Business and Personal.

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.

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

Lubricene, Gear Grease, Cylinder and Machinery Oils. R. J. Chard, 6 Burling Slip, New York.

OFFICE OF THE HALDEMAN PAPER COMPANY, LOCKLAND, O., April 30, 1880.

H. W. Johns M'f'g Co., New York:

GENTLEMEN: In the year 1875 we built a warehouse, 30 x 100, which we covered with your Asbestos Roofing. We have coated it with your roof coating once since it was first applied, and to all appearances it is as good to-day as when first put on. We were so much pleased with this warehouse roof that when we built a new mill, in 1877, we covered it with your Asbestos Roofing. This mill roof has been much admired by all who have seen it and taken the trouble to examine it. It has stood the test of the extremes of weather—two summers' heat and two winters' cold—and resisted all the storms to which it has been exposed. To-day it is in prime condition, and with ordinary care we see no reason why it should not continue to be a good roof for twenty years.

Yours very truly, J. C. RICHARDSON, Pres.

For Sale.—4½ inch refr. Telescope Prism, 4 eyepieces and tripod. Price, $160. H. M. Holbrook, Jersey City, N.J.

Machinery Salesman Wanted.—One who thoroughly understands and can sell Iron and Wood Working Tools. Address T. S. & A. J. Kirkwood, Chicago, Ill.

Wanted—Situation as Foreman or Superintendent of Foundry and Machine Works. Address Box 86, Toledo, O.

Air Compressors, Blowing Engines, Steam Pumping Machinery, Hydraulic Presses. Philadelphia Hydraulic Works, Philadelphia, Pa.

Wanted, by a Steam Heating Engineer, situation as Superintendent or Outside Foreman; 20 years' experience; will accept a percentage on profits as part pay; present engagement expires June 1. Address Wm. J. Baldwin, M. E., Elmira, N. Y.

Blake's Belt Studs are the best and cheapest fastening for leather and rubber belts. Greene, Tweed & Co., 118 Chambers St., New York.

Steel Figures, $1; Letters, $3 a set. York & Smith, Cleveland, Ohio.

Wanted—A Machinist. One who has wrought at Carriage Hardware Manufacturing, and is fully able to construct the dies and tools necessary for such goods. Address, with references, George Gillies, Gananogue, Ontario, Canada.

For the best Brick Moulds made in country, address D. J. C. Arnold, New London, Ohio.

Alcott Lathes with Nulling Attachment. Wm. Scott, Binghamton, N. Y.

For the Development of New Ideas, try Anderson Bros., Peekskill, N. Y. Experience large.

Apply to J. H. Blaisdell for all kinds of Wood and Iron Working Machinery. 107 Liberty St., New York. Send for illustrated catalogue.

Geared Power Press, cost $450, for $200. York & Smith, Cleveland, Ohio.

Sweetland & Co., 126 Union St., New Haven, Conn., manufacture the Sweetland Combination Chuck.

Burgess' Non-conductor for Heated Surfaces; easily applied, efficient, and inexpensive. Applicable to plain or curved surfaces, pipes, elbows, and valves. See p. 284.

Power, Foot, & Hand Presses for Metal Workers. Moderate prices. Peerless Punch & Shear Co., 52 Dey St., N. Y.

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

Corrugated Traction Tire for Portable Engines, etc. Sole manufacturers, H. Lloyd, Sou & Co., Pittsburg, Pa.

For the best Stave, Barrel, Keg, and Hogshead Machinery, address H. A. Crossley, Cleveland, Ohio.

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.

15 H. P. Engines, complete order, $150. York & Smith, Cleveland, Ohio.

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

Walrus Leather and Walrus Wheels for Polishing all kinds of Metals. Greene, Tweed & Co., 118 Chambers St., New York.

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 cut-off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

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

Bradley's cushioned helve hammers. See illus. ad. p. 300.

Electrical Indicators for giving signal notice of extremes 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 as soon as competent, can be obtained at the National Institute of Steam Engineering, Bridgeport, Conn. For particulars, send for pamphlet.

Hydraulic Jacks, Presses and Pumps. Polishing and Buffing Machinery. Patent Punches, Shears, etc. E. Lyon & Co., 470 Grand St., New York.

Telephones repaired, parts of same for sale. Send stamp for circulars. P. O. Box 285, Jersey City, N. J.

Eclipse Portable Engine. See illustrated adv., p. 284.

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

Small High Speed Steam Yachts complete or in parts. Geo. F. Shedd, Waltham, Mass.

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

Recipes and Information on all Industrial Processes. Park Benjamin's Expert Office, 49 and 50 Astor House, New York.

Blake "Lion and Eagle" Inp'd Crusher. See p. 301.

Special Wood-Working Machinery of every variety. Levi Houston, Montgomery, Pa. See ad. page 301.

For Mill Mach'y & Mill Furnishing, see illus. adv. p. 317.

Peck's Patent Drop Press. See adv., page 301.

4 to 40 H. P. Steam Engines. See adv. p. 285.

Forsaith & Co., Manchester, N. H., & 207 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.

$400 Vertical Engine, 30 H. P. See page 316.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Company, Buffalo, N. Y.

For Standard Turbine, see last or next number.

Millstone Dressing Diamonds. Simple, effective, and durable. J. Dickinson, 64 Nassau St., New York.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Wanted—The address of 40,000 Sawyers and Lumbermen for a copy of Emerson's Hand Book of Saws. New edition 1880. Over 100 illustrations and pages of valuable information. Emerson, Smith & Co., Beaver Falls, Pa.

Eagle Anvils, 10 cents per pound. Fully warranted.

Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 316.

For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 316.

For Separators, Farm & Vertical Engines, see adv. p. 316.

The Horton Lathe Chucks; prices reduced 25 per cent. Address The E. Horton & Son Co., Windsor Locks, Conn.

For Patent Shapers and Planers, see ills. adv. p. 316.

Steam Engines; Eclipse Safety Sectional Boiler. Lambertville Iron Works, Lambertville, N. J. See ad. p. 174.

The 1880 Pennsylvania Lawn Mower.—Light draught and easily adjusted. Machines warranted. See illus. adv. last week. Lloyd, Supplee & Walton, Philadelphia, Pa.

Send stamp for Illustrated Descriptive Price List of the Step Ladder, Ironing Table, and Clothes Drier. An ingenious combination. Useful in hotels, laundries, and every household, in every climate. See description in No 12, Vol. 42, SCIENTIFIC AMERICAN. J. H. Martin, Hartford, New York.

Patent Steam Cranes. See illus. adv., page 316.

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.

For Power Paper, Lard, Cider Presses, see adv. p. 316.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 317.

Combined Universal Concentric or Eccentric and Independent Jaw Chucks. Pratt & Whitney Co., H'tf'd, Ct.

For Wood-Working Machinery, see illus. adv. p. 316.

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

For Middlings, Mill and Mill Furnishing, see adv. p. 316.

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.

Elevators.—Stokes & Parrish, Phila., Pa. See p. 317.

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.

Mackenzie Cupola and Blower. The very best apparatus for melting iron; and with water bosh for smelting lead, silver, or copper ores. Send for pamphlet. Smith & Sayre Manuf. Co., 21 Courtlandt St., New York.

Penfield (Pulley) Block Works. See illus. adv. p. 316.

NEW BOOKS AND PUBLICATIONS.

THE FOOD OF BIRDS. THE THRUSH FAMILY. By S. A. Forbes. From Trans. Ill. State Horticultural Society. Vol. XIII. 1879.

The thrush family in Illinois embraces nine species: the robin, the cat bird, the brown thrush, the wood thrush, the hermit thrush, Swainson's thrush, the Alice thrush, the mocking bird, and Wilson's thrush, of which the first three are most numerous and important. From an examination of the stomachs of 149 specimens of the family, shot in all months from March to September, Mr. Forbes has endeavored to determine the food of these birds and the probable effects of their foraging. Other species of birds will be studied in like manner during the coming seasons. The line of investigation thus marked out is a promising one; but much more information will have to be gathered before any trustworthy deductions can be drawn touching the relative economical value of the different species.

SEVENTH ANNUAL REPORT OF THE PROGRESS OF THE TOPOGRAPHICAL SURVEY OF THE ADIRONDACK REGION OF NEW YORK. By Verplanck Colvin. Albany, 1880.

In addition to a statement of the work of the survey during the year 1878, this volume gives a condensation of the reports for 1874, '75, '76, '77, and '78, with late results in geodetic and trigonometrical measurements, magnetic variation, hydrography, river surveys, leveling and barometric hypsometry, meteorology, rainfalls, botany, zoology, and geology, with many maps, engravings, and chromo-lithographs.

OFFICIAL REPORTS, ETC.

The following named reports of various governmental departments, societies, and so on, have been recently received:

Report of the Director of the Central Park Menagerie, Department of Public Parks, city of New York, for 1879.

Reports for 1879 and 1880, New York Meteorological Observatory, Central Park, New York. Daniel Draper, director

Union League Club; Report on the subject of the Water Supply of New York. 1880.

Thirty-first Annual Report of the Trustees of Astor Library, for the year ending December 31, 1879.

Report of the Special Committee of the Chamber of Commerce of the State of New York on Railroad Transportation, 1880.

Geological Survey of New Jersey. Annual report for 1879. George H. Cook, State Geologist. Trenton: W. S. Sharp.

First Report of the Superintendent and Secretary of the Burlington Waterworks, Burlington, Iowa, 1880. Ira A. Holly, Superintendent.

The Northern Water Route; Lake Superior to the Red River of the North. Resolutions adopted by the Chamber of Commerce, Duluth, Minnesota, February 22, 1880.

United States Government Reports, Washington, D. C.

Annual Report of the Operations of the United States Life Saving Service for the year ending June 30, 1879.

Army Register for January, 1880.

Report of a Board of United States Naval Engineers on the Herreshoff Boiler and System of Machinery for Steam Yachts, etc. Navy Department, December, 1879.

Annual Report of the Chief of Ordnance for the Fiscal year 1879.

PRACTICAL HINTS ON MILL BUILDING. By R. James Abernathey. Moline, Ill.: R. James Abernathey. 8vo, cl., pp. 298. Price $4.

A plain, simple, practical, and sensible treatise on flour milling and the building of flour mills, apparently designed with special reference to the needs of young millwrights who, without being either machinists or carpenters, must have a working knowledge of much that belongs to both those trades as well as a practical knowledge of the construction and use of the various apparatus used in flour mills. The author has calculated several new tables on gearing, belting, and shafting, and has added much other tabular matter likely to be useful to all classes of mechanics and manufacturers.

POCKET MINING ATLAS. Compiled by Edwin Bolitho. New York: *Engineering and Mining Journal*. 1880.

A handy pocket atlas, showing on twenty-eight maps the principal mining districts and the location of the chief mines of the United States. The new mining districts of Colorado are given with especial fullness.

Notes & Queries

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) F. H. S. asks: 1. Can I make a black aniline ink for working the new copying process? If so, please give formula. A. There is no satisfactory black. 2. What grade of aniline is used for the darkest violet inks? A. 4 B to 6 B methyl violet.

(2) W. S. R. asks for information in regard to making cast iron bells by mixing the material with the iron in the ladle, so it will not interfere with the balance of the iron in the cupola; and also, do you know of a cheap liquid bronze for bronzing bells or cast iron? A. To increase the hardness and sonorous qualities of the metal it is essential that the additions (of manganese or titanium) should be made in such a way that their thorough fusion and diffusion throughout the mass of metal should be effected; otherwise a non-homogeneous or brittle casting is apt to result. The mixing cannot be done in a ladle. For a bronze a mixture of coarse gold bronze in thin copal or amber varnish may be employed.

(3) G. F. C. asks: What kind of liquid or sizing is best to mix with ordinary bronze for painting iron wire, etc.? A. Common stopping or filling varnish will answer in some cases; gold size is best.

(4) T. M. H. asks how to oxidize iron wire to look like black japanning. A. We know of no way of "oxidizing" the metal to present such an appearance.

(5) J. B. C.—The lines on the "jellograph" may be removed by remelting the composition. We know of no better or simpler way.

(6) J. M. writes: In your last number you give a method of making waterproof cloth by dissolving rubber in bisulphide of carbon and adding a certain percentage of alcohol. Now, I cannot find any of our druggists that can make that preparation. They say if you had given a certain amount of rubber to bisulphide of carbon, then they could tell what percentage or how much six per cent of alcohol is. A. Bisulphide of carbon, 94 oz.; absolute alcohol, 6 oz.: mix a sufficient quantity of this to accomplish the softening of the rubber.

(7) A. B. T. writes: I live in a locality where much of the water is strongly impregnated with lime. After using for two or three months the hot water pipes leading from the range to the boiler in my kitchen become entirely closed by the sediment deposited in them during the boiling of the water, and this obstruction afterwards hardening can only be removed by a cold chisel. What can be done to soften the water without injuring its quality for ordinary purposes, or to prevent its clogging the pipes and incrusting the boiler? A. Try the addition of a small quantity of dry slaked lime, beginning with about 10 grains of lime to the gallon. The "lime" in this water is doubtless lime carbonate, held in solution by free carbonic acid. The addition of a suitable quantity of lime under the circumstances withdraws the free carbonic acid, forming with it insoluble carbonate of lime; and at the same time throwing down what lime carbonate the acid water held. The only other practical remedy is to heat the water, when the acid gas escapes, leaving the lime carbonate insoluble. Water very often contains more or less sulphate of lime, which cannot be economically eliminated.

(8) J. Y. asks. 1. How is sheet metal prepared for tinning? A. The plates, bent V-shape, are placed on edge in a pickle of dilute muriatic (water 6, acid 8) acid for about five minutes, then placed in a row (∩) on the floor, and by means of a rod passed through them lifted into an annealing oven, where they are heated to redness and the scale drops off. They are then allowed to cool, straightened on an anvil, and cold rolled between highly polished rolls under great pressure. The plates are then immersed in fermenting bran water, at 100° Fah., for 12 hours, the plates standing on one edge being reversed after six hours. From the bran water the plates are transferred to a pickle of dilute sulphuric acid at 100° Fah. for an hour, which makes them bright; then washed and scoured with hemp and sand, and after washing in clean water are ready for the grease pot, in which they are kept for an hour or more before putting in the tin bath. 2. What material are the vessels made of for holding the acids in the tinning process? A. Usually of wood.

(9) C. asks: 1. What is 1 horse power? A. 33,000 lb. raised one foot high per minute. 2. Man's power? A. The usual allowance is five to six men equal one horse. 3. In what book on mechanics can the principle of the pulley and the duplication of force by it be studied best? A. "Jamieson's Mechanics," "Cambridge Mechanics."

(10) L. G. S. asks: How many horse power make a "run of stone," that is, in a run of stone (so-called) what amount of force is given when computed in horse power? In this community, where water power is used exclusively, I have asked several, and find no two to agree in the estimate. Will you give it? A. The power required to drive a "run" of stones depends upon their weight and diameter and the velocity at which they are driven. Formerly from 5 to 8 horsepower was allowed, but on acount of increased weight and velocity we suppose that now from 7 to 12 horse power should be allowed.

(11) W. C. B. asks: 1. Can you inform me how to construct a compressed air tank to run a one horse power engine? A. The best form is a plain cylinder, like a cylinder boiler; its capacity will depend upon the length of time you wish to run the engine with one charge of air. 2. Can I buy such a thing, and if so, where? A. Such reservoirs may be obtained from almost any boiler maker.

(12) H. L. C. asks What should be the number of revolutions per minute of a 3 inch circular saw, and also of a planer head, 1½ inches diameter, to do good work on hard or soft wood? Will the planer work with 2,200 per minute? A. We should say 7,500 to 8,000 revolutions per minute. The head is very small, and may be run 4,000 to 4,400 revolutions per minute.

(13) S. H. B. asks 1. Is the steel of any special grade required for permanent magnets, or must it be forged in any particular way to get compactness of grain? A. A medium quality of steel is better than the finest. It should be worked as little as possible, and should be hardened throughout and drawn down to a straw color. 2. Are they magnetized by a coil of wire or with a strong electro-magnet? I have an electro-magnet which will readily lift more than one hundred pounds, cores 1 inch diameter, four layers of wire about No 14, six cells Grove battery, platinums 6 by 2 inches, but I do not get very strong magnets by this means yet. A. For charging bar magnets a coil which will just fit the bar seems to answer little better than an electro-magnet. You should make the coil of No. 14 wire; 6 or 8 layers should be wound one over the other. The coil should be about 3 inches long. Connect this coil with your battery, hold it vertically, and insert one of the steel bars; allow it to became suspended centrally in the coil, then push it down so that the upper end of the bar is within the coil. Allow the bar to come back to its central position, and then, before removing it from the coil, disconnect the latter from the battery. This method of magnetizing steel is described and illustrated in SUPPLEMENT 142. Telephones—Horseshoe magnets may be charged by drawing them across the face of your large magnet always in the same direction, and disconnecting the battery as the stroke is completed. Bar magnets may be charged in the same way by clamping two of them together by the ends so as to form temporarily a horse shoe. 3. How would quite thin steel, say one-sixteenth, do, if pieces enough were used to make a magnet, say, 1 inch square section and of horse shoe shape, 8 inches long? A. Very well, but they would make a better magnet if bent one over the other. 4. Is not the Jamin magnet of even thinner steel than that? Those I mentioned are of one-quarter inch thick steel and nearly one inch broad. A. Yes. 5. Would it be as well to pack up a compound magnet of straight squared pieces, and magnetize them separately, as to make the separate horseshoe shapes? A. No, the horse-shoe shape would be the best.

(14) A C. asks: 1. What is the variation of pressure in the steam chest of a locomotive engine when she is running at regular speed with throttle open full and lever set to cut-off at half stroke, steam pressure on boiler 100 lb.? A. The variation in pressure will be from full boiler pressure, when steam is cut off, to a minimum pressure, depending upon proportions, pressure, and speed of piston. 2. How much will water compress under a pressure of 100 lb. to square inch? How much will oil compress under the same pressure? A. Compression scarcely appreciable with either water or oil. 3. How much will air compress under 100 lb. pressure? A. 100 lb. pressure above the atmosphere is =7·7 atmospheres—hence bulk=1-7·7 or a little more than 1/8.

(15) W. T. S. asks: 1. About how many horse power do we get with our engine, 7x10 inches, running at about 400 revolutions per minute, with 1½ inch feed pipe, pressure 80 lb. per square inch? A. With 80 lb. pressure on the piston and 400 revolutions per minute, 46 horse power. 2. If the throttle valve of an engine be set to run it at 100 revolutions per minute, with 20 lb. of steam, would it not require about 80 lb. of steam to run it 200 revolutions per minute, the valve being the same as for 20 lb.? A If 20 lb. is sufficient to overcome the resistance at 100 revolutions, it will be approximately the same (leaving out friction) at 200 revolutions, but you must supply double the quantity of steam at that pressure.

(16) E. A. G. writes: It is said that even "Homer sometimes nods," but the SCIENTIFIC does not often so much as wink. But please tell me, is it not as wise to bore a hole in the bottom of a boat to let the water out as to put a stop cock at the highest part of a siphon "to let the air out?" See SCIENTIFIC AMERICAN, April 10, page 235, answer to C. W. W., No. 35. Some one may be misled by it. A. Your criticism applied to an ordinary siphon is very pertinent, but we do not think it applies to the conditions in this case. The stop cock should be applied in connection with some means of taking out the air accumulating from leaks. Of course it was an error to say briefly stop cock. A pump or some other device for removing the air must be applied outside the stop cock.

(17) "Walter" asks: Which travels the greater distance, any given point on the face or tread of a locomotive driving wheel, or any fixed part of the locomotive, the boiler for instance? The wheel is not supposed to slip on the rail during the journey. A. The lower point of the wheel in contact with the rail has no forward motion relative to the rail; the upper point has twice the forward motion of the boiler.

(18) "Constant Reader" asks: Does a fly wheel increase the power of the engine to which it is applied? A. No.

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

T. C. W.—It consists chiefly of a semi decomposed syenitic rock with a little hematite. It cannot be called an iron ore; such an ore may occur in the vicinity.—M. D. M.—It is a fair quality of kaolin, used for making porcelain, "white ware," and pottery.—G. C. R.—It is limonite, an excellent ore of iron.—J. H. B.—The button is composed chiefly of lead, carrying a trace of silver. It probably occurs as galena—sulphide of lead.

COMMUNICATIONS RECEIVED.

On a Remarkable Group of Sun Spots. By W. R. B.
On a Freak of Lightning. By F. M. G.
On Tide Water Pipe Line. By G. L. B.
On the Cause of Thunder. By G. H. E.
On Examples of Pseudo-Crystallization. By A. L.
On Gravitation. By W. L. T.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

pril 20, 1880,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for one dollar. In ordering please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

Addressing machine, E. F. Pernot ... 226,781
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