

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.

Lubricene.—A Lubricating Material in the form of a Grease. One pound equal to two gallons of sperm oil. R. J. Chard, New York.

Assays of Ores, Analyses of Minerals, Waters, Commercial Articles, etc. Technical formulae and processes. Laboratory, 33 Park Row, N. Y. Fuller & Stillman.

Manufacturers of Improved Goods who desire to build up a lucrative foreign trade, will do well to insert a well displayed advertisement in the SCIENTIFIC AMERICAN Export Edition. This paper has a very large foreign circulation.

Cutters, shaped entirely by machinery, for cutting teeth of Gear Wheels. Pratt & Whitney Co., Manufacturers, Hartford, Conn.

15 ft. Steam Yacht, \$250. Geo. F. Sheard, Waltham, Mass.

Electrical instruments of all kinds. One Electric Bell Battery, Push Button, and 50 feet Wire for \$4.00. Send for catalogue. H. Thau, 128 Fulton St., N. Y.

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

Boilers ready for shipment, new and 2d hand. For a good boiler, send to Hilles & Jones, Wilmington, Del. Best Steam Pipe & Boiler Covering. P. Carey, Dayton, O. Foot Lathes, Fret Saws, 6c., 90pp. E. Brown, Lowell, Ms. Sperm Oil, Pure. Wm. F. Nye, New Bedford, Mass.

Power & Foot Presses, Ferracite Co., Bridgeton, N. J. Kreider, Campbell & Co., 1030 Germantown Ave., Phila., Pa., contractors for mills for all kinds of grinding.

Punching Presses, Drop Hammers, and Dies for working Metals, etc. The Stiles & Parker Press Co., Middle town, Conn.

All kinds of Saws will cut Smooth and True by filing them with our New Machine, price \$2.50. Illustrated Circular free. E. Roth & Bro., New Oxford, Pa.

"The Best Mill in the World," for White Lead, Dry, Paste, or Mixed Paint, Printing Ink, Chocolate, Paris White, Shoe Blacking, etc., Flour, Meal, Feed, Drugs, Cork, etc. Charles Ross, Jr., Williamsburgh, N. Y.

A Practical Engineer and Machinist, 24 years' experience. Best of reference, marine or stationary; forge; fit; repair. W. Barker, 433 2d Ave., N. Y.

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

Nickel Plating.—A white deposit guaranteed by using our material. Condit, Hanson & Van Winkle, Newark, N. J.

Cheap but Good. The "Roberts Engine," see cut in this paper, June 1st, 1878. Also horizontal and vertical engines and boilers. E. E. Roberts, 107 Liberty St., N. Y.

The Cameron Steam Pump mounted in Phosphor Bronze is an indestructible machine. See ad. back page.

Presses, Dies, and Tools for working Sheet Metals, etc. Fruit and other Can Tools. Bliss & Williams, Brooklyn, N. Y., and Paris Exposition, 1878.

The SCIENTIFIC AMERICAN Export Edition is published monthly, about the 15th of each month. Every number comprises most of the plates of the four preceding weekly numbers of the SCIENTIFIC AMERICAN, with other appropriate contents, business announcements, etc. It forms a large and splendid periodical of nearly one hundred quarto pages, each number illustrated with about one hundred engravings. It is a complete record of American progress in the arts.

Bound Volumes of the Scientific American.—I will sell bound volumes 4, 10, 11, 12, 13, 16, 28, and 32, New Series, for \$1 each, to be sent by express. Address John Edwards, P. O. Box 773, New York.

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

Pulverizing Mills for all hard substance and grinding purposes. Walker Bros. & Co., 23d and Wood St., Phila. 2d hand Planers, 7' x 30', \$300; 6' x 24', \$225; 5' x 24', \$200; sc. cutt. b'k g'd Lathe, 9' x 28', \$300; A. C. Stebbins, Worcester, Mass.

J. C. Hoadley, Consulting Engineer and Mechanical and Scientific Expert, Lawrence, Mass.

Best Wood Cutting Machinery, of the latest improved kinds, eminently superior, manufactured by Bentel, Margedant & Co., Hamilton, Ohio, at lowest prices.

Water Wheels, increased power. O. J. Bollinger, York, Pa. We make steel castings from 1/4 to 10,000 lbs. weight, 3 times as strong as cast iron. 12,000 Crank Shafts of this steel now running and proved superior to wrought iron. Circulars and price list free. Address Chester Steel Castings Co., Evelina St., Philadelphia, Pa.

Diamond Saws. J. Dickinson, 64 Nassau St., N. Y.

Machine Cut Brass Gear Wheels for Models, etc. (new list). Models, experimental work, and machine work generally. D. Gilbert & Son, 212 Chester St., Phila., Pa.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in Scientific American of last week.

The only Engine in the market attached to boiler having cold bearings. F. F. & A. B. Landis, Lancaster, Pa.

The Turbine Wheel made by Risdon & Co., Mt. Holly, N. J., gave the best results at Centennial tests.

Hand Fire Engines, Lift and Force Pumps for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., U. S. A.

For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St. Wm. Sellers & Co.

Wm. Sellers & Co., Phila., have introduced a new Injector, worked by a single motion of a lever.

NEW BOOKS AND PUBLICATIONS.

METALS AND THEIR CHIEF INDUSTRIAL APPLICATIONS. By Charles R. Alder Wright. London: Macmillan & Co. 12mo; pp. 191. Price \$1.25.

In this neat little volume we have the substance of a course of lectures delivered at the Royal Institution of Great Britain in 1877, with thirty or more engraved il-

lustrations of various metallurgical operations. The author discusses briefly, yet with sufficient fullness for popular purposes, the principal processes for reducing metals from their ores, the natural sources of metals, the metallurgy of the different metals, the physical properties of metals, and their thermic, electric, and chemical relations. The style is simple and the matter well chosen.

DOSIA. A Russian Story. Translated from the French of Henry Greville, by Mary Neal Sherwood. Boston: Estes & Lauriat. Price \$1.50.

This is the seventh of the Cobweb Series of choice fiction: a bright, wholesome but rather thin story, as befits its associations. Novel readers will find it an amusing companion for a rainy day in the country, or for beguiling the tedium of a summer journey.



(1) H. P. says: Please inform me of some recipe for removing superfluous hair. A. Make a strong solution of sulphuret of barium into a paste with powdered starch. Apply immediately after being mixed and allow to remain for ten or fifteen minutes. See also p. 107 (9), vol. 38, and p. 25, current volume.

(2) M. A. C. writes: I would like to know how to dissolve bleached shellac, to make it a cement for stone. A. Dissolve it by digestion in 3 or 4 parts of strong alcohol, or by the aid of 1/4 its weight of borax in about 4 volumes of boiling water.

(3) A. K. asks: 1. In rating substances as to hardness, diamond being No. 10, how do aluminum, osmium, iridium and steel as used in steel pens, number, also common and tempered glass? A. Aluminum about 3, iridosmine 6.5 to 7, steel 5.5 to 6, glass 5 to 5.5. 2. Can glass 3/8 inch in thickness be ground to angles of 15 per cent or less, and points as fine as pins, without difficulty, and how? A. No.

(4) D. C. S. asks for a good recipe for cleaning and polishing dirty and tarnished brass. A. Dip for a short time in strong hot aqueous solution of caustic alkali, rinse in water, dip for a few moments in nitric acid diluted with an equal volume of water, rinse again, and finish with whiting.

(5) C. J. H. asks for the simplest way of producing a coating of the magnetic or black oxide of iron on iron plates 3 feet x 6 feet. I think it is called the Barff process. A. See pp. 1041 SCIENTIFIC AMERICAN SUPPLEMENT, and 232, vol. 36, and 4, vol. 37, of the SCIENTIFIC AMERICAN.

How can I make tissue paper impervious to air and water, and yet strong enough to confine gas? A. You may pass the fabric through a solution of about 1 part caoutchouc in 35 parts of carbonic disulphide, exposing it then to the air until the solvent has evaporated.

(6) J. H. J. asks how to use hyposulphite (?) of soda to neutralize chloride of lime in cotton and linen goods after bleaching the same. A. After washing from it the large excess of the hypochlorite, the fabric is passed slowly through a solution containing about 10 per cent of the hyposulphite, and then again thoroughly washed in clean water.

(7) Columbus asks for a recipe for making ink to rule faint lines, such as he is now writing on. He wants it to rule into columns in books. A. Dissolve in a small quantity of warm water 20 parts of Prussian blue by the aid of 3 parts of potassium ferrocyanide, and dilute the solution with thin gum water until the proper degree of color is obtained.

(8) A. I. B. asks: Can I add anything to Arnold's writing fluid which will cause it to give a good free copy in my letter book? A. Try a little sugar.

(9) R. & C. ask for information in regard to the process of printing copies of drawings made on transparent materials, by using chemically prepared paper and exposing to the sunlight. A. It is based on the fact that an acid in the presence of potassium dichromate strikes a blackish-green color when brought in contact with aniline. The paper is prepared by floating it on a bath of aqueous solution of potassium dichromate and a trace of phosphoric acid, and then drying it in the dark. Aniline is dissolved in a little alcohol, and the mixed vapors allowed to come into contact with the sensitive paper that has been exposed to strong sunlight beneath the drawing, when the portions not changed by the sunlight assume the dark color mentioned. All that is requisite is that the paper or cloth original should be fairly penetrable by the light. A piece of paper sensitized as indicated, a sheet of glass to place over the drawing, and a box in which to place the exposed print to the aniline vapor are the only necessary plant.

(10) P. Y. P. writes: 1. To find the number of acres in a farm of valley and hillside land, is it by measuring the general contour of the land, allowing its actual surface, or by measuring and allowing only the imaginary face of the plane of it? A. The latter is the correct method. 2. Can more grain, say rye, be raised on a farm of valley and hillside land, as described above, than on a farm having a flat surface, the area of which is equal to the plane of the former, all other things supposed to be equal? A. No.

(11) Inventor asks: 1. Can you tell me of a book on sound boards? A. We do not know of a book especially devoted to the subject. 2. Also the best kind of wood to make them out of? A. Spruce.

(12) F. C. A. writes: I wish to construct a bar electro-magnet to go in a cylinder 1 inch in diameter and 1 inch long. 1. What size ought the core to be? What number of wire shall I use, and what number of Léclanché cells shall I use (not to exceed twelve) to obtain the greatest possible attractive power, distance 1/8 of an inch? A. Make the core 3/8 inch, wind it with No. 24 silk covered wire. Use 6 or 8 cells. 2. In the same space, could a horseshoe magnet be used, with a gain of power over the bar magnet? A. A cylindrical magnet, which is substantially the same as a horseshoe, might be substituted with advantage for the bar magnet.

(13) W. C. H. writes: In turning a tapering shaft in an engine lathe, will the tool if raised above the centers of the lathe turn the taper true from end to end, i. e., neither concave nor convex, the taper to be made by sliding the tail center the required distance? A. The taper will be concave.

(14) H. E. H. asks how to make lime light. A. The lime light is made by directing the jet of an oxyhydrogen blowpipe against a cylinder of lime. The blowpipe is contrived to take the proper proportion of oxygen and hydrogen gas, and the lime is placed in the reducing focus of the jet.

(15) L. F. asks: 1. How many Daniell's or Smee's cells would it require to produce the same effect as 50 Bunsen cells? A. About 100. 2. Is the diaphragm equally necessary in Bunsen's, Smee's and Daniell's cells, or can it be omitted in any one of them easier than in the others, and why so? A. The diaphragm or porous cell is required in Daniell's and Bunsen's batteries, but is not used in Smee's. The porous cell is used only in two fluid batteries; its object is to allow the current to pass, but to prevent the mixture of the two liquids. 3. Is the thickness of the zinc of any importance? A. Only that the thicker zinc lasts longer. 4. Which is the cheapest way to produce electric sparks and to charge a Leyden jar, and what will be the expense? A. By means of a frictional electrical machine. The machines cost from \$10 upward.

(16) R. C. K. writes: I am an engineer by trade; have been at it 9 years. Am out of a position at present and want to learn mechanical draughting. How long would it take me to become a good draughtsman by taking a special course at some university? And with my knowledge of engineering and draughting, would my services be likely to be in fair demand? A. If you are familiar with mechanical operations, you might become a good draughtsman by close application under a competent instructor for one or two years. At present there are many excellent draughtsmen looking for positions.

(17) G. B. M. asks for the cause of the ribs or ridges on the surface of a piece of timber which has passed through a planing machine. A. They are frequently due to the intermittent motion of the feed.

(18) A. F. writes: Having a small quantity of gold and gold plated things, I would like to know the simplest way to melt it. A. Put it in a small crucible with a little borax and melt in a common kitchen fire.

(19) J. H. S. writes: I have three drawings each 21 x 30 inches, which I wish to mount upon cloth like a map, placing them end to end so as to make one whole sheet 90 inches long. The drawings are upon heavy Whatman paper. A. You should stretch wet canvas or factory cloth upon a frame, and while it is still damp apply paste to the backs of the drawings and lay them smoothly on the stretched cloth. When the paste becomes thoroughly dry cut the cloth from the stretching frame and paste a tape binding around the edges.

(20) P. M. asks: What is the difference between the inner and outer rails of a 10° curve 100 yards in length, gauge 4 feet 8 inches? A. If this 100 yards is measured on the center of the curve, whose radius in feet is R, the length of the inner rail is $\frac{R-2\frac{1}{2}}{R} \times 100$, and of the outer rail $\frac{R+2\frac{1}{2}}{R} \times 100$.

(21) W. B. K. asks how to make a shoe dressing for ladies' shoes. A. Soft water, 1 gallon; extract of logwood, 6 ozs.; dissolve at a temperature of about 120° Fah. Soft water, 1 gallon; borax, 6 ozs.; shellac, 1 1/2 oz.; boil until dissolved. Potassium dichromate, 1/2 oz.; hot water, 1/2 pint; dissolve, and add all together. It is preferred to add 3 ozs. of strong aqua ammonia to the liquid before bottling.

(22) J. D. asks: What chemicals can be put into water to increase its efficiency in extinguishing fire? A. Carbonic acid; sodium carbonate.

(23) H. P. writes: Please give me the advantages and disadvantages of substituting a galvanized iron tube 18 inches in diameter and 20 feet high for a wood tank, 5 feet wide and 6 deep, as a container of water in a dwelling house in the country. Would the narrower body of water keep fresh or sweet longer, etc.? Also the thickness of iron necessary to safety, and the number of gallons of water this tube would hold. A. The advantages are in favor of the wooden tank; zinc lined vessels (galvanized) are unsuitable for reservoirs for potable water. See p. 369, vol. 36, SCIENTIFIC AMERICAN. 0-3 inch iron would be stout enough. A pipe of the dimensions specified would contain about 327 gallons when full.

(24) F. L. M. asks: 1. What is the process by which wire is given a copper finish? A. Clean the wire by pickling it for a short time in very dilute sulphuric acid and scouring with sand if necessary. Then pass the clean wire through a strong bath of copper sulphate dissolved in water. 2. Can wire be thus finished and also annealed? If so, how? A. The wire should be annealed first. 3. What other finish can be put on iron wire (annealed), and by what process? A. Zinc—by passing the clean wire through molten zinc covered with sal ammoniac; tin—by drawing the wire through a bath of molten tin covered with tallow.

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

J. H. McF.—A fine quality of kaolin.—F. C. H.—The floury powder consists chiefly, if not altogether, of calcium carbonate.—C. L. G.—They are all silicious limestones. We cannot judge fairly of their value for building purposes from the powders sent.—D. K.—Ferruginous earth or marl.—A. E.—It is a partially decomposed felspar. The white powder is for the most part an impure, silicious, kaolin.—E. H.—It consists chiefly of basic carbonate and hydrated oxide of lead—poisonous.—J. B. V.—It is a fair quality of pipe clay—impure silicate of alumina—probably worth about \$2 per ton in New York.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure the receipt of original papers and contributions on the following subjects: Religion, By W. M. E. Cause of Explosion in Flouring Mills. By G. M.

[OFFICIAL.]

INDEX OF INVENTIONS

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

May 28, 1878,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city.

Table listing various inventions and their patent numbers, including items like Acid, recovering waste sulphuric, Axle box slide, Axle nut, adjustable, Axles, sand guard for carriage, Baker and cooker, steam, Bale tie, L. Arnold, Bale tie, Wynkoop & Bloomingdale, Barrel and box, moth-proof, M. L. Thompson, Barrel for shipping bottled liquors, S. Strauss, Barrel washer, H. Binder, Bed bottom, T. & O. Howe, Bed bottom, G. S. Walker, Bedstead, wardrobe, Hand & Caulier, Bedstead, E. Kiss, Bedstead, invalid attachment for, T. T. Kendrick, Belting, rubber, C. T. Petchell, Bending links, machine for, H. E. Grant, Boiler brooms, operating, A. C. Cock, Boilers, removing sediment from, T. C. Purves, Boots and shoes, making, Hurst & Miller, Bottle stopper, H. Martin, Bottle stopper fastener, L. Kutscher, Brake, car, J. Ramsey, Jr., Brake for railway carriages, R. D. Sanders, Brake for railway trains, safety, L. Blanck, Brake, horse, I. Spitz, Brake pipes on cars, coupling, F. A. Sheeley, Brake shoe, W. McConway (r), Brick kiln, E. F. Andrews, Bridge eyes, making, A. Schneiderlochner, Bridge, self-adjusting, B. Williams, Buckle, trace, Landon & Decker, Burial apparatus, Patterson & Wheeler, Burial casket, W. Hamilton, Can, fish, bait, and oyster, R. Roney, Can, refrigerating, transportation, W. A. Moore, Car coupling, L. Gasser, Car coupling, G. Gifford, Car coupling, C. A. Roberts, Car, sleeping, A. Jaeger, Cars, dust arrester for railway, A. Clarke, Carbureter, gas and air, Dusenbury & Winn, Carriage seats, corner iron for, W. B. C. Hershey, Carriages, reversible handle for, A. Shoeninger, Casting apparatus, J. Duff, Castings, moulding dovetails, Burdick & Easterly, Celluloid, etc., core and tube former, J. W. Hyatt, Celluloid tubes and hollow articles, J. W. Hyatt, Celluloid bar or spring coater, Hyatt & Burroughs, Chair, convertible, M. V. Lunger, Chair, invalid, E. C. Jones, Chair, rocking, L. Rausch, Chuck, A. Saunders, Churn, Barrett & Smith, Churning apparatus, A. N. Myers, Churning apparatus, J. A. Perry, Clasp for ribbons on rolls, H. G. & C. G. Hubert, Clevis, double tree, A. Rosier, Clew line leader, S. R. Brooks, Clock case, G. & D. B. Hills, Clock, repeating, H. Thompson, Clod crusher, C. R. Polen, Sr., Clothes drier, W. F. Wilson, Clothes pounder, O. Schindler, Cook, stop, G. N. Munger, Cooler, beer, H. F. Schmidt, Corkscrew, A. W. Sperry, Corn sheller, J. W. Miller, Corpse preserver, Miller & Schneider, Cotton roving can, J. Hill, Cotton worm destroyer, G. Yeager, Cream, apparatus for raising, J. W. Brady, Cultivator, J. Young, Cultivator, harrow, E. Crane (r), Cutter, rotary, Mellor & Orum (r), Cutting board, F. Weed, Desk, school, J. Edgar, Draught equalizer, J. Branning, Drilling apparatus, well, J. B. & G. R. Elliott, Drilling machine, metal, D. W. Pond, Drills, spring hoe for grain, C. E. Patrie, Drying kiln, E. T. Gennert, Engine cylinder, steam, G. E. Banner, Engine standard and cylinder, steam, G. E. Banner, Engine, wind, H. N. Hill, Engine, wind, Longyear & Clark, Envelope, shade & Lockwood, Escapement, W. A. Wales, Excavator and plow, W. M. Smith, Eyeglasses, J. F. Traub, Fence, hedge, I. O. Childs, Fence, iron, F. R. Martin, Fence post, O. Allen, Fence post, H. A. Pierce, Fence, wire, W. H. H. Frye, Field roller, T. B. Rice, Jr., File, newspaper, D. H. King, Fire alarm signal box, R. N. Tooker (r), Firearm, revolving, B. F. Joslyn, Firearms, extractor for, B. F. Joslyn, Fire escape, I. D. Cross, Flour, manufacturing, R. L. Downton, Fruit pitting and cutting machine, C. P. Bowen, Fruit pitting machine, A. T. Hatch, Furnace, brass melting, J. Fletcher, Furnace door, P. S. Kemon, Furnace, metallurgical, H. Swindell, Furnace, ore roasting, C. Stetefeldt (r), Game apparatus, M. Entenmann, Game counter, C. B. Wessmann, Gas, making illuminating, H. W. Adams, Gas burner, W. Anderson, Gas burners, attachment for, W. W. Batchelder, Gas meter, A. C. Blount.