### ENGINEERING INVENTIONS.

A car coupling has been patented by Mr. John G. Ogden, of No. 46 Jackson Street, Ill. This invention relates to means for automatically coupling and uncoupling railway cars without going between them, and to this end covers novel details of construc tion and arrangement of parts.

A steam boiler has been patented by Mr. Michael E. Herbert, of St. Joseph, Mo. The boiler combines an upper section with a semi-annular chamber communicating with a semi-cylindrical chamber at its rear end, the lower and inner section having a semiannular chamber, and having the hollow bridge communicating therewith, circulating pipes connecting the sections together, and the coal magazine located at the front end of the boiler.

#### AGRICULTURAL INVENTIONS.

A cotton harvester has been patented by Mr. George W. Purcell, of Black Hawk, Miss. It is a device which can be held to the body and operated by hand, and combines a fork in which is journaled a picker disk, with cleaner brushes and means for revolving the disk.

A combined band cutter and feeder for thrashing machines has been patented by Mr. David Grubb, of Waldron, Ind. The cutters consist of circular disks with sharp edges to be pressed down in the sheaves, to insure the cutting of the bands, and the feeders have prongs or teeth to spread the grain and distribute it.

A roller bearing has been patented by Messrs. Henry H. Clay and Millard D. Philleo, of Cedar Falls, Iowa. The bearings are formed by ferrules fixed to the ends of the roller, to revolve in grooves in the faces of their supporting bars, with other novel features, the special object being to prevent clogging at their ends of endless carrier rollers of harvesting machines by straws and the like winding around the axles or gudgeons.

A convertible plow has been patented by Mr. Henry D. Terrell, of Covington, Ga. It is made with a foot plate or piece with edge fianges, and an offset shouldered end allowing the attachment thereto of interchangeable side plates or wingsand plow points of various kinds, so as to make, as required, a scooter or bull nose plow, a turning plow, a shovel plow, and a scraper plow; also permitting small or short plow points to be used.

# MISCELLANEOUS INVENTIONS.

An apparatus for the electrolytical separation and deposition of metals has been patented by Mr. Bernard Moebius, of Chihuahua, Mexico. This apparatus is for refining silver and separating it from gold, platinum, copper, lead, and other metals, by electricity. The anodes and cathodes form the elements of an electric battery, the solution of which is contained in a liquid proof tank, the contents of which may be heated by steam pipes as desired, enameled metal or earthenware being necessary for the tanks when the contents are to be heated. The cathodes and anodes have brushes for preventing the accumulation of metals and peroxides and bubbles of oxygen or hydrogen on the elements, and the exciting liquid consists of a solution of nitrate of silver acadulated with nitric acid, to which quantities of nitrate of copper are added. By heating the solution its resistance is decreased, and the decomposition of the anode is greatly facilitated. It is claimed for this apparatus that the operation is continuous and very simple, and large quantities of silver can be rapidly refined at a low cost, as only a small quantity of chemicals is used; the apparatus requires but little attention, all the parts can be easily replaced, and there is no need of filtering, transferring, or handling acids producing noxious and dangerous gases.

A bottle stopper has been patented by Mr. Charles L. Morehouse, of Brooklyn, N.Y. It is simple in construction, having a threaded screw ring and cap, and various novel features, making a strong and durable stopper to seal tightly fruit jars, cans, or other vessels.

A hub cap has been patented by Mr. Albert F. Taylor, of Pawtucket, R. I. This invention covers a novel construction and arrangement of parts for closing the outer end of a hub, and thus preventing the grease from flowing out and sand from passing in between the axle box and axle.

Agarment has been patented by Mr. Ignac Pick, of London, Middlesex County, England. It combines in a single article a cape, boa, and muff, the muffs or pockets for the hands being at the lower edge of the cape, and the boa being stitched around the neck to form a collar.

A feathering paddle wheel has been patented by Mr. James Williams, of Laytonville, Md. This invention relates to such wheels formed with rotary paddles supported on radial shafts and operated by cams located within the wheel hub, and covers a

This invention covers a novel design of gauge for use by mechanics for squaring corners and hexagonal corners, gauging equilateral triangles, finding the center of a square, measuring the angle of a center hole, measuring the depth of apertures, etc.

A dish warmer has been patented by Messrs. Richard V. Lewis and Henry C. Conger, of New York city. The device is constructed to inclose the dishes, and is designed to be placed near the table in the dining room, where the heat rising from the most convenient fuel or a lamp will heat the dishes and keep them warm till required for use.

A hoof clamp has been patented by Mr. Alexander H. Carroll, of Philadelphia, Pa. It is formed of two clips, each having a hook prong at the end on its inner surface, and a transverse dovetail groove in the front surface, with a key fitting in the groove to hold the clips together, the object being to hold split hoofs in correct position until the parts have grown together, when the clamp is removed

A bag holder has been patented by Mr. John G. Wagner, of Cooperstown, Pa. In combination with a baseboard having staples is a standard with means for engaging the mouth of a bag, and with a base consisting of two crossbars having hooks or catches thereon adapted to be engaged by the staples, the standard having an adjustably connected band, and cam for holding the band to the mouth of a bag.

An improved sash for car windows has been patented by Mr. Eugene D. Mann, of New York city. Double panes of glass are used, forming a dead air space between them, and combined with them and with the frame are duplicate glazing strips and soft or flexible beddings for the panes and glazing strips, whereby the fullest advantages of the dead air space are obtained, and moisture and dust effectually excluded.

A fur clipping and unhairing machine N.Y. has been patented by Mr. Theophil Rasmus, of New York city. The invention covers an improvement on a former patented invention of the same inventor; with a strip over which the fur is passed are knives for cutting off the hair, an air forcing apparatus, combs for holding down some of the hairs that have been laid by the current, the comb so arranged that they will be first moved toward each other, and then downward.

An automatic coffee roaster has been patented in the United States and the principal foreign countries by Mr. William H. Bruning, of Madison, Ind. The invention is intended especially for roasting coffee in large quantities, and requires but one skilled operator to roast one thousand bags of coffee per day. It consists of large revolving cylinders, the shell being unperforated and tightly calked, to protect the coffee from the smoke and gases of the fire. The cylinders have an apertured end with spiral conveyers within, which receive and retain the coffee when the cylinder is revolved in one direction, and discharge it when the motion is reversed. The device also has a breeching inclosing the open end, with a pipe at the top leading to a flue or chimney, to carry off all the steam and odor from the roasting, and a pipe at the bottom for spouting the roasted coffee into a covered cooler upon the same floor or floors below, preventing any coffee smoke or odor within the building.

### NEW BOOKS AND PUBLICATIONS.

COAL MINING DESCRIBED AND ILLUS-TRATED. By Thomas H. Walton. Henry Carey Baird & Co., Philadelphia. Price \$5.

This quarto volume, of 175 pages of text and 24 large plates, after actual workings and apparatus, presents the latest modes of taking out coal contained in coal seams, as practiced in England and the United States The book is the work of a practical mining engineer, and, with much general information concerning coal mines and miners, gives details and actual experiences connected with the working of many mines, treating especially of coal dust and gas, marsh gas, improved methods of ventilation, working levels, and district and panel workings, topographical features, reworking of old mines, drilling and blasting, drainage, underground fires, miners' tools, etc. The various branches of mining work are described in a plain, matter of fact way, easily understood by those previously entirely unacquainted with the subject.

MAGNETO AND DYNAMO ELECTRIC MA-CHINES: with a Description of Elec-tric Accumulators. Edited by Paget Higgs. Symons & Co., London. Price 6s.

This volume is one of a "Specialists' Series" edited by Dr. Paget Higgs and Professor Charles Forbes, all containing much useful information on subjects of current interest, and, without adding much new matter. presents in condensed form an epitome of electrical progress up to recent dates.

A TEXT BOOK OF HYGIENE. By George H. Rohe. Thomas & Evans, Balti-more, Md.

# 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

Lane's Patent Anti-friction Steel Door Hanger and Track. Lane Bros., Box 276, Poughkeepsie, N. Y.

\$15 Telephone Magneto Bells. W. E. Lewis, Corry, Pa Wrought Iron Bridges, Roofs, Girders, and Structural Iron Work. Hudson Bridge Works, Box411, Hudson, N.Y. See our special offer of Single Breech-loader in next eek's paper. J. A. Ross & Co., Boston, Mass

Manufacturers, Mechanics, Artisans, should read the Industrial Review. Send for sample copy. Industrial Review Co., Limited, Philadelphia.

Wanted.-A Steam Engine and Machine Tools. Em ory College School of Technology. Three hundred stu-dents. Ten thousand calalogues circulated annually in Atlantic and Gulf States. Manufacturers correspond with I. S. Hopkins, President, Oxford, Georgia

All kinds of Steam and Water Packing. Greene Tweed & Co., 118 Chambers St., N. Y.

Emerson's E Book of Saws free. Reduced price. 50,000 Sawyers and Lumbermen. for 1885. Address Emerson, Smith & Co., Limited, Beaver Falls, Pa.

Scientific Works by Huxley, Tyndall, Spencer, etc. very cheap. J. Fitzgerald, 20 Lafayette Place, New York. Forced Sale .- Drill Presses. S. M. York, Clev'd, O. Whistles, Injectors, Damper Regulators; guaranteed. Special C. O. D. prices. A. G. Brooks, 261 N. 3d St., Phila.

Agents with \$2 capital wanted. Brown, Elliott & Spears, Silver Creek, N. Y. Experimental Machinery Perfected,

models, patterns, etc. Tolhurst Machine Works, Troy

Brush Electric Arc Lights and Storage Batteries. Twenty thousand Arc Lights already sold. Our largest machine gives 65 Arc Lights with 45 horse power. Our Storage Battery is the only practical one in the market. Brush Electric Co., Cleveland, O.

The Cyclone Steam Flue Cleaner on 30 days' trial to reliable parties. Crescent Mfg. Co. Cleveland, O.

For Steam and Power Pumping Machinery of Single and Duplex Pattern, embracing boiler feed, fire and low pressure pumps, independent condensing outfits, vacuum, hydraulic, artesian, and deep well pumps, air comsers. address Geo. F. Blake Mfg. Co., 44 Washington. St., Boston; 97 Liberty St., N. Y. Send for catalogue

Stationary, Marine, Portable, and Locomotive Boiler a specialty. Lake Erie Boiler Works, Buffalo, N. Y.

Wanted .- Patented articles or machinery to manufac ture and introduce. Lexington Mfg. Co., Lexington, Ky. "How to Keep Boilers Clean." Book sent free by

James F. Hotchkiss, 86 John St., New York. Mills, Engines, and Boilers for all purposes and of

every description. Send for circulars. Newell Universal Mill Co., 10 Barclay Street, N.Y. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

For Power & Economy, Alcott's Turbine, Mt. Holly, N.J. Steam Boilers, Rotary Bleachers, Wrought Iron Turn Tables, Plate Iron Work. Tippett & Wood, Easton, Pa. Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn.

Send for Monthly Machinery List to the George Place Machinery Company

## 121 Chambers and 103 Reade Streets, New York.

If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN patent agency, 361 Broadway, New York.

Guild & Garrison's Steam Pump Works, Brooklyn, N.Y. Steam Pumping Machinery of every description. Send for catalogue.

Nickel Plating .- Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. Com-plete outfit for plating, etc. Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty, St., New York.

Supplement Catalogue .- Persons in pursuit of information of any special engineering, mechanical, or scientific subject, can have catalogue of contents of the Sci-ENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139Center St., N. Y. Walrus and Sea Lion Leather for Gin Rolls and Metal

Polishing. Greene, Tweed & Co., N. Y. C. B. Rogers & Co., Norwich, Conn., Wood Working

Machinery of every kind. See adv., page 438. For Sale .- Steel Figures, \$1 per set. S.M. York, Clev'd, O. to the best manner of disguising the taste, or to take

Woodwor'gMach'y, Rollstone Mach.Co. Adv., p. 14. Drop Forgings, Billings & Spencer Co., Hartford, Conn. We are sole manufacturers of the Fibrous Asbestos emovable Pipe and Boiler Coverings. We make pure

All books and everything relating to electricity cheap. School of Electricity, N. Y.

Solid and Shell Reamers, durable and efficient Pratt & Whitney Co., Hartford, Conn.

Catalogue of Books, 128 pages, for Engineers and Electricians, sent free. E. & F. N. Spon, 35 Murray Street, N. Y.

The Porter-Allen High Speed Steam Engine. South-vark Foundry & Mach. Co., 430 Washington Ave., Phil.Pa. Split Pulleys at low prices, and of same strength and arance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.



#### HINTS TO CORRESPONDENTS.

- HINTS TO CORRESPONDENTS. Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn. Special Information requests on matters of personal rather than general interest, and requests for Prompt Answers by Letter, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remnentation. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Minerals sent for examination should be distinctly marked or labeled.

(1) W. T. T. asks how to find the length diagonally of a given square. For instance, a true square 12'x20 measured diagonally from one corner to the other. A. Obtain the diagonal by squaring the sides; add them together. The square root of the sum is the length of the diagonal. Thus in your true square,  $12^2 = 144$  $12^{2}=144$  = 544, the square root of which is 233238076 inches We have no other printed catalogue of SCIEN-TIFIC AMERICAN articles than such as appear in the closing numbers of each volume.

(2) L. Y. asks: 1. What is good to put in a boiler to clear it of scale formed by the boiling water, and how use it? A. Many back numbers of Sci-ENTIFIC AMERICAN and the SUPPLEMENT treat of this subject at length. 2. What is the largest cylinder that could be used with a boiler 6 feet long, 4 feet in diameter, and what sized screw wheel would be suitable for such a machine? A. Cannot answer this without the detail of tubes, etc. A boiler of the size (a simplecylinder) would be of little use in a boat. 3. Is sturgeon oil a good lubricator? A. Sturgeon oil would probably be as good a lubricator as most fish oils. 4. What should be done with the machinery of a boat to keep it all right during winter? A. Paint all the finished parts with a mixture of white lead, tallow, and lard oil (equal parts); heat and thoroughly mix. Apply hot with a brush. Work a mixture of lard and kerosene oil through the steam chest and cylinder. Pump one or two quarts of kerosene oil into the boiler while steam is on, draw the fire, and blow out clean. Close all openings, and protect from the weather.

(3) H. P. writes: 1. By what means can I keep cold a gold ring or other jewelry that contains a precious stone while hard-soldering it? A. The safest way is to take the stone out. If the shank is very light, the setting may be wrapped in a rag and kept wet. 2. What does the pickle consist of which brass finishers use for brightening brass, such as clock trimmings? A. Dipping bath for sheet brass: Sulphuric acid 1 pound, nitric acid 1 ounce, muriatic acid 1 ounce, niter 1 pound, water 1 ounce. 3. How can I repair old zinc clock dials from which the enamel is partly chipped off? A. By filling the chipped places with thick white japan varnish, and baking as in the process of japanning. 4. What kind of varnish or lacquer is used on polished brass, and how is it to be applied? A. Thin shellac varnish. Heat the articles to 150° as near as you can guess, and varnish quickly with a flat camel's hair brush.

(4) R. B. asks for (1) a mixture or dip to clean brass ware, brass coach trimmings, something that would not be any worse than strong lye-water in its effects on the hand. A. Take 1 ounce oxalic acid, 6 ounces rotten stone, 1/2 ounce gum arabic, all in powder. 1 ounce sweet oil, and sufficient of water to make a paste. Apply a small portion, and rub dry with a flannel or leather. The liquid dip most generally used consists of nitric and sulphuric acids, but this is more corrosive even than the alkalies. 2. A receipt or direction as Curtis Pressure Regulator and Steam Trap. Seep. 14. cod liver oil without buying the compounds they have on hand in drug stores? A. Make an infusion of Irish moss, strain, and agitate with equal parts of the cod liver oil, flavor with oil of wintergreen, or an emulsion can be made by agitating the oil with milk with a little rum arabic. Flavor as before.

special construction and arrangement of parts.

A detachable button or stud has been patented by Mr. Jacob L. Lindauer, of New York city. It is made with a back plate with a spring, and slotted to receive the bent parts of two J-shaped bars which have teeth in their adjacent convex surfaces, whereby both the bars will be turned by the movement of either.

A harness and neck yoke for double teams has been patented by Mr. Roswell R. Noyes, of Darlington, Wis. The back pads or skirts have means for holding the ends of the neck voke, and the neck yoke is adapted so to be held, whereby the weight of the tongue of the vehicle may be borne upon the backs instead of the necks of the horses.

A chamfering plane has been patented by Mr. Richard V. Wicks, of Brooklyn, N. Y. It has a peculiarly constructed stock with an enlarged oblique opening down through it for introducing a guide corresponding with the shape of the chamfer or moulding, and the cutter being also suitably formed, with other novel features

A combination gauge has been patented by Mr. Andrew J. Hellings, of Philadelphia, Pa.

This book is a treatise on the principles and practice of preventive medicine from an American standpoint, by a practitioner and professor of long experience. It is a book which cannot fail to be useful at a time when the public mind is in a state of apprehension as to the possible early advent of an epidemic.

COMPARATIVE PHYSIOGNOMY. By James W. Redfield. Fowler & Wells Co., New York.

This is a late edition of a book heretofore widely known. The publishers say of it that "one may read the book out of mere curiosity, or may look at it from a humorous point of view," but will in any case find suggestions of value-a statement which its reputation for many years attests.

## Received.

METEOROLOGICAL OBSERVATIONS AT THE ADELAIDE OBSERVATORY AND ELSEWHERE IN AUSTRALIA, FOR 1881. Under the direction of Charles Todd, Ob-server and Superintendent of Telegraphs.

ARCHITECTS' AND STAIRBUILDERS' TABLES OF TREADS AND RISERS. By John A. Hamilton. William T. Comstock, New York.

asbestos goods of all kinds. The Chalmers-Spence Co. 419 East 8th Street, New York.

Rubber Skate Wheels. See advertisement, page 13. Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York. Hoisting Engines, Friction Clutch Pulleys, Cut-off Couplings. D. Frisbie & Co., Philadelphia, Pa.

Barrel, Keg, Hogshead, Stave Mach'y. See adv. p. 422. Munson's Improved Portable Mills, Utica, N. Y.

For best low price Planer and Matcher, and latest improved Sash. Door, and Blind Machinery, send for and that of the cups; and if so, what the ratio is, and catalogue to Rowley & Hermance, Williamsport, Pa.

### Young Men! Read This!

The VOLTAIC BELT Co., of Marshall, Mich., offer to send their celebrated ELECTRO-VOLTAIC BELT and other ELECTRIC APPLIANCES on trial for thirty days, to men (young or old) afflicted with nervous debility, loss of vitality and manhood, and all kindred troubles. Also for rheumatism, ralgia, paralysis, and many other diseases. neu-Com restoration to health, vigor, and manhood plete guaranteed. No risk is incurred, as thirty days' trial is allowed. Write them at once for illustrated is allowed. pamphlet free.

(5) R. B. R. asks (1) why hemispherical cups, instead of conical, are used on the United States Signal Service Anemometers. A. The hemispherical cups are supposed to present less negative resistance to the force of the wind than any other form, the apice of a hemisphere being in the line of direction of the wind in all parts of its revolution. 2. How the velocity and force of the wind are determined by such anemometers? A. By trial or experiment. 3. If there is a constant ratio between the velocity of the wind how calculated? A. The ratios of velocities are also found by experiment for a standard anemometer, when offer | newly constructed ones are graduated by comparison.

(6) O. A. T. asks what kind of red paint would be most suitable for a towboat's funnel. At present I am using a wash made of red lead and buttermilk, but it is not desirable in wet weather, and red paint made with linseed oil don't keep its color on account of the heat. What would you recommend? A. We know of nothing better than red oxide of iron (Prince's metallic paint, and linseed oil). Any color will

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turn dark by heat if mixed with any substance that re- that pressure? How long would a 2 in. iron pipe (such sists water. You might try solicate of soda with a color and a little lime as a water color. 2. Please decide between two persons, A and B, the difference, if any, between a square foot of measurement and a foot square? A says there is no difference, while B maintains that a rating surface will answer your purpose. If the pipe is foot square is equal to a cubic foot. Who is right? A. good and lap welded, you can carry any pressure up to There is no difference between a foot square and a square 100 lb. The pipe should be equal to 500 lb, pressure. foot, but a great difference with any other number. A foot square is not a cubic foot. "Square feet" is superficial measure, while "cubic feet " is solid measure.

(7) O. F. T. writes: In "America; an Encyclopedia of its History and Biography," by Stephen Morrill Newman, M.A., speaking of steamboat speed, it says: "In 1873, at a trial of steamboat speed, the Mary Powell ran on the Hudson, from New York to Poughkeepsie, 76 miles, in 3 hours and 3 minutes," which would be nearly 25 miles an hour (24.9+). How is this? A. The speed given in the "American Encyclopedia" was probably attained on a strong flood tide, and perhaps strong wind in her favor. The distance to Poughkeepsie is 741/2 miles, not 76 miles. This would reduce the speed to 24.44 miles per hour. A strong flood tide is from 3 to 3½ miles, which deducted gives a speed through the water say of 21.44 miles. An average of several runs by same boat on her regular service, from accurate notes taken by Mr. Skeel, gave 192 miles. Haswell gives the result of a run to Poughkeepsie in 1867 on flood tide, a speed of 22.37 miles; deduct 3 miles for tide gives 1937 miles through the water. We know of no greater speed by steamboat than made by this boat. We are quite sure no boat has ever made 25 miles per hour through the water.

(8) S. S. W. asks if there are any chemicals that can be used to remove paints and varnish from wood so it would not injure the wood. Something that has very little potash or soda in it, as the above articles are injurious to the wood. A. The best plan is to use either soda or potash. The following receipt is a good one: Mix 1 part by weight of American pearl ash with 3 parts quick stone lime, by slaking the lime in water and tt is largely used to clear boilers of incrustation where then adding the pearl ash, making the mixture about the consistence of paint. Lay the above over the whole of the work required to be cleaned, with an old brush; let it remain 14 or 16 hours, when the paint can be easily scraped off. If the foregoing is not satisfactory, the paint can be wetted with naphtha, repeating as often as is required, but frequently it is claimed one application will dissolve the paint. As soon as it is softened, rub the surface clean. Chloroform mixed with small quantity of spirit of ammonia has been employed very successfully to remove the stains of dry paint.

(9) G. H. P. asks (1) for a receipt for makingwhite ink. A. White ink is prepared as follows: Mix pure, freshly precipitated barium sulphate or fiake white with water containing enough gum arabic to prevent the intermediate settling of the substance. Starch or magnesium carbonate may be used in a similar way. These must be reduced to impalpable powder. 2. Also the composition of Chinese white, and the nature of it? A. For the manufacture of Chinese white: Take as much as is required of zinc white finely ground, put it on a marble or glass slab, mix it into a cream of the required consistence by adding mucilage of gum tragacanth, grinding with a glass muller. For quantity re-quired to fill an ordinary sized Chinese white bottle, add to above 10 or 12 drops of thick gum arabic mucilage and 5 or 6 drops of pure glycerine; grind well together, and fill bottle by aid of palette knife.

(10) F. Y.—The height of hills can be readily measured by the aneroid barometer, 900 feet elevation to 1 inch depression of the barometer, or parts in proportion, for ordinary use. For more exact work see a work on the aneroid barometer and its use, by Plympton

(11) F. L. N.-"B-ham," of which you write, means *Birmingham*, the English wire gauge. Its numbers are from one to two sizes larger than the American gauge. Any hardware storeshould have both kinds on hand

(12) E. J. R. writes: I have a 4 inch exhaust pipe 60 feet high from the heater. Standing in the open air, the condensation is very great. What kind of condenser can I use that I may catch the water and lead it back by a drip pipe to the feed water tank? A. You may turn the exhaust pipe down into the mouth of a large receiver upon the roof, with a drip pipe from the bottom to your tank. Would not advise you to return the exhaust drip to your boiler.

(13) T. D. W. P.-There is very little reliable knowledge as to the average age of mankind in ancient times. The accounts of the ages of noted persons and rulers of ancient times go very little toward establishing the average of the common people. From 'I considerations of the wastefulness of life, through a I norance and low state of civilization among the common people, as against a primitive vital strength, we are of the opinion that the average duration of modern rive much information on this subject in works on anethn

as is used for drive wells) have to be to furnish boiler capacity enough, and how much pressure would it stand with cast iron caps screwed on each end? A. Two square ft. of fire surface; 4ft. of 2in. pipe used as a gene-

(16) J. G. H. asks for the best way of heating a large building-whether by having steam pipes around the building, or by heaters and blowing hot air around. A. Placing coils of pipe along the walls is far the cheapest and best method of heating factories.

(17) M. C. J. asks: 1. What is a good, clear, cheap, gold laquer for fine polished brass work A. Make the lacquer with 95 per cent alcohol, 1 pint; best shellac or seed lac, 1 ounce; dragon's blood, 1 drachm; put all in a bottle and shake up every day for a week and let it settle. When settled, decant the clear lacquer into another bottle. Dilute with 95 per cent alcohol until it will spread with a camel's hair brush to suit. The color may be varied by using gamboge for yellow, which with the dragon's blood will give, by mixing, various shades from a deep yellow to orange. 2. How is it applied? A. Warm the brass work to 175°, or nearly the heat of boiling water, and spread the lacquer quickly with a flat camel's hair brush, one-half to one and a half inches wide, according to size of piece to be covered. Then place in a warm oven for half a minute, which gives to the lacquer a fine gloss. 3. What sort of metal or alloy is used for making cast iron door bells, and the process of casting the same? A. Cast iron bellsare made in the same manner as other iron castings, but poured with hard iron.

(18) A. D. S.-The niter of salt you ask bout is probably saltpeter, and may be sodium nitrate or potassium nitrate. Your salt soda you say is used in boiler is, no doubt, sal soda, or common washing soda; hard water is used. It is harmless, and recommended such purposes

(19) C. P. S. writes: 1. How can I arrange two vessels so that, when water or liquid is poured into one, the water will remain at a higher standpoint in the other? A. This cannot be done except by placing in the two vessels fluids of different specific gravities. For example, you may place water in one vessel and oil in the other. 2. Is there a siphon that, automatically, will take water from a vessel and convey it to a higher point or vessel? A. There is no siphon that will answer your purpose. 3. How can a name be put upon a razor, so that the letter will go below the surface, the handle being made of bone or gutta percha? A. Coat the razor blade with an asphaltum varnish or with ordinary beeswax, and trace the characters you wish to etch with a needle, then apply to the lines so traced a mixture of nitric and muriatic acids. 4. Where can I find out about the lost arts? What are the lost arts? A. A lecture delivered many times by Wendell Phillips covers the ground very entertainingly. 5. How can I make a fountain (miniature), so that it will throw water higher than the vessel supplying the same, the fountain working automatically? A. Herron's fountain, described in almost all works on physics, throws water higher than its source. 6. Is the construction of a perpetual motion a possibility? A. No.

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	D		
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Bale tie, L. E. Evans 310,502			
Baling press, W. T. Anderson 310,357	Е		
Ballot box, W. P. Furnell 310,506			
Barrel swing, P. A. Potter 310,539	$\mathbf{E}$		
Bat, base ball, W. T. Brown 310,248	$\mathbf{E}$		
Bath tub, A. M. Waterworth 310,344	F		
Dathing commont M I Dooma 210 171	F		

Billiard cue, O. F. Mitchell ...... 310,456

		-
Burglar alarm, H. T. Helmbold		Gra
Burial casket, N. Rappleyea	310,223	Gra
Bushing or bearing, friction roller, A. P. Daboll Button, E. Berman		Gra
Button and fastener, combined, M. Hamburger	310,273	Gra Gra
Button fastener, E. Kempshall Button fastener setting machine, F. H. Richards.	310,524 310,541	Gri
Button or stud, detachable, J. J. Lindauer	310,293	Gu
Button setting instrument, E. Kempshall Calipers, F. G. Lilja		Gu Ha
Cans, etc., filling machine for, J. J. Gorman	310,268	На
Car brake, L. C. Huber Car coupling, Harrison & White		Ha
Car coupling, C. O. Myers	310,535	Ha
Car coupling, J. G. Ogden Car coupling, C. & W. Speer		Ha Ha
Car moving device, E. Barnes		Ha
Car replacer, R. Jones Car starter, J. Goodfellow		Ha Ha
Car stock, Perkins & Burton		На
Cardboard cutting machine, S. J. Murray	310,534	' He
Carpet cleaning machine, J. B. & L. M. Peters Carpet fastener, G. C. Myers		' He
Carriage jack, J. McFarland	310,453	He
Cartridge crimping machine, E. Parker Cartridge loading implement, C. F. Loudon		Hi Hi
Chain link, W. Gerhard		He
Chain links, machine for making and twisting, C. H. Reinisch	210 217	; <b>H</b> o
Check row wires, anchor stake for, W. H. Clay		H
Check spring, tension, T. H. Hicks		Ho Ho
Chimney cap, H. S. Dickinson Chopper. See Cotton chopper.	910'991	H
Chuck, S. Moore		Hu
Chute, coal, J. Heatherington Cider press, J. & C. Gype		Ice
Clamp. See Yoke clamp.	-	Ice
Clamp, W. H. Golding Clap. See Album clasp. Corset clasp.		Ice Ine
Clasp or fastening, G. Frost	310,504	Ins
Cleaner. See Boiler flue cleaner. Colter cleaner.		Ins
Cotton cleaner. Clock system, electric pneumatic, C. A. Mayr-		Iro
hofer	310,530	Jao
Clover hullers, rubber for, J. N. Kailor		Joi
Cock, gauge, Atwood & Slate	310,490	Ke
Coffee and spice mill, C. Halstead Coffee pet, L. P. Jenks		Ke Kn
Coffin, L. Eichelberg	310,262	La
Colter cleaner, F. E. Jeanjaquet Composing stick, W. Hendrickson		La La
Concrete walls, mould and mould hoisting appara-		La
tus for building, T. W. Carrico	310,377	La
Conveyer apparatus, J. F. Downing Corn husking machine, I. M. Chase		La
Corset clasp, L. Hill	310,512	La
Cotton chopper, H. T. Butler Cotton chopper, J. S. Lamar		La La
Cotton chopper and cultivator, combined, L. Z.		La
Grigsby Cotton cleaner, J. Ralston		La
Cotton gin rib, W. F. Edwards	310,193	La
Coupling. See Friction coupling. Thill coupling.		Le Lif
Pipe coupling. Coupling hook and loop, Harris & Baltzly	310,274	Li
Cover for culinary vessels, Schimper & Siedhof		Lo
Cranes, system of traveling transfer, W. Lowe Cringle, J. W. Greene		' Lu Lu
Cultivator, J. Lane.	310,289	Ma
Cultivator and seeder teeth, attachment for, H. O. Lewis		Ma Me
Cut-off for hose nozzles, L. B. Smith	310,326	
Cut-offmechanism, valve, J. Dow Cut-off valve, G. H. Reynolds		Me
Cut-off valve gear, J. B. Pitchford	310,310	Me
Cutter. Seel Edging cutter. Paper cutter. To-		ί <b>Μ</b> ε
bacco cutter. Washer cutter. Wick cutter. Damper, J. M. Read	310,224	Me
Demijohn or bottle, A. Hoeber		M€ ¦M€
Dental drill, R. M. Ross Dental impression cup, A. Garner	310,407	1 1916
Dental plate, Spyer & Ingalls		Me
Derrick and carrier, grain and hay, T. B. Elliott Dish warmer, Lewis & Conger		' Me Mi
Distillation of petroleum, process of and appara-		Mi
tus for the fractional, R. Dean Dividing instrument, draughtsman's, P. S. Marks.	310,497 310,450	Mi
Door closer, E. H. Brown	310,179	
Door hanger, O Seely Drawer, M. Meyer		Mo Mo
Drill. See Dental drill.		Mo
Easel, T. C. Vail Easel, picture exhibiting, J. D. Richards	310,481 310,319	Mı Mı
Edging cutter, A. Rodgers	310,321	
Electric signal, visual, F. M. Godfrey Electrical conductor, H. C. Watt		Mu Na
Electrical conductor binder, J Brady	310 177	Or
Electrical wires, metallic curbing for containing,		Pa
P H. Griffin Electricity, apparatus for measuring, J Caude-	01U,X/?	Pa Pa
ray		Pa
Elevator, P. F. Corbett	910,183	Pa Pa
gine. Traction engine. Wind engine.		Pa
Envelope, G. W. Crane Evaporating pan and furnace, C. W. Frick		Pa Pa
Feed rack and manger, combined, W. S. Downing	310,261	; Pa
Fence post, Carpenter & Dudley Fence strips, device for making barbed, J. W.		Pa
Ells	310.394	Pe
Fence wire strainer, S. W. Fulton Fertilizer distributer and planter, F. M. & W. E.	310,505	Pi Pi
King	310,208	Pla
Fire alarm box, automatic, W. C. Hess Firearm, magazine, G. N. Spencer	310,424	Pla   Pla
Fire extinguisher automatic C L Horack		

421	Grading machine, road, J. D. Adams	310.165
<b>22</b> 3 ¦	Grain scourer, A. L. Teetor	
259 361	Grain separators, measuring, sacking, and regis- tering attachment for, J. Forrest	310.503
273	Grate, J. W. Houston	310,514
524 541	Grate front, E. A. Jackson Grinding mill, roller, W. H. Wakeford	310,437 310 236
293	Guard. See Hose guard.	010,200
525	Gun, compressed air multiple, L. S. Chichester	310,382
292 ,268	Hanger. See Door hanger. Harness and neck yoke for double teams, R. R.	
435	Noyes	
511   535	Harness hook, J. Wagner Harrow, J. H. Barley	
<b>460</b>	Harrow, C. Drew et al	310,499
327 492	Harrow, disk, Swift & Phelps Harvester, J. W. Reams	
520	Harvester, cotton, G. W. Purcell	310,314
197 463	Harvester, grain binding, J. F. Seiberling Hatchway lock, spring, W. J. Ritchey	
534	Heated surfaces, fabric for covering, H. W	
,307   ,217	Johns Heating apparatus E. Kraschovitz	310,205
453	Hee! burnishing machine jack, E. E. Spencer	310,470
,306 ,295	Hinge and stay. trunk, J E. Ladd	
,267	Holder. See Bag holder Lamp holder. Pen	010,100
017	holder Sack holder. Sash holder.	
317 ,384	Hook. See Harness hook. Horse power brake, B. J. Irish	310,436
,426	Horses. device for controlling runaway, L. Roll	
,391	Horseshoe nail J. C. Simpson Hose guard, railway W X Stevens	310,231
,303	Hub cap, A. F. Taylor	310,332
,278 ,272	Ice cream, packing and preserving, M. T. Fus- sell	310.266
	sell Ice scraper D. Boyd	
,195	Ice tongs, G. J. Dickson (r)	
504	Insufflator, A. Kibele	310,444
	Insulators and other glass articles, press for the manufacture of, G. W Weyman	310.484
	Iron, making sheet, W. D. Wood	310,354
,530 ,523	Jack. See Boot or shoe jack. Carriage jack. Heel burnishing machine jack.	
,356	Joint See Tube joint.	
,490 ,418	Key fastener, E McDonald	
,204	Knife and scissors, combined, M. Kamak	310,439
,262 ,283	Ladder, J. D. & L. M. Norton Ladder for gathering fruit, portable, H. Huber	
,422	Lamp burner, C. G Webber	310,346
,377	Lamp burner, R. M Dill.	310,392 310 373
393	Lamp, incandescent electric, C. A. Hussey	310,516
182 ,512	Lamp, street, R Krausse Lantern, signal, A H. Phillippi	310,209 310,464
, <b>4</b> 93	Lantern, tubular, F. Dietz	310,188
,446	Lantern, tubular, T. Phillips	
<b>416</b>	Latch, gate, W. R. Lampton Lathe, multiplex turning, Pennington & Gatch-	310,528
315	ell Lathe tail stock, A. Dodds	310,538 310,260
199	Lead vessels, constructing, H. Egells	310,500
974	Lifter. See Transom lifter. Links, manufacture of, P F. Greenwood	310 415
,274 ,468	Lock. See Bag lock. Hatchway lock.	010,110
449	Lubricator. See Pulley lubricator.	910 999
414 ,289	Lumber stacker, W. T. Smith Mail bag, Given & Dunning	
<b>~</b> ^^	Marquetry, A. J B. A. Chatain	
,290 ,326	Measuring and facing machine, cloth, Heumann & Pease	310,425
189	Measuring distances, apparatus for, L Cerebo-	
,318 310	tani Mechanical motor, M. Coon	
	Medicine, liver and kidney diseases, remedy for,	
224	G. P. Hilton Metal bending machine, O C. Knipe	310,427
202	Metal, rods, coiling, R. W Kennedy	310,526
,467 ,407	Metals, apparatus for the electrolytical separation and deposition of. B. Moebius	
233	Metals, separation of, B Moebius	310,302
,263 ,291	Metallurgical furnace, W McKenna Middlings purifier, J. M Case.	
	Mill. See Coffee and spice mill Grinding mill.	
497 450	Roller mill. Windmill. Mill for grinding or pressing coffee, spices, etc., O.	
,179	Unger	
, <b>22</b> 9 , <b>2</b> 99	Motion, device for converting, W. H. Atkinson Motor. See Mechanical motor.	910,109
481	Movement cure apparatus, M. G. Farmer	
481 ,319	Music leaf turner, E. G. Hastings Music sheet for mechanical musical instruments,	
321	P. Ehrlich	310,501
412 345	Musical instrument, mechanical. C Donadoni Nail See Horseshoe natl	
177	Organ stop action, M S Wright	310,239 310 20e
271	Package wrapper, D D Kelley Paddlewheei, feathering P C Marsh	310,451
,252	Paddlewheel, feathering J Williams Pan See Evaporating pan Frying pan	310,350
,252 ,183	Pantograph. M Diamond	310,186
	Paper. asbestus, S. Tingley	310,334
,495	Paper box. C. M Arthur Paper cutter, A D Hoffman	310.513
<b>,4</b> 03	Paper pulp engines, roll for, J. H. Horne	310,203
261 ,250	Parer, apple, D H Goodell Pattern for draughting dresses, adjustable, A.	310,196
	McDowell	310,297
,394 ,505	Pen holder, double, C R. Arnold Pipe case, C. & H. Kock	
	Pine counting W R Middleton	310 300
,208 ,424	Plane. W F Achenbach . Plane, bench, W Steers . Plane, chamfering, R V Wicks .	310, <b>1</b> 63 310,473
,328	Plane, chamfering, R V Wicks Planter and cultivator. cotton seed, J. F Ed-	310,349
,432	I MALICI AND CURIVATOR, COROLI SEEU, J. F. Ed-	

inopology and ethnology.	Block. See Swiver block.	Firearin, magazine, G. A. Spencer 310,320	
(14) P. R. writes: I want to make a flue	Blower, fan, H. H. Packer 310,219		
boiler of steel $\frac{1}{6}$ inch thick, 4 feet long, 15 inches in	Boat. See Torpedo boat.	Fire extinguishing compound, F. Frohlich 310,404	
diameter with 90 one inch fuer. Beilen to he a plain	Boiler. See Steam boiler.	Fireplace, open, I. Hayes 310,277	Planter, corn, W L Rucker 310,543
diameter, with 22 one mich nues. Boner to be a plain	Boiler. See Steam boiler. Boiler flue cleaner, J. R. Woodworth 310,549	Flour packer, L. Creveling 310,496	Plow, G, W Bedinger 310,243
cymider with me under it, and me draught to return in	Bolting reel. J. Warrington	Folding table, J. Benedict 310,245	Plow W E Brown
the flues. The dealer the steel was got from said it	Book, black leaf check, G. Powley 310,311	Friction coupling, J. C Blevney 310,173	Plow M L. Rinehart
had a strength of 65,000 pounds. Now, what pressure	Book, cashier's and salesman's check, J. A. Guss 310,508	Fruit and nut gatherer, G. W. Hogan 310,429	Plow, convertible. H. D. Terrell
will the boiler safely stand, and please give me the rule	Book, child's copy, H. P. Hurst 310,515	Frying pan, H. F. Bock	Pneumatic separator, D. Car-Skaden
for finding it, if there is a rule? A. For the bursting	Book, railway passenger tariff and distance guide,	Furnace. See Metallurgical furnace.	Pot. See Coffee pot.
65.000 lb.	S.F. Stevens	Furnace for the manufacture of iron direct from	Potash, apparatus for the manufacture of prussi-
strength of your boiler, = 8,125 lb., strength for	Book, railway time table and distance guide, S. F.	the ore, C. Adams 310,164	ate of, E. R. Carhuff
. 8	Stevens	Furnace grate, F. V. Medynski 310,215	Post. See Fence post.
1/2 inch thick; 8,125	Boot, J. R. Dean	Furnace grate bar attachment, M. A. Foster 310,194	Press. See Baling press. Cider press.
= 1,083 lb., strength	Boot and shoe burnishing machine, W. R. Albert-	Gauge, combination, A. J. Hellings 310,420	Pressure regulator, G. Westinghouse, Jr 310,347
half diameter of 71% inch boiler	son	Game, P. K. Dealy 310,388	Pressure regulator and relief valve G. Westing-
1,083	<sup>1</sup> Boot or shoe heel nailing machine, E. B. Allen 310,488	Game of fractions, F. B. Shannon 310,325	house, Jr
of steel for 15 inch shell; - = 361 lb., strength of	Boot or shoe jack, A. L. F. Mitchell 310,532	Garment, I. Pick	Printed.sheets of paper, machine for varnishing,
3	Boots or shoes, toe and instep stretcher for, C. S.	Gas, apparatus for the manufacture of, A. L.	J. T: Hawkins 310,200
shell for good double riveted seams. This should stand	Case	Allen	Printing plates, producing gelatinous, W. B.
a test of 150 lb., and be safe for 100 lb. steam pressure.	Bottle stopper, C. L. Morehouse 310,304	Gas regulator, T. Angell 310,240	Woodbury 310,486
The heads should be 1/4 inch steel, well riveted, with	Box. See Ballot box. Fire alarm box. Paper	Gate, G. Gibson 310,408	Pulley lubricator, loose, W. J. Ormsby 310,536
expanded ends on tubes. Also a bolt brace from head	1 • •	Gear cutting machine, automatic, Brainard &	Pulp engines, bed plate for, A. A. Simonds 310,230
to head in center of space above tubes.	Brake. See Horse power brake. Vehicle brake.	Coes	Putting-out machine, W. M. Hoffman 310,279
-	Wagon brake	Gear, driving and reversing, H. W. Fowler 310,265	Radiator, steam, W. G. Cannon 310,375
(15) W. S. W. asks: What size boiler		Gearing, belt, J. T. Baggs 310,359	Rack. See Feed rack.
will be required to run an engine 1 in. by 1 in.? What	Buckle, trace, or hame tug, A. E. Deibert 310,390	Governor, steam engine, G. W. Bigelow 310,363	Rails, making steel girder street, A. J. Moxham 310,457
pressure should it carry? How thick to carry twice	Burglar alarm, J. G. Batterson	Governor, steam engine, J. W. Thompson 310,479	Railway clutch, cable, N. A. Fisher
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