28 (or 103's) lbs, avoirdupois at 62° Fah.

(4) L. G. asks: Do the engines on the Pennsylvania Railroad fill their tanks while running, without stopping for water? They did in 1876; do they at present? A. The engines drawing some of the trains do.

(5) C. W. B. asks: Can an engine supply For book on Lubricants, R. J.Chard, 134 M.Lane, N.Y. itself with air sufficient to run it by the use of leverage and by letting the exhaust air back into the air pump ers of Burr Mill Stones and Flour Mill Machinery of all How much surplus power can be obtained? The leverkinds, and dealers in Dufour & Co's Bolting Cloth, age may be any practical length from the engine to the air pump. A. As we understand your meaning, we think not.

knowit. A. Dr. Young, adopting apparently the no- | theory of travelers is that the Jordan always disvision, regarded it as the simplest explanation of this Plain" were situated on the southern border of the defect to suppose that those fibers of the retina which sea. Some suppose that the Jordan at one time flowed are calculated to perceive red are absent or paralyzed. | into the Red Sea, and that its course was depressed The followers of Gall and Spurzheim maintain that the faculty of distinguishing colors does not depend on the eye, but on a particular part of the brain, to which they give the name of the organ of color, and that the defect lies in this organ and not in the eye. On whatever cause a partial or complete insensibility to color depends, it is a state of vision for which there seems to be slight means of cure. Consult McKenzie "On the Eye," and p. 368, vol. 35, SCIENTIFIC AMERICAN.

(8) J. H. B. writes: 1. I have a relay with two spools 11/2 by 31/2 inches. If I should unwind them and rewind the wire on spools 13% to 2 inches long using all of the wire, would there be any difference in the sound? Would the short spools produce a heavier sound, or would they be the same as the longer ones? A. The difference in the sound produced by the alteration you mention would be slight. See answer No. 4, p. 155, SCIENTIFIC AMERICAN, March 9, 1878. 2. Would a relay with three or four spools produce a louder sound than one of two spools? A. That would depend on the relative resistance of the battery; and the wire used in the relay.

Please give me a recipe for a cheap varnish for brass steam throttles? A. Use a thin solution of shellac in alcohol

(9) H. M. writes: I have a magnetic machine, intended for medical purposes, which I wish to adapt to making electrotypes. Will it answer? A. Your instrument produces an intense current of electricity, such as will produce physiological effects, as shocks, etc; electro-plating is best performed with a quantity current of low intensity. Although it is possible to produce an electrotype with the instrument, other end, if the weight of the hand stick is disreyou would find it more convenient to use a battery.

Which is the front end of a steam engine? In books I find it always given as the end farthest from the crank, while in practice I invariably find it called the end through which the piston rod passes. A. This is summary of the art of tanning in the American Cyclo- simply a technicality, and depends somewhat on the style of engine. If youregard as correct the latter interpretation which you mention, it would not generally apply to locomotive engines.

> (10) W. G. L. asks: How can I polish a cow's horn by hand? I wish to polish a handsome horn without using wheels or machinery of any kind. A. We think you can polish it by careful scraping with the edge of a piece of broken glass, and then rubbing it with some smooth, hard substance.

a lime kiln on a small scale, in which to burn oyster shells. Will some of our correspondents enlighten him?

(12) H. W. B. asks: 1. What size wire is best for connecting telephones? Will No. 40 insulated answer? A. No. 40 wire will answer for very short circuits, but it is easily broken; for house service use drometer; sout with instructions by dealers in philoso-phical instruments. Proof vinegar contains 5 per cent about No. 19 copper wire insulated with cotton, and of aceticacid, and will saturate 14% grains of crystal-soaked in paraffin. 2. How should connecting wire be put up from one room to auother (in the same house) so as to be as little visible as possible? A. The wire may be laid in the recesses or grooves of the base board moulding, or tucked under the edge of the

number of revolutions of the pump per minute, divide using the water over several times. The water is neartwice the number of cubic feet to be removed per min- ly boiling hot when thrown into the boiler. An examiute by the speed of the pump piston in feet per min-ute. The quotient will be the area of the piston. 2. What is the rule for finding the capacity of condensers for simple and compound engines? A. A common amount of coal every crop at my sugar estate, nearly is the rule for finding the position of the piston in the cylinder, when the crank is at half stroke, for different strokes and different lengths of connecting rod? A. If to examine. c is the length of the connecting rod, and r the length equal to $c - \sqrt{c^2 - r^2}$).

> has an engine having a 6 x 9 inch cylinder, running 300 revolutions per minute, using 200 lbs. steam to the square inch, cut off half way? A. You might get between 40 and 45 effective horse power, if the engine is well designed and built.

> over again without mechanical force of any kind, something on the plan of the siphon. A. We doubt whether anything of the kind has been or ever will be designed.

tion of Darwin, that the retina is active, not passive, in charged into the Dead Sea, and that the " Cities of the into a deeper valley by a geological change.

(20) J. H. R. asks: Will it do to use the Bell telephone in circuit with the Morse telegraph? A. Yes; but if the magnet wire of the telephone is very fine and has great resistance, it should be connected so as to be in a partial or split circuit with the main line. See answer No. 19, p. 155, SCIENTIFIC AMERICAN of March 9, 1878.

(21) V. & G. write: Our grate bars are 16 inches below our boiler. Would we gain anything by raising them? We burn slack (soft) coal. A. No.

(22) C. S. M. writes: If I wish to ascertain the exact amount of rain which falls on a certain spot, say on a steep hillside, should the top of the gauge be horizontal, or should it incline as the hillside does? A. Horizontal, generally.

(23) J. F. W. writes: When a locomotive is drifting backward and you throw the reverse bar forward, it will fly back if not secured in the quadrant. Where does it get its leverage from? A. If the action occurs, it is due to the compression in the cylinders.

(24) F. S. L. writes: A vessel is going at a certain speed, and it is desired to double its speed. How much more power must be used? A. The exact ratio is not known. By the common rule it would take about 8 times the power.

(25) W. F. U. asks: If three men are to carry a 30 foot iron rail, where must the hand stick be placed so that each man will have an equal load, one man being placed at one end? A. 7% feet from the garded.

(26) F. V. C. asks: Can a steamboat ascend as steep a grade as a locomotive drawing a train of cars, and what is the steepest practicable grade a steamboat can ascend and descend, the water being, say, 2 feet deep? A. The locomotive would have the advantage over the steamer. If you find the velocity of the water in the rapid to be 20 miles an hour, the speed of the boat, to be able to ascend, must be something more than this, and the practical limits are determined by the possible speed of the steamer.

(27) A. M. A. writes: One night I left a pail of water on a stone well box. The next morning I found it frozen over, and in the center was a spike of ice about 6 inches long and sharp at the top. What (11) C. B. desires instructions for making was the cause? A. Without knowing all the circumstances, we may not be able to explain the matter correctly, but we presume it was due to the expansion in freezing, if there were no outside interference. Perhaps other readers have observed similar phenomena on which they have reasoned. If so, we would be glad to hear from them.

(28) J.W.K.writes: We have a 3 horse power engine and boiler, fedfrom a tank which holds about five barrels, lined throughout with zinc, and made steam tight by soldering all joints. The tank has been in use 10 months. We use softwaterfrom a tin roof painted with yellow ocher. The exhaust is blown directly into the tank at one end, and passes (2) J. D. U. WITTES. I have us over a line of the current be utilized (13) S. R. asks: 1. What is the rule for not condense is carried on through a large on over a battery for illuminating purposes, and how? A. Your battery finding the capacity of air pumps for jet and surface over the produce an electric light condensers? A. Having fixed the length of stroke and strange over several times. The water is nearnation shows the zinc around the top of the tank and near the exhaust pipe to be badly corroded and crumbled. (Sample inclosed.) Will the water that has been in contact with this corroded zinc damage practice is to make the cooling surface from two thirds the boiler; and, if so, what will be the effect? A. We to three quarters the boiler heating surface. 3. What do not think the boiler will be injured by the zinc; but from the sample sent we are inclined to think that scale may be deposited in the boiler. It would be well

> (29) W. B. asks: Does soda ash prevent scale from forming in boilers? Will it cause foaming? Is it in jurious to the boiler? A. It has been recommended (14) W. T. H. asks: What horse power for preventing scale, and does not generally cause any inconvenience or injury.

(30) W. H. A. writes: A metallic pipe is standing vertically, supported so that the lower end is free from the ground. At the lower end is a valve which opens downward. The area of valve surface is (15) J. D. B. O. writes: Please give me a ⁵ inches. Air is excluded from the pipe. What depth plan for a small fountain having a perpendicular jet, of water in the pipe will open the valve, the pipe being which will supply itself from the same water over and so long as to permit a vacuum to be formed above the over again without mechanical force of any kind, water? A. The height of the column of water will be about35 feet.

(31) F. B. S. asks: 1. Would it injure the (16) W. J. writes: Wishing to tin some ladle or iron box in a common coal fire; that is, where the coal contains sulphur? Should the ladle or box be covered? A. It would be better to cover the tools with charcoal to prevent decarbonization. 2. How are small tools usually heated for hardening? A. In a charcoal or coal fire in which the gas is burnt out of the coal. The most recent practice for a quantity of tools is to heat in a fluxof one half salt and one half potassium cyanide. (32) P. M. asks: What is the difference in power between running a 60 saw cotton gin with 80 feet of shafting, and with a 42 foot belt from the engine is to the pressure produced, as the distance traveled pulley-with the proper shafting and pulleys in the two cases? A. As we understand the question, we do not think there will be much difference.

John T. Nove & Son, Buffalo, N. Y., are Manufactur-Send for large illustrated catalogue.

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Solid Emery Vulcanite Wheels-The Solid Original Emery Wheel - other kinds imitations and inferior. Caution.-Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. New York Belting and Pack-The best is the cheapest. ing Company, 37 and 38 Park Row, N. Y.

1,000 2d hand machines for sale. Send stamp for descriptive price list. Forsaith & Co., Manchester, N. H.

Steel Castings from one lb. to five thousand lbs. Invaluable for strength and durability. Circulars free. Pittsburgh Steel Casting Co., Pittsburgh, Pa.

For Best Presses, Dies, and Fruit Can Tools, Bliss & Williams, cor. of Plymouth and Jay Sts., Brooklyn, N.Y.

Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Polishing and Buffing metals. E. Lyon & Co., 470 Grand St., N. Y

Wanted.-Second-hand Gun Stocking, and other Gun Machinery. Address V. A. King, Lock Box 81, New Haven, Conn.

For Power&Economy, Alcott's Turbine, Mt.Holly, N.J.

(6) P. R. asks for a recipe for making a glue to be used on damp wood. A. 1. Hamelin's cement: Soak pure glue in water until it is soft; then dissolve it in the smallest possible amount of proof spirit by the aid of a gentle heat. In 2 ozs. of this mixture dissolve 10grains of gumammoniacum, and whilestill liquid add half a drachm of mastic dissolved in 3 drachms of rectified spirit. Stir well and keep the cement liquefied in a covered vessel over a hot water bath. It is essentiall? a solution of glue in mastic varnish. 2. Shellac, 4 ozs., borax, 1 oz.; boil in a little water until dissolved, and concentrate by heat to a paste.

(7) W.S. J. asks: What is the cause of color blindness, and is there any cure forit? I cannot see red apples on a tree at a little distance, the red and green looking just the same. A red light or red flag never attracts my notice, though a blue flag or light instantly does. I can see but three colors in the rain-

1/2 inch round iron hooks, I pickled them for 24 hours in a strong sulphuric acid and water mixture, without success in removing the scale. It costs too much to scour them by hand. What can be done? A. It is doubtful if you can clean them sufficiently without scouring. Mechanical scourers can be used, however. (17) L. C. S. writes: I have a common tobacco press, and desire to know the amount of pressure I obtain by pushing 100 lbs. on the end of a 9 foot lever, the screw being 4 inches in diameter, with 1/4 inch threads. A. Neglecting friction, the force applied where the pressure is applied is to the distance traveled by the force in the same time.

(18) L. A. W. asks: Can a spiral spring, made of good steel wire, be tempered so that it will retain its elasticity when subjected to constant bard usage? A. All spiral springs are apt to set in course of time. For mode of tempering, see SUPPLEMENT, Nos. 95 and 103.

(33) J. F. W. writes: I have been firing a locomotive engine about a year, and never had any trouble in keeping steam up to the standard until within the last three months. The engine is cared for precisely as before, I use the same kind of coal, and I cannot see any difference in the way the fire burns. What is the difficulty? A. It may be caused by incrus-

(19) S. B. G. asks: Where did the river tations on the heating surfaces, which prevent the bow, and always call light brown or buff, green. If Jordan discharge its waters, before Sodom and Gomor- transmission of heat to the water to a considerable exthere is any remedy for the disease I should be glad to rah were destroyed? A. The most generally accepted tent. From your account this seems probable.

(34) E. H. R. suggests that if J. D. B. (p. 155, current volume) should make his elevator pit of cast iron, the trouble about leakage would be ended.

(35) A. W. asks: How can green cherry lumber be seasoned without checking? A. If it is sea soned by immersion in water, the difficulty you speak of will probably be avoided. Some of the patented processes of seasoning may perhaps be applied to advantage.

(36) J. W. writes: Am I right in understanding that bearings should always be softer than the spindles which run in them? Is that only necessary in case of the oil being forced out? I use hardened steel much carbonaceous matter, iron, and alkaline earths, spindles running in Babbitt boxes (woodworking ma- which renders it quite fusible. It may be used with chinery). As I use refined blacklead and oil as a lubricant, which does not answer so well with soft metals, I some decorative purposes. No. 2. Clay containing much am desirous of employing iron or steel in future for bearings. What kind of iron or steel should I use for in brickmaking. No. 3. Similar to No. 2. If washed this purpose? A. The condition you lay down is by no it might perhaps be used by paper makers. No. 4. means a necessary one. Cast iron makes a good bearing if plenty of surface is exposed to the pressure.

(37) J. S. S. writes: 1. I have a 10½ x 36 engine with a 10 foot fly wheel; boiler 3 feet diameter and 10 feet long, with 30 flues of 3 inches inside diameter. With this, how much Alabama pine ought I to saw in 10 hours? A. With a first class saw milt you might cut from 8,000 to 10,000 feet of inch boards if the logs are of good size. 2. How much corn ought I to grind in 10 hours with wood fuel, and 3/2. oot Esopus stones? A. When the millstones are sharp you should grind from 12 to 15 bushels of corn per hour.

(38) G. S. writes: 1. I wish to put up some telegraph wire. Will common unannealed wire do, or will it have a tendency to act as a permanent magnet? A. It will do. We have not heard of its having a noticeable tendency to act in the way you mention. 2. Would not a 10 gallon jar, with zinc and copper to correspond, give as much electricity as 10 one gallon cells? A. It would be aps to give a greater quantity of electricity, but the tension of the electricity, or its ability to overcome resistance, would be nearly $\frac{1}{10}$ of the tension of electricity produced by the battery formed of 10 one gallon jars.

(39) T. C. wishes to stretch a 1 inch iron wire rope a distance of 400 feet, allowing but 10 feet sag in the middle, and carrying on the rope a weight of from 1,500 to 1,800 lbs. With these conditions he desires to know what will be the strain on the rope. A. According to Mr. Trautwine's tables, the strain = 503 \times (weight of rope+suspended weight).

(40) E. M. asks: What is the best material for a flat roof for a machine shop and foundry? A. Tin will answer very well. Corrugated iron and various patented materials are also frequently used.

(41) W. C. asks: 1. How are ocean cables repaired? A. The ends are hanled up and united. 2. Has a diverever been to the bottom of the ocean? A. We are not aware of any diver having reached a depth of over 170 feet.

(42) C. E. S. asks: 1. In making an Æolian harp, what kind of strings is preferable catgut orwire? A. Ordinary violin or guitar strings answer very well. 2. How many strings are used? A. There is no partic ular limit to the number.

(43) M. J. C. writes: Please explain to me the difference between brace, stay, and gusset, and also what is meant by crow-foot? A. A brace supports parts in compression, and a stay, parts in tension. A gusset is an angle piece in a structure, used to stiffen it, and a crow-foot is a casting with three or more feet, used to secure from the outside, covers to holes that bear on the inside of a plate.

(44) H. N. L. asks: How much counterbalance must be put in a crank arm to make an engine run without vibration? A. The vibration cannot be prevented under all circumstances. You will find the principles of counterbalancing clearly laid down in Ran

toso dril economical that its use is advisable, unless there is some other special reason for heating by gas. In case gas is used, some one of the patent heaters in the mar ket might be applied to advantage.

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

J. H. P.-The fragment contains a little copper blende, pyrites, and lead sulphide.-A. R. B.-It is a crystal of smoky quartz, the angles of which have been rounded by attrition.-D. N. LaB.-It is fine asbestos, of some value.-C. W. S. T.-No. 1. Clay containing which renders it quite fusible. It may be used with other clays for earthenware, etc., and (pressed) for sand. Tempered with other clay it might be employed Clay slate. No. 5. An ocherous clay, suitable for a cheap pigment if burned and ground. No. 6. Sandstone. No. 7. It is a valuable copper ore-chalcopy-rite, etc. Nos. 8 and 9 are chalcedony, of some value. No. 10 is barytes-sulphate of baryta-of good quality.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure the receipt of original papers and contributions on the following subjects:

Telephonic Phenomena. By W. E. G. A Brilliant Meteor. By G. W. S. Snake Cannibalism. ByH. R. H. and D. L. Power Required for Velocipedes. By E. B. C. and G. F. S. Nickel Plating. By W. H. F. Darwinian Theory. By E. S. M. Treatment of Inebriates. By T. P. P. Perpetual Motion. By E. R. M. Calculation of Horse Power. By T. J. L. A Leech Barometer. By E. S. C.

HINTS TO CORRESPONDENTS.

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 thepage, or the number of the question.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Inquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all: but we generally take pleas ure in answering briefly by mail, if the writer's address is given.

OFFICIAL.

INDEX OF INVENTIONS FOR WHICH

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

February 19, 1878, AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list. including both the specifications and drawings, 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.

Rankine's "Machinery and Millwork."	Annunciator, electric, T. L. Reed 200,569	Paddlewheel, L. Shook 200,577	Copyrights, Designs, Patents, Appeals, Reissues, In-
(15) T W W asks: 1 Is it practicable to	Axle box, A. A. Freeman 200,385	Paddlewheel, W. C. Smalstig 200,578	fringements, Assignments, Rejected Cases, Hints on
(40) 1. W. W. asks. I. Is it placticable to	Axle box, J. Stephenson (r)8,084, 8,085, 8,086, 8,087	Paging machine, E. Gorenfio 200,527	the Sale of Patents, etc.
grind common oats into meal or nour suitable for bread	Axle sleeve, J. Dickens 203,519	Paper pulp machine, W. W. D. Jeffers 200,540	Foreign PatentsWe also send, free of charge, a
on an ordinary country mill? A. They must first be	Bale tie, J. R. Blossom 200,428	Pen, drawing, R. 1. Walter 200,588	Synopsis of Foreign Patent Laws, showing the cost and
kiln-dried. 2. What is the best dress for 30 inch granite	Bale tie, J. J. Hagins (r) 8,094	Phonograph or speaking machine, T. A. Edison. 20,521	method of securing patents in all the principal coun-
stones, which are intended to grind wheat and corn?	Bale tie, W. E. Borst 200,371	Pillow, H. J. Buell	tries of the world. American inventors should bear in
A. Furrows of moderate depth.	Ballot box, M. D. Williams	Picture arbititor I C Kach	mind that, as a general rule, any invention that is valu-
(AG) St. C. askar 1. What thickness of steel	Barrel, J. D. McEachren	Pitman connection P M Lamson 200,460	able to the patentee in this country is worth equally as
(40) St. C. asks: I. What thickness of steel	Bed boltoni, E. A. Jenery 200,597 Bedstead ashinot I C & I W Enspr	Planter H Timmersmann 900.415	much in England and some other foreign countries
is necessary to resist a bullet fired from an army re-	Bedstead, cabinet, J. G. & J. W. Khapp 200,401	Planter ate R R Werner 900,500	Five patents_embracing Canadian English German
volver? A. We think a plate from one eighth to three	Bee feeding device E Carter 200,545	Planter L. J. Corbin (\mathbf{r}) 8089	Fronch and Balgian-will scaure to an inventor the av-
sixteenths inch thick will answer. 2. Which of the met-	Belting W H Curtiss 200,500	Planter, check row attachment, E. W.Ouincy 200.407	alusive monopoly to his discovery among about over
als, steel or iron, presents the strongest resistance to	Binder H E Thompson Jr 200,488	Plow, W. S. Moon	clusive monopoly to his discovery among about one
leaden balls? A. Steel, generally. 3. Would a plate	Bleacher and dver squeezing machine, W. Birch. 200.427	Plow, J. H. Riggan	HUNDRED AND FIFTY MILLIONS OF the most intempent
formed by riveting several sheets of steel together be	Book rack, A. R. Sherman 200,576	Plow, H. F. & G. F. Shaw	people in the world. The facilities of business and
stronger than a solid piece of the same thickness? A.	Boot and shoe heel plate, L. W. Buxton 200,505	Plow, R. C. Buckley	steam communication are such that patents can be ob-
No.	Boot tree, J. T. Flynn	Plow an'd seeder, P. H. Elliott	tained abroad by our citizens almost as easily as at
	Bottle register, W. S. Lynn 200.552	Portfolio, J. D. Richards 200,477	home. The expense to apply for an English patent is
(47) W. T. W. asks: Is it possible to make	Bottle stopper, L. Rose 200,409	Post marking and canceling, R. L. Grinnan 200,389	\$75; German, \$100; French, \$100; Belgian, \$100; Cana-
a horizontal engine reversible using only one eccentric,	Brick surfaces, wash for covering, Bartlett & Ward 200,498	Press for fruits, etc., E. A. Stears 200,487	dian, \$50.
and that a fixed one? A. Yes.	Brush, T. J. Connell 200,434	Press, seal, S. Larkin 200,548	Copies of PatentsPersons desiring any patent
(48) C. B. asks: Who was the engineer in	Buckle, W. Bray, Jr 200,501	Printing pills, machine for, W. R. Warner 200,589	issued from 1836 to November 26. 1867, can be supplied
(10) C. D. asks. Who was the engineer in	Buckle, A. E. McConnell 200,466	Punching sheet metal tubing, E. O. Higgins 200,454	with official copies at reasonable cost, the price de-
charge of the construction of the Hoosac tunnel? A.	Burglar alarm, G. F. Busby 200,372	Rain gauge, Dunne & Richmond 200,443	pending upon the extent of drawings and length of
Thomas Doane.	Butter pressing apparatus, J. Harlan 200,392	Rake, W. M. White 200,592	specifications
What will prevent the falling out of hair from the	Button, E. W. McGlaulin 200,554	Rolling metal, J. H. Swett 200,582	Any patent issued since November 27 1867 at which
head of a young person who is otherwise in perfect	Cabinet, toilet, G. Rivera 200,480	Ruling machine, J. McAdams 200,553	time the Patent Office commenced printing the draw.
health? A. It is sometimes beneficial to cut the hair.	Car coupling, M. R. Delay 200,438	Saddle, J. R. Dempsy 200,378	ings and specifications may be had by remitting to
Consult a physician.	Car drought and buffing apparatus E I Coum (n) 8005	Sauchel Hallule, G. Havell	this office \$1
(49) G. J. B. asks. What is the best way	Care driving goon for street I Pichon 900 400	Saw IIIII, F. C. Flost 200,448	this once of the chines of our petert issued since 1990
togeften this partiana of shilled sections in order to	Carburster W H Reed 200,568	Saving machine, C. H. Jones 200,944	A copy of the claims of any patent issued since 1850
defilith and A Annual them	Carnet fastener W Aldrich 200,500	Scales, A. D. Federicks 200,386	will be furnished for \$1.
driftnem? A. Anneal them.	Carriage boot, Dodge & Brown	Screen J. T. Cavanagh 200,433	When ordering copies, please to remit for the same
(50) F. B. asks for instructions for making	Carriage seat shifting rail for C Fritschy 200447	Screw thread machine Fairbairn & Simon 200522	as above, and state name of patentee, title of inven-
a small steam lannch. A. Take your pattern from a	Cask washing machine. A. Muntzenberger et al 200.470	Seed cleaning machine, I. B. Sandusky	tion, and date of patent.
good rowboat, and put in just as large an engine and	Chair fan attachment, Thompson & Bergstrom 200.414	Sewer trap. J. Sargent	A pamphlet, containing full directions for obtaining
boiler as you can conveniently carry See SUPPLEMENT	Chair, folding, C. D. Hyde 200456	Sewing machine embroiderer, G. E. Hart 200,452	United States patents sent free. A handsomely bound
Nose 60 and 81	Chair, sewing machine, F. Chichester 200,508	Sewing machine ruffler, G. W. Burgess 200,431	Reference Book, gilt edges, contains 140 pages and
	Chair, window cleaning, A. Dormitzer 200,441	Shingle sawing machine, D. Lane 200,546	many engravings and tables important to every pat-
(51) J. S. writes: I have one of Landis'	Chamber vessel, A. M. Rontey 200,481	Shoe tip, E. F. Partridge 200,:66	entee and mechanic, and is a useful hand book of refer-
domestic steam engines, of 11/2 horse power; upright	Cheese cutter, J. N. Parker 200,472	Signaling apparatus, D. H. Iseminger 200,457	ence for everybody. Price 25 cents, mailed free.
boiler, 18 inches in diameter and 32 inches high, with	Cheese manufacture, E. V. Lapham 200,547	Skate, E. H. Barney 200,424	Address
15 one-inch flues, full length of boiler. I am using	Churn, B. B. Hess	Soldering device, F. B. Davis 200,437	MUNN & CO.,
about 60 lbs, of coal and 1 barrel of water per day of.	Churn folding stand, J. McAnespey 200,403	Speaking tube, T. J. & G. O. Woolcocks 200,420	Publishers SCIENTIFIC AMERICAN
say 10 working hours Can Leconomically enhetitate	Clock movement, A. E. Hotchkiss 200,534	Spring, G. K. Smith 200,580	a disitis solisi lipi AmEMICAN,
ras for coal and if so how should the ras he applied?	Clock striking movement, Davies & Lambert 200,518	Spring, D. F. Cooper 200,435	37 Park Row, N. Y.
A We think that the coal would be so much more	Clock striking movement, H. D. Northrop 200,564	Stamp, H. wickham, Jr 200,418	BRANCH OFFICE-Corner of F and 7th Streets,
ALL TT O MILLING VILLO VOLI TTOULO NO SO INUON MOTO	20.36	Stave number, Y. M. Chamban	

Cock for steam boilers, stop, J. L. Heald	200,45
Coffee roaster, G. H. Downie	200,52
Collar, W. M. House	200,53
Cooker, feed, Cunningham, Winhofer & Rice	200,51
Cooking utensil, Shepard & Adams, Jr	200,57
Cord finishing machine, W. Buckton	200,50
Corset, C. A. Blohm	200,50
Corset, L. H. Foy	200,38
Dam or dike. C. M. Scott	200,50
Dental plate, Fahnestock & Powell	200,44
Ditching machine, W. Smith	200,57
Egg case, J. L. & G. W. Stevens (r)	200.46
Envelope, M. J. Duffee	200,44
Faucet, J. O. Waddell	200,41
Feather renovator, Sanders & Smith	200,41
Feed water regulator, C. Mendenham	200,40
Fence wire, C. F. Washburn	200,49
Fence wire stretcher, C. S. Davis	200,37
Fertinzer distributer, H. P. Undernill	200,49
Fire escape, W. B. Garoutte.	200,38
Fire pot or portable furnace, J. W. Fisher	200,52
Foot rest, J. M. Shaw	200,48
Foot rest for not air registers, J. Bonnet Forge, Morrison, Mildren & Moore	200,42
Fruit drier, P. Riley	200,47
Furnace for heating links, J. H. Helm	200,39
Game apparatus, C. A. Roth	200,57
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Gate, F. J. Borgia	200,43
Gite, Cristy & Jay	20051
Gate, J. E. Johnston	200,39
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Grain separator, J. S. Upton	200,58
Grater, S. Barker	200,42
Hame, J. M. Lasater	200,40
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Hat, E. Copleston	200,37
Hinge for moulders' flash. A. Barker.	200,33
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Horse detacher, N. Johnston	200,54
Horse power, W. W. Dingee	200,43
Indexing books, J. Echols	200,38
Inkstand, H. G. Squires	200,58
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Ironing table, S. C. Terry	200,58
Journal for car axles, etc., H. Wakeman	200,49
Key fastener, R. McCully	200,40
Knife, C. Luetters	200,55
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Ladder, J. W. Pine	200,47
Ladder, J. Flinn	200.52
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Lighting apparatus, electric, J. King	200,54
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Loom, E. Howard	200,53
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Organ pipe, A. Gemunder	200,44
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Paging machine, E. Gorenfio	200,52
Paper pulp machine, W. W. D. Jeffers	200,54
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Pin, picket, P. J. Tweed	200.50
	200,50 200,48
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Picture exhibitor, J. C. Koch	200,50 200,48 200,46 200,46 200,41 200,59 8,08
Picture exhibitor, J. C. Koch	200,50 200,48 200,46 200,46 200,41 200,59 8,08 200,40

0,453	Steam generator, W. S. Salisbury	200,48
0,396	Steamer, A W. Humphry	200,53
0,520	Stone sawing machine, H. Young	200,59
),535	Stove leg, H. H. Huntley	200,53
0,515	Stove oven shelf, C. N. Buzzell	200,43
0,575	Strainer for faucets, etc., A. H. Willoughby	200,49
),560	Stuffing box, C. C. Jerome	200,45
),503	Tap with turnable outlets, C. G. Fischer	200,38
),500	Target, E. B. Beer	200,42
0,384	Temperature, indicating, etc., E. Armstrong	200,49
),583	Terret, C. L. Pond	200,47
0,412	Thermostat, W. B. Farrar	200,38
),445	Thill coupling, D. D. Whitney	200,59
),579	Tile laying machine, J. I. & W. J. Mettler	200,55
3,091	Tin from tin scrap, separating, P. C. Vogellus	200,58
,465	Torpedo for oil wells, E. A. L. Roberts	200,57
0,442	Torpedo for oil wells, G. S. Vaughn	200,49
0,416	Toy money box, W. H. Lotz	200,40
0,411	Treadle, S. Haas	200,39
,405	Truck, J. O. A. Bennett (r)	8,09
3,096	Tube expander and trimmer, J. E. Minshull	200,55
),494	Tubing, armor for fiexible, H. Wakeman	200,49
0,377	Twin hook, H. R. Cole	200.51
0,490	Valve, balanced rotary, J. S. Glenn	200,38
0,526	Vapor burner, F. H. Shepherd	200,48
),387	Vat, C. Visel	200,58
),523	Veneer cutting machine, J. D. McEachren	200,46
),483	Vest of paper, etc., Weber & Kruse	200,41
),429	Wagon gear and brake, J. J. Pennington	200,47
),562	Washing machine, C. H. Horne	200,45
0,479	Washing machine, J. Metais	200,46
0,394	Watch case, O. Domon	200,37
),571	Watch plate, Hutchinson & Dehouck	200,53
0,561	Watch and clock escapement, J.M.Hitchcock	200,53
),464	Watch, stemginding and setting, O. Domon	200,38
),430	Water closet disinfector, J. F. Naulty	200,56
06514	Wells, steam heater for oil, J. Harris	200,39
),398	Wheel, car. E. Kaselowsky	200,40
0.555	Wool washing machine, J. Clegg	200,50
),544		

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