

ENGINEERING INVENTION.

Heating railway cars forms the subject of a patent which has been issued to Mr. Carter S. Townley, of Gainesville, Texas. A pipe opening to the air in front of the locomotive passes through the steam space of the boiler, and is thence connected by proper couplings with heating drum in the car floors, similar connections being also made with chambers containing calcined lime or other chemicals, to dry and heat the air, the current of which is aided by an injector entering the pipe as it passes through the boiler.

AGRICULTURAL INVENTION.

A hillside cultivator has been patented by Mr. Edgar C. Wiley, of Independence, Va. Combined with a central beam are side beams having a pivotal and sliding connection therewith, with other novel features, whereby the plow shanks can be adjusted to throw one share in front and the other to the rear, and *vice versa*, that the front plow may be kept on the lower side, the second plow filling the furrow of the first.

MISCELLANEOUS INVENTIONS.

A churn has been patented by Cyrus M. and Etta E. Dickey, of New Garden, Ohio. This invention covers a simple and inexpensive rocking churn, which may be operated easily and will bring the butter quickly, while it is not liable to get out of order, and may be conveniently and thoroughly cleaned.

A fire escape has been patented by Mr. William Block, of St. Petersburg, Russia. It is light and strong, and adapted to be quickly and securely attached to any form of support, being made preferably of steel wire, the invention covering various novel features of construction and the combination of parts.

A covering for pipes, boilers, etc., has been patented by Mr. William M. Suhr, of Brooklyn, N. Y. It consists of a filling of asbestos fiber, mineral wool, or similar non-combustible material, inclosed in an asbestos paper covering, lined with a wire netting, being designed to prevent loss of heat and to render buildings fire-proof.

A utensil head for canes, etc., has been patented by Messrs. Moritz Stiebritz and Adolph Miller, of Schuetzen Park, N. Y. It consists of a box for matches, with an outside lid and inner cover, and a match igniter outside the inner cover, the latter being also adapted to hold a mirror or photograph on its inner face.

A collection box has been patented by Mr. Ferdinand A. Kittell, of Hollidaysburg, Pa. It has an upper tilting bottom, a lower bottom, and a rotary supporting handle adapted to upset the tilting bottom, the arrangement being such that each deposit made in the box may be separately inspected by the collector.

A device for loading vehicles has been patented by Mr. William B. Dolson, of Moberly, Mo. This invention covers a novel combination and arrangement of parts in a hoisting apparatus arranged in combination with the vehicle, whereby the team may be utilized in lifting and placing the load in farm or mercantile wagons.

A grain cleaning cylinder has been patented by Mr. William P. Clifford, of Ottumwa, Iowa. It consists of an upper and lower section, the former being of shorter radius, and forming longitudinal inlet and discharge openings, in combination with a beater, and other novel features, whereby the grain can be subjected to any required amount of cleaning.

A can filling machine has been patented by Mr. Conrad Seimel, of Brooklyn, N. Y. It is especially adapted for filling cans to contain Paris green and similar powders, filling the cans rapidly and shaking down the contents in such manner that the dust will be prevented from escaping, while the cans will be made of uniform weight.

A bell cord attachment specially adapted for use in street cars has been patented by Mr. George W. Naylor, of Jersey City, N. J. The invention consists principally in pivoting a lever to the window frame and securing one end of the lever to the bell cord in a novel way, whereby the bell cord may be readily and easily manipulated from the seat.

A coin controlled height measuring machine has been patented by Mr. Charles R. Williams, of Newark, N. Y. It is made with a vertically sliding pointer to be moved up or down by a person desiring to determine his height, with a plate held in front of the pointer and operated on by the introduction of a coin of a given size and weight.

An ink mill has been patented by Mr. T. Ruddiman Johnston, of Edinburgh, Scotland. This invention covers a novel construction whereby the several parts of the mill are rendered easily accessible for cleaning purposes, and the amount of attendance necessary is reduced, while a better grinding of the ink is secured.

A temperature regulator for incubators has been patented by Mr. John W. Hile, of Valley Falls, Kansas. The invention consists in the arrangement of metal plates coupled together around the inner sides of the incubator walls or drawers, whereby the damper or vent will be operated by the slightest variations of temperature within the chamber.

A ditcher and grader has been patented by Mr. James M. Holland, of Mount Pleasant, Iowa. This invention covers a novel form of implement in which the ditching blade or shovel is reversible, and so connected to the wagon or vehicle to which it is engaged that it will be free to conform to the contour of the ground over which it is drawn.

A mast hoop has been patented by Mr. Charles S. Mott, of Patchogue, N. Y. It consists of two semicircular wooden sections and two outer metallic band sections, the two sections hinged together and provided at their ends with a slotted socket

and a catch, for the ready connection or separation of the hoop sections without injuring the strength or efficiency of the hoop.

A groove cutting tool has been patented by Mr. William H. Parry, of New York City. It is for gaining stairstringers and similar purposes, and consists of a holding shank, a cylindrical head, and groove cutters having side cutting edges and inclined bottom cutting edges projecting from the outer end of the head, the head and cutters being formed on a single piece of steel.

A mechanical movement has been patented by Mr. Marmaduke B. Kellogg, of San Francisco, Cal. The invention covers a device or machine for converting reciprocating into rotary motion, and is designed for the piston rods and cross heads of engines and motors, being designed with a short piston stroke to multiply the stroke without decreasing the power transmitted.

A steam shoveling device has been patented by Mr. Andrew Meyers, of Port Arthur, Ontario, Canada. A hinged shovel or scoop is mounted on a pivoted inclined way, in connection with a hoisting apparatus, a slide being connected to the lower end of the inclined way and operated from the hoisting apparatus, the machine being specially designed for economically handling coal.

A window blind fastener has been patented by Mr. William Simmonds, of Yonkers, N. Y. Each blind has the ordinary spring fastener, in connection with a staple driven into the window sill, and there is used therewith a cheap and convenient fastening device placed loosely upon each staple, whereby the blinds may be locked in closed position or held partially open.

SCIENTIFIC AMERICAN
BUILDING EDITION.

JUNE NUMBER.—(No. 32.)

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ing, marbling, staining, varnishing, polishing, gilding, bronzing, etc., with hints touching nearly all kinds of work in which a brush, pencil, or palette is used.

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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) McK.—Core sand is not made by mixing. For valves use a grade of moulding sand slightly coarser than is used for outside or flasks. Mix it with a little sour beer or very thin molasses—no more than will make the cores dry hard enough to handle. You can blow out the cores by dipping the castings in water before they are cold. Mixtures for valves should be copper 16 ounces, tin 1 ounce, zinc ½ ounce, lead ¾ ounce.

(2) M. E. M. asks how to measure a miner's inch of water. A miner's inch of water is the quantity of water that will flow through a hole 1 inch square in a 2 inch plank, the top of the hole to be 6 inches below the surface of the water in the race or flume. This is what is meant by head. If the top of the hole is but 4 inches below the surface, you get less than a miner's inch. The amount of 1 1/2 for a miner's inch is 11 1/2 gallons (United States) per minute.

(3) L. J. S. asks: 1. Will a shade tree be injured by having electric light wires in contact with its branches? A. Insulated wires will do no harm. Naked arc light wires may burn leaves and small branches in contact, but they have no other effect on the growth. 2. When the sun and moon are in conjunction, will a body weigh less on the side of the earth nearest them than on the opposite side? A. Yes, theoretically, but the amount is too small for ordinary measurement.

(4) F. H. C.—Horse clippers are usually on the shears principle, and should be sharpened in the same way that shears are sharpened, by grinding the bevel edge only.

(5) W. B. asks how egg yolks are dried, and for what used. Also, where a market could be found. A. The yolks are separated from the white part and then dried in any convenient receptacle at a gentle heat. The article is made quite largely in Chicago, but is more expensive than the foreign article. It is used in the fine leather manufacture and other industries, and by bakers, who employ it to advantage when the price of eggs is high or they are scarce.

(6) J. P. M. asks: Can I cast a brass or copper nut on a square thread screw three-quarters of an inch in diameter, to replace a nut of Babbitt metal which does not stand well? A. You can, if not more than 1 1/4 inches in length of thread, without the metal seriously binding. Wash the screw with fine clay and heat it as hot as convenient before putting in the mould. Gently hammer the nut if possible to help unscrew it.

(7) L. B. A. asks: 1. Is there any way to waterproof a cloth apron? For waterproofing fabrics see the articles on that subject in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 58 and 317. 2. Is there anything that I can put into milk that is changed (a little sour) to sweeten it? A. Add a small quantity of finely powdered salt. 3. Is there anything that I can use in my curd or milk to give my cheese a nice flavor? A. Cheese may be flavored with herbs, or decoctions of herbs such as thyme, sage, and the like.

(8) C. B. H. asks how to cut a Turkey oil stone into two. A. You can saw it with sand and water fed to a piece of sheet iron made into a saw without teeth, or quicker with a copper blade and emery and water.

(9) J. P. W. asks: What can I mix with talc to cause it to adhere after grinding the talc for fire brick? A. Use clay, as pure as can be had. Burn as other bricks.

(10) G. C. asks: 1. What pressure would it take to sink a hollow ball that contained 231 in. in water? A. It will take as much pressure as the ball displaces in weight of water (835 pounds for 231 cubic inches). 2. In a vessel 23 1/2 in. deep, which is filled with water, what would the pressure be on one inch of surface at the bottom? A. The pressure due to 23 1/2 in. in depth is 0.833 pounds per square inch. 3. What pressure would it take to compress one cubic foot of air into 1/2, into 1/4, into 1/8, or into 1/16 cubic foot? A. Compressing air to 1/2 = 10 lb., 1/4 = 12 1/2 lb., 1/8 = 15 lb., 1/16 = 17 1/2 lb.

=30 lb. pressure. 4. Can water be compressed? A. Water is only slightly compressible under high pressure.

(11) F. E. DeC. asks: 1. What can be used to repolish a piano? A. Dissolve 4 oz. orange shell in one quart of 95 per cent alcohol; to this add one quart of linseed oil and one pint turpentine; when mixed add 4 oz. of sulphuric ether and 4 oz. of aqua ammonia; mix thoroughly and well before using. Apply with a cloth or sponge, and rub the surface to which it is applied until the polish appears. Such jobs require no little skill, as well as a good deal of hard work. Most amateurs will stop work where a good polisher really only commences. 2. Is there anything that will bring back the color of marble, which has been stained with vinegar? A. If the marble is white, coat it with gum arabic and expose it to the sun. When it peels off, wash with water, or make a paste with fuller's earth and hot water, cover the spots therewith, let it dry on, and next day scour it off with soft soap. The luster can be restored by rubbing with a dry cloth.

(12) E. C. R. asks: The best way to mix plumbago so as to produce a bright and lasting polish on stoves and not cause disagreeable odor. A. The common liquid stove polish consists of black lead 1 lb., water 4 oz., turpentine 4 oz., and sugar 1 oz. Mix thoroughly. It is not very lasting, nor has it a very agreeable odor, but it is about as good as anything yet found for the purpose.

(13) J. H. R. desires a recipe for a blood purifier, one that will cure acne and eruptions breaking out on the face. A. Take 2 parts of sulphur and 1 part of cream tartar and mix it with sufficient molasses to allow it to flow, i. e., it must not be made too stiff. Take one tablespoonful daily.

(14) G. G. B. asks how to make a good mucilage, without using gum arabic. A. Take gum dextrine 2 parts; water 5 parts; acetic acid 1 part; dissolve by aid of heat and 1 part of alcohol.

(15) W. F. B. asks the formula for making a cement that the brass sign makers use for filling the letters on brass signs. A. Mix asphaltum, brown japan, and lamp black into a putty like mass, and then fill in the spaces, and finally clean the edges with turpentine.

(16) J. B. J. desires a formula for making glue used on edges of writing paper tablets to hold sheets together. A. Use either (1) white glue, refined glycerine, acetic acid, and coloring material; (2) common glue with 5 per cent glycerine; or (3) $\frac{1}{4}$ oz. crude gutta percha dissolved in carbon disulphide to the consistence of mucilage. The materials used in making this glue or cement are of a low grade commercially, so that some experiment is necessary to make a good article.

(17) G. H. J. asks if there is any substance that will remove printer's ink from paper, without disfiguring the paper. A. Place a thick pad of white blotting paper beneath the sheet of paper which is soiled. Then apply sulphuric ether with cotton wool, gently rubbing. Finally apply white blotting paper to absorb the color. Continue the application of fresh ether and repeat until all stains disappear. Do this away from a light.

(18) J. A. P. writes: In printing with ordinary gold size and bronze powder, upon soft leather, the print after several weeks becomes discolored and broken up, apparently by reason of the size sinking into the leather. Can you give a formula for a size which can be used on a printing press, and will dry on the surface of the leather without penetrating it? Or can you suggest a transparent flexible varnish that I can put on the leather before printing, something that is absolutely proof against the gold size, and will remain so. A. An "olive size" is made which may answer your purpose. When our printers have work of this kind to do they use ordinary gold size, but always give it two impressions. That is print the job in size and let it lie overnight and dry. In the morning run it through the press again. The leather will absorb the first printing, but the second will remain on the surface. A little of the white of egg mixed with the size, in the second printing, will make it dry very rapidly.

(19) J. C.—The plant is the English plantain or rib grass (*Plantago lanceolata*). It is a common and widely distributed weed. It has no value except as a pasture for cattle, and not much value for that.

(20) F. V. B.—Your fluid extracts are spoiled, and there is no remedy in the case. The cause of the change you mention is not known. Write to the manufacturer, who, for the sake of his reputation, would doubtless substitute fresh extracts for the spoiled ones.

(21) H. S.—The plant is the common mallow (*Malva sylvestris*). The leaves and flowers are chiefly used in fomentations, cataplasms and emollient enemata. Its properties are demulcent.

(22) H. R. E. asks concerning the process for the manufacture of yellow ochre into paint, also for preparing kaolin or china clay for the trade, such as whitening, calcining, adulterant, etc., for which it is largely used. A. Ochre is dried by heat, ground into powder and made into paint by mixing with oil. The process is similar for the other materials mentioned.

(23) J. D. asks: What are the ingredients composed of for making metallic paints, such as are used by card writers, to write on an enameled surface? How to grade, to make them hard or soft? A. They are made in varying proportions of tin, lead, bismuth, and antimony, those that are the hardest are of lead melted with some antimony and a little quicksilver.

(24) W. P. K. asks: What should be mixed with ordinary printer's ink to make it suitable for printing etchings? A. Etcher's ink is similar to printer's, but more carefully ground. It consists essentially of linseed oil, varnish and lampblack. You can buy it much more cheaply and probably of better quality than you can make it yourself.

(25) M. G. H. asks: How mirrors or looking glasses are made, and what the materials are, and how prepared? A. A large, perfectly flat stone table is provided, upon which is evenly spread a sheet of tin-foil, without a crack or flaw. This is covered uniformly to the depth of $\frac{1}{16}$ inch with clean mercury. The plate of glass, perfectly cleansed from all grease and impurity, is floated on to the mercury carefully, so as to exclude all air bubbles. It is then pressed down by loading it with weights, in order to squeeze out all mercury which remains fluid. After about 24 hours it is raised gently on its edges, and in a few weeks it is ready to frame.

(26) S. L. M. asks: 1. Directions for soldering brass articles, by means of ordinary solder—for soldering brass to iron. A. For soldering brass and tools, see a valuable treatise in SCIENTIFIC AMERICAN SUPPLEMENT, No. 20. 2. Also for making mastic varnish from gum mastic. A. Dissolve the gum mastic in turpentine enough to make it of the proper consistency.

(27) H. A. M. writes: A distinguished clergyman says: "Astronomers have swept their telescopes through the sky, and have found out that there have been thirteen worlds, in the last two centuries, that have disappeared. At first they looked just like other worlds. Then they got deeply red—they were on fire. Then they got ashen, showing they were burned down. Then they disappeared, showing that even the ashes were scattered. And if the geologist be right in his prophecy, then our world is to go in the same way." Does not science teach us that the earth was once a molten mass, and that it has, for countless ages been losing its heat, and is at the present time still in the cooling process? A. We believe that the clergyman referred to does not profess to be a scientist, but is ever ready to catch at a theory that may be made an element of destruction to sinners. Your question gives the idea most commonly entertained, but even at this time a collision of the earth with some wandering star from beyond our system would produce an outburst of heat and light similar to the star outbursts that have been observed.

(28) W. H. S. asks: 1. Does choke boring a shot gun improve penetration? A. No; it prevents too much scattering by drawing the charge together at the instant of leaving the gun. 2. Is the mouth of the Mississippi River farther from the center of the earth than the source? A. Yes. 3. Would the Mississippi run toward the north or south if the earth stopped revolving on its axis? A. It would run north. 4. How can I mark steel tools? A. Coat thinly with beeswax, in which make the desired marking down to the tool, and then use nitric acid 1 part and water 4 parts, to bite out the exposed surface of the steel while the wax protects the surrounding portion from the action of the acid.

(29) J. A. S. asks: 1. What is the best substance to keep gun barrels from rusting? A. You can keep gun barrels from rusting only by care in keeping dry and oiling with linseed oil. 2. Can gravel walks be practically treated so that they will not grow weeds? A. Asphalt, cold tar, and cement are good materials to mix with sand to make a layer that will not only keep the weeds out, but make a smooth and hard walk. Gravel walks generally have some soil intermixed, which, with the fining of the gravel by use, affords a foothold for the growth of weeds. 3. What is a good cure for colds? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 75, How to Cure a Bad Cold and Sore Throat. Also a valuable paper on Catching Cold, SCIENTIFIC AMERICAN SUPPLEMENT, No. 297. Also Quick Cure for a Cold in the Head, SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 25 and 228.

(30) J. C. R. desires a formula for making red or strawberry coloring from carmine (or without aniline) for coloring bottled soda pop. A. Boil some Brazil wood in water and then add a small quantity of it. You can make it very dark originally and then dilute until you get the proper shade.

(31) G. J. H. writes: A discussion relative to conductors of electricity has resulted in a wager to the effect that, a stream of water propelled from a brass nozzle and coming in contact with an electric light wire, in an exposed part through which the electric current is running, results in the death of the person handling the nozzle, by the transmission of the shock through the stream of water, provided the current is severe enough. Will you kindly decide in the next issue of your valuable paper the above? A. The conductivity of water is so poor it is doubtful if a dangerous shock could be received under the conditions named.

(32) O. F. M. writes: We want to build a tank of 3 inch pine plank to hold a wash of oil vitriol about one-fifth vitriol, four-fifths water, for wool wash. We usually put these tanks together with three-quarter inch iron bolts, down through the wood, but find the acid will soon penetrate the wood and destroy the iron bolts. Is there any metal strong enough to hold the tank together that the vitriol will not affect, that is practical to use, and where can it be obtained? A. Copper is very slowly attacked by sulphuric acid. You might inclose the iron bolts in pieces of lead pipe. The lead would resist the acid indefinitely.

(33) J. M. asks: Would a copper lined cylinder used in a common well pump do the water any harm for drinking? A. Probably not if it was kept full of water. If alternately dry and wet, it might impair the water.

(34) A. B. J. asks how to remove book-binder's varnish from leather, after it has been on three or four years. A. Try alcohol. It will dissolve the varnish. 2. How to treat egg glair to prevent it smelling. A. Use oil of cloves or some strong antiseptic with it.

(35) G. A. H. asks: 1. Will you kindly give a cheap and effective process for bleaching coral? A. First wash well in very dilute hydrochloric acid in the proportion of one part of acid to thirty of water, then rinse well in water, then immerse in a dilute solution of chloride of lime. 2. Is there a cheap and quick

method of nickel plating wire and tin? A. See "Recipe for Nickelizing without Electricity," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 191.

(36) F. M. J. asks: By what process are horns, such as are used for knife handles, combs, etc., bleached and rendered transparent? A. Care is generally taken to select good white horns, but they can be bleached by exposing to the fumes of burning sulphur, largely diluted with air.

(37) J. F. L. desires a simple process for making koumiss. A. Dissolve 4 ounces white sugar, in 1 gallon of skimmed milk and place in bottles of the capacity of 1 gallon, add 2 ounces of baker's yeast, or a cake of compressed yeast, to each bottle; cork and tie securely, then set in a warm place until fermentation is well under way, and lay the bottles on their sides in a cool cellar. In three days fermentation will have progressed sufficiently to permit the koumiss to be in good condition.

(38) G. W. W. asks how they mix rouge to make it into what is called hard rouge, also what the different articles are and how mixed? A. Take of oxalic acid 1 part, iron peroxide 15 parts, powdered rotten stone 20 parts, palm oil 60 parts, petrolatum 4 parts. Pulverize the oxalic acid, and add the iron and rotten stone, mixing thoroughly, and sift to remove all grit, then add gradually the palm oil and petrolatum, incorporating thoroughly.

(39) F. B. P. asks if there is any remedy that will remove warts. A. Take a small piece of potato, and let it stand in the open air until it slakes, then thicken it to a paste with pulverized gum arabic which prevents it from spreading where it is not wanted. Apply to the wart until it disappears. Some cases, however, are very obstinate, the warts seeming to come constantly for a period, and then suddenly disappearing.

(40) H. N. H.—For making printers' rollers, see answer to query No. 33, in SCIENTIFIC AMERICAN for March 24, 1888.

(41) J. H. asks: What was Queen Victoria's maiden name? A. Guelph.

(42) J. H. C. writes: I wish to run two incandescent Edison lamps. Will you kindly tell me the simplest and cheapest means by which I may attain that end? A. A dynamo driven by steam or other power is the most economical method of obtaining a lighting current.

TO INVENTORS.

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