

Artificial Butter.

To the Editor of the Scientific American: Owing to the receipt of much correspondence concerning my article on artificial butter, which appeared in the SCIENTIFIC AMERICAN SUPPLEMENT, N. Y., Nos. 48 and 49, I wish to state that I own no patent on the process. The only patent held is Mage's, which is owned by the United States Dairy Company, 6 New Churchstreet. All letters, therefore, should be forwarded to that address. The process I described in my article is simply an elaboration of that patented by Mege, and cannot be used without infringing on the United States Dairy Company's patent. HENRY A. MOTT, JR., E. M., PH. D. New York City.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion. If the Notice exceeds four lines, One Dollar and a Half per line will be charged.

Cotton Seed Huller. The judges of the Centennial Commission awarded to D. Kahnweiler, 120 Centre St., N. Y., medal and diploma, for his huller, for the following reasons: For being well made, and thoroughly efficient, supplying an increasing want on cotton plantations: a means for preparing the seed into a highly valuable food.

Agricultural Implements and Industrial Machinery for export and domestic use. R. H. Allen & Co., N. Y.

Skinner Portable Engine Improved, 2-12 to 10 H. P. Skinner & Wood, Erie, Pa.

Engines, Geo. F. Shedd, Waltham, Mass.

Wire Needle Pointer, W. Crabb, Newark, N. J.

Send for circular of Brass Hydraulic Engine for blowing organs. Hilbourne L. Roosevelt, Church Organs, New York.

Patented Articles and Novelties introduced to the trade by G. Webster Peck, Manufacturers' Agent, 110 Chambers St., N. Y. Correspondence solicited.

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

Power & Foot Presses, Ferracuta Co., Bridgeton, N. J.

Magic Lanterns and Stereopticons for Parlor Entertainments and Public Exhibitions. Pays well on small capital. 74 page catalogue free. Centennial Medal and Diploma awarded. McAllister, 49 Nassau St., N. Y.

Superior Lace Leather, all sizes, cheap. Hooks and Couplings for flat and round Belts. Send for catalogue. C. W. Army, 148 North 3d St., Philadelphia, Pa.

F. C. Beach & Co., makers of the Tom Thumb Telegraph and other electrical machines, have removed to 530 Water St., N. Y.

For Best Presses, Dies, and Fruit Can Tools, Bliss & Williams, cor. of Plymouth and Jay Sts., Brooklyn, N. Y.

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

See Boulton's Paneling, Moulding, and Dovetailing Machine at Centennial, B. 855. Send for pamphlet and sample of work. B. C. Mach'y Co., Battle Creek, Mich.

Wanted—Novel and practical invention, by a reliable house, for manufacturing. Address Post Office, Box 25, Chillicothe, Ohio.

Chester Steel Castings Co. make castings twice as strong as malleable iron castings, at about the same price. See their advertisement on page 62.

Articles in Light Metal Work, Fine Castings in Brass, Malleable Iron, &c., Japanning, Tinning, Galvanizing. Welles Specialty Works, Chicago, Ill.

Wanted—A man that thoroughly understands the Galvanizing of sheet iron, etc. None but first class men need apply. Address with references, P. O. Box 903, Montreal, Canada.

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C. A. B. will find directions for bleaching beeswax chemically on p. 299, vol. 31.—M. F. will find a description of the glacier theory on p. 90, vol. 31.—A. K. will find directions for lining casks with a waterproof tasteless compound on p. 11, vol. 34.—C. J. W. will find a description of the Solvay soda process on p. 404, vol. 34.—A. F. C. and others are informed that Mr. Seth Green's address is Rochester, N. Y.—A. L. M. will find on p. 360, vol. 34, directions for renovating clothing.—R. C. will find an explanation of the effect of the moon on the tides on p. 64, vol. 28.—A. J. B., J. K., B. L., H. K., C. F. S., N. J. W., H. A. T., B. M. S., and others who ask us to recommend books on industrial and scientific subjects, should address the booksellers who advertise in our columns, all of whom are trustworthy firms, for catalogues.

(1) R. D. L. T., of Uddevalla, Sweden, asks: Please explain the principle of Bourdon's manometer. Why does the tube straighten when the pressure rises? A. When pressure is applied to the interior of a tube having an elliptical or flat section, the tube tends to

become circular. In thus changing its form, the outer portion is drawn away from the original center of the curve of the tube, and the inner portion is drawn nearer to the original center. The effect of this is to move the center of the curve, or to straighten the tube.

(2) B. R. T. says: We have a new feather bed that smells badly. Is there any remedy except renovating by steam? A. Steam renovation is the best and surest method. The feathers have been placed in the bedding while yet green. The objectionable odor may be got rid of by removing the feathers from the bed, sprinkling them with a little dilute solution of salicylic acid, and allowing them to dry in a warm room, or in strong sunlight in dry air.

(3) J. H. S. asks: What kind of ink or other substance could be used on tin (and not rub or wash off) with a rubber stamp? And what substance could be used in the same manner on porcelain or opal glass shades? A. Try a well triturated paste of dark-colored gum animé, ivory black, and turpentine. This should be prepared at a gentle temperature over a water bath.

I have tried, as you recommended, leather hose on a small force pump for pumping petroleum and its products through, and I find that the fluid penetrates the hose so freely as to render it useless. What could I use to close the pores of the leather? A. We do not know of anything that will answer these requirements. Can you not use a small leaden conduit? This would be impervious to the oil, and flexible to some extent.

(4) R. W. T. says: Please give me a recipe for waterproofing cotton rope, so that the rope can be used constantly under water, and yet impart no unpleasant taste or smell to the water? A. Saturate the materials of the rope with a strong solution of alum, dry-pass through a bath of dilute alkali (aqueous solution), and wash repeatedly in hot water.

How can I fasten galvanized iron balls or cylinders, with holes through the centers, on galvanized wire rope? A. If we understand you, a small screw provided with a set nut will answer; or you can make small knobs with wire, above and below the cylinder, on the wire rope.

(5) C. W. McM. says: The author of an engineer's pocket book, after giving the theoretical, gives the practical, amount of atmospheric air necessary for the combustion of 1 lb. bituminous coal as 891.18 cubic feet; and he then states, as the necessary area for the escape of this volume at the bridge wall, that it will be advantageous to make that area 2 square inches for every 13 lbs. of coal consumed, per hour, and so on in proportion. Am I correct in thus figuring: Given grate bar surface 4 feet long x 4 feet wide = 16 feet? Consuming 208 lbs. coal per hour, this gives 13 lbs. per foot square per hour. Multiplied by 2 square inches, the necessary area given, this shows 32 square inches. Is this correct? A. By the rule as given, the requisite area is 2 x 13 = 26 square inches; but the apparent meaning of the rule is to multiply the pounds of coal burned per hour by 2, to get the area in square inches. Of course we do not know positively what the author intended; but this is our understanding of his meaning. If you make the area between 2 1/2 and 3 square feet, and the other parts are properly proportioned, we think you will secure satisfactory results.

(6) A. Y. McD. says: I have an upright tubular boiler; the grate is 2 feet below the flue sheet. Would it make steam more quickly if I raise the grate 8 or 10 inches? I cannot see how any heat can be lost, and yet I am told by a practical boiler maker that the nearer the fire is to the flue sheet the more economical is the boiler in fuel. A. If there is sufficient air space below you will not be likely to gain anything by the change.

(7) R. W. says: A 28 inch water wheel is put in under a 13 feet head; it makes 464 revolutions per minute, and drives one run of wheat stones and the necessary machinery, grinding 8 bushels per hour with 1/2 gate. An 18 inch wheel, under the same head, is constructed similarly in every particular, but it only makes 365 revolutions. I cannot find a satisfactory solution of the difficulty. Is there a way of calculating the speed derivable from any wheel? A. From the data sent we are not able to throw much light on your questions. If the first wheel is underloaded, and the second has an excess of work, the difference in revolutions is easily accounted for. It is quite possible, too, that the difference is due to design, and is intentional. It is not generally true that, of two wheels, the one that runs the fastest is the best. The best wheel is the one that gives the greatest effect from the water passing through it. For a given case, it can be shown that each wheel has a speed at which it will give the best effect; and manufacturers of successful wheels make use of this fact in perfecting their designs.

(8) A. C. asks: Is the shrinkage equal from middle to each end, in making a long iron casting on end? A. No; it is most at the top of the casting.

(9) C. T. McC. asks: What would be the power of a double engine connected at a right angle, 3 feet by 3 feet, cut-off half stroke, running at 130 revolutions, with 120 lbs. pressure? A. About 3,000 horse power. 2. What power would be exerted at the rim of a pulley 10 feet in diameter. A. Force at periphery of pulley about 25,000 lbs. 3. What size should a multi-tubular boiler be for such an engine? A. Boiler should have from 12 to 15 square feet of heating surface for each horse power of engine.

(10) T. H. Y. asks: Can you give me a recipe for checking, permanently, fermentation in wine and cider, that will not leave any flavor, as sulphite of lime does? A. Bottle the liquor, and immerse a number of the bottles, with the mouths only projecting, in a large vessel of water. Loosen the stoppers and heat the water until of a uniform temperature of 180° Fah.; then remove the bottles, stopper and seal them tightly, and place in an inverted position.

(11) T. O. M. asks: For a stern wheel boat, high pressure, what size boiler and engine do you recommend? The boat is 60 feet long, 18 feet wide, and 3 1/2 feet deep. A. If you use a single engine, attached directly to the wheel, you may make it from 10 to 12 inches in diameter, and of 30 inches stroke. Use a locomotive boiler 40 inches diameter, 12 feet long, with from

400 to 450 square feet of heating surface in fire-box and tubes.

(12) J. F. E. asks: Can you give me a good recipe for making spirit copal varnish? A. Fuse 12 lbs. of colorless gum copal mixed with clean sand in a strong iron vessel capable of being closed airtight, and provided with a suitable stirring apparatus; close the vessel, and while the resin is still in the fused condition pump into the vessel a mixture consisting of 1 1/2 gallons of strongest alcohol, 1 gallon oil of turpentine, and 1 quart of ether; heat for some time with constant stirring. The varnish is clarified by decantation, or, for the finest quality, by filtration through a tall column of granular animal charcoal (bone black).

(13) F. N. B. says: You say, as to winding magnets for telegraph sounders, "wind the magnet with No. 30 silk covered wire." How many feet or what weight of wire shall I use on a magnet for from 1 to 12 miles line? A. About 900 feet or a little over 1 1/2 lb. of No. 28 wire in each helix will answer very well for a line 12 miles long. 2. What kind of iron shall I use for the magnet and armature? The blacksmith's say that iron called nailrod is the softest. Would that work? A. Any kind of soft iron will answer. 3. What difference should be made in winding a magnet for a wire a few feet in length and one 12 miles long? A. About 250 feet of No. 22 copper wire in each helix will make a good set of coils for a magnet to be used in a short circuit.

(14) J. C. asks: How is tetrachloride of carbon made, and what is it used for? A. It is made from chloroform, by acting upon it with a current of dry chlorine gas, or by saturating chlorine with vapor of carbon disulphide, and passing through a red hot tube filled with fragments of porcelain. The products are carbon tetrachloride and sulphur dichloride. The last named is removed by treatment with alkalis. The method first given is to be recommended. Tetrachloride of carbon is said to be obtained as a by product in several technical operations. We do not know to what important technical uses it is applied.

(15) C. K., J. B. M., and others: There is nothing that can be added to silver or nickel electro-plating baths to so influence the deposition of the metal as to obviate the necessity of subsequent burnishing. The whole success of the electro-plater's art lies, first, in producing a smooth and, if necessary, polished surface to the particle to be plated; second, in so freeing the prepared surface from all traces of oil, grease, or metallic oxides that the metal may have absolute contact with the electrolytic deposit; third, that the bath be in proper condition and free from all dissolved, mechanical, and surface impurities; fourth, that the surface of the anode be proportioned to the surface of the cathode or object to be plated. The anode must be of the same metal as that of which the bath is a solution; and the batteries must be constant, and neither too strong nor too weak. The work should be connected with the battery at the moment of or before immersion in the electrolyte. If the current is too strong, the work will be "burned" (the deposit blackened); if too weak, it may be crystalline and liable to scale off. If the conditions are properly fulfilled, the work on coming from the bath, and after having been dried with a little sawdust and a cloth, will present a clear, smooth, metallic appearance, the luster of which is heightened by burnishing.

(16) T. N. H. says: On November 22, at San Francisco, the barometer marked 30.15 inches, at Portland 30.28, and at Salt Lake 30.24. I believe that there is a corresponding decrease in the height of the column of mercury from sea level to different altitudes, and Salt Lake is upward of 4,000 feet above the ocean. I do not understand this report of the barometer. Two years ago I obtained a glass tube of 30 or more inches in length, and from the open end carefully filled it with pure quicksilver, and having previously filled a small bottle with quicksilver, I put my finger firmly over the end of the tube, inverted it, and carefully inserted it in the bottle. There is a vacuum of some 5 inches, and the average reading of the height of the column of quicksilver are 26.5 inches. But the variations do not correspond with my ideas. For instance, it will storm when the mercury marks 26.75, and there will also be fine weather. Again, when the mercury marks 25.75, there will be fine weather and also storm. Again there will be no change or fall in the mercury until some little time has elapsed after the commencement of a storm. The altitude of this place is about 2,500 feet above the sea. Have I properly constructed my barometer? A. We think, from your account, that your barometer is somewhat defective in its action on account of the imperfect removal of air in filling it. We could not do justice to the subject in these crowded columns; but there are several works published by the Smithsonian Institution that will give you considerable information, and in the reports of the weather bureau you will find many facts relating to changes as affected by weather.

(17) A. C. R. says: I have a lump of green vitriol (sulphate of iron). When I placed it on the shelf it was clean but now it is covered with white spots. Please tell me the cause, and also what the white substance is? A. When protosulphate of iron is exposed for any length of time to a dry atmosphere, it gradually loses its water of crystallization, and is converted superficially into a dry white (or greenish white) powder. This may be avoided in great part by covering the crystals with a suitable glass shade.

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

C. H. A.—It is pyrolusite. If free from iron and clay, it is worth from \$10 to \$20 per ton in New York city.—G. A.—It is apparently a portion of the vertebrae of some large animal. It is much broken, and we cannot classify it. The resinous-looking body is bitumen.—S. B. W.—It is sulphide of iron. See p. 7, vol. 36.—M. G. P.—The berry has been examined by several dealers in spices as well as by professional experts; but none of them are able to identify it. Send us a larger sample.—A. G.—No. 1 is trap rock, and contains nothing valuable. No. 2 is limonite, or hydrated peroxide of iron. No. 3 is partially decomposed sulphide of iron. See p. 7, vol. 36.

COMMUNICATIONS RECEIVED. The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and

contributions upon the following subjects: On Railroad Accidents. By J. M. L. On the Hell-Bender, etc. By W. S. A. On Porcelain. By S. W. On Boats at the Centennial. By J. G. S. Also inquiries and answers from the following: H. H.—J. P.—J. N. H.—R. K. B.—J. F. P.—C. S. W.—C. N.—G. G.—R. D. C.—A. B. W.—S. H. L.

HINTS TO CORRESPONDENTS. Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Inquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who sells sail canvas suitable for ice boats? Who makes hardened glass tubes for water gauges? Who sells lactometers? Whose is the best electric engine? Who sells bisulphide of carbon?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

INDEX OF INVENTIONS FOR WHICH Letters Patent of the United States were Granted in the week Ending December 19, 1876. 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 Abdominal supporter, Aerial machine, Alarm for boilers, Amalgamating apparatus, Ash sifters, Atomizer, Bake pan, Bale tie, Barbed metal plates, Bed chair, Bee hive, Bell, Bevel, Blanket, Blasts, Board roofing, Bob sled, Boiler covering, Book case, Book clip, Book support, Bottle stopper, Bottling aerated liquids, Brick treating, Bung for barrels, Button backs, Can head, Can opener, Candy, Car brake, Car platform, Car starter, Car stove, Cartridge shell, Case for stop cocks, Casting glass plate, Check row corn planter, Cheese press, Child's carriage, Chromatope toy, Cigar mold plungers, Cloth finishing machine, Clothes dryer, Clutch for hoist, Coal hod, Coal scuttle and sifter, Coal sifter, Coating of barrels, Coffee pot, Coffey dam, Collars, Concrete pavement, Converting motion, Corn planter, Corn planter, Cotton gin, Cresscut saw handle, Cultivator, Curtain fixture, Curtain fixture, Cuspadoro, Desk and cabinet, Die, paper collar, Dishing metals, District telegraph box, Door check, Door lock, Dredging machine, Drying apparatus, Drying apparatus, Ear muffer, Electro harmonic telegraph, Envelope, Envelope machine, Fan blower, Fare register, Fence, Fence post, Fence post, Filter rack, Fire hose, Fire kindler, Flavoring tobacco, Flower frame, Folding table.

Table listing various items and their prices, including fuel furnaces, gang plows, gas apparatus, and wire bending machines.

Table listing various items and their prices, including oil stoves, ornamenting buttons, and paper ruling machines.

DESIGNS PATENTED.

Table listing patented designs with numbers and names, such as railings, stoves, and glassware.

FOR THE WEEK ENDING DECEMBER 26

Large table listing items for the week ending December 26, including abdominal supports, air chambers, and various mechanical parts.

Table listing items and prices, including piston rod packing, plaiting machines, and reciprocating churns.

Table listing items and prices, including rotary churning, sawing and boring wood, and sewing machines.

WRINKLES AND RECIPES.

Text describing various recipes and mechanical tips, including department of mechanics, engineering, and practical technology.

MUNN & CO. OFFICE SCIENTIFIC AMERICAN, 37 Park Row, New York City.

Advertisement for 'DOLLAR' BRACKET SAW, BEATS 'em all by mail \$1.15. SPATTER WORK BRUSH, 75 cts. Agents wanted. Send for circular. J. J. GREEN, BOONTON, N. J.

Advertisement for The Stockwell Self-Lighting Gas Burner Co., 89 Liberty St., New York.

Advertisement for CENTENNIAL IMPROVED AIR PUMPS, for hand or small power for compressing, exhausting and gas condensing up to 200 lbs.

Advertisement for WOODWORTH SURFACE PLANERS, \$125. Planers and Matchers, \$350. S. C. HILLS, 78 Chambers Street, New York.

Advertisement for BARNES Foot Power MACHINERY, 10 INVALUABLE MACHINES for Mechanics and Amateurs.

Advertisement for CELEBRATED FOOT LATHES, Foot Power, Back-gear, Screw Lathes, Small Hand and Planers for Metal, Small Gear Cutters, Slide-rests, Ball Machine for Lathes, Foot-Crest Saws, Light and heavy, Foot Circular Saws, Just the articles for Amateurs or Artisans.

Advertisement for Wood-Working Machinery, Patent Scroll Saws and Band Saws a Specialty. OVER 500 MACHINES IN USE. Medal at Cincinnati Industrial Exposition. Agents in all large cities. CORDESMAN, EGAN & CO., M'rs, Cincinnati, O.