RECENTLY PATENTED INVENTIONS.

Engineering.

CENTER BLAST PIPE FOR FURNACES.—Charles Johnson, Rutland, Vt. This is an improvement upon a formerly patented invention of the same inventor, designed to insure an equal distribution of the air through a tuyere opening into the heated fuel in the stack, and to permit of readily repairing burned parts of the pipe. The original invention was illustrated and described in the SCIENTIFIC AMERICAN of July 13, 1895. A series of removable rings loosely surround the pipe, which is made in sections, with tuyere openings between them, and the pipe has a conical cap, on the base of which is an annular flange holding a protecting ring.

VAPOR OR STEAM CONDENSER.—Albert Hoberecht, Ensenada, Mexico. This condenser comprises a casing having an offtake or stack at its upper end and a steam inlet at its lower end, there being in its sides air inlets connected with cold air supply pipes, while horizontal baffle plates within the casing direct the ascending steam and vapor past the cold air jets. The amount of cold air admitted may be regulated by dampers, and the water of condensation is passed to an outlet at the bottom of the casing.

SURFACE CONDENSING TUBE.—This is another invention of the same inventor, providing a condensing tube having internal and external condensing surfaces of a material which will conduct heat quickly and of a minimum thickness, whereby the air will have increased cooling action on the outside of the outer tube and the inside of the inner tube. The inside and outside faces of the tubes are strengthened and reinforced by spiral spring wire coils, and both the wires and tubes are strengthened by spiders or transverse supports, so that the tubes will have strength to withstand vacuum and pressure.

Railway Appliances.

CAR FENDER.—Augustin M. Chavez, Mexico, Mexico. This fender is designed to rescue a person lying on the ground as well as one standing up in the path of a moving car, being, it is claimed, thoroughly antomatic in its action, and of simple, durable and inexpensive construction. It is made in two scoop sections adapted to balance one another, and the forward or receiving section being only slightly above the surface of the ground. Covering both sections is a bed of netting, in which one struck by the fender is received, without liability to injury.

RAILROAD TIE PLATE.—Alexander B. B. Harris, Bristol, Tenn. This is a flat plate having tongues or split extensions adjacent to the spike holes, the tongues having projecting toes or flanges adapted to be expanded or forced outwardly and embedded in the tie by the thrust of the spike. The plates are designed to prevent the wear of the tie beneath the rail, for which a solid, firm, and secure anchorage is formed.

CAR WHEEL AND TRACK.—Christian W. Flint, Port Townsend, Washington. To permit a train to run around curves with great speed, without danger of deralling and without inclining the tracks, this invention provides for having two rails for such sections, one rail having its tread higher than the other, and the elevated tread being beveled downward toward the other rail, the wheel also having two treads of different diameters, with a dividing flange between the treads. The gage of the rails on a curve will be about half an inch wider than on a straight track, to prevent the flange of the outer wheel binding on the head of the outer rail.

Electrical.

ELECTRIC LAMP.—Charles E. Quimby, New York City. This invention provides for an electric lamp arranged singly for attachment over one eye, or for a pair of lamps to be mounted on a spectacle frame, the incandescent filament occupying an annular globe in a suitable casing, the globe having an internal diameter of three-eighths to half an inch. The ends of the incandescent filament are attached to wires sealed in the glass, and insulated wires furnishing the current are connected with the lamp by binding screws, the lamp being attached by a universal joint to a band passing around the head of the user.

Mechanical.

CARPENTERS' PLANE OILER.—Theodore M. Anderson, New Whatcom, Washington. To reduce friction between the plane and the wood being dressed this inventor provides a lubricating attachment according to which the plane has a base portion with parallel and perpendicular sides between which is a block, a bit mounted between the sides being supported by the block, in which is an oil chamber, a wick in which is adapted to extend to the under side of the stock.

GRINDING MILL.—George C. Ahrens, Gillespie, Ill. This is an improved mill for grinding coffee, spices, cereals, etc., and is designed to grind large quantities without much exertion. It has crushing and grinding surfaces arranged one above the other, the crushing burr forming a feed for the grinding burr, and the stem of one of the burrs being hollow to receive the stem of the other burr. The stems are locked together in unison and are operated by a handle.

BALL BEARING.—Frederick C. Avery, Chicago, Ill. This inventor has devised a means of protecting a ball bearing against dust or grit, and a bearing that will retain the balls when the cone is removed, the oil being applied directly on the balls, simplifying and cheapening the construction without any addition in weight. The usual flange of the cone is cut away and its outer portion is made cylindrical and of less diameter than the shell or the ball holder, the space being made use of for a special form of dust protector, combined with which is an oil receiver.

Miscellaneous.

AIR SHIP.—Manoel V. Coutinho, Para, Brazil. This invention comprises a balloon with side flange extending around the bow to serve as an aeroplane, its upper and lower portions forming substantially two conical sections, and a sleeve in the central portion having a flexible connection to engage halyards. The apparatus is designed to be navigated by an electric or other motor, side propellers forcing the car up or down or forward or back, and rendering its steering easy.

MULTIPLE PROJECTILE.—Larence A. Johnson, San Francisco, Cal. This is a projectile more especially designed for long range use, and is made in three or more sections which may be separated from each other and arranged to form a projectile to be fired from cannon in the usual manner. The separable sections of the body are each formed with a bore adapted to contain a charge, the sections each having a shank fitting in the bore of the next section, dowel pins engaging recesses in the opposing section, and the sections having interlocking external rings.

SLED PROPELLER.—Willis A. Bradley, Gem, Idaho. This invention provides a steam-propelled ice boat, which may also be used as an engine of a train of boats to be drawn over the ice. It comprises a frame having adjustably mounted and independent runners at each side and a steering runner at one end, while a motor operates a spiked drive wheel. The boat may be guided and controlled by levers and appliances in the pilot house.

DUMP WAGON.—George Vaughan, Salt Lake City, Utah. The bottom of the body of this wagon is composed of a number of drop doors which may be opened by the driver by turning a crank, the arrangement being such that the entire load may be dumped in a pile, or it may be distributed over a given area, the driver not having to leave his seat. The improvement does not interfere with the carrying capacity of the wagon.

VEHICLE WHEEL BEARING.—John Pettinger, Santa Barbara, Cal. The hub box, according to this improvement, has an integral spindle adapted to engage a tubular axle, reducing the friction of the bearing parts to a minimum, while the wheel hub, by reason of the long spindle, easily maintains its proper relation to the axle, so that wabbling is prevented and the wheel is held to run true. Abundant lubricant may be passed between the spindle and the tubular end of the axle, obviating the necessity of frequent lubrication.

EXTRACTING GOLD FROM SOLUTIONS.—Giles O. Pearce, Colorado City, Col. To extract and recover gold and platinum from aqueous solutions, particularly sea water, this inventor provides for passing the solutions through a mass of vegetable carbon having associated with it sulphate of iron, oxalic acid and tartaric acid, to secure the reductions and depositions of the metals on the carbon, which is afterward burned, reducing and melting the metals into a mass.

MACHINE FOR UNDOING CIGARETTES.—Jose M. Urgelles, Guyaquil, Ecuador. For opening or undoing cigarettes which are defective, that the tobacco may be used again while the wrappers go to waste, this inventor has devised a machine in which a movable box is arranged to reciprocate back and forth between a feed device and a cutter. the defective cigarettes falling from a hopper upon the bottom of the box, and being carried singly into the path of cutter blades, by which they are torn open and fall into a receptacle below.

COPY HOLDER.—George E. Smith and Frank P. Garrison, Westwood, Ohio. This device comprises a standard on which is movable a runner with horizontally swinging arm carrying a pivoted copy-holding frame which may be swung to bring it into any desired position. A spring-actuated clamping bar of the copyholding frame is also adapted to hold books, the bar being arranged to bear on each side of an open book. The device is very simple and inexpensive, readily adjustable, and adapted to be securely fastened to a table or desk.

FLY TRAP.—James S. Shumate and Henry W. Bartels, Houck, Mo. This is a device adapted for attachment to a curtain, so that when the curtain is drawn over a window light is admitted only through the trap, thus attracting the flies to enter it. Means are provided for regulating the amount of air to be passed through the trap, and the device is very simple and inexpensive.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

NEW BOOKS AND PUBLICATIONS.

COMPUTATION RULES AND LOGARITHMS, WITH TABLES OF OTHER USEFUL FUNCTIONS. By Silas W. Holman. New York and London: Macmillan & Company. 1896. Pp. xlv, 73. Price $1.

Of those who use logarithms, very many imperfectly understand the full use to be made of them. There is much in the science of computation that is not always fully grasped even by those who have long calculations to make, and to such persons the class of works giving computation rules are particularly valuable. They should be in the hands of all scientific students. These columns are admirably printed so as to save the strain on the eyes incident, and unavoidably so, to the use of such tables. A very nice feature of the book is found in the last pages, where a quantity of logarithmic constants, mathematical and mechanical, are given, so that logarithms can be directly applied to the most generally used calculations of mechanics.

A TREATISE ON THE MANUFACTURE OF SOAP AND CANDLES, LUBRICANTS, AND GLYCERIN. By William Lant Carpenter. Second edition. Revised and enlarged by Henry Leask. London: E. & F. N. Spon. New York: Spon & Chamberlain. 1895. Pp. xii, 446. Price $4.

An excellent idea of the extent of this work and the fullness of the treatment accorded to its subject can be gained from the twenty-two page index, and it really is an example to technical publishers as an illustration of how technical works should be indexed. Everything touching the subject, from A to Z, seems here to be covered. Numerous illustrations are contained, and the subjects of analysis and examination of materials are excellently treated. Thus we notice, among other features, description of new apparatus for the determination of specific gravity and melting points, with illustrations and descriptions of their use in the text. The book is one that should be on the shelves of the libraries of all soap manufacturers. We cannot but believe that the technology of one subject will be of assistance in the study of many others. One chapter is devoted to the bibliography, and the meagerness of the list would seem to indicate how little trodden is the field which is open for such a work as the one under consideration.

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.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

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.

(6803) O. H. F. asks: By what electrical arrangement can I heat to 103 degrees Fah. a box 3 feet square by 2 feet high? Am using gas now, but with poor result. A. Use a coil of iron or German silver wire if you have an incandescent system to draw on. For thermostats see our SUPPLEMENT, Nos. 848, 902, 959.

(6804) H. M. H. asks: Can you give me a number of good and simple receipts for an inexpensive, colorless gum, for labels? A. 1. Tragacanth, 1 ounce; gum arabic, 4 ounces; water, 1 pint. Dissolve, strain, and add thymol, 14 grains; glycerine, 4 ounces; and water to make 2 pints. Shake or stir before using it. 2. Rye flour, 4 ounces; alum, ½ ounce; water, 8 ounces. Rub to a smooth paste, pour into a pint of boiling water, heat until thick, and finally add glycerine, 1 ounce, and oil cloves, 30 drops. 3. Rye flour, 4 ounces; water, 1 pint. Mix, strain, add nitric acid, 1 drachm. heat until thickened, and finally add carbolic acid, 10 minims; oil of cloves, 10 minims; and glycerine, 1 ounce. 4. Dextrin, 8 parts; water, 10 parts; acetic acid, 2 parts. Mix to a smooth paste and add alcohol, 2 parts. This is suitable for bottles of wood, but not for tin, for which the first three are likewise adapted. 5. A paste very similar to 3, but omitting nitric acid and glycerine, is also recommended by Dr. H. T. Cummings.

(6805) P. A. J. asks: 1. Where can the calcium carbide be obtained A. You can get calcium carbide from the dealers in scientific and mechanical supplies. 2. Would like to get a good recipe for a frosting on a skylight. It must look neat when dry and not wash off easily. A. Sandarac, 18 parts; mastic, 4 parts; ether, 200 parts; benzol, 80 to 100 parts; or, for an imitation ground glass that steam will not destroy, put a piece of putty in muslin, twist the fabric tight and tie it into the shape of a pad; well clean the glass first, and then pat it over. The putty will exude sufficiently through the muslin to render the stain opaque. Let it dry hard and then varnish. If a pattern is required, cut it out in paper as a stencil; place it so as not to slip and proceed as above, removing the stencil when finished. If there should be any objection to the existence of the clear spaces, cover with slightly opaque varnish. 3. In order to increase an electric spark, what should I do—increase the number of windings on spark coil or use more battery? A. Increase the number of windings and the size of core of the coil. More battery will also increase the spark. In the SCIENTIFIC AMERICAN, vol. 74, No. 2, spark coil apparatus for lighting gas is described.

(6806) R. A. R. asks: 1. Can I make a coil to give a 3 or 4 inch spark, using No. 16 wire for the primary and for the secondary No. 36 cotton covered wire and immersing the whole coil in paraffine or other oil, first heating so it will penetrate? I would make the interrupter independent. Do you think the oil insulation would stand if I made the coil long and thin, rather than short and thick, and would I get the same effect? A. Our SUPPLEMENT, No. 160, describes a coil rather smaller than the one you specify, but it gives a good model to go by A coil such as you describe is large for an amateur to make. See also our SUPPLEMENT, No. 229, for a larger coil. Nothing is better than oil as an insulator, as it is self-repairing. You may make the coil long. Wind the secondary in short sections. 2. What is a Tesla coil? A. Tesla uses a liquid dielectric in his coil. It is adapted for high potential work. 3. I want to tap the incandescent circuit alternating of 54 volts, using a step-up transformer to get 1,000 volts, and then increase the voltage so as to get as high as possible voltage and lowest amperage, getting the luminous vacuum effects. How shall I proceed? A. Use converters, establishing the desired ratio between the number of turns in primary and secondary. Diminish the size of wire to correspond with the reduced amperage. 4. Where can I get Sir William Thomson's table for computing voltage by the spark length? A. Allow 10,000 volts per one-tenth inch.

(6807) W. W. K. asks: 1. Are the carbon plates used in batteries made of carbon which has first been ground and then moulded into the plates? If so, please describe the process, so that I may be able to make them. A. They are moulded. For description of the identical manufacture of electric light carbons, we refer you to our SUPPLEMENT, No. 626. 2. What is the best way to melt gutta percha when making the compound for rendering wooden cells acidproof, given in SCIENTIFIC AMERICAN of March 7, 1896, ninth question of questioner 6746. A. Do it over a carefully regulated source of heat. 3. About how many volts does an induction coil give when the spark is one-quarter inch long? A. See last answer in above query. 4. How much zinc surface is required for each ampere in a Grenet battery? A. No fixed area can be cited, as it constantly varies. Allow one to three square inches of immersed plate. 5. Will you please give a table of wire resistances, etc.? A. We refer you to Sloane's "Arithmetic of Electricity" for a wiring table.

(6808) J. L. writes: How many volts are there required to light a 16 candle lamp and also what surface should I give to accumulators and how many batteries must I have to charge them? A. A 16 candle power lamp is made for 20 to 120 volts, or even higher, according to requirements. In a storage battery allow 5 amperes for each square foot of positive plate and 2 volts for each cell. It is not advisable to make your own batteries. For storage battery work use the 20 volt lamps. They consume 2 to 2½ amperes each.

(6809) M. A. L. asks: Will you give directions through Notes and Queries for making the bellows for a photographic camera, also the material used for same? A. In our SUPPLEMENT, No. 625, we give an elaborate description with full illustrations of how to make one, to which we refer you.

(6810) C. L. C. asks: What is the average horse power of a modern passenger locomotive? A. The largest locomotives can develop 1,600 horse power. The average work may be stated at about 1,000 horse power with full trains, on up grades.

(6811) X. Y. Z. writes: 1. On a barometer just purchased I notice that the vernier does not correspond to the inch spaces on the scale, and, on investigation, I find that in all the illustrations of the vernier in cyclopedias, etc., it is always made to conform to a longer or shorter space than the spaces on the scale. In our own barometer the inches on the scale are divided into twentieths, while the vernier is divided into twenty-fifths, and "evens up" with the scale at $\frac{2}{25}$ of an inch. Why is it not made so that the inch mark will be the place where the scale and the vernier agree? As it is now, it seems to me that the reading of the vernier will not have as its unit the inch, but that it will have $1\frac{1}{25}$ inches as its unit. A. The vernier, as you describe it, divides each $\frac{1}{20}$ of an inch into 25 parts; the reading, in other words, is to the $\frac{1}{500}$ inch, and by eye you can get it to $\frac{1}{1000}$ inch. The vernier divisions have no reference to the inch, but to the $\frac{1}{20}$ inch. The vernier might just as well have 50 divisions for 49 of the scale divisions, or any other ratio (the inch is not involved, but the fractional or small divisions are)—in your case $\frac{1}{20}$ inch. 2. What mathematical principle is involved in the following examples? I am able to secure the answers, but cannot devise any satisfactory rule or method for solving either one. (a) A's age is to B's as 1 to 3, but in 20 years their ages will be as 1 to 2. Required their ages (20 and 60). (b) A courier rides from the rear to the front and back of an army fifty miles long while the army moves forward 50 miles. How far does he travel? (About 120·711 miles.) A. Algebra gives the readiest solutions. (a) Call A's age x and B's age y. We then have

$$3x = y; \quad (1)$$
$$2(x+20) = y+20; \quad (2)$$
$$x = 20$$
$$y = 60 \quad \text{answer.}$$

(b) Assume rate of army's march to be 1 mile per hour. Let x = courier's rate; y = distance traversed by army when courier reaches their front and turns. The time occupied by the courier will then be 50 hours. He will ride forward a distance of 50 + y, will turn and ride back a distance y. The distance he rides can be expressed by 50x or by 50 + 2y. This gives

$$50 + 2y = 50x. \quad (1)$$

While he rides forward 50 + y miles at x miles per hour, the army moves y miles at 1 mile per hour. This gives

$$\frac{50+y}{x} = y \quad (2)$$

Solving, we get $y = \sqrt{1250} = 35{\cdot}355+$

Substituting in (1) we find $50x = 120{\cdot}711+$.