

## ENGINEERING INVENTIONS.

An improved car coupling has been patented by Mr. Charles W. Spencer, of Richmond, Mo. The invention covers a double hook or anchor-shaped link, with a balance weight, and means for raising or lowering it to disconnect it from another, making a simple means for coupling or uncoupling by men on the cars or on the ground.

A car truck has been patented by Messrs. James H. McClure and George F. Murdock, of Wells-ville, O. This invention provides means whereby cars of reasonable length may be mounted on three trucks each, and the central truck be enabled to follow curved tracks, so the length of a car may be doubled at only a small additional expense.

A car replacer has been patented by Mr. Joseph A. Hodel, of Cumberland, Md. This is for replacing on the track cars which have been derailed, and provides means for guiding the wheels while the car is moved, and means whereby the same device is adapted to be used in connection with rails of different heights, and so a portion of the device may be forced through the ground beneath the rail.

## MECHANICAL INVENTIONS.

A valve grinder has been patented by Mr. Harry W. Burleigh, of Franklin, N. H. The invention comprises improved clamps, centering devices, revolving gear, and coupling mechanism, making simple and efficient means for readily grinding globe and similar valves, and refitting them without disconnecting them from the pipes with which they are in use.

A circular sawing machine has been patented by Mr. John Van Patten, of East Tawas, Mich. This invention provides means whereby two ends of a piece of lumber may be sawed off in succession, means whereby the said frames may be adjusted to align the saws, different saw frames held up while their saws are at work, and so the throwing up of one frame will cause the others to fall, and generally improving sawing machines where two or more saws are used.

## AGRICULTURAL INVENTIONS.

A check row corn planter has been patented by Mr. Thomas J. Lindsay, of Lafayette, Ind. The invention covers a special combination and arrangement of parts to secure accuracy in check row corn planting, and promote convenience in controlling the planters.

A cotton planter has been patented by Mr. William T. Gardner, of Tarborough, N. C. The invention covers a special construction and arrangement, whereby the spout slightly spreads the seeds, so the plants can be more readily thinned than when the seed is deposited in the ground in bunches, the seed is covered with soil, and the top of the ridge is smoothed off by a covering block.

A corn planter has been patented by Mr. Hiram D. Layman, of Benton, Ark. This invention relates to wheeled corn planters having rotary dropping devices, and the wheels are so made adjustable on their axles by means of feathers that they may be set to act as guides in laying off rows of any desired distance apart. A seed sower has also been patented by the same inventor, the patent covering a novel construction in that class of devices where a perforated rotary cylinder is employed for distributing the seeds over the ground. A cotton planter forms another subject of a patent issued to the same inventor, the frame being combined with a series of plows arranged to throw up a ridge and open a furrow therein, in connection with which is operated a cylindrical seed drum with a series of uniform holes, with various special devices connected therewith. A cotton chopper has also been patented by Mr. Layman. This invention covers a novel construction in which the hoes are made readily removable, so that any desired number may be employed, according to the "stand" of cotton required, and there is a device for elevating the chopper, to hold the plows and wheels out of contact with the ground when desired.

## MISCELLANEOUS INVENTIONS.

An improved trunk has been patented by Mr. William J. Large, of Brooklyn, N. Y. The invention consists principally in the direct pivoting of the tray to the lid and connecting it pivotally to the body, with various subsidiary parts.

An odorless privy seat or chair has been patented by Mr. Franklin B. Kendall, of Tamwater, W. Ter. This invention is an improvement on a former patent issued to the same inventor, covering improvements in the construction and arrangement of parts.

A process of making zinc sulphide anhydrous has been patented by Mr. Thomas Macfarlane, of Montreal, Canada. The invention consists in mingling zinc chloride with hydrated zinc sulphide, to exclude air while it is being ignited or rendered anhydrous and converted into a valuable pigment.

An improved pencil has been patented by Mr. George C. Ward, of Girard, Kansas. The invention relates to automatic pencils, in which the lead or crayon is projected by pressure on the rear end of a spring tube, and provides therefor an improved construction and combination of parts.

A buck saw frame has been patented by Mr. Theophilus Larouche, of Williamstown, N. Y. This invention covers a special arrangement and combination of parts, whereby a buck saw frame is made firm and easily adjustable, and will not fall apart when loosened up for removing or replacing the saw blade.

An engraver's bangle clamp has been patented by Mr. Henry Carpenter, of Flushing, N. Y. It is made of a tapered and slotted block, with recessed clamping plates at its upper end, and with a tapered and slotted band working on guide pins for drawing the parts of the clamp together, and a spring for separating them.

A toy to be used with fire crackers has been patented by Mr. Charles Diener, of New York city. A

miniature house is so made, and provided with various images, that the explosion of a fire cracker therein will force the images into position for observation at various openings, such as at the top of the chimney and at the doors and windows.

An apparatus for stereotyping has been patented by Mr. Frederick J. Smith, of Brooklyn, N. Y. In combination with a novel which has its forward end slotted is a foot piece with its forward side notched and removable side bars engaging therewith, with other peculiarities of arrangement and construction to adapt the apparatus to a wide variety of work.

A mail bag has been patented by Mr. John S. Bailey, of Buckingham, Pa. In combination with the jointed frame of a mail bag is a shield plate attached to one of the center joints of the frame, with fingers on its inner face for bracing the frame and holding the labels, with which is connected a suitable hump, with other peculiarities of arrangement and construction.

An elevator for seed cotton and other materials has been patented by Mr. Sidney W. Bartholomew, of Castalia, N. C. In combination with a hopper having grooves is an adjustable feed board with ribs, so the quantity of seed cotton or other material drawn up the flue can be regulated to prevent clogging of the machine.

A wagon brake has been patented by Messrs. James Hocking and Clement R. Jones, of Deuton, Neb. The invention relates to wagon brakes which are automatically applied by the back thrust of the team, and consists in the special construction and arrangement of devices in a single horse vehicle for accomplishing this result.

A washing machine has been patented by Mr. Francis G. Powers, of Champaign, Ill. The invention covers an improved construction for securing a better connection between the pounder stem and its operating handle, and means for making a better joint between the pounder stem and the cover, as well as an improvement in the pounder itself.

A label holder for mail bags has been patented by Mr. Frank L. Herold, of Terryville, Conn. Combined with a strip having grooved flanges and a longitudinal slot is a slide adapted to receive the tag, and to pass it under the grooved flanges, thereby holding the tag on the strip, so the tags can be inserted or removed easily and rapidly.

A carriage top fastener has been patented by Mr. John J. Travis, of Carson City, Mich. The invention consists of straps attached to the bows of buggy and other falling carriage tops in a novel manner, for use in fastening the bows together, and to the braces of the top when the top is down, to protect them from breaking and wear, etc.

An automatic clock winding device has been patented by Mr. Nathan Silberberg, of Yassy, Roumania. The invention consists in a series of metallic rods or bars so connected that the variations in their length from changes in temperature can be utilized for producing the power necessary to wind up the clock works, the device being self-operating.

A churn cover fastener has been patented by Mr. Mark M. Maycock, of Buffalo, N. Y. In combination with the head, having a central opening and staples, is a cover with guides and a disk, with overlapping flanges, and handles and radially sliding bolts, making a specially advantageous construction, in which the wear is evenly distributed.

A fire escape has been patented by Mr. Reuben C. Rutherford, of Quincy, Ill. This invention relates to that class of fire escapes in which a metallic band, wire, or cable is wound on a drum held in a device with means for suspending a person. The apparatus can be stopped and started at will as desired, by simply pressing the brake levers.

An improved shirt has been patented by Mr. John H. Scriven, of Grafton, N. Y. After the bosom is cut to shape, a perfect hem is formed and stitched on the margin thereof, after which the hemmed portion is joined with the body or main portion of the shirt, so as to give the same appearance to the bosom as if separate binding strips were used.

An automatic incline pool ball rack and spotter has been patented by Mr. William A. Tea, of Clyde, O. The invention consists in providing a place for keeping a given number of pool balls, which can be placed on the table when desired, and spotted or bunched by simply moving the conductor or tube until it strikes the table, when the balls pass down an incline into the slotted tube.

An improved tongs for lifting spools of fence wire has been patented by Mr. William A. Hardin, of Leavenworth, Kansas. The invention consists of two bent levers pivoted together, with two of their ends adapted to lie close together, so they may be inserted in a central opening of a spool, and then spread apart to cause them to bind, by the act of lifting one or both the levers.

An apparatus for agitating the liquor in tan vats has been patented by Mr. Thomas A. Mayes, of Phillipsburg, Pa. In combination with a vat are boxes or compartments on the bottom with pipes and valves so connected therewith that fresh lime can be mixed with the liquid in the vats without requiring the skins to be removed, and they can be limed more rapidly than in the ordinary vats.

A stove jacket has been patented by Mr. William H. Benson, of Elston, Mo. It fits over the stove and connects with the draught flue, and has a heating closet within and supported by the jacket to inclose the stove top, the closet and jacket having independent connections with the draught flue, all to confine the heat radiated from the stove, and keep the apartment cool when desired.

A buoyant propeller for vessels has been patented by Mr. Nicolai Peterseu, of Charleston, S. C. This invention provides wheels which will float themselves and a superposed load, the wheels at the same time serving as propellers; a deck or cabin is so mounted on the wheels that one or more of them may be turned for steering the boat, and all are connected with one driving power.

A shutter worker has been patented by Mr. Leonard Tilton, of Brooklyn, N. Y. The invention consists principally of a jointed arm adapted to be attached to the blind, and to a stud fastened on the window sill, the arm and stud having means for locking the arm and its sections at any desired position for holding the blind open or closed or at any intermediate position.

An improved coupling for ropes or cables has been patented by Mr. George M. Green, of Sreator, Ill. A socket with two longitudinal grooves in the sides of its aperture and two notches at the inner end, has a key fitting in the aperture, with two opposite projections on the inner end, the socket having a loop or frame in which is a spring, thus making an easily operated coupling for ropes or cables.

Improvements in blocks for building purposes form the subject of a patent issued to Mr. Thomas L. Jowett, of Boston, Mass. The invention covers, in a wall, floor, or other like structure, the combination of a series of slab like blocks, with longitudinal tongues and shoulders on opposite sides, with which buildings may be constructed cheaply, made fireproof, free from damp, and of a solid and neat external appearance.

A butter package has been patented by Mr. John C. Brown, of Davenport Center, N. Y. The cover has an annular ridge, with a series of diametrically opposite notches, ears projecting from a ring surrounding the jar, can levers held to turn on the ears, and a cross piece pivoted in the can levers, the whole making a package which may be sealed air tight, with a handle forming part of the fastening.

A combined platform rocker and reclining chair has been patented by Mr. Peter B. Cupp, of Van Wert, Ohio. The seat frame has side grooves and arms with closed slots, the sliding seat has a rack with hinged back having studs projecting laterally into the slots, and there is a rotatable pinion shaft with a squared end, with other improved details of construction for adjusting the seat and limiting its movements.

A fire escape ladder has been patented by Mr. William Brannan, of Fredericksburg, Va. Combined with a wheeled frame is a sheath and ladder pivoted to a rear axle, a lazy tongs and operating screw connecting the sheath to the forward axle, and anchors adapted to be set in the ground when the ladder is elevated, the whole making an extensible ladder to reach the windows or roofs of houses from the ground in case of fire.

A hand power vehicle has been patented by Mr. Thomas A. Davies, of New York city. Hand levers are pivoted to the frame and connected with a chain wheel attached to the axle of the drive wheels, the axle and drive wheels being connected by ratchet wheels and pawls, so the vehicle will be forced forward by oscillating the levers. The driver rests his feet on the front bar of the frame, but to turn to one side operates a cross rod on that side. A further patent has been issued to the same inventor for an invention whose object is to simplify the construction and lessen the weight of hand power vehicles, secure a direct application of the driving power, and lessen the friction.

## 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.

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.

Stephen's Vises. Special size for amateurs. See p. 237. Valuable Hydraulic Motor patent for sale low. Address W. Henry Philbrick, Box 343, Laconia, N. H.

Cyclone Steam Flue Cleaner. The best in the world. Crescent Mfg. Co., Cleveland, O.

No sooner did Blackwell & Co. secure the confidence of all smokers by the purity and excellence of Blackwell's Durham Long Cut, than a swarm of imitators arose to palm off inferior tobacco as Durham. The name is very taking, and its use will deceive novices, unless they make sure that the Durham Bull is on the tobacco they buy.

All Scientific Books cheap. School Electricity, N. Y. For Freight and Passenger Elevators send to L. S. Graves & Son, Rochester, N. Y., or 46 Cortlandt St., N. Y.

Wanted.—Specialties in Cast Iron to manufacture, heavy or light. Address J. B. Box 306, New Haven, Ct. Munson's Improved Portable Mills, Utica, N. Y.

Drop Forgings. Billings & Spencer Co., Hartford, Conn. Wanted.—Patented articles or machinery to make and introduce. Gaynor & Fitzgerald, Lexington, Ky.

Sewing machine, water closet, & other light castings made to order. Lehigh Stove & Mfg. Co., Lehigh, Pa. "How to Keep Boilers Clean." Book sent free by James F. Hotchkiss, 86 John St., New York.

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

Railway and Machine Shop Equipment. Send for Monthly Machinery List to the George Place Machinery Company, 121 Chambers and 103 Reade Streets, New York.

The Hyatt filters and methods guaranteed to render all kinds of turbid water pure and sparkling, at economical cost. The Newark Filtering Co., Newark, N. J.

If you want the best cushioned Helve Hammer in the world, send to Bradley & Company, Syracuse, N. Y. "The Sweetland Chuck." See ad. p. 252.

Steam Boilers, Rotary Bleachers, Wrought Iron Turn Tables, Plate Iron Work, Tippet & Wood, Easton, Pa. Iron and Steel Drop Forgings of every description. R. A. Belden & Co., Danbury, Ct.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn. Pumps—Hand & Power, Boiler Pumps. The Goulds Mfg. Co., Seneca Falls, N. Y., & 15 Park Place, New York.

Best Squaring Shears, Timmers', and Canners' Tools at Niagara Stamping and Tool Company, Buffalo, N. Y.

Lathes 14 in. swing, with and without back gears and screw. J. Birkenhead, Mansfield, Mass.

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, 261 Broadway, New York.

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

For Power & Economy, Alcott's Turbine, Mt. Holly, N. J. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Supplement Catalogue.—Persons in pursuit of information on any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC 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., 139 Center St., N. Y.

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

Mineral Lands Prospected, Artesian Wells Bored, by Pa. Diamond Drill Co. Box 423, Pottsville, Pa. See p. 237.

Catalogues free.—Scientific Books, 100 pages; Electrical Books, 14 pages. E. & F. N. Spon, 35 Murray St., N. Y.

Job lots in Rubber Belting, Packing, Tubing, and Hose. 75 per cent off belting. John W. Buckley, 156 South Street, New York.

We are sole manufacturers of the Fibrous Asbestos Removable Pipe and Boiler Coverings. We make pure asbestos goods of all kinds. The Chalmers-Spence Co., 419 East 8th Street, New York.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Emerson's 1884 Book of Saws. New matter, 75,000. Free. Address Emerson, Smith & Co., Beaver Falls, Pa.

Hoisting Engines, Friction Clutch Pulleys, Cut-off Couplings. D. Frisbie & Co., Philadelphia, Pa.

Cotton Belting, three, four, five, and six ply, for driving belts. Greene, Tweed & Co., New York.

Barrel, Keg, Hoghead, Stave Mach'y. See adv. p. 269. Renshaw's Ratchet for Square and Taper Shank Drills. The Pratt & Whitney Co., Hartford, Conn.

Catechism of the Locomotive, 625 pages, 250 engravings. Most accurate, complete, and easily understood book on the Locomotive. Price \$2.50. Send for catalogue of railroad books. The Railroad Gazette, 73 Broadway, N. Y.

For best low price Planer and Matcher, and latest improved Sash, Door, and Blot Machinery, send for catalogue to Rowley & Hearnace, Williamsport, Pa.

The Porter-Allen High Speed Steam Engine. South-ward Foundry & Mach. Co., 430 Washington Ave., Phil. Pa.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Gears.—Grant, 4 Alden St., Boston.—Water motors. Nickel Emery. We are selling pure Nickel and Emery at largely reduced rates. Greene, Tweed & Co., New York.

## Notes &amp; Queries

## HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

Renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at the office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) W. B. A. writes: I have some lard that is old and strong; is there any way to get the strong taste out, or any cheap way to get it into an oil for a lubricator? A. The following is given as an excellent method for trying out the lard: Set a large kettle over a fire in some sheltered place, out of doors, on a still day. It will cook much quicker in large quantities. Put into the kettle, while the lard is cold, a little saleratus, say one tablespoonful to every twenty pounds; stir almost constantly when nearly done, till the scraps are brown or crisp, or until the steam ceases to rise, then there is no danger of its moulding; strain out into pans, and the first will be ready to empty into crocks when the last is strained. Or, take of lard 2½ pounds; camphor, 1 ounce; black lead, ¼ pound; rub the camphor in a mortar, down into a paste, with a little of the lard; then add the rest of the lard and the black lead, and mix thoroughly for a satisfactory anti-attrition paste.

(2) J. A., of St. Petersburg.—Steer's opodeldoc is as follows: White Castile soap, cut small, 2 pounds; camphor, 5 ounces; oil of rosemary, 1 ounce; oil of origanum, 2 ounces; rectified spirit, 1 gallon; dissolve in a corked bottle by the heat of a water bath; and when quite cool, strain, then add ammonium hydroxide (aqua ammonia), 11 ounces; immediately put it in bottles, cork close, and tie over with bladder. It will be very fine, solid, and transparent when cold.

The liquid opodeldoc is prepared by taking 2 ounces Castile soap shavings, and dissolving them in one quart alcohol, with gentle heat, then add 1 ounce camphor, 1/2 ounce oil rosemary, and 2 ounces spirits hartshorn (aqua ammonia) For cure of rheumatism, we advise consultation with physician. It is impossible to recommend any prescription without first seeing the patient.

(3) G. A. S. asks what he can use to remove varnish and paint from wood. A. We would recommend you to use a solution of caustic soda. It is applied with a brush made of bristles, and after a while is rinsed off with water. This operation is repeated several times, according to the thickness of the paint. Some caution is necessary to prevent the wood checking. By this means the wood is restored to its natural color.

(4) H. C. asks for any apparatus or dialyzer by which alkali and silica in solution (solution of silicate of soda) can be separated in large quantities, retaining the alkali in solution in one vessel and the silica in solution in another. A. We do not remember any mechanical apparatus by which the silica can be separated from the waterglass. Chemically, however, that is, by the addition of alkaline carbonates or chlorides, the silica will be thrown down.

(5) M. M. W.—On page 2499 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 157, several recipes for indestructible inks are given, either of which will probably meet your demands. The majority of inks contain glycerine, the tendency of which is to prevent their perfect drying, and hence the blurring to which you allude.

(6) G. K. G. asks: What will remove red ink from a ledger without defacing the writing? A. SCIENTIFIC AMERICAN SUPPLEMENT, No. 157, recommends cold aqueous or acetic acid solution of calcium hypochlorite, bleaching powder, or eau de javelle; in fact, any bleaching agent ought to accomplish the object.

(7) B. S. H. asks for preparation by which steam laundries make their goods so stiff and give such a glaze to them, especially collars and cuffs? A. This is given in full in answer 2, in SCIENTIFIC AMERICAN of May 26, 1883. 2. Please give formula for good cologne. A. Take of pure 95 per cent cologne spirits 6 gallons, oil of neroli 4 ounces, oil of rosemary 2 ounces, oil of orange 5 ounces, oil of citron 5 ounces, oil of bergamot 2 ounces; agitate; then allow to stand for a few days perfectly quiet before bottling. 3. What is the use of gold chloride in photography; otherwise, what good does toning do a picture, and what is it for? A. Gold chloride is used to tone the picture, that is, to soften the harsh effects produced by the direct action of the sun.

(8) C. A. B. writes: I am desirous of becoming a mechanical engineer, and having mastered mathematics through calculus, would like to know what books would be required? A. We give the names of some of the works studied in our schools of technology, but we think you would find it very difficult to master them without supplementary instruction: Elementary Mechanics, by De Volson Wood. The Materials of Engineering, 2 vols., R. H. Thurston. Mechanics of Engineering, J. Weistach. Machinery and Millwork, Steam Engine and other Prime Movers, by J. W. McQu-Bankine. Roofs and Bridges, De V. Wood. Civil Engineering, Wheeler. Metallurgy, "Science Series," Bioxam. Elements of Machine Design, Unwin. Steam Engine, Proportion of W. D. Marks. Elementary Quantitative Analysis, Elliot & Storer. Elementary Quantitative Analysis, Thorpe. Steam Engine, Arthur Rigg. Catechism of the Locomotive, Forney. Haswell, Engineer's Pocketbook. Molesworth, Engineer's Pocketbook. Trantwine, C. E. Pocketbook. Ganot's Physics, Atkinson.

(9) J. B. F. asks: 1. Ought steam pipes to leak at all if properly put up and the valves kept constantly packed and in good order? A. No. 2. Could the turning of steam on to a line of pipes when the return valve is closed start a leak or burst the pipes? A. It should not.

(10) M. & Co. ask what are the best proportions of tin, antimony, and copper for genuine Babbitt metal. Are the different proportions of these metals used according to the different speeds required? A. Genuine Babbitt metal, according to the formula of the inventor, is 9 of tin and 1 of copper. Antimony has been added since, so that the proportions by hundreds will stand 80 tin, 5 copper, 15 antimony. For high speeds the metals should be cooler, giving a larger proportion of tin; for weight the metal should be harder, giving a larger proportion of antimony.

(11) E. C. asks how to clarify or filter cod liver oil? A. Filter the oil through charcoal in a linen or felt filter.

(12) H. W. writes: The other day I accidentally got some quicksilver on a large gold ring, and am unable to remove it. A. We fear that the mercury has become amalgamated with the gold, in which case it will be necessary to treat the ring with chemical reagents. It is possible that you may remove some of the mercury by heating the ring as hot as possible without melting, thereby causing the mercury to volatilize.

(13) J. W. S. writes: 1. A mischievous boy has snatched my blackboard with candle grease. It does not wash off with soap or soda. What solvent would you recommend? A. If the candle is made of paraffine, hot oil of turpentine will dissolve it. Ether will also be found to be a good solvent. 2. How may I make an automatic blow pipe to use in blowing glass? I cannot blow the flame and glass too. A. Connect the end of the blow pipe with bellows by means of rubber tubing.

(14) A. G. W. asks if there is any preparation for making the hair white without injuring the hair or scalp? A. Peroxide of hydrogen will take the coloring material entirely out of hair. See description of this important bleaching agent in SCIENTIFIC AMERICAN SUPPLEMENT, No. 339. No injury attends its employment.

(15) E. B. S. asks the horse power of an engine as follows, viz.: Diameter of cylinder, 9 in.; length

of stroke, 12 in.; revolutions per minute, 150; pressure of steam (in boiler), 60 pounds; cut off at 9 in.; mean effective pressure, 58 pounds? A. About twenty-five horse power. 2. The means by which the power is obtained? A. See rule in SUPPLEMENT, No. 253.

(16) J. R. D. asks: What lacquer is used by makers of chandeliers that makes them look so bright and like red brass? A. Take two gallons spirits of wine, one pound dragon's blood, three pounds Spanish annatto, four and a half pounds gum sandarac, two pints turpentine. Digest for a week, shake frequently, decant, and filter.

(17) P. & Co. ask: What are the compositions used in making the slip for the inside of popkins? A. The following is a white glaze suitable for earthen ware. An intimate mixture of massicot, 4 parts; tin ashes, 2 parts; crystal glass fragments, 3 parts; and 1/2 part sea salt. This mixture is melted, and the liquid flux used.

(18) W. L. C. asks for a formula for correcting the taste of rancid butter? A. The rancidity is due to butyric acid, a substance freely soluble in water or fresh milk, so that the butter can be thoroughly washed, first with good new milk and then with cold spring water; or the butter can be melted in water, which will dissolve out the butyric acid, and then work it over.

(19) J. F. writes: I have some wrought iron bars which I wish to nickel plate, but from some cause unknown to me I have been unable to plate them so as to keep bright in the open air. How shall I remedy this? A. The difficulty is due to the oxidation of the iron, the adhesion of the nickel not being as satisfactory as if the iron were first copper plated and then coated with nickel; or even better still would be to first coat the iron with copper, then tin, and finally with nickel.

(20) L. S. asks (1) the best and cheapest way to construct a furnace for melting brass and cast iron for casting small articles. A. You may melt 5 pounds of brass or cast iron in a forge by building a small well of fire bricks around the tuyere, about 16 inches high, 12 inches diameter, and melt in a crucible with a charcoal fire; put a large piece of charcoal over the crucible to keep the heat in. 2. Do you think it at all probable that bills now pending, as regards patents, will become laws? A. Time alone can divulge what action our erratic Congress may take as regards the patent laws. 3. Do you think the new form of steel mentioned in SCIENTIFIC AMERICAN of 8th ult., page 151, column three, will soon be introduced in United States? A. We have had inquiries concerning the steel castings you mentioned from our own manufacturers, and we presume that experiments in that line are already being made in this country. If the new steel is found upon trial to be useful for its price, it will no doubt be largely used.

(21) W. W. asks: 1. Why is it that the rule for finding the traction of locomotives only takes note of one cylinder? A. We have seen no rule that takes note of but one cylinder; if you can refer to such a rule, perhaps we shall be able to explain it. 2. What is the cause of water flowing in gushes from an underground flume? Would several different angles of inclination cause it? A. Could not say without examination. Very likely, because of commingling with the current. 3. If the velocity of water falling free from a height of 16 ft. is about 32 ft. per second, what would be the velocity at the small end of a properly constructed cone under the same head of water? A. The velocity will be less under the conditions you name, but we cannot tell exactly how much, since you do not state explicitly all the aspects of the problem.

(22) R. C. asks best receipt for cleaning spots or stains from his English tile. A. This depends upon the nature of the stain forming the spot. Naturally they must be removed by some solvent which will dissolve them without affecting the tile. Water, alcohol, ammonia, caustic alkalies, and even acids will hardly have any effect upon the porcelain surface of tiles.

(23) B. S. H.—Of course trotting at a high rate of speed is an artificial gait for a horse, but we believe that trotting is the natural intermediate gait between walking and cantering. There is nothing in the anatomy of the horse that renders trotting unnatural or awkward. The yearling at the side of its dam takes as naturally to trotting as it does to cantering.

(24) S. A. H. writes: I should like to ask if salt in some form is not necessary to the maintenance of the human system. A. Salt (chloride of sodium) is believed to be necessary to the health of the human system. But probably no such extensive and habitual use of it as civilized people indulge in is essential. It is well known that the Maori, aborigines of New Zealand, a strong and hardy race, do not use salt.

(25) J. P. McD. asks: 1. What animal has the finest hearing, and its cause? A. Nothing is certainly known as to the absolute superiority of any species of animals in this respect. That many mammals possess a very keen sense of hearing, and detect sounds, inaudible to human ears, is unquestioned. The common cat in an alert state has a very sharp and accurate ear, also the barn owl. The bats have extremely sensitive auditory nerves, detecting the almost noiseless rush of insects through the air. Perhaps the best equipped animals with this sense are the group of foxes known as Fenecks, or desert foxes, of Africa, of which *Canis zerba*, the desert fox, is a typical example. It has large ears and nervous concentration when aroused. In regard to the cause, it may be generally said that the acuteness of a sense is conditioned largely upon its usefulness in the animal's economy. Hunting animals have necessarily a better sense of hearing than those whose prey is more easily obtained. Again *per contra*, timid, defenseless animals, as the hares, have trained ears because they subserv to them the purpose of protectors. Also the size of the external ear is a fair index of the provisions supplied in this sense for the animal. All animals, says Brehm, which have large, erect, and easily moved ears hear better than those whose auditory apparatus is small, dependent, and sluggish. 2. Is not perfection in nervous

force and physical development more nearly attained in the tropics than elsewhere? A. This may be answered with some reservations, yes, though some definitions of nervous force might modify this considerably.

(26) A. G. asks: 1. How is gold lettering put on the backs of books, and what composition is used to make the gold leaf stick? A. Gold letters are printed or pressed on book bindings by means of an albuminous size—white of eggs—the gold leaf placed on the size and the block of type heated and pressed on the gold leaf. 2. How is gold printing done on cards and paper? A. Gold printing on paper is printing with a size sold as "gold size" and dusting with bronze powder.

(27) F. O. asks how to give brass the beautiful iridescent colors. A. By referring to the SCIENTIFIC AMERICAN of December 1, answer 14, the process of obtaining the iridescent colors will be found. The antique or very old brass color is probably the result of some lacquer whose composition is not generally known. The bright gold finish on brass is, if not the result of polishing, apt to be produced by some lacquer, such as the following: Seed lac, 3 ounces, turmeric 1 ounce, dragon's blood 1/4 ounce, alcohol 1 pint. Digest for a week, frequently shaking, decant, and filter.

(28) L. P. V. asks if a refracting telescope can be rendered as perfectly free from chromatic and spherical aberration on the dialytic plan as by the common method where the crown and flint lenses are in contact, or nearly so? And, if so, why are not the larger astronomical telescopes so constructed, thus saving thousands of dollars in the cost of the flint lens, besides actually shortening the length of tube for a given focal distance? A. The dialytic telescope cannot be made as perfect as those corrected at the object glass. This is the reason they are but little known. The field is not as large, and the definition is only good in the center.

(29) M. E. E. asks for a recipe for making water colors, such as are used for coloring photographs. A. The articles referred to are presumably nothing but aniline colors. So that you can purchase the desired color or shade of aniline you desire, dissolve it in water or alcohol according as to which is the proper solvent, and you will have the color precisely identical to the variety possessing the fanciful name. 2. Can you tell me of any way in which tar can be rendered more palatable to the taste, when taken as a medicine? Macerate tar in eight times its weight of alcohol until completely dissolved, then add a suitable flavoring compound, such as oil of wintergreen.

(30) G. J. G. writes: If two ten horse power engines were running 100 revolutions per minute, one with 48 inch pulley on crank shaft driving on to a 24 inch pulley on counter shaft, the other with 24 inch pulley on crank shaft driving on to a 24 inch pulley on counter shaft, both using 4 inch belt and same distance from center to center of each shaft, which counter shaft will require the most amount of power to stop in the same length of time? A. One-half the power only applied in the second case to the counter shaft will be required in the first case.

(31) H. B. A. asks: Will oil spread over tubes in boiler after cleaning prevent its scaling? A. No, but for a short time it may prevent the scale adhering.

(32) A. McL., Jr., asks how litmus is thoroughly dissolved. A. The preparation of litmus is as follows: The ground lichens are first treated with urine containing a little potash, and allowed to ferment for several weeks, whereby they produce a purple red; the colored liquor, treated with quick lime and some more urine, is again set to ferment during two or three weeks; then it is mixed with chalk or gypsum into a paste which is formed into small cubical pieces by being pressed into brass moulds and dried in the shade. Litmus is easy to pulverize, is partially soluble in water and dilute alcohol, leaving a residue consisting of calcium carbonate, silica, gypsum, and iron oxide combined with the dye. This residue is not soluble unless by treatment with acids, which would interfere with the action of the litmus. For making litmus paper an infusion of one ounce of litmus to half a pint of hot water is recommended by Faraday.

(33) J. B. R. asks: 1. Is the pressure the same on the bottom of a boiler as on the top? If there is any difference, please tell me which has the greatest, and what is the difference? A. The greatest pressure is at the bottom, as you have there the weight of the water in addition to the pressure of steam. 2. How high will a good jet throw water with 100 pounds steam? A. We cannot say, as it depends on other things than merely the pressure, viz., length, kind and size of pipe, diameter and shape of nozzle. 3. How high will a siphon lift water or oil with one hundred feet fall? With two hundred feet fall? A. A siphon cannot lift water more than 26 or 28 feet, and even then there must not be any air leaks; we think not more than 18 or 20 feet can be depended upon in ordinary work. 4. When a locomotive is going down grade with her engines reversed for the purpose of holding back, where does she exhaust her steam? A. Whether going ahead or back, it must exhaust through the pipe to chimney.

(34) H. N. P. asks how the cement composed of equal parts of pitch, gutta percha, and shellac is made. A. Fuse together the gutta percha and the pitch, then add the shellac, or else dissolve the mixture in carbon disulphide.

(35) J. B. W. asks: How shall I mix wax and gutta percha? A. By dissolving them in coal tar, naphtha, carbon disulphide, or like solvents.

(36) J. M. asks how to make powdered manganese into blocks for Leclanche batteries. A. Manganese dioxide is mixed in nearly equal parts with carbon, but with the addition of a small quantity—5 per cent—of resin for the purpose of giving consistency to the mass. These three substances, properly pulverized and intimately mixed, are conglomerated under a considerable pressure, and at a temperature of 212° Fah., into a solid cylinder. A small cylinder of sodium

bisulphate is also inserted in the center of the carbon and manganese electrode while it is being moulded.

(37) J. K. M.—The composition used for picture frame ornaments is elastic, for fitting to uneven surfaces while fresh, and dries hard. If for outside work they should be thoroughly oiled with linseed oil upon the backs when applied, using nails and no glue. This composition is made like putty and of the same material, only worked up hard and moulded with a press.

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

Mrs. B. W. A.—The specimen is an iron ore—hematite (sesquioxide of iron).

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

April 15, 1884,

AND EACH BEARING THAT DATE.

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

Table listing various inventions and their patent numbers, including Addressing machine, Advertising bird cage, Advertising card, Advertising musical instrument, Agaving whisky, Air cooling machine, Alarm, Alarm apparatus, Alloys, Anvil attachment, Aquarium, Auger handle, Ax polls, Axle, self-oiling, Baby jumper, Bag, Balls for buckets, Barre shaping machine, Bathing apparatus, Bed bottom, Bell, electric call, Bell pull, Bell ringing apparatus, Bicycle handle, Bill-of-fare indicator, Bit, Block, Boiler, Bookcase, Boots and shoes, Boring square holes, Bottle stopper, Box, Brick drier, Brick kiln, Brick machine, Bridle bit, Broom balance tip, Brushes, Buckle, Building block, Butter package, Button, Button attaching instrument, Button fastener, Button fastener, Cable road slots, Cables, Calendar, Candy machine, Capsule drying rack, Capsule machine, Capsule stripping machine, Car brake, Car, cattle, Car coupling, Car coupling, Car cover, Car railway, Car seat, Car wheel, Car wheel, Car wheel lubricator, Cars, Carriage body, Carriage top fastener, Carrier, Case, Cash and parcel receptacle, Cash carrier, Cash carrier system, Celluloid, Celluloid for enameling, Celluloid, etc., Cellulose, Chain roller, Check row wire, Cherry seeder, Chest of drawers, Chuck lathe, Churn, Churn cover fastener, Clasp, Clay for potters' use, Clock winding device, Clod crusher, Clutch, Cock, Cock, waste, Coffee mill motor, Coffee pot, Coffin, Collapsing cup, Convertible chair and bedstead.