

The standard gallon of the United States contains 231 cubic inches. H. W. Johns' Asbestos Liquid Paints are sold by this measure, and, although they command a higher price than any others, they are more economical owing to their wonderful covering qualities and superior durability. They are strictly pure linseed oil paints of a higher grade than have ever before been offered to the public, and are in use upon the finest and most extensive structures in this country, among others the United States Capitol at Washington, the Metropolitan Elevated Railroad of New York, etc. Samples of twenty-eight newest shades for dwellings sent free. H. W. Johns Mfg Co., sole manufacturers, No. 87 Maiden Lane, New York.—Adv.

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.

Chard's Extra Heavy Machinery Oil. Chard's Anti-Corrosive Cylinder Oil. Chard's Patent Lubricene and Gear Grease. R. J. Chard, Sole Proprietor, 6 Burling Slip, New York. The Tools, Fixtures, and Patterns of the Taunton Foundry and Machine Company for sale, by the George Place Machinery Agency, 121 Chambers St., New York.

Steam Yacht Wanted.—Send description, speed, and lowest cash price, to Lock Drawer C, Meredith, N. H. A. J. Emery, Mechan. Engineer, 7 Cortlandt St., N. Y. For Sale, on account of increase of power, one 24 x 48 Corliss Engine, with three boilers and equipment complete. Now in use, but deliverable in November next. For particulars address Natchez Cotton Mills Company, Natchez, Miss.

2 Steam Yachts for sale. Geo. F. Sheard, Waltham, Mass. Factory for sale or lease. Building 40 x 100 feet; forge shop 30 x 160 feet; 12 lots; steam power. Burr & Co., 212 West St., Brooklyn.

Shafting Straighteners. J. H. Wells, Vineland, N. J. The genuine Asbestos Cement Felting consists of fine long asbestos fibers and a cementing compound, which forms a light, porous, fireproof covering, partaking of the nature of a felt and a cement. It is prepared ready for use, can be easily applied by unskilled workmen, and forms the most effective, durable, and economical non-conducting covering in use for steam pipes, boilers, and other heated surfaces. H. W. Johns Manuf. Co., 87 Maiden Lane, New York, sole manufacturers.

Wanted.—A Second-hand Engine Lathe, back gear, screw cutting, in good order. Address, giving description and price, Glass Works, Poughkeepsie, N. Y.

Improved Rock Drills and Air Compressors. Illustrated catalogues and information gladly furnished. Address Ingersoll Rock Drill Co., 1 1/2 Park Place, N. Y.

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.

The Eureka Mowing Machine now is acknowledged as the best in the market. It has taken the first premium in nearly every State Fair this year. Prices to suit the times. Send for illustrated circular to Eureka Mower Company, Towanda, Pa.

The Boomer & Boschert Press Co. have in daily operation, at the Am. Inst. Fair, a complete cider mill and cider jelly manufactory. New York Office, 15 Park Row.

Packing once tried always used. Phoenix Packing from 1-16 up in spools or on coils. Phoenix Packing Company, 108 Liberty St., N. Y.

Gas Machines.—Be sure that you never buy one until you have circulars from Terrill's Underground Meter Gas Machine, 39 Dey St., New York.

Experts in Patent Causes and Mechanical Counsel. Park Benjamin & Bro., 50 Astor House, New York.

Corrugated Wrought Iron for Tires on Traction Engines, etc. Sole mfrs., H. Lloyd, Son & Co., Pittsburg, Pa. Malleable and Gray Iron Castings, all descriptions, by Erie Malleable Iron Company, limited, Erie, Pa.

Skinner & Wood, Erie, Pa., Portable and Stationary Engines, are full of orders, and withdraw their illustrated advertisement. Send for their new circulars.

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

Power, Foot, and Hand Presses for Metal Workers. Lowest 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.

Recipes and Information on all Industrial Processes. Park Benjamin's Expert Office, 50 Astor House, N. Y.

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

Best Oak Tanned Leather Belting. Wm. F. Forepaugh, Jr., & Bros., 531 Jefferson St., Philadelphia, Pa.

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 Hoghead Machinery a specialty, by E. & B. Holmes, Buffalo, N. Y.

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.

For Patent Shapers and Planers, see illus. adv. p. 220. Presses, Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

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

Sheet Metal Presses, Ferracute Co., Bridgeton, N. J. Wright's Patent Steam Engine, with automatic cut off. The best engine made. For prices, address William Wright, Manufacturer, Newburgh, N. Y.

Improved Solid Emery Wheels and Machinery, Automatic Knife Grinders, Portable Chuck Jaws. Important, that users should have prices of these first class goods. American Twist Drill Co., Meredithville, N. H. Silent Injector, Blower, and Exhauster. See adv. p. 252. Fire Brick, Tile, and Clay Retorts, all shapes. Borgner & O'Brien, M'Frs, 23d St., above Race, Phila., Pa.

Don't buy until you see the \$4 Drill Chuck; holds 0 to 9-16. A. F. Cushman, Hartford, Conn.

Diamond Planers. J. Dickinson, 64 Nassau St., N. Y. Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

50,000 Sawyers wanted to send their full address for Emerson's Hand Book of Saws (free). Over 100 illustrations and pages of valuable information. How to straighten saws, etc. Emerson, Smith & Co., Beaver Falls, Pa.

For Wood-Working Machinery, see illus. adv. p. 252. Eclipse Portable Engine. See illustrated adv., p. 252.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 253. For Separators, Farm & Vertical Engines, see adv. p. 220.

Elevators, Freight and Passenger, Shafting, Pulleys and Hangers. L. S. Graves & Son, Rochester, N. Y. Clark Rubber Wheels adv. See page 237.

Steam Engines; Eclipse Safety Sectional Boiler. Lambertville Iron Works, Lambertville, N. J. See ad. p. 141. 4 to 40 H. P. Steam Engines. See adv. p. 252.

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. Rollstone Mac. Co.'s Wood Working Mach'y ad. p. 237.

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

For best low price Planer and Mather, and latest improved Sash, Door, and Bini Machinery, Send for catalogue to Rowley & Hermance, Williamsport, Pa.

Elevators.—Stokes & Parrish, Phila., Pa. See p. 252. National Institute of Steam and Mechanical Engineering, Bridgeport, Conn. Blast Furnace Construction and Management. The metallurgy of iron and steel. Practical Instruction in Steam Engineering, and a good situation when competent. Send for pamphlet.

Reed's Sectional Covering for steam surfaces; any one can apply it; can be removed and replaced without injury. J. A. Locke, Agt., 32 Cortlandt St., N. Y. C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 205.

For Yale Mills and Engines, see page 252. For Pat. Safety Elevators, Hoisting Engines, Friction Clutch Pulleys, Cut-off Coupling, see Frisbie's ad. p. 220. For Mill Mach'y & Mill Furnishing, see illus. adv. p. 221.

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 21. Machine Knives for Wood-working Machinery, Book Binders, and Paper Mills. Large knife work a specialty. Also manufacturers of Solomon's Parallel Vise. Taylor, Stiles & Co., Riegelsville, N. J.

Penfield (Pulley) Blocks, Lockport, N. Y. See ad. p. 252.

NEW BOOKS AND PUBLICATIONS.

THE VICTORIA REVIEW. Published at Melbourne, Australia, by the Victoria Review Publishing Company, and edited by H. Mortimer Franklyn, Esq.

This is one of the best magazines that comes to this office from any country. The Victoria Review is published monthly, and its contributors are among the most able and profound writers of the day. The July number, just received, contains papers from several eminent writers, and to better convey an idea of the nature of the publication we append a list of the writers and the subjects of their several contributions in the July issue; Lewes' History of Philosophy, by C. Hamilton Bromby (Tasmania); Nineteenth Century England, by the Rev. W. H. Fitchett; A Few Words about Béranger, by John F. Perrin (New Zealand); Proportional Representation, by Guido Padellitti (Florence); Modern Biology, by Edward B. Sanger (Adelaide); The Place of Religion in Fictitious Literature, by Miss C. H. Spence (Adelaide); A Venetian Dramatist, by James Smith; Sermons on Genesis by Dr. Bromby, by the Very Rev. the Dean of Melbourne; Goethe's "Faust" and Byron's "Manfred," by R. Colonna-Close; The Affairs of Europe, by Emilio Castelar (Madrid); A Menacing Comet, by Richard A. Proctor; The Decay of Matrimony in Victoria, by the editor; The Contemporary Thought of Great Britain, Europe, and the United States. We would like to see this Review more widely circulated than it has heretofore been in this country, for it merits an extensive subscription list, if it is published in a remote English colony on the other side of the globe. We would, therefore, recommend it to the patronage of students and all thoughtful persons, who, we are sure, will be both interested and benefited by receiving the publication regularly. D. Appleton, 3 Bond street, New York, receives subscriptions and furnishes the numbers to their subscribers as soon as they are received.

MANUAL OF THE RAILROADS OF THE UNITED STATES FOR 1880. By Henry V. Poor. New York: H. V. & H. W. Poor. 8vo, cl., pp. 1077. \$5.

Poor's Manual grows fatter and more widely useful every year. This the thirteenth annual number gives the mileage, stocks, bonds, cost, traffic, earnings, expenses, and organizations of something like 1,400 railroads, with an appendix containing a full analysis of the debt of the United States and of the several States.

BOLETIN DE LA SOCIEDAD DE GEOGRAFIA Y ESTADISTICA DE LA REPUBLICA MEXICANA. Vol. V. Mexico, 1880.

The present issue of this valuable scientific publication, which we have just received from the society, embraces the first three numbers of the fifth volume (third series). The articles, as usual, pertain to a wide range of scientific subjects, are very interesting, and give evidence of conscientious study and much painstaking labor on the part of the authors. The contents, in addition to the society's proceedings, embrace contribu-

tions from Sr. Fernandez on the "Determination of the Length of the Seconds Pendulum in Mexico at 2,233 Meters above the Sea Level;" Sr. Leal on a "Study of Mortality in the City of Leon de Akiamas;" Sr. Ramirez on the "Mines and Mineral Productions of Guadalupe in San Luis Potosi;" Sr. Reyes, "Meteorological Observations;" and Sr. Arechiga, "Note on the Saltpit of Sayula." In addition to these signatures, there are various notes and translations by the editors, making altogether a collection which well sustains the high standard reached by the preceding volumes. We congratulate the Mexican Society of Geography and Statistics on having so many earnest workers, in its ranks, and wish it every success.

ELEMENTARY TREATISE ON ELECTRIC BATTERIES. From the French of Alfred Niaudet. Translated by L. M. Fishback. New York: John Wiley & Sons. \$2.50.

Telegraphers, and all others who have to do with or desire to study the nature and management of the various types of electric batteries, will find M. Niaudet's book very serviceable. The translator's fitness for his task is generally vouched for by the capable electrician of the Western Union Telegraph Company, Mr. George d'Infreville.

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) L. H. C. asks: 1. How many two quart Bunsen cells will be necessary to run a Duboscq's electric light regulator? A. About 50. 2. Is the following a proper formula for the battery fluids: for porous cell—1 gallon water, 1 lb. bichromate of potash, 1 1/4 parts sulphuric acid; in outside jar—1 part sulphuric acid to 12 of water (by measurement)? A. Yes.

(2) D. H. F. asks: Will a dynamo-electric machine produce a continuation of sparks between two or more electrodes in the circuit, or must an induction coil be placed in the circuit? A. An induction coil will be required. 2. What is the best material to make the electrodes of? A. Platinum. 3. Why are the buttons on telegraphic instruments platinum tipped? A. Because it is refractory and unoxidizable. 4. Does not every electro-magnet placed in an electric circuit act as so much of a break or resistance coil to the current? A. As so much resistance.

(3) H. S. writes: I wish to build a cistern to hold twelve thousand gallons. It can't extend over five and a half feet below the surface, on account of the quicksand. What shape and dimensions are required to secure the greatest strength in walls? How many bricks will it take to build it? A. A cistern twenty feet diameter and five feet deep will hold the quantity named. The number of bricks cannot be given, without knowing the thickness of the walls, and this will depend somewhat upon the nature of the soil backing the walls.

(4) C. W. H. asks: 1. On what part of the axle of a buggy wheel is the greatest friction while the vehicle is in forward motion? A. It depends upon the surface over which the wheel is traveling, the size of the wheel, and the load. Generally a little forward of the vertical line. You may determine this point in any given case by examining an axle long in use, and see where has been the greatest wear. 2. If a wheel could be suddenly freed from its axle while the vehicle was in motion, would the wheel run on with accelerated motion—in other words, if the speed of the vehicle continued the same, could the free wheel pass it? A. No.

(5) G. S. H. writes: 1. I wish to build a small steam yacht; I wish it entirely for speed. The boat must be sufficiently large to carry 500 lb., besides boiler and engine. I have an engine, 2 inch bore by 4 inch stroke. What size boiler and boat will I require, and the speed I can make with same? A. Length 18 to 20 feet by 4 1/2 feet beam, by 28 inches deep; engine, 2 inch cylinder by 4 inch stroke; boiler, upright tubular, 22 inches diameter by 40 inches high; tubes, 1 inch or 1 1/4 inch diameter by 24 inches long.

(6) C. W. asks: 1. Would it not be as well in making the dynamo machine described in SUPPLEMENT, No. 161, to wind the wire round the armature instead of lengthways? A. No. 2. Would the machine be strong enough to magnetize small bars of steel? A. When made according to directions given in the SUPPLEMENT, yes.

(7) J. N. J. asks: Will it require a stronger dam or dike to hold a large body of water than it does to hold a very small body? A. Leaving out of consideration the effect of waves, the depth being the same in both cases, there would be no difference in the strength of dam required.

COMMUNICATIONS RECEIVED.

On Boiler Explosions. By L. H. K. On Hydraulic Cements. By J. D.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending September 21, 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.

Table listing various inventions and their patent numbers, including items like Air engine, Alarm lock, Animal power, Armor plate, Axle arms, Axle carriage, Axle coupling, Bag holder, Baling press, Ball trap, Barrel swing, Barrels, Bed bottom spring, Bell, Belting, Belts, Binder, Blower, Boiler furnace, Boot and shoe sole, Buckle, Buffer roller, Butter press, Button, Car coupling, Car door, Carpet lining, Chair, Check row wires, Chimney cap, Churn power, Cigar holder, Clapboard sawing machine, Cock, Coffee, Colter and jointer, Comb, Copying apparatus, Cornice, Corset, Corset cover, Cot, Damper regulator, Dentist's chair, Doll support, Door hanger, Door mat, Drier, Dust pan, Egg beater, Ejector, Elbow pipes, Electric lighting apparatus, Electric machine, Electrical visual indicator, Elevator, Elevator carrier, Elevators, Exercising machine, Explosive compound, Eyeglass case, Faucet, Feed for horses and cattle, Feed water heater, Feed water heater, Fence, Fence, Fire alarm signal box, Fire engines with hydrants, Fish cans, Flooring clamp, Flour dressing machine, Flue cleaner, Friezing machine, Game apparatus, Garment supporter, Gearing, Glass and other fragile vessels, Grain binder, Grain drills.

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**English Patents Issued to Americans.**  
 From September 17 to September 24, 1880, inclusive.  
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