ENGINEERING INVENTIONS.

A safety valve has been patented by Messrs. John W. Spolders and Francis X. Vien, of Brooklyn, N. Y. It is designed to act on the slightest excessive steam pressure, all the contacting points offering very little resistance, while the construction is simple and not liable to get out of order.

A railroad water tank has been patented by Messrs. John Skinner and Rolly W. Jackson, of Newman, Ill. This invention covers improvements to prevent the valve and its connections and the outlet pipe from becoming inoperative from the freezing of the water in the tank, and to do this effectually and cheaply.

A car coupling has been patented by Messrs. Henry L. and Charles W. Banta, of Canon City, Col. This invention covers a peculiar construction and arrangement of the coupling pin adjusting mechanism and of the link adjusting contrivance, the coupling being operated without the train man going between the cars to couple or uncouple them.

An exhaust nozzle extension for locomotives has been patented by Mr. Julius T. Lee, of Mattoon, Ill. Pipes of varying lengths are movably and adjustably supported within the smoke stack, above the stand pipe, whereby the exhaust steam may be discharged at different points in the stack, as desired, to increase or diminish the draught, the use of either discharge pipe being under the ready control of the engineer.

A balanced valve for steam engines has also been patented by the same inventor. The invention consists of an adjustable table or track held in the steam chest, and a roller frame with rollers traveling on the table and supporting the slide valve, being designed to save friction and wear of the valve, while keeping it true and even.

AGRICULTURAL INVENTIONS.

A center draught mowing machine has been patented by Mr. Warren Hill, of Towanda, Pa. This invention covers a novel construction and combination of parts in a machine designed to cut a very broad swath, and in which all the parts are easily adjustable, without rattling, and the minimum amount of friction.

A seeding machine has been patented by Mr. William H. Schenck, of Sterling, Col. This invention provides a drill designed to close without the aid of a drill or furrow closer after the passage of the drill-opening devices, making a narrow furrow and avoiding the necessity of employing a dragging furrow-closer.

MISCELLANEOUS INVENTIONS.

A chinch trap has been patented by Mr. Robert H. Wilson, of Timber Lake, Col. This invention provides a trap of novel construction designed to catch any kind of insects which secrete themselves in crevices and places from which it is difficult to dislodge them.

A bobbin winder for sewing machines has been patented by Annie Lewis, of Galveston, Texas. This invention covers a novel construction, combination, and arrangement of parts, constituting a new and improved attachment for sewing machines for winding bobbins.

A mandrel for bending lead pipes has been patented by Mr. John J. Carr, of Brooklyn, N. Y. It is made with a shank having a quarter bend and slightly tapering, with a shoulder formed on the shank for driving the latter wholly or partly into the pipe to be bent.

A combined burglar alarm and sash lock has been patented by Mr. Archie B. Caudle, of Monroe, N. C. This invention provides a device serving as a lock for the sash, and which operates an alarm, while the sash may be partly raised for ventilation, with no danger of its getting out of order, and the alarm may automatically reset itself.

A rubber compound or mixture has been patented by Mr. John A. Titzel, of Glenshaw, Pa. It is composed of gilsonite asphaltum, vulcanized rubber or scrap or waste, manganated linseed oil, spirits of turpentine, deodorized petroleum naphtha, and powdered sulphur, making a compound to be variously prepared and applied for different uses.

A twine oiler for self-binding reapers has been patented by Mr. Donald McCoig, of Mull, Ontario, Canada. It is a novel device, to be attached to the reaper in such a position that the twine may pass through it while passing from the twine box to the needle, to coat the twine with a substance to prevent insects and mice from eating it.

A whiffletree coupling has been patented by Mr. Ingalls Bragg, of South Andover, Me. This invention relates to an improvement in couplings in which the pivot bolt has a bearing above the whiffletree in a brace fixed to and rising from the cross bar or evener, the object being to make sure against accidental loosening and detachment of the bolt.

A bolt or bar having a coating of enamel or vitreous substance, combined with a protecting sleeve or jacket, has been patented by Mr. Oliver R. Butler, of Cooperstown, N. Y. Such vitreous covering of bolts is designed to absolutely resist the burglar's saw or file, making it impossible to sever a bolt or bar so made by any cutting instrument.

A skimmer has been patented by Mr. George W. Gulledge, of Briartown, Indian Ter. It consists of a pan secured to a bandle fulcrumed on a pivot secured to an extension rod, with a slotted fork held on the pivot and pressed against the end of the handle by a spring coiled on a rod extending from the fork, being specially adapted for skimming sorghum while undergoing the usual boiling process.

A rest for packing hats has been patented by Mr. James W. Seymour, of Brooklyn, N. Y. Combined with a packing box having a series of spaced brackets on opposite inner sides is a rest consisting of a ring of the general shape of the hat crown, and having loop ends longer than the width of the hat crown, to facilitate the packing and unpacking of hats in boxes.

A method of musical notation has been patented by Mr. Diego Fallon, of Bogota, U. S. of Colombia. It consists essentially of designating the sounds by consonants and their value and duration by vowels, the music to be written without the use of notes, clefs, keys, staffs, flats, or sharps, to enable a beginner to learn quickly, and to transpose music readily from one key to another.

A churn has been patented by Mr. Lambert Snyder, of Midland Park, N. J. The dash stem has adversely arranged slotted conical frames, with horizontal rods in alignment with the slots of the frames, whereby the fluid is drawn from the top and bottom toward the center of the dasher, in a way designed to make fine butter in a short time, with little labor.

A portable safe has been patented by Mr. Joseph J. Schuknecht, of Bailey, Ohio. It is for the storage of important papers, jewelry, etc., and has a hollow box with a lid, a box enlarged to form a step near its top held in the body a fire-proof filling isolating the box from the body, and other novel features, being cheaply manufactured and designed to afford secure protection against fire.

A combined cane and stool has been patented by Mr. William Leisner, of Los Angeles, Cal. This invention covers a cane made with two separable sections, a tubular head section and a body section, with two series of essentially triangular hinged members, and other novel features, making a cane which can be conveniently converted into a stool, while the article can be simply and cheaply manufactured.

A screw driver has been patented by Mr. Michael Cashin, of New York City. It has a longitudinally slotted handle with reversible pawls, the bit having right and left threads, a ratchet having pins engaging grooves in the bit, the pawls being adapted to be thrown into and out of engagement with the ratchet by turning the cap, the device being designed to be used as a simple screw driver or a ratchet screw driver.

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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.

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

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Minerals sent for examination should be distinctly marked or labeled.

(1) C. W. D. asks: For the best way to get copper off the sides of a vat which has deposited there. The vat is lead lined. Also can you give me the process of coating electrotypes with steel? A. Connect your vat to the wire leading to the copper or carbon of your battery. Fill vat with sulphuric acid and water, and carry a wire from your zinc pole to a plate of copper immersed in the sulphuric acid. This will strip the copper.—For steeling process we refer you to SUPPLEMENT, No. 605, which we can send you for 10 cents.

(2) H. W. W. asks: 1. What is the process for reducing raw lump alum to burnt alum powder in large quantities? And what is loss in weight of alum by evaporation? A. Simply heat the alum in an open vessel to 401° Fah., such as an enameled frying pan. The following are the elaborate directions of the United States Pharmacopœia: Alum, in small pieces, one hundred and eighty-four parts. To make one hundred parts. Expose the alum for several days to a temperature of about 80° C. (176° Fah.) until it has thoroughly effloresced. Then place it in a porcelain capsule, and gradually heat it to a temperature of 200° C. (392° Fah.), being careful not to allow the heat to rise above 205° C. (401° Fah.) Continue heating at the before mentioned temperature until the mass becomes white and porous, and weighs one hundred parts. When cold, reduce it to a fine powder, and preserve it in well stopped vessels. 2. Please give receipt for a good blacking. A. For blacking we refer you to Phin's "Trade Secrets," which we can send you by mail for sixty cents.

(3) D. F. C. writes: A party recently passed through here selling a powder which, placed in a lamp containing oil, rendered it non-explosive; do you know of any compound of that description? A. We do not, and no such powder is known. The powder sold was valueless, and without effect of any kind.

(4) A. R. S. asks: 1. If hot and cold water are exposed to a temperature below freezing, will the hot water freeze first? Will it make any difference in this respect whether the water is in open vessels or in closed pipes? A. The cold water will freeze first, whether in open vessels or in pipes. 2. If water that has been heated and is become cold again and water that has not been heated are exposed to heat, will they both begin to boil at the same time? A. The unheated water will be apt to boil the first, owing to the presence of a certain amount of dissolved gases.

(5) R. G. D. asks: 1. If a solid glass ball be dropped into the ocean (at its greatest depth), will it sink to the bottom? A. It will. 2. Why should a diver be weighted according to the depth he desires to descend? A. This is a practical question. A weight that would cause a man to sink in one depth would insure his sinking to any depth. The diver finds by experience what weighting is best adapted to his needs.

(6) A. F. B. asks: 1. How near may one go to a dynamo for the electric light without danger of having one's watch balance wheel magnetized? A. It depends on the dynamo, its size, make, etc., and also on the size, quality of steel, etc., used in the watch movement. 2. What are the symptoms of such magnetizing? A. Your watch will fail to keep time, and the works will attract a fine needle suspended by a thin thread. 3. Supposing the watch balance to be magnetized, how may this be entirely demagnetized? A. For demagnetization of watches we refer you to SUPPLEMENT, Nos. 206,207, and SCIENTIFIC AMERICAN, 14, vol. 55.

(7) G. B. asks whether or not bisulphide of carbon is too dangerous to handle as an ant and gopher destroyer; in fact, as general insect destroyer. If not too dangerous for a careful person to use, will you please state how best used for above purpose? A. Bisulphide of carbon as well as its vapor is highly inflammable. Inhalation of its vapor produces very serious effects, a species of intoxication following, with loss of memory, etc. A person might become its victim when applying it, however careful he might be. Inject into soil with a syringe or force pump. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 471, which we can send you for ten cents, for illustrations of improved appliances for application of bisulphide of carbon to the soil.

(8) E. F. F. writes: In a discussion with a friend, I made use of the phrase that in the telephone sound was converted into electricity on one end, and then on the other end of the line reconverted into sound. The correctness of this expression was doubted, it being held

that sound could not be turned into electricity. Please decide whether I am right, and if not, please explain the principle of the process. A. Sound is not convertible into electricity, but sound waves are utilized as a motive power for operating apparatus for varying the current, or for generating it, according to the kind of instrument used. In the case of the carbon transmitter, the vibration of the diaphragm by the impact of sound waves varies the current in the local circuit by varying the pressure of the two electrodes of the transmitter. The Bell telephone, when used as a transmitter, is simply a magneto-electric generator in which the armature is vibratory instead of rotary. The diaphragm (which is the armature), when vibrated by sound waves, causes electrical impulses to be generated in the coils of the instrument. These electrical impulses produce in the diaphragm of the receiving instrument vibrations corresponding to those of the transmitting instrument, and the vibration of the diaphragm of the receiving instrument produces air vibrations similar to those which actuated the diaphragm of the transmitting instrument.

(9) S. S. asks: 1. Can I do satisfactory nickel plating without a battery? A. No. 2. If not, what kind of a battery would you recommend? A. Use a large bichromate Bunsen type battery.

(10) N. S. C. asks: 1. What are the proportions of air and common illuminating gas that constitute the most explosive mixture? A. One gas, seven to ten air. 2. How can I remove writing ink stains from a photograph? A. Use a dilute solution of oxalic acid.

(11) F. X. W.—For information as to construction of electrical apparatus in general we refer you to Bottone's "Electrical Instrument Making for Amateurs," which we can send you by mail for $1.20.

(12) H. M. B. asks how and of what material is superphosphate made. A. It is made by treating phosphate of lime with sulphuric acid in proper amount. As a source of phosphate of lime the natural phosphate rock of Charleston, S. C., is largely used.

(13) G. F. writes: In using tallow in my laundry I succeed in making it odorless. I wish to know the way to make it white and soft. A. Melt and heat with water, allow to cool, and remove the solid tallow. If it is bad to start with, you will probably be unable to purify it satisfactorily.

(14) R. H.—For information on balloons we refer you to May's "Ballooning," which we can send by mail for $1.00. For emery wheel address makers, stating your requirements. A 40 foot sloop yacht may run at from $300 up to $2,000 per annum; a 40 foot steam yacht will cost about twice as much.

(15) W. W. C. asks: 1. How can I treat cow horns so they may be bent into shapes? A. Steam will soften them so that they can be bent to a certain extent. 2. Is there any process for dyeing or coloring horns black? A. They may be dyed by an aniline dye, or by soaking in copperas solution, followed by soaking in logwood decoction.

(16) V. C. T. asks: What would be the best book to get for a young man of 18 to learn electricity? A. We recommend Thompson's "Elementary Electricity," price $1.25. "Practical Electricity," by Ayrton, $2.50. Thompson's "Dynamo-Electricity," $5. We can supply all of these works, free by mail.

(17) A. P. asks for a paste or cement by which cotton cloth may be made to adhere to metal plates, the latter throwing out a heat of about as great as the hand can bear. A. Try silicate of soda, also try gum tragacanth mixed with water and a little glycerine to the thickness of soft butter.

(18) F. V. asks how to make a solution of tin for electroplating.

A. Distilled water.... .....200 parts by weight.
Pyrophosphate of soda..... 2 " " "
Fused chloride of tin.....200 " " "

Dissolve the soda salt first, and then gradually introduce the tin salt.

(19) W. I. K. asks: How many cells, and of what kind, would be required to run a one candle power Edison miniature lamp? How long will same be run by the battery, that is, in continuous use? A. One or two good bichromate cells, Grenet or Bunsen, would run it for a number of hours.

(20) W. W. C. asks: 1. Will a battery composed of a zinc and a copper plate suspended in a strong solution of NaCl be reliable when placed in the circuit of an electric door bell? A. It will be very weak and liable to polarization. 2. What is the best and simplest home-made battery for an electric door bell? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 157. 3. Does a stop or diaphragm when placed in a lens have any more effect than to exclude the rays of light that fall on the outer edge of the lens? A. This is practically its function. 4. Would a Darlot R. H. (common angle lens), which with full opening covers a four-fifth plate, cover a larger one if stoppered down with a diaphragm three-sixteenths of an inch in diameter? If so, what size? A. Probably it would cover a 6½×8½ plate. To test it hold the lens in front of a window, then place a large white cardboard behind it, moving it nearer or further from the lens until the image is distinct. Then measure the circle it cuts, and you have the actual size of plate it will cover. 5. What is the best shape for a canvas canoe for speed on smooth water? Why? A. The one that will expose the minimum surface, because "skin friction" is the principal resistance to the motion of a vessel. 6. Of what wood would you recommend that the frame be built? A. Ash, hickory, or white oak, as strong, light, and easily bent. 7. Is there any better way for waterproofing canvas than applying one or two coats of linseed oil, letting it dry, and then varnishing? A. Melted paraffin is excellent. For full details of canoe construction we refer you to our SUPPLEMENT, Nos. 164, 181, 216, and 219, which we can send you for 10 cents each.

(21) O. S. asks: 1. Is there a locomotive or stationary engine in existence that can get up steam enough to run itself with a one-inch hole in the dome? A. It is a question of size of boiler, of size of engine, of relative sizes, and of steaming capacity The question we answer affirmatively. 2. Is there any substance that can be mixed with liquid glass that will thin it, and what is liquid glass made of? A. Water. Liquid glass is a solution of silicate of soda or potash in water. 3. Which is the highest mountain in the world? A. Mt. Everest, in the] Himalaya ranges in Asia—29,000 feet high. 4. What was the highest altitude ever reached by man, and by whom? A. 37,000 feet, attained by Glaisher and Coxwell in a balloon, September 5, 1862. 5. Are white maple and sugar tree the same? A. Yes.

(22) A. C. asks for a formula for collodio-bromide emulsion that is rapid. The following is recommended:

Ether s. g. 0·720..... 4 fluid ounces.
Alcohol s. g. 0·820 ..... 2½ " "
Pyroxyline ..... 40 grains.
Castile soap dissolved in alcohol..... 30 "
Bromide of ammonium and cadmium..... .....56 "

Dissolve 125 grains of nitrate of silver in one ounce of boiling alcohol, and sensitize the emulsion by adding one drachm of the silver solution at a time, thoroughly stirring with a glass rod until the silver is well incorporated. After the whole has stood for twelve hours add 30 grains more of the double bromide of ammonium and cadmium dissolved in half an ounce of alcohol. After standing for a few hours longer the emulsion is poured into a flat dish and allowed to evaporate and dry. It is then washed with distilled water by repeated soakings until all the soluble salts are removed. After drying it is again redissolved in equal parts of alcohol, at the rate of from twenty to twenty-four grains to the ounce of solvents. Then it is ready for use, and plates may be used wet or dry.

(23) J. McG. asks: 1. What is meant by the philosopher's stone? A. A substance which could turn base metals into gold. 2. How can I make ethereal solution of gold? A. To one part strong solution of terchloride of gold add three parts ether in a separatory funnel, mix by gentle agitation, allow it to stand until the supernatant ether is strongly colored, draw off the water from beneath, and the solution will remain. 3. Will hydrochloric acid etch soft steel? A. Yes. 4. Which is the cheapest for newspaper etching—copper or zinc plates? A. Zinc plates are used for relief work.

(24) E. H. F. asks for the best way of applying naphtha to furniture and carpets, to be effectual in destroying Buffalo moths, without injury to the articles. A. Naphtha will not injure carpets, but will injure varnish. It can be applied by sprinkling. It is very dangerous as regards conflagration, its vapor being liable to ignite from fires, lamps, etc.

(25) T. H. B. asks how to prepare a toilet cream, with snow white petrolatum as the base, and mixture tinted a faint or delicate pink. A. You can color the petrolatum pink by a little alkanine, or extract of alkanet root. It can be stiffened with a little white wax, and almond oil can be added. The subject is excellently treated in various books, such as Cooley's "Practical Treatise on Perfumery," which we can send you by mail for $1.50.

(26) G. R. C. asks how white metal is made. I mean the kind that is used in the manufacture of cheap table ware, such as table casters, spoons, butter knives, etc. The metal being naturally soft, will you also please state how same can be hardened and still retain its color? I want it for small castings, cog wheels, etc. A. The following are formulas for white metal. Melt together: (*a*) Tin 82, lead 18, antimony 5, zinc 1, copper 4 parts. (*b*) Brass 32, lead 2, tin 2, zinc 1 part. For a hard metal, not so white, melt together bismuth 6 parts, zinc 3 parts, lead 13 parts. Or use type metal—lead 3 to 7 parts, antimony 1 part.

(27) J. P. asks for a good recipe for stove polish. A. We can supply you with "The Techno-Chemical Receipt Book," price $2, which contains a very good receipt for stove polish.

(28) T. J. asks: Can a molecule exist apart from gravity? A. Gravity is supposed to be inherent in all molecules; none can exist without possessing it.

(29) A. G. asks for the best wire to use for heating purposes. A. Platinum, which may be coated with a thin wash of pipe clay and water.

(30) Carpenter asks: Would you please tell me how long a man could subsist without any special inconveniences in a barrel six feet in diameter, ten feet long, perfectly airtight? A. One or two hours.

(31) S. R. K. writes: Please straighten me out on the following problems: 1.

$$y = 17 \sqrt[1\cdot35]{\frac{45,000}{80,500}} = ?$$

A. Reduce the quantity under the sign to a decimal, find logarithm, divide the logarithm by 1·35, and find number corresponding thereto, multiply this by 17. 2.

$$P = \left(\frac{1}{1\cdot3308}\right)^{1\cdot4} = ?$$

A. Reduce quantity within parenthesis to decimal, find logarithm, multiply the logarithm by 1·4, and find number corresponding thereto.

(32) R. B.—The size of a wheel affects the sliding friction at the axle, and the resistance offered as its circumference in its rolling motion strikes obstacles on the road. The large wheel is normally the easiest running.

(33) J. B. S. writes: I wish to extract the fiber from a certain kind of grass. What is the simplest plan without machinery? A. Soak in water and beat with a mallet until the fiber separates; repeated washings and rubbings will gradually remove all soft matter and leave pure fiber.

(34) F. S. asks how the operation known as "boiling out" a meerschaum pipe is performed. A. The pipe is immersed in hot beeswax for ten or fifteen minutes.

(35) W. T. asks: 1. How many pounds of pressure will a mixture of O and H produce by their combination by electricity in a limited space of the same volume as the gas? A. Ten atmospheres under the most favorable circumstances. 2. What will be the temperature? A. About 7,000° Fah., under assumption of complete combustion; practically far less. 3. Will it take less O and H mixed in a proper proportion to run a gas engine than the gas generally used, and what will be the proportion in cubic feet? A. It will take about seven times as much coal gas and air.

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For which Letters Patent of the United States were Granted

November 6, 1888,

AND EACH BEARING THAT DATE.

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