

ENGINEERING INVENTIONS.

A rail joint has been patented by Mr. Joseph D. Green, of Marshall, Mo. Two sections are formed to cover the joint, the one with a groove and the other with a rib fitted thereto, the construction being such that these sections can be clamped or locked over the joint and held in place by spikes, by which the base of the meeting rails will be firmly held in position.

A car coupling has been patented by Messrs. James N. Moore and Abraham L. Miner, of Lowell, Ind. The construction is such that when the cars are run together, the link on the adjacent car will strike a beveled end of the drawbar and be guided downward into a notch, when the spring will return the drawbar to its normal position and couple the cars, the device being one which can also be operated from the sides or top of the car.

AGRICULTURAL INVENTIONS.

A hay sling has been patented by Mr. John M. Hart, of Oswego, Kansas. The invention consists of two bars provided with ropes at their ends and with means for holding them spaced, and with devices for locking and releasing them, to facilitate the unloading of hay or grain from a wagon and storing it in a barn.

A plow has been patented by Mr. Andrew L. Thompson, of Millbrook, Ill. It is so made that when the blades meet large stones, roots, stumps, or other obstructions, a fragile pin will be broken and the blade will be turned back without damage until the obstruction is passed, with other novel details of construction and combination of parts.

MISCELLANEOUS INVENTIONS.

A scarf holder has been patented by Mr. John E. Eayrs, of Washington, D. C. It consists of an elastic strip with an attaching pin at one end and a key hole slotted clip at its opposite end, there being formed a combined clamp and button, with other novel features, for securing the lower end of the scarf to a shirt front.

A tobacco conveyer has been patented by Mr. Henry B. Light, of Simpson's, Va. The apparatus comprises an inclined cable, a rack having hooks at its upper opposite ends engaging the rope, and lower hooks adapted to receive the tobacco stick, for convenience in transporting tobacco from the field to the barn or storehouse.

A window cornice has been patented by Mr. William C. Doscher, of New York City. The front center piece of the cornice has flanged cleats at its back, and the sides are made in sections to slide in these cleats, so that by extending them or shoving them inward the cornice may be adjusted in length to suit windows of different width.

A curry comb has been patented by Messrs. Charles and Joseph Knopp, of Winona, Minn. This invention covers a novel form of device wherein the comb proper is provided with two operating faces, either one of which may be brought into play, intercoiled wires being used upon the limbs of the animal and toothed flanges of a plate upon the body.

A rotary saw sharpener has been patented by Mr. Robert Gaskin, of Fairville, New Brunswick, Canada. This invention covers an adjustable saw holder mounted on a sliding frame, means for imparting forward and backward motion to the frame, a device for turning the saw automatically the distance of one tooth, and a stationary grinding wheel.

A nut has been patented by Mr. John C. Shellito, of Penn Run, Pa. It is formed with an internal thread and an externally threaded projection, combined with a plug or bolt with an internally threaded socket and an externally threaded projection, the nut being designed more especially for use in connection with hollow axle skeins.

A steam steering apparatus has been patented by Mr. Samuel G. Martin, of New York City. It consists of two lines attached to opposite sides of the rudder and passing over abutments, in combination with a steam cylinder, a piston rod passing entirely through it, and connected at its ends to the lines, to act oppositely and simultaneously upon them.

A planter has been patented by Mr. Millard F. Myers, of Greenville, Ohio. The main object of this invention is to provide a machine particularly adapted for planting potatoes, although it may be used for other planting, and it is so made that two rows may be planted at the same time, or one row, or the device may be employed as a check row planter.

A nut lock has been patented by Mr. Zachariah F. Jones, of Scottsville, Va. It has a locking plate with an opening contracted or reduced in width toward one end, and having a groove formed in its under side, the plate being adapted to be placed on the bolt and moved longitudinally along it, in connection with a securing plate, and other novel features.

A cattle guard has been patented by Messrs. Pleasant P. Linder and Rufus P. Bryant, of Jacksonville, Ala. This invention covers a peculiar construction and combination of parts to provide a guard that will effectually prevent cattle from entering adjoining fields traversed by a railroad, the invention covering a specially contrived counterpoised gate and other novel features.

An automatic lubricator has been patented by Mr. Joseph Patrick, of Frankfort-on-the-Main, Germany. This invention is based on the fact that metals have different expanding coefficients when heated, providing adjacent surfaces made of different metals, that when in a quiescent state will close the feeding of the lubricant, but when heated will separate on account of their different expanding coefficients.

A gas generator has been patented by Mr. Antonio Ordonez y Ponce, of Matanzas, Cuba. It has a gas preparatory cylinder with oblong screens, and connected with another cylinder, also having revolving screens which mix the gas and air, revolving under

a high rate of speed, for mixing and making gas with hydrocarbons, for all purposes where a high or strong heat is needed.

A continuous recording seal and door fastener has been patented by Mr. George J. Ferguson, of Greenville, Texas. It is a device for fastening the door of a car or other sliding or hinged door, which is accomplished by a single movement of a lever, and in such way that the initial and number of the car, or other name or number, will be impressed on the seal paper slip each time the door is fastened.

A harness saddle has been patented by Mr. Alexander P. Waddell, of Union City, Tenn. It is intended especially for plow or heavy draught horses, and consists of a spring metal tree, with side bars and cross bars, and an intermediate or central cross bar, the pads connected therewith, so that the saddle will fit horses of different sizes, and afford ample ventilation to the back of the animal.

A barrel cover has been patented by Messrs. George J. Broemser and Edward D. Bradshaw, of Little Rock, Ark. The cover is made in hinged sections, through one of which is an opening to which is secured a box intended to exhibit a sample of the contents of the barrel, to facilitate examination and promote the convenience of grocers and others using a variety of goods kept in barrels.

A rein holder has been patented by Mr. Charles E. Austin, of Salmon Falls, N. H. It is made of a plate of elastic metal cut or stamped out to form a base plate, with opposite end tongues and attaching lips or tags, whereby a rein slipped into the holder will be firmly held, or may be clamped flatwise between the elastic tongues and the base plate of the holder.

A weather strip for windows has been patented by Mr. George W. Everett, of New York City. This invention relates to that description of weather strips which consist of flexible strips of rubber, which are attached to the sashes, the parting strips being grooved for the free edges of the elastic strips to fit into and work up and down within, with other novel features.

An adjustable hair spring fastening for watches has been patented by Mr. Louis R. Kaufmann, of Lexington, Mo. This construction is such that in all cases the adjustment is guided and is not a matter of guesswork and repeated trials, the plug or stud not being fixed, but adjustable, so that the lever can be conveniently brought into beat or the spring adjusted with reference to the usual regulator.

A stove has been patented by Mr. Charles Rohlf, of Brooklyn, N. Y. The stove body is made with an open air heating space at the bottom, with slots opening outside of the stove at the top of said space, upright hollow columns communicating with the air-heating space and open at the top, there being suitable dampers to close the slots and the hollow columns.

A turntable has been patented by Mr. Abraham Ayres, of New York City. This invention covers a novel construction of turntable, to facilitate the turning of street cars at the end of the route, the design giving a large leverage when the car is turned, while a truck or other vehicle driven upon the edge of the table will not cause displacement or too much tipping.

A gauge for mouldings has been patented by Mr. William T. Farrell, of Chicago, Ill. Combined with a bevel stock having a socket in its head and a longitudinal slot at right angles to the main slot, formed by the two sides of the stock, is an adjustable sliding stem with a catch, and on its top a disk and pointer, with other novel features, making a device for promoting accuracy in obtaining lines, angles, etc., in working stone.

A reel has been patented by Mr. William Slot, of Brooklyn, N. Y. The reel frame is formed entire from a single piece of metal plate, the cross piece being pressed into concave form, and the arms bent parallel with each other and formed with central holes to form bearings for the spool journals, making an improved fishing reel which is exceedingly cheap and simple.

A trunk attachment has been patented by Messrs. James E. McDowell and Thomas Medford, of Huntington, West Va. To each end of the trunk there is pivotally connected a link, there being formed two cuts in the upper ends of the links, the metal being bent inward to form a projection between the cuts, the device being for connecting the body and tray in a specially convenient way.

A ditching machine has been patented by Mr. Louis Arsene Desy, of Winnipeg, Manitoba, Canada. This invention provides means for guiding the propelling wheels, for raising and lowering the rear end of the machine, thereby gauging the depth of the ditch, means for rotating the excavator from side to side on a vertical pivot, whereby a trench may be dug with a given slant on its side embankments, and the dirt raised and discharged to one side.

A pump has been patented by Mr. Robert F. Dobson, of Darlington, Wis. It has a single valve, vertical tube, a horizontal tube connected to the lower end of the vertical tube, an air chamber connected to the horizontal tube, and a piston in the vertical tube, the parts being so connected and arranged that the pressure will be equal on both faces of the piston, and the pump can be worked with great economy of power.

A machine for forming veneer drums has been patented by Messrs. Wilson Godfrey and George W. Halstead, of Brooklyn, N. Y. Three sheets of veneer are first glued together, the grain of the central sheet crossing that of the other two, to prevent splitting and cracking, the united sheet being then turned over a former and the edges united, and while upon the former the sheets are compressed while the glue is warm, the machine enabling the lapped edges to be firmly clamped while on the former and then withdrawn from the forming cylinder.

NEW BOOKS AND PUBLICATIONS.

A TREATISE ON SIMPLE AND COMPOUND OPHTHALMIC LENSES. By Charles F. Prentice. New York. 1886. Pp. 41.

This work is a simple and clear presentation of its subject. Graphic methods are principally used, the object being to keep the matter within the range of the layman. The different kinds of lenses are illustrated by drawings, giving the lines of refraction and the establishment thereby of the foci. The subject of cylindrical lenses, and of the effects of combining two cylindrical surfaces, one for front and one for back of the same lens, with axes either parallel or perpendicular (crossed cylindrical lenses) to each other, is very excellently illustrated by graphic methods. The drawings are reproductions of Mr. Prentice's pen work. A concluding section on asymmetrical lenses closes the text. Finally, two tables of crossed cylinders and their spherocylindrical equivalents, very elaborately worked out, are given.

PRACTICAL ELECTRICITY. By W. E. Ayrton, F.R.S. Cassell & Co.: London, Paris, New York and Melbourne. 1887. Illustrated. Pp. xvi. and 516.

This work professes to be a laboratory and lecture course for first year students of electrical engineering. It is intended as a manual for practical experimentation in the science. It starts with a consideration of the electric current, its direction and its measurement. Under this head such subjects as calibration of galvanometers and measurement of distribution of magnetism in a permanent magnet are treated of, as well as the generalities of the matter. Galvanometers are described more at length in a special chapter. Electromotive force, difference of potentials, quantity and density, and their measurement are fully defined and described. Under potential the influence of the shape of the conductor is elaborately treated. Resistance receives a full chapter, the measurement of it being given in detail, along with the subject of heating of conductors and work of currents. Current generators come next. In this section the author introduces a new abbreviation, P. D., for difference of potentials—a very good suggestion, and resembling Daniell's abbreviation E. M. D. P. Insulation, quantity, and capacity, commercial instruments, such as ammeters, voltmeters, and a chapter on power and its measurement, with what has gone before, make up the bulk of the work. Some specimens of instructions for experiments and a very full index complete the book. It is designed for use by students examined by the City and Guilds of London Institute. This gives it a slightly local flavor, but it is a most admirable work, and well worthy of its distinguished author. The illustrations are numerous and particularly good.

* * Any of the above books may be purchased through this office. Address Munn & Co., 361 Broadway, New York.

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.

Power users should read and builders of power app. should advertise in *Power*, 113 Liberty Street, N. Y.

Nafis' useful invention—The improved cask or tub. See *Sci. Am.*, Mar. 12, 1887. Patent for sale. Address G. R. Nafis, 266 Monroe St., Brooklyn, N. Y.

Manufacturers and capitalists desiring to become interested in a tested patent to prevent water freezing in pipes will address U. S. Automatic Water Cut-off Co., Atlanta, Ga.

Wanted—A competent man to take entire charge of a factory where metal is cut, stamped, spun, and drawn into various forms. Only parties of practical experience and undoubted mechanical ability need apply. Answers must contain full details, with name and references, otherwise they will have no attention. Address L. P. O. box 2,304, N. Y. city.

Wanted Magnets—Sizes, $\frac{3}{4}$ inch wide, 1-50 inch thick, 12 or 15 inches long bar; bent into a horseshoe-shaped magnet, with a power of lifting, at least, its own weight twelve times. Parties wishing to furnish the same address C. Johnson, Brooklyn P. O., N. Y.

We desire the services of a thoroughly competent man to take the place of our present secretary, who is obliged to retire on account of ill health, and to assist in general management. Experience and first-class business qualifications will be required, and to the right person excellent inducements will be offered. Great Western Mfg. Co., mill furnishers and manufacturers of general machinery, Leavenworth, Kans.

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.

The Knowles Steam Pump Works, 113 Federal St., Boston, and 93 Liberty St., New York, have just issued a new catalogue, in which are many new and improved forms of Pumping Machinery of the single and duplex, steam and power type. This catalogue will be mailed free of charge on application.

For the latest improved diamond prospecting drills, address the M. C. Bullock Manfg. Co., 158 Lake St., Chicago, Ill.

Link Belting and Wheels. Link Belt M. Co., Chicago. The *Railroad Gazette*, handsomely illustrated, published weekly, at 73 Broadway, New York. Specimen copies free. Send for catalogue of railroad books.

Protection for Watches. Anti-magnetic shields—an absolute protection from all electric and magnetic influences. Can be applied to any watch. Experimental exhibition and explanation at Anti-Magnetic Shield & Watch Case Co., 18 John St., New York. F. B. Giles, Agt., or Giles Bro. & Co., Chicago, where full assortment of Anti-Magnetic Watches can be had. Send for full descriptive circular.

Manufacturers quarry and stone working machinery, tools, and supplies generally, send catalogues and price lists to T. L. Fossick & Co., Ingleton, Colbert Co., Ala.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Woodworking Machinery of all kinds. The Bental & Margedant Co., 116 Fourth St., Hamilton, O.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. \$100 "Little Wonder." A perfect Electro Plating Machine. Sole manufacturers of the new Dip Lacquer Kristaline. Complete outfit for plating, etc. Hanson, Van Winkle & Co., Newark, N. J., and 92 and 94 Liberty St., New York.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn. Timber Gaining Machine. All kinds Wood Working Machinery. C. B. Rogers & Co., Norwich, Conn.

Wanted—Manto run air furnace. St. Louis Malleable Iron Co., St. Louis, Mo.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Pumps for liquids, air, and gases. New catalogue now ready.

Manufacturers bucket machinery and tools, light iron and brass hooping, pail ears and bail wire, rivets and tacks, and woodenware manufacturers supplies generally, send catalogues and price lists to T. L. Fossick & Co., Ingleton, Colbert Co., Ala.

Iron and Steel Wire, Wire Rope, Wire Rope Tramways. Trenton Iron Company, Trenton, N. J.

Drop Forgings. Upward of 3,000 different articles. Billings & Spencer Co., Hartford, Conn.

Curtis Pressure Regulator and Steam Trap. See p. 45.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Hoisting Engines. D. Friebie & Co., New York City.

Veneer Machines, with latest improvements. Farrel Fdry. Mach. Co., Ansonia, Conn. Send for circular.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv., p. 28.

Lick Telescope and all smaller sizes built by Warner & Swasey, Cleveland, Ohio.

Notes & Queries

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 Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(1) H. P. S. writes: I have in use a number of paper lamp shades for coal oil lamps; they are yellow and sooty on the inside, but otherwise good, though they do not reflect the light enough. Is there any white composition with which I can paint the inside so as to increase the reflection? A. Try pasting new paper over their interiors, or give them a coat of alcoholic solution of shellac, and paint with zinc white. The purchase of new shades is probably your best plan.

(2) F. R. L. asks: Can a good carbon for zinc carbon batteries be made from coke? If so, how? A. The coke must be ground to fine powder, mixed with sirup or coal tar, pressed into moulds, and baked. One or two dippings in coal tar or sirup while hot, followed by baking, will improve it. 2. Can half a pint bichromate cell run an electric bell 50 feet from touch button? A. Yes; but for intermittent use you should select Leclanche or some similar open circuit battery.

(3) F. H. asks: What size pipe and how high would I have to run it to get from 80 pounds to 90 pounds pressure from a cask, the same being full of water and the pipe tightly fitted in the top? A. 180 to 200 feet would be needed.

(4) F. E. S. writes: In leveling the foot of iron bridges, iron turnings have been and are used, and sal ammoniac is put into the turnings to rust them and make them more compact. Will the sal ammoniac rust the bottom of the bridge or plate, or does it exhaust its power on the turnings, with which it acts as a cement? A. If there is not an excess of sal ammoniac, no harm can occur to the foot plates beyond a slight surface rust.

(5) R. D. S. asks: Would there be any power gained by using two windmill wheels of the same size, one directly behind the other, the slats in the rear wheel being the reverse of those in the front, thus giving it a reverse motion, and both wheels working upon the same pinion on the upright shaft? A. Theoretically there is power thus gained, but the mechanical difficulties have heretofore been a serious obstacle to their use, simplicity of construction being of the utmost importance to the successful running of windmills.

(6) J. B. asks how the cushions of a steam launch are made to answer as life preservers. A. By making them of finely divided cork in waterproof canvas covers.

(7) H. C. S. asks: Is there any rule to estimate the cost of distilled water at a given price for coal? Form of boiler and steam pressure both immaterial. A. The best regenerative system of distillation produces from 13 to 14 pounds of water per pound of coal, to which must be added interest on plant, labor, and repairs.

(8) J. J. K. asks: How I can remove the ink on postal cards? I have quite a number that I had printed and never used. A. There is no satisfactory process of accomplishing this. It can only be partially done with a good deal of difficulty.

(9) E. E. H. asks (1) what substance is used by plumbers for covering lead pipe and sheet lead, to prevent the solder from sticking to it. A. Lamp

black mixed with thin glue or mucilage. 2. Of what material is the wrapper made that is used for spreading the solder? A. Very generally of bed ticking. 3. What grade of solder is the best for fastening lead pipe? A. For wiping, equal parts tin and lead.

(10) D. A. H.—We know of no compositions cheaper than the metals they are composed of. Common yellow brass is the cheapest that can be made with copper. Cast iron is the cheapest metal.

(11) E. T. S. asks the best polish for the brass on steam engines. A. Whiting or chalk mixed with engine oil is the best to keep the brass work bright. When the brass work gets black or stained, use oxalic acid mixed with tripoli. Rub in all cases with a woolen cloth.

(12) A. R. asks if Bessemer steel has, when rolled, any more spring than iron. A. It depends on the amount of carbon contained. As usually made, it has very little more elasticity than iron; has a little spring when rolled or hammered hard; will not harden, but may be casehardened.

(13) D. E. S. asks how deep it is practicable to go down in diving bells, and with submarine armor. A. 75 to 100 feet is about the working limit, though divers have thus been down over 200 feet.

(14) O. M. C. asks the process for writing or making objects on glass that can only be seen when you breathe upon it. A. The drawings are made with pencils of talc or soapstone. They are sometimes very lightly etched with hydrofluoric acid.

(15) W. F. asks: 1. What is the cause of blue vitriol turning into powder? A. It is due to efflorescence, or the giving up of its water of crystallization. 2. Does it have any strength when it is so turned? A. It is stronger.

(16) H. M. E. asks: At a given temperature—20° C.—how many volumes of gas will a given volume of liquefied CO₂ yield when the pressure is removed? How much at 0°? A. All measurements being taken at 20° C., one volume of liquefied carbon dioxide will give 450 volumes of the gas; all measurements being taken at 0° C., one volume of the liquid will give 480-4 of the gas. These are approximate, but nearly right.

(17) R. B. asks: What is the receipt for putting quicksilver on the back of a looking-glass? A. This is usually done by coating the glass with an amalgam. For this purpose a large, perfectly flat stone table is provided; upon it is evenly spread a sheet of tin foil without crack or flaw; this is covered uniformly to the depth of one-eighth inch with clean mercury. The plate of glass perfectly cleaned from all grease and impurity is floated on to the mercury by sliding, so as to exclude all air bubbles. It is then pressed down by loading it with weights, in order to press out all the mercury which remains fluid, which is received in a gutter around the stone. After about 24 hours, it is raised gently upon its edge, and in a few weeks it is ready to frame.

(18) R. J. A. asks what temper steel should be to make a strong permanent magnet. A. Tool temper; draw to about a straw color.

(19) W. M. H. asks: What bodies are the poorest conductors of heat? A. Silk is the poorest conductor, and the resins, glass, and wood are all poor conductors. 2. A recipe for a violin varnish. A. Use mastic varnish; or, 12 parts sandarac, 6 parts shellac, 6 parts mastic, 150 parts 95 per cent alcohol, 6 parts Venice turpentine; mix and dissolve warm.

(20) J. B. B. asks: What can I put in water to lower the boiling point to 185° Fah., so that the temperature will not rise any higher, whatever fire is under the copper? A. The addition of alcohol will lower the boiling point of the mixture; but will evaporate so that the boiling point will continually rise.

(21) R., D. & Co.—For etching on cutlery you will require a ground wax composed of equal parts asphaltum, Burgundy pitch, and beeswax, melted together and thoroughly incorporated. In applying it, use a dabber, or ball of cotton covered with silk. Warm the piece of cutlery so that a stick of the wax will readily melt by touching. Smear a small quantity of the wax on the blade or articles, and dab it evenly all over the surface. When cold, scratch the required design or name on the surface and touch the parts with acid (nitric acid 1 part, water 4 to 6 parts), using a camel's hair pencil to cover the surface and bring the acid into contact with all the lines. In a few minutes the biting is done. Dip in hot water to wash off the acid, and the surface may be cleaned by wiping with benzine. Another way is to make a varnish of asphalt and turpentine, with a few drops of linseed oil to make it tacky. Have a rubberstamp made of the required design, with a border, so as to stop off around the design. Stamp the goods, and with some of the varnish thinned down with turpentine and a brush stop off the surrounding parts; or surround the design with a small rim of beeswax, and apply the acid as above.

(22) Reader asks: 1. What will remove warts from the hand with little or no pain? A. Get a piece of sal ammoniac about the size of a walnut; moisten the warts, and rub the sal ammoniac well on them every night and morning for a fortnight. 2. If I manufacture an article or compound, have I a right to sell it anywhere and everywhere, without paying license or tax? If I take orders for a book which is sold by subscription only, have I a right to take the books along with me and deliver them as I secure orders without paying license or tax? A. You must pay license for some kinds of business in certain localities, but the different laws for taxing drummers in several of the States have been decided unconstitutional. 3. A recipe for making hair dye from walnut juice? A. This consists simply of the expressed juice of the bark or shells of green walnuts, to which a little rectified spirit is commonly added for the purpose of preserving it, with a few bruised cloves, and the whole digested together with occasional agitation for a week or fortnight, when the clear portion is decanted, and if necessary, filtered.

4. A SUPPLEMENT containing receipts for making cosmetics, cements, blackings, etc.? A. See Cements, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 158; for cosmetics and blackings, see "Techno-Chemical Receipt Book," which we can send for \$2. For special treatment of freckles, moles, etc., see SUPPLEMENT, 507.

(23) T. G. C. asks: 1. Why does churning make butter? A. Agitating the milk causes the rupture of the coating of the butter globules contained in the milk, and their fatty contents then collect together. 2. What can I use to clean carpets. A. Use about 3 gills of ox gall in a pailful of water; rub with a soft scrubbing brush some of the ox gall water on the carpet, which will raise a lather. When a convenient sized portion is done, wash the lather off with a clean linen cloth dipped in clean water. Let this water be changed frequently, and when all the lather has disappeared, rub the part with a clean dry cloth. Mixtures of magnesia and fuller's earth made into a paste are used to remove grease spots.

(24) E. M. D. asks how he can prepare water for fire extinguishing purposes, to be used with a common pump. What will be the advantage over ordinary water? A. We doubt whether there is anything practical to use in the way you propose. Water saturated with alum or sulphate of soda or various other salts has superior value in extinguishing fires, due to the coating it gives to objects wet with it, which prevents contact with the oxygen of the air, and thus diminishes the rapidity of the combustion.

(25) H. B. H. asks: If we take say 100 or 1,000 Winchester regular cartridges, take out the bullet and leave the powder in, or say part of the powder, and put them in a crucible to melt the metal, do you think that when the cartridges begin to get heated they will cause an explosion capable of injuring the building or the crucible? We maintain that it will not do so, but that the cartridges will discharge gradually with the heat, as it is impossible that they should all get heated at the same time. A. You will have a number of explosions, which on account of the fulminate of mercury in the shells will be almost instantaneous, or equivalent to a single great explosion, capable of doing much injury.

(26) R. S. writes: 1. The velocity of electricity is said to be 288,000 miles per second. What kind of electricity has that velocity, and what kind of a conductor should it have? A. This is the velocity of a current of dynamic electricity on the best possible conductor, suspended in air so as to avoid all dielectric action. 2. Does the entire current on a wire flow in one direction, viz., from the copper pole to the zinc pole? I think that electricity flows from the earth through the negative pole. Am I right? A. The term current is purely conventional. It is assumed to flow from carbon to zinc (or equivalently) on the outer circuit. This would make it flow from the earth to the zinc pole. 3. If light is admitted through glass of any color, the rays appear of the same color as the substance through which they have passed. They are not separated in a prismatic way. How is it that light passing through red glass will appear red? A. The true color of a body that transmits colored light is the complement of the light it transmits. A colored glass acts like a screen or sieve, and sifts out and absorbs or reflects all rays except those that pass through it.

(27) H. P. P. R. asks: 1. How many units of heat are given out in the burning of one ton of average steam coal, under conditions the same as in heating the boiler of a ship's engine? How many units of heat are given out in the combination of 2,000 cubic feet of hydrogen with 1,000 cubic feet of oxygen to form water? A. One part of carbon in burning gives off heat enough to raise 7,273 parts of water one degree C. in temperature; one part of hydrogen enough to raise 34,462 parts of water one degree C.; 2,000 cubic feet of hydrogen weigh 73,958 grains, or 10,565 pounds, at standard barometer and thermometer readings. Taking coal as representing 95 per cent carbon, one ton of 2,240 pounds would raise 15,476,944 pounds of water one degree C., and 2,000 cubic feet of hydrogen would raise 364,091 pounds of water one degree C. From these factors you can deduce heat units of any desired system. As long as the coal is completely burned, the conditions have no influence on the heat evolved. They only affect the heat collected.

(28) G. M. asks how to prepare the mercury for a barometer? Also how expel the air from the tube after it is filled? A. If the mercury is not free from other metals, it should be distilled. This is best done in an iron retort. If contaminated with dirt, it can be purified by passing through an inverted cone made of a sheet of paper containing a very small hole at its apex. Your best plan is to buy pure mercury, and not attempt to distill it yourself. The air bubbles may be gathered by introducing a clean iron wire and drawing the bubbles together with it. When they acquire a sufficient size, they will rise and escape. The air may be much better expelled by boiling in the tube, but unless experienced you will probably break the tube. The mercury for this operation should be added three or four inches at a time, and each addition boiled.

(29) H. N. B. writes: I am about making an induction coil, but would like to ask a few questions: When the core of an induction coil is magnetized by a current passing through the primary coil, the core is rendered magnetic only at the poles, and not in the middle. When the current is broken, and the soft iron core discharges its magnetism, do the magnetic lines pass from the poles only, or do they come from the middle of the core as thick as from the poles? If the middle is neutral when magnetized, I think no magnetic lines would come from the middle when discharged. Why do they wind the secondary wire all across the spool? When they come to the center, why don't they skip over that part of the core where there would be no magnetic lines, and resume the winding after they pass little beyond the middle, thus saving wire and resistance? A. The magnetic lines of force that radiate from the core of an induction coil are most numerous at the ends. Coils have often been constructed without wire in the center as you describe, but just how much is gained by this is not known. The saving is not very great.

(30) F. N. R. writes: 1. You gave a formula for a freezing mixture, viz., 5 parts nitrate of ammonia, 6 parts sulphate of soda, and 4 parts dilute nitric acid. Will such a mixture preserve the freezing properties indefinitely or for any length of time if kept inclosed in an airtight space? A. It will reach a low temperature, and maintain it for a varying length of time, according to the non-conducting power of the materials surrounding it. It cannot in your sense be preserved for future use, but must be mixed at the moment of application. 2. Will the liquid stove polish receipt given by you some time ago in your paper, viz., pulverized black lead, turpentine, water, and sugar, keep its consistency as when first made, or will it have a tendency to settle after standing a while? A. There will be a natural tendency in the black lead to settle out, and we would advise it to be shaken before use.

(31) J. P. S. says: In your issue of 26th of March, in answer to No. 17, J. W. P., you say wet the edges of the paper to overcome electrical attraction between the sheets. I run a cylinder press, and was troubled the same way. The jobs were such that I could not wet the edges. I took a large type "galley" and laid it on the delivery table, where the sheets would fall on it. A copper wire from it to the steam pipes just behind it carried off all electricity, so the sheets could be straightened easily.

(32) T. H. N. asks where he can find a full account of the composition and manufacture of aluminum bronze alloys produced by electrical methods. A. In SCIENTIFIC AMERICAN, May 22, 1886, and November 13, 1886. Also in Richards on Aluminum, very recently published, which we can mail for \$2.50. [Such replies as the foregoing we usually prefer to send by mail, or at least to exercise the privilege of so doing, but there are those, whom we much regret to disoblige, who are continually forgetting to send their names and full address.—Ed.]

(33) G. H. W. asks: 1. Will a cubic foot of air under pressure of say five hundred pounds be more buoyant under water than of simple atmospheric pressure? A. Air at a pressure of 500 pounds to the square inch will be less buoyant than air at normal pressure. 2. Can water be compressed to any perceptible amount? A. Water is compressed 0.0005 vol. per atmosphere of pressure (15 pounds to square inch) to which it may be subjected.

(34) A. B. asks (1) how to glue or cement German silver on to wood. A. Use the marine cement recommended in SCIENTIFIC AMERICAN SUPPLEMENT, No. 158, under title of "Cements." 2. How to polish German silver by hand. A. Use a mixture of 1 part olive oil, 1 of spirit of sal ammoniac, 2 of lime, and 1 of water as a thick paste.

(35) D. H. asks: What fluid can be used in card writing, that will retain gold dust or bronze? A. Use gold size or albumen.

(36) W. H. B., Greenville, Tenn., asks: Can you give me a recipe for making wax to polish hickory handles with? A. Take of seed lac 1 ounce, gum guaiacum 2 drachms, dragon's blood 2 drachms, gum mastic 2 drachms, put into a bottle with one pint spirits of wine, cork close, expose to a moderate heat till the gums are dissolved; strain into a bottle for use with 1/2 gill linseed oil; shake together.

(37) J. A. H. asks if there is any flux for brazing cast iron. A. We know of nothing better than borax ground in water until it assumes the consistency of milk.

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

B. D. B.—The yellow substance sent is a clay, and might be available for earthenware, terra cotta, or brick making. Lignite or brown coal can be used as fuel if of sufficient purity. It cannot be accepted as an indication of better coal underneath, except in the sense that better lignite may exist below it.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

April 5, 1887,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions such as Acid of diamido-stilbene, production of disulpho, F. Bender, 360,553; Annealing wire, W. H. Sawyer, 360,732; Annunciator, electric, J. C. Kunkle, 360,447, 360,448; Aqueeducts, aeration in, J. W. Hyatt, 360,593; Arm rest for keyboard operators, J. S. Jurey, 360,529; Ash and garbage receptacle, Baynes & Clark, 360,646; Automatic brake, W. B. Clark, 360,419; Axle box and journal, car, C. Omer, 360,802; Axle clip, A. E. Parker, 360,724; Baling press, W. F. Kengle, 360,445; Banjo brackets, manufacture of, J. W. Lyon, 360,534; Banjos or violins, tail piece for, A. G. Wood, 360,790; Bath. See Vapor bath.

Table listing inventions such as Bath and wash tub, combined, W. Watkins, 360,634; Batten, metallic, DeLassus & Robbins, 360,788; Bed pan, C. A. Tatum, 360,490; Bell, electric house, E. G. Coleman, 360,660; Belt for machinery, J. Arnao, Jr., 360,751; Belt shifting device, automatic, S. Jonsson, 360,775; Bicycle, Johnston & Peifer, Jr., 360,595; Bicycle bearing, J. H. Palmer, 360,470; Bit brace, ratchet, L. C. Bolen, 360,460; Blind, J. B. Hartman, 360,523; Blind roller and fittings, W. H. Keates, 360,531; Blind slats, means for adjusting, W. Morstatt, 360,612; Block. See Paving block; Boiler. See Steam boiler; Boiler cleaner, steam, H. Rushton, 360,821; Bolting machine, J. Huxtable, 360,592; Boot or shoe, T. D. Barry, 360,756; Boots, buttonhole piece for button, G. S. Hill, 360,590; Boots or shoes, fastener for rubber, Thompson & Curtis, 360,491; Boots or shoes, making, A. Seaver, 360,822; Boots or shoes, making rubber, G. Watkinson, 360,635; Boots or shoes, trimming machine for, L. E. 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