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. INT The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.

The Edson Recording and Alarm Gauge, made and sold at 91 Liberty St., New York, causes a gong to ring in office and engine room when over-pressure occurs; and give written "charts" of all pressure carried, whether of air, steam. or water. Used in breweries, paper mills, hotels, city water works, charitable and educational in-stitutions and upon steamers, ferry boats, private yachts, and lighthouses. See card, with illustrations, in February number of Export Edition, under "Business Cards."

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

Wanted .- A good second-hand Pile Driving Engine Address S. L. Wiley, Greenfield, Mass

Wanted .- An Oil Mill of the most improved pattern for the manufacture of cotton seed oil from the seed of the Sea Island cotton. State price and terms. Address Spirit of the Times, Jasper, Fla.

For Sale, in one lot, cheap, 200 "Mead " Sewing Machines, without stands. Apply P. O. Box 1595, Montreal, Canada

For Sale.-The large factory building, at Marion Sta tion. on the Pennsylvania Railroad, in Jersey City, formerly occupied by the United States Watch Co., together with the boilers, engine, shafting. The premises comprise three acres, inclosed by iron fence. Building 250 x 27, wing, 40 x 90. Apply to Jas. A. Alexander, No. 2 Cortlandt St., New York city.

A thoroughly practical mechanic desires to correspond with a firm in want of a draughtsman, who can design, construct, and execute. Has had many years' experience in improved steam power, millwork, and special tools. Address J. C. D., Box 773, New York.

Carre's French Cylindric Carbons for Electric Lights; assorted sizes; imported and for sale by C. Raoux, 226 Front St., New York city.

New Tubular Boiler, about five H. P., for sale cheap. Address W. N. W., Box 773, New York.

Scroll Saws; cheapest and best. D.S.Abbott, Olean, N.Y. H. W. Johns' Asbestos Liquid Paints are strictly firstclasspure linseed oil paints, and contain nowater. They are the best and most economical paints in the world for structural purposes. H. W. Johns M'f'g Co., 87 Maiden Lane, sole manufacturers.

For Wood-Working Machinery, see illus, adv. p. 125. Competent man wanted understanding wire rope con-

veyers for lumber, coal, etc. Address Rathbun & Co., Oswego, N. Y. Steel Name Stamps, 15 cents per letter; steel figures,

\$1 per set. C. L. Anderson, Cleveland, Ohio. For Mill Mach'y & Mill Furnishing, see illus. adv p.125.

Wanted .- A few sober, industrious Machinists and Moulders. Address H. B. Smith Machine Co., Smithville, Burl. Co., N. J.

New Inventions examined and tested. Designs and improvements. Reports for investors. Recipes and information on all industrial processes. Benjamin's Sci. Expert Office, 37 Park Row, New York.

Latest improved methods for working hard or soft metals, grinding long knives, tools, etc. Portable Chuck Jaws and Diamond Tools. Address American Twist Drill Co., Woonsocket, R. 1.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Company, Buffalo, N. Y. Steam Hammers, Improved Hydraulic Jacks, and Tube

Expanders. R. Dudgeon, 24 Columbia St., New York. Chase's Pipe Cutting & Threading Machine. Send for

circular. Chase Machine Co., 120 Front St., New York. Sawyer's Own Book, Illustrated. Over 100 pages of

valuable information. How to straighten saws, etc. Sent free by mail to any part of the world. Send your full address to Emerson, Smith & Co., Beaver Falls, Pa. Eagle Anvils, 9 cents per pound. Fully warranted.

Ice Machines selected. Information on all kinds. Benjamin's Sci. Expert Office, 37 Park Row, New York. Diamond Drills, J. Dickinson, 64 Nassau St., N. Y.

Special Tools for Railway Repair Shops. L. B. Flan ders Machine Works, Philadelphia, Pa.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 125. The "Fitchburg" Automatic Cut-off Horizontal En-

"Haskins" Engines and Boilers. Send for The gines pamphlet. Fitchburg Steam Engine Co., Fitchb'g, Mass Tight and Slack Barrel machinery a specialty. John

Greenwood & Co., Rochester, N. Y. See illus'd adv. p. 62. Elevators, Freight and Passenger, Shafting, Pulleys, and Hangers. L. S. Graves & Son, Rochester, N. Y.

Blake's Belt Studs. The most durable fastening for rubber and leather belts. Greene, Tweed & Co., N. Y.

Rue's New "Little Giant" Injector is much praised for its capacity, reliability, and long use without repairs. Rue Manufacturing Co., Philadelphia, Pa.

Catechism of the Locomotive, 625 pages, 250 engravngs. The most accurate, complete, and easily understood book on the Locomotive. Price \$2.50. Send for a catalogue of railroad books. The Railroad Gazette, 73 Broadway, New York.

Elevators .-- Stokes & Parrish, Phila., Pa. See p. 126 Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Large knife work a specialty. Also manufacturers of Soloman's Parallel Vise. Taylor, Stiles & Co , Riegelsville N. J

The Twiss Automatic Cut-off; also Vertical and Yacht Engines. N. W. Twiss, New Haven, Conn.

J. F. Tallant, Engineer, Burlington, Iowa, makes a specialty of saving fuel and increasing power of defective boilers and engines.

Mica in sheet and scrap for sale in quantity to suit. Parties using Mica in any form please send for samples. Atlantis Land and Mining Co., Box 2762, Leadville, Col.

A No. 6 Root Blower, steel shafts of extra strength, and used less than four months, in good order. Charles L. Oudesluys & Son, 67 Exchange Place, Baltimore, Md.

Portable Forges. \$12, Roberts, 107 Liberty St., N.Y. For Sale .- Foundry and Machine Shop, third city in State; good business. Box 275, Winona, Minn.

Hydraulic Jacks and Presses. Polishing and Buffing fachinery. Patent Punches, Shears, etc. E. Lyon &

Co., 4'0 Grand St., New York. Steam Engine for sale very low. See advertisement

on another page. A Rare Chance .- We have on hand a 40 H. P. Horizontal Oscillating Engine, built for special work, but never used. It is first-class in all respects; has patent guides to prevent wear; has balance wheel, but no pulley. Price \$350. Heald, Sisco & Co., Baldwinsville, N.Y. Campbell's Self-acting Window Shade Rollers are the

best in the market. Models and terms to the trade. 85 Centre St., New York. Forsaith & Co, Manchester, N. H., & 213 Centre St.,

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

Electrical Indicators for giving signal notice of ex- 1% inches. tremes of pressure or temperature. Costs only \$20. Attached to any instrument. T.Shaw,915 Ridge Ave.Phila.

Instruction in Steam and Mechanical Engineering. A thorough practical education, and a desirable situation soon as competent, can be obtained at the National Institute of Steam Engineering, Bridgeport, Conn. For particulars, send for pamphlet.

Collection of Ornaments.-A book containing over 1,000 different designs, such as crests, coats of arms, vignettes, scrolls, corners, borders, etc., sent on receipt of \$2. Palm & Fechteler, 403 Broadway, New York city.

Best Oak Tanned Leather Belting, Wm. F. Forepaugh, Jr., & Bros. 531 Jefferson St., Philadelphia, Pa. To stop leaks in boiler tubes, use Quinn's Patent Fer-

rules. Address S. M. Co., So. Newmarket, N. H.

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

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

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

Presses, Dies, and Tools for working Sheet Metal. etc. Fruit & other can tools. Bliss & Williams. B'klyn, N. Y.

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

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

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 inch stroke. Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

Sheet Metal Presses, Ferracute Co., Bridgeton, N. J. Telephones repaired, parts of same for sale. Send stamp for circulars. P. O. Box 205, Jersey City, N. J.

Eclipse Portable Engine. See illustrated adv., p. 94. For best low price Planer and Matcher, and latest improved Sash, Door, and Bind 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. Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 45.

NEW BOOKS AND PUBLICATIONS.

No. 1. E lited Hughes, M.D. St. Louis: Ev. E. Carreras. Price \$5 a year.



Scientific American.

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 given to inquirers.

We renew our request that correspondents, in referring purpose? A. Yes. 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.

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-MENTreferred to in these columns may be had at this office. Price 10 cents each

(1) II. D. P. writes: In No. 21 of SCIEN-TIFIC AMERICAN of 1879, you give receipt for making ink to be used with copying pad. In the receipt occurs the symbols (2R B to 3 B). Please explain their meaning in making the ink. I have asked a great many who should know, but they cannot tell me. A. The terms

2B. 3B, etc., are technical expressions descriptive of certain grades or degrees of color, as bluish blue, blue blue, blue, etc. (2) H. J. D. asks: 1. Will brass make a durable cylinder for a small steam engine (bore 3 inches, stroke 4 inches)? A. Yes. 2. Will Babbitt metal do to

pack the piston head, melt and run it in? A. It could be done, but would remain tight but a short time. Cast Letters Patent of the United States were iron rings would be better. 3. What size should the induction ports be for cylinder 3 x 4 inches? A. 36 by

(3) E. N. J. writes: I am using stationary tubular boiler, 44 inches shell, 48 3-inch tubes, 12 feet long, fire passing underneath and returning through flues; have lined up fire box so that it is at least 4 inches narrower than the boiler. I claim that fire box ought to be at least 2 inches wider than the boiler to get the full benefit of our fuel, wood. Am I correct? If not, why? A. It is not necessary that the grate should be 4 inches vider than the diameter of the boiler, but the firechamber above the grate should be at least 6 inches wider.

(4) G. H. S. asks if in the celebrated "Krupp one hundred ton steam hammer" the piston and hammer-head weigh together one hundred tons, and if so, is this the usual method of expressing the power of steam hammers. A. We suppose it to be the weight of the "tup," that is, hammer-head, piston, and rod, as theweight of steam hammers is generally spoken of in that way.

(5) C. L. H. asks. Can you give me any further instruction for making ink to use on the copying pad, in your SCIENTIFIC AMERICAN, No. 21? I have made some after that direction, as far as I understood it, and can get only about 10 fair copies; and by using ink furnished with other pads, can get 50 copies. Should be glad to receive any instructions you can give on the subject. A. You have probably used impure or im-Bradley's cushioned helve hammers. See illus. ad. p. 110. proper aniline violet. Use pure 3 B methyl aniline violet.

> (6) W. A. M. writes: I am desirous of building a steam yacht after the model of the one in SUPPLEMENT, No. 179, but propose to make it larger, 45 feet long by 10 feet beam. How many passengers will she carry, and what power engines will be needed? A. 18 to 22 passengers. 9 inch cylinder and 10

(7) W. T. R. asks: 1. How can I prepare cyanide of silver for making a plating bath to use with a battery? A. Dissolve the silver in a small quantity of warm nitric acid. Evaporate nearly to dryness in a porcelain vessel, redissolve in pure water and add slowly solution (aqueous) of potassium until no further precipitate forms. Better decant the clear liquid, wash and dry the precipitated cyanide of silver. 2. Is chloride of gold used in its purity for a gilding solution? If not, please give directions for preparing it. A. No; use the cyanide of gold and potassium. 3. Will a gravity battery answer as well as a Smee for plating? I have been using it for plating some small articles, but have not had very good success. I prepared the solution by the battery process from silver coin. A. If properly managed, yes. 4. Is silver com fit to prepare solution from or to use for anodes? A. Coin silver will not answer; it contains copper. 5. How much mercury does it take to operate a Sprengel air pump? A. From 20 to 50 lb. are commonly employed.

(11) M. W. asks: 1. Is there any rotary engine equal in point of power to the best type of reciprocating engines? If so, who is the inventor and where is it manufactured? A. No. 2. Suppose a reciprocating engine turns 100 revolutions per minute, does it give an y clearance? A. It must have some clearance to allow for the spring and play of the parts.

(12) H. D. writes: 1. I have an engraved copper plate which I wish to electroplate with steel. Can be I do it, and how? A. Consult Gore's and Napier's Elec-tro-metallurgies. 2. Can a Smee battery be used for the

(13) J. T. A. writes: There is a difference of opinion between a man and myself about a small steam boat as regards the government law. He says a Correspondents whose inquiries do not appear after small steam boat under five tons capacity has nothing to pay. I say they have to pay license and also inspection. A. You are right.

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

> M. F.-1. Mica schist with hornblende. 2. Syenite. 3 Zinc. 4. Red jasper. 5. Quartz, feldspar, and chalcopyrite. 6. Quartzose rock. 7. Sandstone. 8. Muscovite, 9. Sandstone, 10. Granite, 11. Quartz and trap. 12. Mica schist. 13. Limestone. 14. Chalcopyrite in talcose slate. 15. Gneiss and mica schist.

COMMUNICATIONS RECEIVED.

How to File the Champion Saw. By J. A. H. On Limestone Built Cities. By J. S. Five Sundays in February. By H. G. A. On Inventors. By H. S. B.

[OFFICIAL.]

INDEX OF INVENTIONS FOR WHICH

Granted in the Week Ending

January 27, 1880,

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, or any patent issued since 1867, 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,

| Bedstead fastening, F. S. Clarkson | 223,837 |
|---|---------|
| Beehive, E. H. Key | |
| Belting, machinery for stretching leather, J. | |
| Brady (r) | 9,059 |
| Blacking box, J. Lamont | 223,929 |
| Blast furnace, P. L. Weimer | |
| Blower or exhauster, jet, J. Zellweger | |
| Boiler furnaces, air nozzle for steam, D.C.Cregier | 223,841 |
| Boot and shoe tree, P. Marsielje, | |
| Box for holding embroideries, etc., W. Stauder | 223,958 |
| Bretzel machine, H. Huber | |
| Brush, rotary, J. G. Dinkelbihler | 223,842 |
| Brushes, manufacture of rubber backs for wire, | |
| A. C. Estabrook | 223,844 |
| Buckboard, Joubert & White | |
| Butter washer, cooler, and worker, H. J. Lyman | 223,934 |
| Carbrake and starter, J. L. Cole | |
| Car, dumping, J. Jones | 223,922 |
| Car, oil tank, H. F. Snyder | 223,867 |
| Car, stock, S. Bray | 223,876 |
| Cars, mechanism for making ladder irons and | |
| hand holds for freight, Briggs & Dougherty | |
| Carpet tacker, S. S. Grannis | |
| Carriage top brace, C. Fockler | |
| Caster, F. S. Clarkson | |
| Caster, W. C. Coddington | 223,839 |
| Caster, O. Pederson | 223,948 |
| Caster, furniture, M. Fiset | 223,846 |
| Casting, flexible core for, T. Shehan | 223,820 |
| Cement and artificial stone, making, F. Ransome. | 223,815 |
| Cereal, prepared, J. F. Gent | |
| Chain, log carrying or bull, R. E. Gleason | |
| Cham, ornamental, G. B. Whitney | |
| Chandelier, extension, C. Deavs | 223,893 |
| Cheese bandage, B. W. Horton | 223,915 |
| Churn dasher, W. H. Brockman | |
| Cider press, G. Ziegler | |
| Coat hook, A. E. Taylor | |
| Cock, automatic cylinder, G. F. Hammer (r) | |
| Crayon compound, Ullman & Stiles | |
| Cultivator, B. M. Root | |
| Currycomb, W. G. Schaefer | |
| Curtain fixture, M. Brown | 223,878 |
| Door hanger, A. N. Monteer | 223.941 |
| Drums, jacket for shipping, J. H. Preater | |
| Elastic rollers, composition for, J. Burbridge et al. | |
| Electric machine, dynamo, S. D. Field | |
| Electrical switch pin, J. H. C. Watts | 223,969 |
| Exercising machine, D. P. Butler 223,798, | |
| Farm gate, J. S. Padon | |
| Faucet, T. F Conklin | 223,886 |
| Feed water heater for steam boilers, E. Reynolds. | 223 816 |
| | |
| File, bill, J. P. Patterson | |

HINTS TO CORRESPONDENTS.

The Horton Lathe Chucks; prices reduced 25 per cent Address The E. Horton & Son Co., Windsor Locks, Conn. \$400 Vertical Engine, 30 H. P. See page 125.

Emery Wheels of all kinds, and Machines at reduced prices. Lehigh Valley Emery Wheel Co., Weissport, Pa. Steam Engines; Eclipse Safety Sectional Boiler. Lam bertville Iron Works, Lambertville, N. J. See ad. p. 46.

Patent Steam Cranes. See illus. adv., page 125.

Nellis' Cast Tool Steel, Castings from which our specialty is Plow Shares. Also all kinds agricultural steels and ornamental fencings. Nellis, Shriver & Co., Pittsburg, Pa.

Best Turkey Emery in bbls., segs, and cases. Special rates for large quantities. Greene, Tweed & Co., N. Y.

Wheels and Pinions, heavy and light, remarkably strong and durable. Especially suited for sugar mills and similar work. Circulars on application. Pittsburg Steel Casting Company, Pittsburg, Pa.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 125.

Deoxidized Bronze. Patent for machine and engine journals. Philadelphia Smelting Co., Phila., Pa.

square shank drills. Pratt & Whitney Co., Hartford, Ct 'several departments of the museum.

This journal of scientific, clinical, and forensic psychiatry and neurology, is intended especially to meet the wants of the general practitioner of medicine. Its fundamental idea is that these departments of medical practice are parts of the trunk rather than special branches of medicine; and it will be devoted to the promulgation, among general practitioners of medicine, of sound teaching respecting the nature and treatment of ; neuro-psychic and nervous diseases, the proper management and care of the insane, and kindred matters. The initial number shows a good list of contributions by

capable writers.

WASHINGTON, D. C. Edited by W. J. Rhees. Washington: Judd & Detweiler. Paper, pp. 96. Price 35 cents.

Contains an illustrated description of the present building, and a cutof thenew building; also a descrip-Renshaw's Ratchet (short spindle) uses taper and tive guide to the cases and objects displayed in the

(8) W. S. B. asks: Is there any rule that will ascertain the pressure per square foot on a ship at different depths down its side? A. The pressure is 144 lb. per square foot for each 26 inches in depth, nearly. 2. Supposing a hollow tube could be plunged through the bottom of a ship, would the water rise and retain a position in the tube above the outside water level? A. No; it would rise to the height of the level of the water outside

(9) J. K. writes: A states that the pressure of air necessary to keep the water from entering a diving bell is no greater at a depth of 500 feet than it is when the bell is only at a depth of 50 feet in the water. B states that on the contrary the greater the depth VISITOR'S GUIDE TO THE SMITHSONIAN IN- to which the bell is sunk in the water, the so much greater pressure of air is required to counterbalance the upward pressure of the water. Please state which is right, A or B. A. A is wrong. The pressure of air must be at least equal to the pressure due to the depth of water. B is right.

> (10) W. E. K. asks how to take a large coal oil spot out of a carpet. A. Try benzole and woolen cloths

| | Firearm lock, T. G Bennett | 223.797 |
|---|--|---------|
| | Flush tank, G. E. Waring, Jr. | 223,826 |
| | Folding chair and settee, G. W. Chamberlin | 223,883 |
| | Grain binder, P. F Hodges | 223,805 |
| | Grain binder, A S. Hoyt | 223,852 |
| | Grain separator, magnetic, C. E. Fritz | |
| | Grazing post, T. B. Ashford | 223,872 |
| | Grinding mill, middlings, J. Mills | 223,856 |
| | Gear. stopmotion, P. F Hodges | 223,806 |
| | Goods exhibitor, roll, S. T. Dickens | |
| | Guard finger, M. Howard | |
| | Harness gag runner, M. R. Dowlin | |
| | Harrow, rotary, W. W. Vanhorn | |
| i | Harvester, W. F. Olin | |
| l | Harvester, hand binding, S. Johnston | |
| ļ | Hay rake, Johnson & Parsons | |
| , | Hinge, awning blind, T. O. Memery | |
| | Hinge, gate, J. E. Davis | |
| | Hoop coiling machine, A. F. Ward | |
| | Hoop lock cutter, H. A. & W. Tripp | |
| | Hop picking machine, S. D. Locke | |
| | Horse power, R M. Beebee | |
| 1 | Hydrant, S. A. Jenks. | |
| l | Hydraulic motor, J. A. Myers | |
| 1 | Indicator lock, H. L. Russell | 223,955 |
| | Inking apparatus, S. G. Ames | |
| | Jewelry, etc., ornamentation of, L. J. Falize, Jr. | |
| | | |