

ENGINEERING INVENTIONS.

A steam engine has been patented by Mr. Peter S. Rush, of Atlanta, Texas. It has three cylinders, the pistons of which are connected in the usual way with the main shaft, steam being supplied by rotary valves as their ports are uncovered in such way as to obviate a dead center position, while the pressure of the live steam will be advantageously utilized.

A car step has been patented by Mr. Lewis W. Sheldon, of New York City. Combined with a lower main step having vertical slots in its riser is an auxiliary step with side pieces to pass through the slots when the step is folded, a strap hinge connecting the top of the riser of the auxiliary step with the lower main step, with other novel features, making a convenient folding step.

A pinch bar has been patented by Mr. John S. Yinger, of Manchester, Pa. The bit has a shank bearing against the under side of the bar proper, and a point or prong extended at approximately a right angle from the forward end of the shank, with guide lugs and fastenings, the device being very simple, and intended to act without slipping when ice, snow, oil, etc., may be on the rail.

An injector has been patented by Mr. Ferdinand Brunbauer, of Vienna, Austria-Hungary. It has two concentric steam tubes, the inner one endwise movable, forming a steam way of ring shaped section, adapted to operate a cut-off valve by the movement of the inner tube, in combination with a fixed conical valve for the inner tube, a valve seat on the tube, and means for adjustment of the tube, with other novel features.

A car truck has been patented by Mr. Ferdinand E. Canda, of New York City. It is more especially for use in mounting street car bodies, and is so designed that the car body is mounted upon and supported by posts that are free to tilt upon their connections with the car trucks, providing for the more easy passage of the car around curves, and for mounting the two pairs of wheels farther apart, with other advantages.

AGRICULTURAL INVENTION.

A hay stack binder has been patented by Messrs. David F. Laughlin and Charles F. Leslie, of Clyde, Kansas. It is a cord or wire tightening device, adapted to be conveniently carried around, and to be readily attached to the binding cords or wires and take up the slack until they are securely tied around the stack, to prevent hay from being blown away or scattered by high winds.

MISCELLANEOUS INVENTIONS.

A trunk harness has been patented by Mr. Charles H. Van Orden, of Catskill, N. Y. It is a binding device for trunks, boxes, etc., so made as to go around and have a tightening strap or rope applied for easily drawing the harness tightly.

The manufacture of emery forms the subject of a patent issued to Mr. William Ihne. It consists in first burning, then cooling and afterward reducing, iron ore or raw iron outcroppings, or material composed mainly of silica and aluminum, and subsequently separating and sifting it into different grades.

A lubricator has been patented by Mr. George Rupley, of Duluth, Minn. It is a novel form of lubricator applicable for use in connection with fixed bearings, having a cup and piston with threaded stem so arranged that by turning a nut the lubricating material will be forced out to the bearing.

A mantel cabinet has been patented by Mr. William C. Doscher, of New York City. The base is provided with sliding blocks in combination with ornamental corner pieces adjustably attached, whereby the cabinet may be made to fit a mantel of any width and always present a handsome appearance.

A refrigerating device has been patented by Mr. Henry W. Speight, of Brooklyn, N. Y. It consists of an inner receptacle around which the cold waste water from an ice box is made to circulate, being especially adapted for butchers' use in keeping meats cool at small cost.

A sand box for street cars has been patented by Mr. Charles Clark, of Brooklyn, N. Y. It is held beneath the seat, over an opening in the floor of the car, in combination with a vertical and horizontal tube, and a valve under the control of the driver, for supplying the track when needed, as in the case of freezing weather or when the tracks are slippery.

A paper box has been patented by Mr. John F. Diemer, of Elizabeth, N. J. The box body has flaps which are locked in place on a metallic plate of peculiar construction, the box opening at one end so that it can be used single or with a sliding box for various purposes, especially for storing letters and other documents.

A curtain shade fixture has been patented by Mr. Robert P. Trimble, of Oregon, Mo. It is for sustaining the curtain shade roller and lambrquin rod at the upper part of the window in such a manner as to permit the same to be quickly applied or removed and adjusted higher or lower, as may be required for purposes of better ventilation.

A railway spike and method of making it has been patented by Mr. Thomas A. Davies, of New York City. It is a plate spike, with a general taper for its entire length, and formed with a diagonal head, a tapering plate being first formed with a flange at one edge, and the blank then being cut into narrow strips diagonally across from edge to edge.

A brick kiln has been patented by Mr. Lawrence Manning, of Nokomis, Ill. The invention consists of a draught pipe leading from the outside to the pit, so as to concentrate the heat either in the center of the arch part or on both sides of the kiln simultaneously, for burning the bricks quickly in the centers as well as at the sides of the kiln.

A chemical fire kindler has been patented by Mr. Nils Johanson, of Muskegon, Mich. It

is made by pressing in a conical mould a small quantity of "excelsior," such as used in the furniture trade, inclosing it in a binder of zinc, then immersing the pointed half in liquid paraffine and the base half in resin.

A weighing scale has been patented by Mr. George W. Craig, of Grimm's Landing, West Va. This invention provides a framework and weighing apparatus designed more particularly for weighing heavy bodies, as railway cars and locomotives, loaded wagons, live stock, etc., and one which is of simple and cheap construction and accurate means for adjustment.

A composition to be used as a non-conductor of heat has been patented by Mr. Nicholas J. Clayton, of Galveston, Texas. It consists of cottonseed hulls or waste treated with a solution of alum or its equivalent, combined with plaster of Paris and comminuted materials, and prepared for use in a manner specially described.

A pie holder has been patented by Mary Jory, of Salem, Oregon. It consists of trays within a specially devised frame for holding them one above the other, the frame being composed of a strip of metal bent twice at right angles, with its extremities parallel with each other and its central part forming a handle.

A wire cloth delivering reel has been patented by Mr. Silas E. Ratekin, of Kansas City, Mo. It consists of a vertical post to which is pivoted a roll holder capable of being turned from a vertical to a horizontal position, making a reel for properly supporting such rolls for exhibition, and for delivering portions of the fabric therefrom.

A camera stand has been patented by Mr. Thomas Powers, of Perryville, Mo. The bed is made capable of being raised or lowered and of being adjusted to occupy different angular positions, the invention covering a novel construction, with certain automatic stops for operating the bed or platform and for holding it at its different adjustments.

A grater cylinder has been patented by Mr. Sidney E. Smith, of Brooklyn, N. Y. It is designed for grating cocoon, vegetables, and other substances, the cylinder being formed with numerous passages in which are inserted short plates of metal to form teeth, the device being cheaply made and very effective.

A fire escape has been patented by Mr. Edward Sutton, of Brooklyn, N. Y. It consists of a frame provided with cleats and holding a ladder, together with rods, a pulley, shaft and drum, with ratchet wheel, ropes, and various other features, which can be easily placed in readiness for firemen to ascend or to lower persons from a burning building.

An amalgamator has been patented by Mr. Carl M. Stolle, of Bellevue, Idaho Ter. It has tapering cylinders, to facilitate the passage or tailings from one end to the other, and they are of polygonal form, to cause the tailings to be thrown from one plane surface to another with a force which promotes separation of the gold and its adherence to the plates.

A fastener for envelopes, etc., has been patented by Mr. Paul E. Gonon, of New York City. The fastener consists principally of three parts, an elastic band, a clamp provided with prongs and longitudinal slits, and a hook or button, the clamp being secured to the flap of the envelope by pressing the prongs through the material and then bending them flat on the inner side.

A pocket book clasp has been patented by Mr. Louis B. Prahár, of Brooklyn, N. Y. It has an outer sliding plate and an inner plate, in combination with an intermediate plate formed with an opening and with integral tongues set out from the face of the plate to form friction springs at the side of the opening, the device being cheap, practical, and not liable to get out of order.

A knockdown crate has been patented by Mr. John T. Aikin, of Purdy, Mo. The invention covers certain novel features of construction and the combination of parts in a crate adapted for the shipment of produce or general merchandise, which shall be simple and inexpensive, and may be knocked down into comparatively small space for return to the shipper.

A support for electric conductors has been patented by Mr. Maurice J. Hart, of New Orleans, La. The invention contemplates the erection of towers at the intersection of streets of sufficient height to support all electric conductors above the top of the highest buildings, with intermediate posts supporting girders, the construction being also adapted for supporting water pipes and for use as a fire escape.

An improved boot top and method of forming it have been patented by Mr. John T. Gray, of Gray, Dakota Ter. The invention consists principally in forming the front section with a fold or swell adjacent to the lower ends of its edges at the rear of the vamp, whereby the vamp may be quickly fitted to the concave waist of a last without straining the leather.

A bridle blind has been patented by Mr. William W. Ross, of Saratoga, Kansas. Its side leathers have extensions for attachment to the check straps, in combination with a stiffening wire bent in a curve and interposed between the leathers, in such way that the wire acts to stiffen the blind and thus dispense with the necessity of a stiffening plate in the body of the blind.

A tension regulating attachment for loom shuttles has been patented by Mr. Pierre Ashby, of Central Falls, R. I. It is of metal, and consists mainly of a U-shaped case in which is mounted a tongue, apertures adjustable relatively in the case and tongue affording means of varying the tension from the bobbin as desired, making greater uniformity in the weaving of the cloth, especially at the side edges.

A nut lock has been patented by Mr. George W. Roberts, of Walla Walla, Washington Ter. Combined with a slotted bolt and nut is a locking piece

consisting of a short heavy shank, formed on its end with an oblong eye, the interior surface of which flares at the ends to correspond with the taper of the upper side of the conical section of the bolt, and at the sides to correspond with the taper of the sides of said conical section, with other novel features.

A machine for drawing metals has been patented by Mr. Henry R. Kennedy, of Ithaca, N. Y. Combined with a revolving cup having a central aperture and a central annular recess are balls held in the recess and placed alongside of each other, a die having a central aperture and serving to hold the balls in place, and a fixed stripping plate having a central aperture located above the die, with other novel features, making an improved machine for drawing sheet metal, tubing, or wire.

An anti-freezing device for water pipes has been patented by Mr. Donald McDonald, of Louisville, Ky. Combined with a stationary case and attached hollow base with valves connecting with the water pipes, a floating weight is arranged to act on a lever, while an air pipe connects with the top of the case with means for automatically admitting air on a fall of temperature, together with other novel features, the invention being an improvement on a former temperature alarm device of the same inventor.

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ELECTRICITY TREATED EXPERIMENTALLY. By Linnaeus Cumming, A.M. New York, 1887. D. Van Nostrand. Pp. xiii., 389.

This work, designed for use in instruction in high schools, is to be highly recommended. It gives an extremely clear view of the subject matter, with a number of illustrations. The cuts are many of them old friends, as is necessarily the case, but others are new, and all are apposite and appropriate. After treating of magnetism, static and dynamic electricity, a concluding chapter is devoted to absolute units in the C. G. S. system. A table of contents is provided, but no index accompanies the work.

CHOIX DE METHODES ANALYTIQUES DES SUBSTANCES QUE SE RENCONTRENT LE PLUS FREQUEMMENT DANS L'INDUSTRIE. Par Georges Krechel. Paris, 1887. George Carre. Pp. 477.

In this book the author proposes to furnish to practical manufacturers methods for analysis of the general class of commercial products. His work is hardly intended for professional chemists. It gives one method which the author has selected as the best for each analysis, so that the user has not to choose from a variety, but has a suitable process at once presented. The objects to be analyzed are treated under the general divisions of inorganic and organic, and a great deal of ground is thus covered. Though the modesty of the author is discernible in his preface, where his tendency is to restrict the

use of his book to others than expert chemists, yet we should consider the work a most useful laboratory companion, often giving valuable hints toward a more elaborate method than the one prescribed.

TEN THOUSAND MILES ON A BICYCLE. By Karl Kron. New York, 1887. (Published by author.) Pp. cviii., 800.

Our best recommendation of this work is to say that we find it very hard to convey any idea of its variety to a short notice. The author has conveyed so much of his very marked and interesting personality into every page, his reading and notes and views of men and things crop out so profusely, the interest never flags. Though ostensibly devoted to an account of ten thousand miles made on his 'cycle, "No. 234," it is an *olla podrida* of endless variety. The matter contained cannot be estimated by the number of pages. The small and exceedingly clear type makes it contain the substance of three or four volumes of respectable size. His accidents with his machine, from his first ride of one rod, resulting in a broken elbow and damaged machine, the cost of which rode he puts at \$234, to the entanglement with a tow rope on the canal path and the runaway of the mules with the 'cycle, are all graphically told and described at length. Chapters on other long-distance riders, a list of his original 3,000 subscribers to the book (copartners he calls them), and a variety of other matter are included. Those who enjoy thoroughly characteristic books will appreciate the one under review. Exhaustive indexes of persons and things are contained also.

TORNADOES: WHAT THEY ARE AND HOW TO OBSERVE THEM, WITH SUGGESTIONS FOR THE PROTECTION OF LIFE AND PROPERTY. By John P. Finley, U. S. A. New York: The Insurance Monitor. Pp. 196. \$1.

The author, a lieutenant in the signal corps, gives us the result of years' study and observation of this class of storms, in a sketchy and narrative form, with compilations of data from the Signal Service reports, and many illustrations, a considerable number of which are reproductions of views taken by instantaneous photography. The peculiarities of some of the most memorable tornadoes are noticed, on the testimony of eye witnesses, and their destructive effects are shown by several views of the ruin they caused. A chart showing the average distribution of these storms over the United States for many years gives, as the location of their greatest frequency, a district on either side of the Missouri River, from Omaha to Kansas City, embracing portions of Iowa, Nebraska, Kansas, and Missouri. A small section just east of the southern end of Lake Michigan has also been very frequently visited, as has also a larger area in northern Georgia and Alabama, and western South and North Carolina, while in Virginia, West Virginia, and Kentucky such visitations have been quite infrequent.

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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 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) M. P. R. writes: I have played on a B flat cornet over a year, and I have had considerable trouble with my lips, especially when playing high notes; they seem to be very soft instead of being hard, which they should be. What will harden them? A. Try aromatic wine, which you can purchase from any druggist. The preparation is made as follows: Take of rue, sage, hyssop, lavender, absinth, rose leaves, thyme, and elder flowers, of each, 4 ounces. Digest for two weeks in 9 pints of claret. Then add tannic acid, alum, and wine of opium, of each 9 ounces.

(2) F. W. asks how to stop out pin holes in a negative. A. Touch them out with a soft lead pencil, such as is employed by retouchers. Formula for a toning solution giving dark tones is as follows: Chloride of gold..... 1 grain. Sodium carbonate..... 10 grains. Water..... 10 ounces. Use immediately after mixing.

(3) L. F. D. asks (1) what Strassburg turpentine is. A. Strassburg turpentine is made of European silver fir; it is much used in Germany, and any large druggist should be able to get it for you. 2. A good receipt to make an imitation of the imported gin. A. Dissolve 3 1/2 drachms oil of juniper in sufficient 95 per cent alcohol to make a clear liquid; add to it 40 gallons French spirits 10 above proof, with 8 ounces orange peel flavoring, 1 quart sirup, and 30 drops oil of sweet fennel. Brant on Distillation gives many recipes and directions for making gins, etc. We mail it for \$2.50.

(4) F. W. B. asks: How many pint cells of the plange battery described in SCIENTIFIC AMERICAN of August 20, 1887, page 116, connected in series, will run an Edison 1 candle power incandescent lamp? A. Four cells would run a one candle lamp brilliantly. 2. And about what is the electromotive force in volts of each cell when connected in series? A. Each cell has an electromotive force of 1.90 volts when freshly charged.

(5) J. J. R.—Make red copper or royal copper by boiling the articles in a nitric acid pickle (nitric acid and water). It is not unusual to have insulated material, that is, a conductor, or capable of receiving electricity, electrified by induction during a thunder storm, or if connected to the earth through water pipes, gas pipes, etc., to become charged with the opposite electrical conditions from the thunder cloud.

(6) J. B. H. asks: By what chemical reaction do the fumes of burning sulphur bleach apricots in drying? A. SO₂ + H₂O = H₂SO₃ + 2H. The nascent hydrogen combines with the coloring matter, reducing it to a colorless compound.

(7) E. Mc. L. writes: Our brick house sweats and destroys the paper on the walls. What is the best remedy or best finish to use in such cases? A. Brush the wall over with a hot solution of 1/4 pound of castile soap in 1 gallon of water; let it dry for twenty-four hours and then apply a solution of 1/2 pound of alum in 4 gallons of water.

(8) P. R. writes: 1. Please give me directions for amalgamating zinc plates for use in Smee batteries. I have an amalgamating solution that I made according to directions that I saw in a catalogue of electrical goods, but I think there is something wrong with it, for after plunging the plates (5x1 1/2x1/8 inch) in it till the mercury will flow about on the surface, they will not last in a Smee or Bunsen battery on open circuit. They very soon become covered with a thick coating of a black substance, and waste away very rapidly. Will you please tell me why this is, and also whether or not they can be so treated that they will not corrode in sulphuric acid diluted with ten or fifteen parts by weight of water? A. We think the trouble is with your zinc. It is probably quite impure. Try immersing the lower ends of the zincs in a cup containing a small quantity of metallic mercury. The cup should be left in the battery cell to continuously maintain the amalgamation. Amalgamated plates on open circuit are apt to give more trouble. Short circuiting for a while will often improve them. 2. Also what is an "infernal machine"? A. An infernal machine is a device containing an explosive or highly combustible substance, and provided with a time exploder or igniter. 3. What is the cause of the beautiful play of colors in mother of pearl? A. The phenomenon is known as diffraction. It is the decomposition of the light by extremely minute grooves in the surface of the pearl.

(9) F. B. asks: 1. Can you give me a recipe for a good bichromate battery solution? A. Mix 100 parts of water with 12 to 20 of bichromate of potash in fine powder. Slowly add with constant stirring 25 parts of oil of vitriol. If you pulverize the bichromate, you should tie a cloth over your mouth and nose, as the dust if inhaled may produce ulcers. 2. How can I make a mould for casting battery zincs? A. Cast battery zincs in plaster of Paris moulds, or simply in clay, using a model of wood around which to form the mould. 3. How far apart should the zincs and carbons be in a bichromate battery? A. About 1/4 to 1/2 inch. 4. Will placing a carbon on each side of a zinc, or zinc on each side of a carbon, give twice the current that a single zinc and carbon produces? A. It greatly reduces the resistance, which varies to a great extent in proportion to the areas of the plates that face each other. This improves the efficiency.

(10) W. C. C. asks: 1. State how invisible pictures on glass are made, those that are brought out by breathing on the glass. A. The design is drawn by etching slightly with hydrofluoric acid. See SUPPLEMENT, No. 373, for illustration and description of the process. 2. Is there a preparation of French chalk used in the process? A. Drawing with soapstone or French chalk forms an alternative way of making the design. 3. Can compound be put on with rubber stamp? A. You might experiment with rubber stamp. 4. Please give receipt for making a perfectly white slip, that will melt at low temperature, such as in tile kilns, etc. A. Take 3 1/2 parts flint, 3 borax calcined, 1 Cornish stone, 1/2 oxide of tin. 5. Do you think the following storage battery will work? If so, how much current will be produced after storage? Lead shot in fiat porous cell forming the negative pole and oxide of lead in same kind of cell for positive pole, in a weak solution of sulphuric acid cells, 4x7 inches, containing one pound each, all inclosed in wooden box. A. The resistance of your battery will be too high.

(11) S. B. S. wants (1) a good and easy recipe for making Seidlitz powders in small quantities. A. The proportions are as follows: Rochelle salts 2 drachms, soda bicarbonate 2 scruples put these into a blue paper and thirty-five grains tartaric acid in a white paper. 2. A recipe for making wax tapers. A. Wax alone being too brittle, the composition used is wax 8 parts, white resin 4 parts, tallow 2 parts, turpentine 2 parts. Description of process of making is too long to give here; you will find it in the "Techno-Chemical Receipt Book," page 388, which we can send you postpaid for \$2.00. 3. A good recipe for making a stove polish. A. Mix 2 parts copperas, 1 of bone black, 1 of black lead, with sufficient water to make a paste. 4. How to make the tooth wash called sozodont? A. Take of potassium carbonate 1/2 ounce, honey 4 ounces, alcohol 2 ounces, water 10 ounces, oil of wintergreen and oil of rose sufficient to perfume. 5. A recipe for making a plaster good for drawing, healing, and strengthening purposes? A. Consult the U. S. Dispensatory. It contains recipes for many varieties of plasters.

(12) J. M. B. asks whether there is any way of tempering or hardening a saw smithing anvil, one that has been through a fire. A. If it has not been injured by being too long in the fire, so as to change the character of the steel by what is called burning, it can be rehardened; but it requires the experience of a person used to hardening. A good blacksmith should be able to do it.

(13) H. F. writes: I have a German silver protractor 5 inches in diameter, graduated to 1/2 degrees, but the lines are so fine that I can scarcely see them. Is there anything I can do to make them more clear? A. Make a little paste of lampblack, boiled linseed oil, and turpentine, and rub it across the lines with the finger, wiping off the excess from the surface.

Or substitute vermilion for the lamp black, so as to get red divisions. If they are only fine and already filled with black, we can only advise a low-power magnifying glass.

(14) A. R. asks the medical use of milk in hydrophobia. It has been said that if dogs have plenty of new milk, they will not have the hydrophobia. Is this the truth? A. We cannot indorse the use of milk for rabies in dogs. The best thing to do is to kill the dog immediately, when symptoms of the disease manifest themselves. You will find interesting articles on this subject in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 63, 87, 125, 128, 137, 230, 276, 352, and 468. 2. The medical use of some of our vegetables. A. For the medicinal properties of vegetables you must consult some physician and works on materia medica. Their action varies with the temperament of different individuals.

(15) C. B. asks: What cheap article should I use to harden a body of plaster of Paris? A. Mix with alum water.

(16) T. D. desires (1) a recipe for curing deer skins so as to make them durable and pliant like soft leather. A. Wash the skin in warm water, and remove all fleshy matter from the inner surface; then clean the wool with soft soap and wash clean. When the skin is perfectly free from all fatty and oily matter, apply the following mixture to the flesh side: Common salt and ground alum 1/4 pound each and 1/2 ounce borax. Dissolve the whole in 1 quart hot water and sufficiently cool to bear the hands; add rye meal to make it into a thick paste, which spread on the flesh side of the skin. Fold it lengthwise, the skin being quite moist, and let it remain for two weeks in an airy and shady place; then remove the past, from the surface, wash and dry. When nearly dry, scrape the flesh side of the skin with a crescent-shaped knife. 2. Tell me whether a panther skin can be cured and the hair left on? A. Yes; you may try the same as the above, or simply roll up with salt and alum rubbed well into the flesh side. Care must be taken to clean off all flesh and fat, and the skin needs to be well pulled and worked by a smooth and blunt tool.

(17) H. S. S. writes: A well is 700 feet from a house; the land at the well is 25 feet higher than at the house. The well is 35 feet deep. Now, with the pump (common force pump) can water be taken from the well to the house, the pump being at the house? A. It can. 2. Can ice be made on a small scale inexpensively? How? A. No. It requires an expensive machine. 3. How can drinking water be kept cool in warm climates? A. By placing it in unglazed pots, or in vessels wrapped in wet cloths, in a shaded place exposed to the wind. The evaporation of the exuding moisture cools the water, as practiced in Egypt and the Indies. 4. How can I take ink stains out of linen? A. Use a mixture of 2 parts cream of tartar, 1 part alum; pulverize together and make a strong solution in water, saturate the stain for a few minutes and wash. If not entirely removed, a weak solution of oxalic acid may be applied for a minute, and wash.

(18) L. W. asks a receipt to make Worcestershire sauce. A. Mix together 1 1/2 gallons white wine vinegar, 1 gallon walnut catsup, 1 gallon mushroom catsup, 1/2 gallon Madeira wine, 1/2 gallon Canton soy, 2 1/2 gallons moist sugar, 19 ounces salt, 3 ounces powdered capsicum, 1 1/2 ounces chutney, 3/4 ounce each of cloves, mace, and cinnamon, and 6 1/2 drachms asafoetida dissolved in 1 pint brandy, 20 above proof. Boil 2 pounds hog's liver in 1 gallon of water, adding water as required to keep up the quantity, then mix the boiled liver thoroughly with the water, strain through a sieve, and add this to the sauce.

(19) E. A. L. asks whether borax, and also whether the silicates of sodium and potassium, when fused, are decomposed by an electric current of not more than 20 volts pressure. What compound substances (if any) resist, when fused, a current of above strength? A. An electric current of 20 volts potential will decompose any chemical compound under proper conditions.

(20) B. F. M. asks: What facing must be used in moulding brass in order that the castings shall be bright brass color when made? A. Use pulverized charcoal. There is an art in producing bright color in brass castings, independent of the method of moulding. It consists partly in timing the opening of the moulds and quickly cooling the castings in water before they have time to oxidize.

(21) H. E. D. asks: With what size wire should the armature in eight light dynamo (SUPPLEMENT, No. 600) be wound for plating, and how should the machine be arranged? A. Wind field with No. 8 wire until full and armature with two layers No. 12 wire. Arrange in series.

(22) R. O. desires (1) the best receipts for stove blacking. A. Take 2 parts copperas, 1 part bone black, one of black lead, with sufficient water to make a creamy paste. 2. For stove pipe varnish. A. Take of asphaltum 2 pounds, boiled linseed oil 1 pint, oil of turpentine 2 quarts. Fuse the asphaltum in an iron pot, boil the linseed oil and add while hot, stir well and remove from the fire. When partially cooled, add the oil of turpentine. Some makers add driers.

(23) J. C. S. asks the formula for computing the horse power of ordinary cylindrical steam boilers. A. The nominal horse power of boilers is the effective fire surface in square feet, divided by 12 for large boilers (over 30 horse power) and 14 for small boilers. The effective surface is all the shell exposed to the fire or heat and two-thirds of the tube surface on the fire side.

(24) J. G. Y. S. desires (1) the most practical and economical proceeding for taking away the smell, taste, and color from olive oil. A. Add bone or blood charcoal in powder, shake well and filter. 2. A receipt that is practical and economical for making black varnish for machinery and stoves. A. See answer to No. 22.

(25) J. McN. asks how many cells of Fuller's mercury bichromate of potassium battery will be required to operate a circuit of about two hundred feet which has on three bells of high resistance, eight

ohms each I think, and a clock arranged to open and close the circuit, also how much the battery should be increased to operate five bells. A. Five cells would suffice for the first case and eight for thesecond. Owing to the high resistance of the bells, more battery would be advantageous.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

August 30, 1887,

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 items like Adjustable chair, Advertising chariot, Air brake, Amalgamator, Angle iron, Animal catcher, Animal stock, Auger, Awning, Ax handles, Axle lubricator, Axle lubricator, Axle skein, Axle, vehicle, Back band hook, Bag, Baling press, Baling press, Bar, Barrel cover, Battery, Bedstead, Bell cord coupling, Belt fastener, Belt rest, Belt shifter and brake, Binder, Bit, Blackboard, Blind stop, Blind window, Board, Boat, Boiler, Bolt head, Books, Boot or shoe, Boot top, Boring bit, Bottle stopper, Bottle stopper extractor, Bottle wrapper, Box, Brake, Brake beam, Brake handle, Brazeing machine, Brick machine, Bricks or tiles, Bridle blind, Buckle, Buckle, harness, Buckle, shoe, Bustle, Button, Button attaching machine, Button cuff, Button, separable, Button setting machine, Button tuft, Buttons, Calendar, Camera stand, Can, Can opener, Car brake, Car coupling, Car coupling, Car coupling, Car coupling, Car starter, Car starter, Car starter, Car, end gate for coal, Cars, folding and swinging gate for railway, Cars, operating device for the windows of railway, Cars, weed cutting attachment for railway, Carding engines, Carpet sweeper, Carrier, Cash and package carrier, Cash and package carrier, Cash carrier, Cash register and indicator, Caster, Catarrh remedy, Chain, watch, Chair, Chairs, spring for base rocking, Chopper, Chuck jaw, Cigar bunching machine, Cigar bunding machine, Cigarette box, Clasp or buckle, Clay crusher, Cleaner, Clock, calendar, Closet, Clothes drier, Coin fastener, Coffin lid fastener, Coin box, Comb, Composition to be used as a non-conductor of heat and for other purposes.