

ENGINEERING INVENTIONS.

A rail clearer for snow plows has been patented by Mr. Augustus F. Priest, of Fort William, Ont., Canada. The invention covers a special construction for track clearers and their attachment to the plow, whereby they may conform to the curves and irregularities of the track, and be lifted and let down at will by connections extending to the engine cab.

AGRICULTURAL INVENTIONS.

A harvester has been patented by Mr. William F. Weirick, of Charlestown, West Va. It has automatic rakes and binders, and is designed to be carried bodily upon and propelled by an engine, being arranged so that the engine driver may drop the bundles which have been cut and bound by the harvester.

A grain cleaner for thrashing machines has been patented by Mr. David L. Stroud, of Richford, Minn. To the sides of the sieve shoe are added extensions, with a series of rocker bars arranged between them on pivots, with fingers ranging from one to the other and overlapping them to form a riddle, the grain escaping from the straw and chaff as it passes over.

MISCELLANEOUS INVENTIONS.

A jar fastener has been patented by Mr. Charles Watts, of Crooksville, Ohio. Combined with a jar having apertures in its neck above the cover seat is a peculiarly bent wire locking device, intended to make a cheap and effective sealing attachment for earthenware jars.

A speculum has been patented by Mr. Joseph G. Ellis, of Oak Ridge, La. It is for the use of physicians and surgeons in making internal examinations, and the speculum is adapted to be withdrawn through the chamber of the instrument in connection with which it is used.

A gate has been patented by Mr. Samuel C. Gridley, of Northhoff, Cal. This invention covers a special construction and arrangement of parts for a gate to move back and forth between two posts set at one side of the roadway, which will be strong and durable, and can be operated without stopping the team.

A breast pad has been patented by Mr. Charles L. Morehouse, of Brooklyn, N. Y. It is made of hollow rubber, to be suitably supported by straps and a belt, and, while being well calculated to fit the form, is susceptible of ready ornamentation with lace, ruffles, etc., while it may be covered with silk or other suitable material.

A treadle has been patented by Mr. Thomas P. Gooch, of Oakland, Miss. The treadle lever has its lower end formed with two arms, one having a hook and the other a foot piece, with other novel features, whereby the foot rest is intended to apply equally on both sides of the shaft, and so that friction will be in great part avoided.

A weighing scale has been patented by Mr. William Watkins, of Moss Point, Miss. It has two beams, one graduated to indicate values and the other prices at which articles are sold, the beams having weights which can be so adjusted as to enable the desired quantity of an article to be ascertained in pounds for a given price.

A brace wire fastening for wire fences has been patented by Mr. Arthur Lott, of Riddleville, Tex. Combined with the panel wires are braces and triarmed clasps embracing the wires and braces at their points of intersection, the clasps each being made in one piece, with its arms bent around a longitudinal or panel wire and a brace wire.

A hinge has been patented by Mr. John A. Resch, of Jersey City, N. J. The invention consists in hinges made with their plates of unequal width and bent outward or from each other at right angles, so that, when used for inside blinds, the latter, when folded together, can be turned back against the wall of the room at the sides of the window.

A ticket chart has been patented by Mr. Henry E. Lomas, of Cresco, Iowa. It consists in a printed plan, adaptable for any place of entertainment, with removable portions, so that these portions can be removed and attached to the tickets, and the remaining plan will represent the solid and unsold portions of the house.

A nut lock has been patented by Mr. Samuel J. Wisdom, of Montgomery, Ala. This invention consists in a washer having an inclined slot, and made with its top edge slightly bent, being especially designed for use with flanged fish plates, furnishing a cheap and reliable lock, with a washer that can be applied to the bolt without taking off the nut.

A screen attachment for bottling machines has been patented by Mr. Frank Seely, of New York City. It is made of sheet or cast metal, to be so attached to a bottling machine that the attendant will be fully protected against flying fragments of glass in case the bottle bursts when being corked, the screen being automatic in its action.

A safety check for music boxes has been patented by Mr. C. Henry Jacot, of Hoboken, N. J. Combined with the cylinder shaft is a ratchet wheel and a double pawl having a weighted arm, whereby the shaft will be stopped and held should its speed be unduly increased, thus preventing the pins and teeth of the comb from danger of being broken or injured.

A side bar vehicle has been patented by Mr. Luther Stouffer, of St. Joseph, Mo. Combined with a vehicle box and side bars is a spring rod or bar bent to form a square or oblong figure, with its outer ends crossed and extended laterally to the side bars, to which they are secured, giving a more gradual and easy movement than is usual in side bar vehicles.

A washing machine has been patented by Mr. Frank Belliel, of Hastings, Neb. It consists of a semicircular tub and cover hinged together, so made that the clothes are placed in a space between a board and cylindrical rubber, the revolving of the latter carrying the clothes around against the ribs of the board, springs pressing the board and rubber together.

A shears has been patented by Mr. Benjamin F. McCarty, of Rolling Prairie, Ind. The invention consists of a disk turned by a lever, a pivoted arm carrying dies and connected by arms to the disk, with an adjustable arm to prevent the metal from rising when being cut, the shears being especially devised for cutting metal bars and sheet metal by hand power.

A feeder for roller mills has been patented by Messrs. Louis Nolden and Alfred E. May, of Beardstown, Ill. It is made with a case having an inclined rear side, a skeleton, a rotary cylinder revolving within the case, and an adjustable feed plate to adapt it to feed middlings and other soft materials to the rollers regularly and uniformly.

An axle for vehicles has been patented by Mr. Gouverneur M. Forbes, of Salt Lake City, Utah Ter. It has crank arms at its ends, with cams for retaining the body level or nearly so as the crank turns over, the design being to make the vehicle travel more easily and smoothly than one with a straight axle over ordinary roads.

A grate for furnaces has been patented by Mr. Silas H. Huntington, of West Pittston, Pa. This invention covers a special construction of roller grate bars to provide a free air circulation through them to the fire, with hollow teeth alternating with the teeth of the grate bars, to prevent burning out, the formation of clinker, and secure a level settling of the fire as the bars are rotated.

A latch has been patented by Messrs. Rudolf E. Woodrich, of New York City, and Charles Langbien, of Brooklyn, N. Y. Combined with a lock casing is a sliding bolt therein, a knob shaft connected with the bolt, and a sliding latch in a sleeve surrounding the knob shaft, the bolt being acted upon by the knob shaft and also adapted to be locked in place by means of a latch.

An improved roofing has been patented by Mr. Benjamin E. Adams, of Roswell, New Mexico Ter. It consists of rectangular plates applied diagonally upon the roof by fitting the angle of each between the diagonal sides of adjacent plates of the course above, nailing the corner and folding the plate over to cover the nail, so the roofing will be unaffected by changes of temperature.

A composition of matter for lining or coating boxes has been patented by Mr. Adolf Hollner, of Dennison, Ohio. It is more particularly designed for boxes for holding coffee or other articles from which it is desirable to exclude moisture and preserve the aroma therein, and consists of glue, skimmed milk, and calcareous material, such as chalk, prepared and applied in a specified manner.

A mechanism for controlling steam driven sewing machines has been patented by Mr. James H. Rohme, of Newburg, N. Y. In combination with the drive pulley and a rock shaft a treadle is so arranged and connected that the pulley will be instantly stopped when thrown out of gear with its friction wheel, so that the machines can be instantly started or stopped, and their speed readily controlled.

A saw set has been patented by Mr. John S. Long, of Murphysborough, Ill. This is an improvement on a former patented invention of the same inventor, whereby the hammer is caused automatically to descend upon the anvil or saw teeth held thereon prior to delivering its blow, so as to indicate to the operator the exact position on the anvil that the saw tooth should be held to be effectively struck.

A job printer's case has been patented by Mr. George W. Butler, of Chicago, Ill. It consists of an upper and lower case made regulation size, the lower case having a large compartment in which to rest a "job galley," while on both sides thereof, and in the whole space of the upper case, are divisions for holding leads, rules, slugs, spaces, quads, and other conveniences for the work of a job printer.

A pendulum escapement for clocks has been patented by Mr. William Hart, of Kirksville, Mo. It is applied to the lower end of the pendulum, but detached from the latter, although the escapement wheel and lever may be fitted to operate at any point in the length of the pendulum, and the device is intended to facilitate the use of the pendulum by hanging shelves thereon for displaying goods.

An automatic cut-off for gas burners has been patented by Mr. John E. Birch, of Winnipeg, Manitoba, Canada. By this invention the expansibility of a confined body of air is utilized to hold open a valve that permits the flow of gas to continue, the air being heated by the normal heat of the burner, and so that when it cools by the extinguishment of the flame the valve will close.

A cartridge loader has been patented by Mr. Charles A. Thompson, of Hopkinsville, Ky. Combined with suitably held powder and shot holders is a shell carrying arm adapted to act on the stems of the holders, a rammer, a wad holder, and an ejector for forcing the wads out of the holder, with other novel features, adapted for a machine to be worked effectively by unskilled labor.

A fireproof floor has been patented by Mr. William W. Hazlett, of Toronto, Ohio. This invention relates especially to a protection for the lower portions of the flanged iron beams of the floors, and has for its object to improve the construction of the floors by providing a better protection to the beams, and also to facilitate the setting of the tile arches between the beams.

A stock car has been patented by Messrs. Daniel Lines and Charles T. Long, of Milano, Tex. It is so constructed that the hay racks swing up automatically and the troughs can be lowered to be out of the way when not in use, or easily swung up when the animals are to be watered, the design being such that ordinary cars can easily be converted in this way into stock cars.

A nut machine has been patented by Mr. Alfred Marland, of Pittsburg, Pa. Combined with forming and compressing dies are a cutting die at one side of the forming die, a blank cutting and carrying knife, and means for operating it for cutting the blanks and feeding them to the dies, with other novel features,

the invention covering improvements on former patented inventions of the same inventor in nut machines.

A cotton press has been patented by Mr. Samuel I. Wilkinson, of Yazoo City, Miss. Combined with a box pivoted to swing in a horizontal plane are plungers connected with a fixed object, so the latter will be reciprocated in the box when the latter is swung or rocked, the press being one which can be operated by hand or power, and can be cheaply made of wood or metal.

A band pulley has been patented by Mr. Reuben Jones, of Atlanta, Ga. It is designed to carry a rope belt, and is a sectional pulley having teeth at its edges inclined in opposite directions, enabling both sections of the pulley to be cast in the same mould, forming a diagonal crimp in the rope between the teeth, and giving one sharp angle for the rope to catch against whether moving forward or backward.

A gate hanger has been patented by Mr. Issachar Crowfoot, of Hartford, Wis. Combined with the gate post is a screw held therein supporting a block or head in which the top supporting bar of the gate is held, so that by turning the screw the gate can be raised or lowered at will, the post passing through a spider frame, and its lower end resting in a flanged cup embedded in the ground.

An adding machine has been patented by Mr. John L. McCaleb, of Benton, Tex. It consists of a box with a spindle surrounded by a sleeve, there being a handle on the spindle and on the sleeve, with devices for turning the spindle from the sleeve, a cog wheel revolved from the spindle, and an extra hand in connection with the cog wheel, making a simple device for adding and multiplying numbers.

A ratchet drill has been patented by Mr. John J. Banta, of Pacific, Mo. There is a novel arrangement of pawls in a block fixed to the tool holding spindle, which is journaled in a frame or stock, the pawls being adapted to engage and slip over ratchet teeth fixed to bevel pinions loose on the spindle and driven by a gear wheel and crank, to insure the easier adjustment and more efficient operation of ratchet boring or drilling machines.

A method of making plush articles of clothing has been patented by Messrs. Charles Theinert and Simon Christiansen, of New York City. It consists of cutting the plush on the back by means of a knife diagonally to the warps and wefts, abutting the edges of the pieces, and uniting them by the glove or cross stitch, so that a garment thus made will have invisible seams, not indicated by any depression in the surface of the plush.

An odometer has been patented by Mr. Henry O. Brooks, of Lowell, Mass. The case has rings or hangers placed loosely on an elongated collar which is made in halves, and bound upon the axle so the collar revolves with the axle and the odometer hangs loosely from the collar, the split construction of the collar allowing it to be readily affixed to any axle, and the device being an inexpensive one for measuring the distance traveled by bicycles and other vehicles.

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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 Information requests on matters of personal rather than general interest, and requests for Prompt Answer by Letter, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each. Minerals sent for examination should be distinctly marked or labeled.

(1) R. H. K. asks (1) a recipe or method for whitening ivory, viz., handles on surgical instruments, etc. A. Treat with hydrogen peroxide. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 339. 2. How may I toughen feet so as to take long tramps comfortably? A. Treating them with some astringent solution is said to be slightly beneficial. 3. Best black ink for pen sketches and other drawing purposes? A. You will find several formulas for inks given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 157. 4. Which pencils do artists consider the best? A. Dixon's or Faber's; either are good. 5. Where can I get the best book or account of taking long tramps on foot? Practical papers. Also best one for sketching from nature? A. "A Pilgrimage in Canterbury," by the artist Joseph Pennell, may interest you. The files of "Outing" are more likely to give you information of the character desired rather than any single book or books.

(2) M. D. asks: Would not the combustion of an old time blast furnace preclude there being a paying amount of iron remaining in the slag? Could graded iron be produced from this slag, using with it a fair percentage of scrap? Would charcoal fuel be of any advantage in such reduction? Please decide a discussion among your readers, in a general answer, including the chemical operations of such reduction and composition of product. A. The iron in the slag of old style furnaces is not worth the cost of redemption. It will not pay for the fuel for remelting.

(3) R. M. asks the most practical way to get rid of sewage, by absorption of the soil where the ground is level, and the frost line eight feet deep, the soil being compact clay. A. We know of no means of absorbing sewage in compact clay. You may so arrange a drainage system as to discharge on a lower level, and utilize the sewage as a fertilizer. Or, if a town house, gather in a cesspool and discharge by pumping into a wagon tank and hauling. This is much practiced in the Eastern States. In many places sanitary laws forbid absorption on account of well contamination.

(4) R. M. writes: Having dropped some indelible ink upon the oil cloth of the table of my

study, I procured potassium cyanide to remove the same. But the solution being too strong, it left two large areas, where the greenishness of the cloth is entirely taken away, or in some places but slightly. What should I use to restore the cloth to its former color? A. By the use of the cyanide you have entirely removed the color, and therefore it cannot be restored. A little coloring matter with some alcohol varnish might produce a new coating.

(5) L. P. S. asks how the cold rolled shafting is made. A. By pickling the round iron in an acid bath to free it from scale, and rolling between hard, polished, grooved rollers.

(6) S. A. H. asks how to clean a rubber watch chain that has become brown by or faded by the sun; it was originally black. A. Dip the chain in carbon disulphide. This chemical, however, must be very cautiously used, as it is an exceedingly dangerous substance to handle by one not an expert.

(7) J. S. S. asks a rule for finding boiler capacity necessary for heating building where pipe and heaters are in place and radiating surface known? A. One square foot of effectual heating surface in boiler to eight square feet of radiating surface in cold or exposed buildings. One to nine and one to ten, where conditions are less active.

(8) E. E. D. asks when the Greek language ceased to be a living language. A. The so-called ancient forms never died out, but are nearly all found, even in the more cultivated modern Greek of the middle ages. Greek is now, says Geldart, "as really alive as it was in the days of Homer. Modern Greek resembles the ancient language fully as much as current English does the English of Chaucer."

(9) Hatmaker writes: We use a varnish to cover pin holes in cotton cloth and silk which leaves too great a gloss in contrast to the material (black); can you give us a recipe that would answer the purpose better? We use alcohol varnish only, and want a dead color? A. Try the following: Well wash 1 lb. of parchment shavings or cuttings in two or more lots of cold water; then put them into a saucepan or other vessel with 4 quarts of cold water, and let them simmer gently until the quantity is reduced to 2 quarts. Strain through a fine sieve, and one teaspoonful mixed with 1 quart of water are the proportions used in finishing silks.

(10) S. & F. ask how rubber bands are made. A. Rubber bands are made by cutting rubber tubing into suitable sizes. The process of making the tubing is given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 251, under title of "The India Rubber and Gutta Percha Industries," a series of valuable papers appearing in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 249, 251, 252.

(11) C. S. asks: 1. In what proportion to take dextrine in place of gum arabic to have the same consistence and the same gloss, etc., as with the latter, for inks, varnishes, etc.? A. The gum is added for the purpose of holding the gallo-tannate precipitate in suspension, and also in order to give the ink a body or gloss on drying, therefore the amount is easily determined by adding the gum until the precipitate ceases to fall. The difference between the amount of dextrine to be used and the gum arabic will be very slight. 2. Receipts for burnishing ink for heel and sole edge polishing? A.

- a. Extract of logwood.....1 to 2 ounces. Tincture of iron.....1 to 2 " Sweet oil.....1 to 2 drachms. Diluted alcohol.....1 pint. b. Extract of logwood.....4 ounces. Bichromate of potassium.....12 grains. Ferrocyanide of potassium.....12 " Rainwater.....1 gallon.

The ink in either case is applied with a brush and immediately burnished with a hot iron. 3. Some authorities on inks? SCIENTIFIC AMERICAN SUPPLEMENT, No. 157, treats the subject of inks quite fully. Spoons' Workshop Receipts (§2) contain numerous recipes for the substances mentioned by you.

(12) H. C. asks: 1. What plating battery is the cheapest for gold plating jewelry? A. Better use a Smee battery. 2. Also, how to remove printer's ink from some valuable engravings, without injuring them? A. It cannot be done except in places where a sharp eraser can be used.

(13) R. asks: Why does lightning so seldom strike trains and rails? Railroad men claim that the oiling and greasing of the iron is the cause. Mechanics claim it is the immense quantity of iron, that spreads and weakens the electricity. A. It is probably due to the diffusive effect of the metal of the track.

(14) C. T. writes: I have been building a battery of the cells and covered copper wire belonging to a telephone; the name on the cells is "Leclanche battery;" the wire is the wire which I found running in the walls of a building, and I also got an electric bell. I wound about 300 or 400 yards of the wire on a reel about 6 in. long; the reel is tin for the core and wood at the ends. I connected the wires from the reel to the electric bell, and connected the wires from the bell machine to the cells, two of them, then I connected two wires with handles to the electric bell machine. It will work all right, only when it has been working about ten minutes it gets weaker and again I have got the fine iron wires in the core, but it does not seem to regulate the current. Could you kindly help me out of my trouble, or tell me where the fault is? Is it with the wire all being of one size, or is it with the tin being in for the core? Can you tell me of any back number of the SCIENTIFIC AMERICAN SUPPLEMENT with the full description of building a battery, so I can get one? A. The trouble with your battery is that you keep it on a closed circuit too long. It is probably partially exhausted, and therefore polarizes or "runs down" quickly. The Leclanche battery is not adapted to continuous use, but is very efficient for intermittent use. The coil you have made, if we understand you, is only a primary or magnetic coil formed of office wire. You should have used magnet wire, and to secure the results you seek, you should apply a secondary wire. See article on induction coil in SUPPLEMENT, 160. For information on batteries consult SUPPLEMENT, Nos. 157, 158, and 159.

(15) J. L. B. asks whether a vessel with a centerboard can carry more sail without upsetting than one without, provided there is no weight to the centerboard? A. The tendency of a boat to capsize is increased by the centerboard (if light), by preventing the leeway of the boat on a side squall.

(16) J. B. H.—You could compress about 2,000 cubic feet of air into a steel cylinder 1 foot in diameter and 10 feet long. It would have a pressure of nearly 2,000 pounds to the square inch. A human being requires about 15 cubic feet of air per hour, so this would last three men 40 hours. It would run a horse power engine about 1 1/4 hours, if the change of temperature caused by the use of the air were otherwise provided for.

(17) C. C. P. asks: When can a person be called a musician? Has a person got to know how to read music at sight before they can be called a musician, or is there such a thing as a natural musician? I had an argument with a lady here, and she claims that you cannot call a person a musician unless they can read music at sight, no matter how good they can play on different instruments. I claim if they are good players on different instruments, they are musicians. Which is right? A. A musician, according to Webster, is "one that sings or performs on instruments of music according to the rules of the art." One may be a good musician without being a scientific musician, and we would call anyone who could produce good music a musician.

(18) C. R. C. writes: I intend to build a small steam engine, cylinder 2 1/4 x 1 1/4 in. About how many pounds power will it have? How large a boiler would it require, boiler made of 3/8 in. iron? How many pounds working pressure would it stand? How large a fly wheel would engine require? A. It would depend on the construction of the engine, the speed at which it is driven, and the steam pressure. Probably one-third horse power would be a fair estimate, the engine making 300 revolutions under 60 lb. average piston pressure. The boiler should have 4 to 5 square feet of heating surface. If you make the diameter of the boiler small, it will easily stand 75 lb. pressure per sq. in. Your fly wheel should be 10 in. in diameter, and should weigh about 20 lb.

(19) J. E. M. asks how much oxygen gas water will hold in solution, and the best simple means of generating it for office use? A. The coefficient of solubility of oxygen in water at 59° F. is 0.02359, i. e., water will absorb 0.02359 of its volume of oxygen. This is a very small percentage. It may be greatly increased by lowering the temperature. For 32° F. the coefficient is 0.04114. Oxygenated water or peroxide of hydrogen, H2O2 is prepared by heating some baryta (BaO) in a current of oxygen, converting it into peroxide of barium (BaO2). This is powdered, suspended in water, and acted upon by a stream of carbonic acid gas. The water is thus charged with peroxide of hydrogen: BaO2 + H2O + CO2 = BaO.CO2 + H2O2. The carbonate of baryta is allowed to subside, and the clear solution of peroxide of hydrogen is poured off. Oxygen is readily prepared by mixing with chlorate of potash one-fifth of its weight of powdered black oxide of manganese, and heating it in an iron or glass retort. The oxygen is conveyed from the retort to the wash bottle by means of a rubber tube. If pure oxygen is required it should be passed through tubes containing potash, to remove any carbonic acid and chlorine which it might contain. Two precautions are necessary in making oxygen; one is to test a small portion of the mixture of manganese and chlorate of potash in an open spoon or ladle over a flame, to see that it contains nothing which would render it explosive; the other is to remove the rubber tube from the retort when the bubbles of oxygen cease to rise in the wash bottle, to prevent the drawing of the water back into the retort.

(20) W. B. asks a good welding compound for cast steel. A. Borax 91 parts, sal ammoniac 9 parts. Pulverize together and melt in an iron pot until frothing ceases, pour out and cool. Then grind in a mortar to a powder for use.

(21) S. E. K. F.—Saw teeth should always be set so as to allow a clearance to the saw. It makes the saw run easier, and prevents heating by the friction. For circular and mill saws there are swedges made that set up the edge of the tooth to give clearance to the blade. The whole tooth does not need to be set out or swaged, only the point.

(22) Subscriber wishes a formula for making red, blue, and purple ink, used for rubber stamps. Also how to make a good hektograph. A. Red.—Dissolve 1/2 ounce of carmine in 2 ounces of strong water of ammonia, and add 1 drachm of glycerine and 1/2 ounce of dextrine. Blue.—Rub 1 ounce of Prussian blue with enough water to make a perfectly smooth paste; then add 1 ounce of dextrine, incorporate it well, and finally add sufficient water to bring it to the proper consistence. Violet.—Mix and dissolve 2 to 4 drachms aniline violet, 15 ounces alcohol, and 15 ounces glycerine. The solution is poured on the cushion and rubbed in with a brush. For hektograph, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 435, under title of "How to Make and How to Use the Copying Pad."

(23) J. M. B. writes: We have made some "farm bells" out of cast iron, and they don't ring satisfactorily. What is the trouble? What composition should go in with the cast iron to make a good sounding farm bell? A. Use hard iron, No. 4 or 5. Make the model from a good-sounding bell. The form has great influence on the tone.

(24) C. N. asks, in order to settle a dispute, the course a rifle ball takes after leaving the gun. A. The course of a rifle ball is very nearly a parabola, the curve or trajectory being the result of three forces—the impulse of the gun, the resistance of the atmosphere, and gravitation. You will find a very interesting and mathematical discussion of the whole subject of projectiles, illustrated with geometrical diagrams, in Chambers' "Treatise on Practical Mathematics," pages 348 to 353, which we can mail you for \$1.50.

(25) E. W. asks: 1. How can cast iron plates one inch to one and one-half inches thick, eight inches wide, and five feet long, be chilled without springing the chills? The trouble we have met with

is that the chill, which we make about four inches thick, expands on the top surface through contact with the hot iron, and throws the ends down, forming an arc of a circle, thus cutting the middle of the castings almost in two. We have also tried to chill these castings for about two feet in the center, and have failed on account of the chill warping and leaving an uneven surface at ends of chill. A. Either make your chill hollow and flow water through it, or make it sectional. 2. Also what is the best work you can name on electricity and electrical engineering? I want to make it a study; understand the elementary principles already. A. Dredge's Electric Illumination, Thompson's Dynamo Electric Machinery, Gordon's Electricity and Magnetism, Maxwell's Electricity and Magnetism. You should also study Faraday's Researches.

(26) G. K., Jr.—Paint sticks to tin that has been exposed to the weather for a short time better than to fresh, bright tin. There is a slight film of oxide formed by the exposure, which prevents the paint from chipping off.

(27) J. F. S. asks the best receipt for solution for the preservation of fruits in a fresh state for exhibition purposes. A. Glycerine has been recommended for the preservation of fruits, previous to eating which, the glycerine should be removed by immersing the fruit in water. Dipping the fruit in paraffine is an excellent means of preserving it. Colloation will probably be found most satisfactory for exhibition purposes. A thin coating of this varnish will entirely prevent the access of air to the fruit.

(28) C. M. asks the best way to mix plumbago and mineral oil, in order that the former may not precipitate, but remain suspended in the oil. A. The only way is to make the mixture so thick and pasty with plumbago that mechanical settlement is practically excluded.

(29) J. G. L. asks how to make a cheap orange stain for birch wood. A. Yellow or orange stains generally result from the use of nitric acid or turmeric. Thus 2 1/2 ounces finely powdered turmeric are digested for several days in 17 1/2 ounces 80 per cent alcohol, and then strained through a cloth. This solution is applied to the articles to be stained. Nitric acid diluted with 3 parts of water is likewise used. A hot concentrated solution of picric acid can likewise be used.

(30) G. A. F. asks what to apply to gilt gas fixtures to remove dirt, fly specks, etc. A. Very few chandeliers are gilt; they are burnished and lacquered with yellow lacquer. Take the chandeliers to pieces, and boil in strong soda ley for a few minutes, brush over with a soft brush, pass it through a strong solution of potassium cyanide (a deadly poison), wash through a tubful of boiling water, dry in clean saw dust, wipe up bright with a wash leather, and relacquer. A pale gold lacquer consists of 1 gallon of methyl alcohol, 10 ounces of seed lac bruised, and 1/2 an ounce of red sanders, dissolved and strained.

(31) C. R. S. asks how extract of malt is made, also quantity that would be a dose. A. Extract of malt is made from the infusion extracted with water at a temperature ranging between 160° and 170° Fah., drained off without pressure, and evaporated to the consistence of honey. It is nutritious and laxative. The dose is a tablespoonful or more, ad libitum.

(32) A. J. V. desires a recipe for mahogany stain. A. In order to produce a dark mahogany stain: Boil 1/2 pound of madder and 2 ounces of logwood in 1 gallon of water, and brush well over the wood while hot; when dry, go over the whole with pearl ash solution, 2 drachms to the quart. For a lighter stain: Put 2 ounces of dragon's blood, well bruised, into 1 quart of oil of turpentine; let the bottle stand in a warm place, shake frequently, and, when dissolved, steep the wood in the mixture.

(33) A. R. R.—For a silvering solution, add 15 drachms crystallized nitrate of silver to 250 drachms water, to which add 30 drachms cyanide of potassium: when dissolved, add 750 drachms of water in which 15 drachms of common salt has been dissolved. Clean the metal thoroughly and dip in a weak bath of nitric acid and water, rinse in clear water, and dip in the silver bath. The silvered wood mouldings are silver gilt or silver bronzed in the same manner as painters gilt and bronze signs and ornamental work.

(34) W. J. L. desires (1) a remedy for removing rough skin from the face, that has been pitted by small pox. A. Use simple oil, pomade, or ointment medicated with croton oil, and of a strength just sufficient to raise a very slight pustular eruption, is probably the safest and most effective and convenient of all the preparations that are employed for the purpose of removing pock marks. 2. One for removing blackheads that appear on the face. A. Cover the parts affected with a pomade consisting [of kaolin 4 parts, glycerine 3 parts, acetic acid 2 parts, with the addition of a small quantity of some ethereal oil.

(35) G. S. F. asks: Can a generator be made that will generate gas from 74° gasolene sufficient to supply 12 gas burners? If so, how can it be made and what size will it be, and what is the best kind of material to use to make same, and what shape would it be? A. It requires a great deal of experience to produce a generator for gasolene gas. Almost any device by which air is brought into contact with gasolene, or fibrous material saturated with gasolene, will produce gasolene gas, but the important points are to produce gas of uniform quality and to produce it safely. Our advice would be to purchase a machine from a reputable maker.

(36) P. H. B. asks: Is not a dose of ammonia diluted so much as not to be impossible to swallow, injurious to the taker, in some way, even while effecting some cure? If so, in what way? Are eruptions on the face and general loss of energy among the hurtful effects? A. Ammonia is simply a stimulant, and entirely transient in its action. It has no cumulative effect. Aqua ammonia is used chiefly as an external application; very seldom internally. If diluted with water to such a degree that it could be swallowed without difficulty, its effect would be slight, and

there would be no reason to apprehend danger. Facial eruptions and loss of vital force and energy certainly are not to be charged to it: they are doubtless due to some other cause.

(37) R. M. G. writes: Will you kindly inform me how I can use the dynamo described in your paper as a motor and how many cells of battery I require to run it, and about what fraction of a horse power it will be? A. The dynamo will operate as a motor without any alteration, provided it is properly adjusted as a dynamo. Possibly you may be obliged to shift the commutator a little one way or the other. It will require from 8 to 10 cells of Bunsen or Grove battery to run it. It will not be as economical as if constructed for a motor. More wire on the armature and less on the field magnet would improve it for a motor. The amount of power realized from it depends upon so many circumstances as to make it difficult to say. Probably one-fifteenth horse power.

(38) J. W. C. asks: 1. Where can I get a two cell Leclanche battery? A. From any dealer in electrical supplies. Consult our advertising columns. 2. Can you give me any information in regard to making or wrapping an electro-magnet, and what size wire should I use on it? 3. For description of various forms of electro-magnets consult SUPPLEMENT, No. 182. The size of wire used will depend on the purpose for which you intend the magnet. 3. Where can I purchase electrical supplies? A. See our advertising columns. 4. Where can I get a book on electricity? A. See our book catalogue, which we send you. 5. Are there any directions in any back numbers of the SUPPLEMENT to make a battery and magnets? If so, what number? A. See SUPPLEMENT, Nos. 157, 158, and 159, for articles on batteries, and SUPPLEMENT, No. 182, for magnets.

COMMUNICATIONS RECEIVED.

- "Why," by C. S. "On the New Star in Andromeda," by E. J. P. "Gulf Stream," by J. C. G.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

September 22, 1885,

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 Accordion, mechanical, C. Oettel; Adding machine, J. L. McCaleb; Aiding machine, R. F. Wilcox; Air brake, W. W. Hanscom; Alarm lock, G. Bredee; Alcohol and hydrocarbons and rectifying and aging liquors, manufacturing and distilling, D. D. Cattanch; Alcohol, hydrocarbons, and acetic acid, and for aging and refining liquors, apparatus for the manufacture and distillation of, D. D. Cattanch; Ash leach, J. H. Moran; Automatic guard or track clearer, H. M. Taaffe; Axes, forming the edges of, H. Hammond; Bag, J. Macdock; Bait, artificial, F. C. P. Robinson; Bale and package tie, I. N. Hopkins; Baling press, J. B. Miller; Ball, See Rubber ball; Barrel, metallic, J. D. Moran; Bed bottom, spring, J. M. M. Gerner; Bed, extension, H. B. Pritchard; Bed rail brace, J. Adams; Belt shifter, automatic, F. L. Dow; Belt tightening device, C. S. Wardwell; Bird cage, G. Bredee; Bit, See Bridle bit; Blast furnace, V. O. Strobel; Bluing, compound for laundry, P. Spence; Board, See Wash board; Boiler, See Steam boiler; Boiler furnace, J. Collis; Boiler furnace, steam, M. Coryell; Boiler furnace, steam, F. Leadbeater; Boiler indicator and alarm, J. M. Williams; Book cover or protector, C. Boyce; Boot or shoe nail, F. F. Raymond, 2d; Boot or shoe tip and stud, G. Chambers; Bottle stopper and fastener, C. J. Jordan; Bottles containing aerated liquids and fitted with internal stoppers, apparatus for opening, H. Cold; Bottling machine screen attachment, F. Seely; Box, See Fare box, Folding box; Box opener, E. Krieger; Brace, See Bed rail brace; Bracelet, F. F. Tingley; Brake, See Air brake, Car brake, Wagon and carriage brake; Breast pad, C. I. Morehouse; Brick hack, portable, Walker & Miner; Bridle bit, A. P. Baldwin; Bridle bit, C. E. Heinze; Bull lead, J. C. Covert; Burner, See Gas and vapor burner; Button and pin, combined, E. M. Chapman; Button locating machine, T. E. Keavy; Button setting machine, F. H. Richards; Buttons, attaching, J. Mathison; Cabinets, etc., self-opening lid for, P. Vander-noth; Canopy, W. M. A. Cole; Capsule joining machine, T. C. Merz; Car brake, W. Banell; Car brake, H. M. Taaffe; Car brake, automatic, H. M. Taaffe; Car coupling, S. U. Branstetter; Car coupling, E. Howe; Car coupling, O. J. Michaels; Car coupling, A. S. Reeves; Car coupling, J. Skinner; Car, dumping, Talley & Barnes; Car, freight, A. Wolcott; Car starter, C. Dickenson; Car starter, F. Rousseau; Car, stock, Lines & Long; Cars, system for heating freight, A. B. Vandemark; Card, playing, E. Seetherhouse; Carriage, S. M. Chester; Carrier, See Trace carrier.