RECENTLY PATENTED INVENTIONS.

Electrical Devices.

LIGHTNING-ARRESTER.—H. N. KEIFER, Topeka, Kan. In the present patent the invention has reference to new and improved lightning-arresters of the kind provided with a fuse, and capable of general use, but particularly adapted for service in connection with telephones, telegraphs, voltmeters, and the like.

Hardware and Tools.

SAW SWAGING AND FILING GAGE.—S. J. GALLOWAY, Hillsboro, Ore. This invention relates to a tool adapted especially for crosscut or drag saws; and it comprises devices for swaging or truing the drag-teeth and for gaging the filing or sharpening of the cutting-teeth, these devices being embodied in a single instrument, so that by means of this instrument the entire saw may be put in order.

TONGS OR CLAMP.—P. A. ORTH, Menno, S. D. Mr. Orth has in view in this invention the provision of a simple tool adapted to grasp a heated plowshare, so as to hold it in shape when immersing it in a bath for tempering the share. The tool affords protection to the edge of the share to prevent it from taking too hard a temper, and the tool is adjustable to plowshares of different sizes.

Heating and Lighting Apparatus.

LAMP.—C. G. HOLMBERG, Woonsocket, S. D. In this patent the invention relates to lamps, more particularly of the type used out of doors and subjected to all kinds of weather. It relates further to certain improvements upon the carbureters for hydrocarbon-vapor generators sometimes used in connection with such lamps. Gusts of cold wind or sheets of rain cannot affect the lamp. The globe and almost the entire outer parts may be covered with snow and ice and not materially impair the illuminating qualities.

LAMP.—R. P. HAGEL, Sturgis, S. D. In this instance the invention has reference to improvements in gasoline-lamps, the object of the inventor being to provide a simple means for causing a constant and uniform pressure on the gasoline without the use of pumps, thus resulting in a steady light. Location of weights indicate when it is necessary to refill the reservoir, and to clean it, the cover and plunger may be easily removed.

RADIATOR.—G. M. AYLSWORTH, Collingwood, Ontario, Canada. The invention has reference more especially to the form of radiator shown and described in a former patent granted to Mr. Aylsworth. The principle object is to provide a structure of this kind which operates to promote the process of convection taking place within a room or other apartment in which the radiator may be located.

APPARATUS FOR FEEDING FINE FUEL AND AIR TO FURNACES.—A. E. CREIGH, Ronceverte, W. V. The primary object in this case is to distribute the fuel on the grate in such manner as to insure a better combustion of the fuel and the gases therefrom, and this is effected by a mechanism adapted to operate automatically. The fuel-dischargers proper may, however, be manipulated manually, and they are so arranged as to operate without obstructing access to the grate through the ordinary furnace-doors for raking the fire as practised in the case of boiler-furnaces.

Household Utilities.

PERMANENT MEMORANDUM FOR HOUSEHOLD USE.—A. R. MENSING, Chicago, Ill. The principal object the inventor has in view is to provide a simple and compact article of the type described which may be secured to a door or wall in a room where it may be easily and conveniently reached and will always be in plain view to remind the household of articles desired.

PICTURE-HANGER.—H. MINCK, Jersey City, N. J. One purpose of this inventor is to provide a picture-hanger constructed entirely of wire, and consisting mainly of two limbs connected by a hook or other form of suspension device, each of which limbs terminates at its free end in an open loop for attachment to a picture-frame.

Machines and Mechanical Devices.

METER FOR MEASURING WATER OR OTHER LIQUIDS.—O. C. PIPER, Horsens, Denmark. Water-meters built on the turbine and water-wheel principle generally suffer from the drawback that the meter registers differently by different pressures, and consequent different velocity of rotation. Another, that they are easily influenced by dirt and wear, and thereby become inaccurate, the least resistance against the revolving of the meter-wheel making the registration less. This device regulates the meter-wheel rotation so as to get rid of the above-named drawbacks.

GRIP-WHEEL.—H. F. ONG, Wendling, Ore. In this instance the invention has reference to improvements in cable-grip wheels for logging or traction engines, an object being the provision of a gripping mechanism operated by air or steam pressure and having means for automatically controlling the supply and exhaust of motive agent. The gripping takes place about two thirds the diameter of the wheel.

AUTOMATIC INDUCTION-VALVE FOR BOTTLE-FILLING MACHINES.—S. C. MILLER, Louisville, Ky. Mr. Miller's invention pertains to bottle-filling machines, and has for its object the provision of an induction-valve for the filling-tank thereof which will render the feeding of a supply of liquid to the tank automatic in operation. It is adapted for the filling of bottles of large or small dimensions.

BOTTLE-FILLING MACHINE.—S. C. MILLER, Louisville, Ky. The object of the present invention is to provide a bottle-filling machine having details of construction which especially adapt it for filling bottles with a semi-liquid material that does not flow freely—that is to say, condiments, such as mustard, catsup, and chile sauce, that require air pressure to enforce the passage from the tank through the filling-tubes and into bottles to be filled. Improvements in this class of apparatus are shown in two former patents granted to Mr. Miller.

ICE-MAKING MACHINE.—R. F. LEARNED, Natchez, Miss. One object the inventor has in view is to provide means in a freezing-can which will establish and maintain a circulation through the water in order to obviate the formation of a core in the center of a commercial cake of ice. A further object is to overcome clogging or closing of the air or gas supply pipe associated with the can, thereby insuring operation of the apparatus when maintaining it in service.

CLUTCH-PULLEY.—W. J. HILLIARD, Buffalo, N. Y. The present invention has reference to improvements in clutch-pulleys adapted for use on shafts and machinery; and one object the inventor has in view is the provision of a device which embodies in a single structure the parts necessary to drive or to be driven by a belt to make the belt member fast or loose with a shaft.

DECORTICATING-MACHINE.—A. D. ESTIENNE, 9 Rue Jean Martin, Marseilles, France. In this patent the invention relates to a machine for decorticating ramie and other plants, leaves, or textile materials, effecting a regular and complete decortication of all the leaves or stalks introduced into the apparatus and a ready separation of the hackled material. The specially arranged elastic pallets or paddles characterizing this machine can be applied to other forms of decorticating-machines.

CUPEL-MAKING MACHINE.—A. C. CALKINS, Los Angeles, Cal. Means are furnished by this invention for producing cupels used in separating precious metal, gold and silver, from lead by oxidizing the lead and forming it into litharge, which, with other impurities, are absorbed by the porous bone-ash, from which the cupel is made. The present invention more specifically relates to improvements in that type of machine disclosed in a former patent granted Mr. Calkins and provides means whereby the operation of making cupels will be more practical and economical and in which a more effective means for the cupel-body and ejecting the same from the mold is provided.

ORE-SEPARATOR.—H. J. BURROUGHS, Los Angeles, Cal. The mechanism separates precious metals from their ores. In carrying out the invention Mr. Burroughs has practically in view the production of a separator of the character specified which may be easily and readily assembled in position for use and which shall be simple in construction and capable of standing the strain and wear and tear to which it is subjected while in operation. Devices are provided for adjusting or raising and lowering the cylindrical water-tank of the separator relative to the mercury tank, and occupying little space.

WHEEL-LATHE.—J. R. CROWLEY, Savannah, Ga. This improvement relates to wheel-lathes, more definitely stated work-driving means for wheel-lathes. The special object is to simplify and improve the work-driving devices heretofore employed in connection with car-wheel-turning lathes. In the practice of this invention any type of center-drive lathe may be employed.

AUTOMATIC ADDING AND SUBTRACTING APPARATUS.—N. H. KODAMA, New York, N. Y. In this case the invention relates to that form of apparatus employing a series of wheels each carrying on its periphery a series of numerals, and the inventor provides special devices in connection with the wheels to insure the locking of the same at the proper times and to cause the operations to be perfected with accuracy and expedition.

STAVE SHAPING MACHINE.—A. L. SHAW, Whitecastle, La. Mr. Shaw's invention refers to improvements in machines for shaping staves, by which he is able to prepare staves for tanks, vats, stills, and other regularly-tapered receptacles in a manner to give the desired longitudinal taper and the necessary bevel to the edges of the staves, both these operations being performed on the stave simultaneously and during its passage through the machine.

KNITTING-MACHINE.—I. W. LAMB, Perry, Mich. The invention pertains to machines of the Lamb type for two straight rows of needles arranged on opposite sides of the machines and between which rows of needles the work passes, as shown, for instance, in former Letters Patent granted to Mr. Lamb. The object of the inventor in the present case is to provide an improved machine more especially designed for producing mittens, sweaters and other garments having main and auxiliary parts.

Of Interest to Farmers.

COUPLING.—W. H. WALLACE, Whitefield, near Henry, Ill. The invention has reference to improvements in couplings particularly designed for use in connection with traction-engines for coupling the same to tenders, agricultural implements, threshing-machines, and other wheeled devices, Mr. Wallace's object being to furnish a coupling that may be readily attached to a traction-engine and that will be strong and durable. An engineer can couple his engine to a separator without assistance of those who are getting the latter ready for the road, thus saving much time and labor. Cushion springs are the only springs used and they avoid sudden jolting upon starting or stopping of an engine.

BINDER-COVER.—A. HERTJE, Tonkawa, Oklahoma Ter. The object of this improvement is to provide a structure affording a complete and effective cover for grain-binding machines. In many instances these machines are necessarily continually exposed to the elements and rapidly deteriorate by reason thereof. By means of this invention, however, they may be conveniently and effectively covered and protected from any deleterious exposure, as fully as though they were housed.

MECHANICAL MOVEMENT ADAPTED TO GRAIN-BINDERS.—W. C. DURYEA, Blawenburg, N. J. The intention in this instance is to provide novel means for driving a rotating knotter-shaft and a rocking needle-shaft without resorting to the use of a long train of gears and a complicated clutch mechanism usually employed for actuation of these parts. The subject-matter of this application constitutes a division of a prior application for Letters Patent filed by Mr. Duryea.

Pertaining to Vehicles.

SUPPORT FOR BUGGY-TOPS.—J. D'ALESSANDRO, Walnutgrove, Cal. The detachable support in this invention comprises a clamp attachable to what is commonly known as the prop support of the buggy, and it has spring supporting arms formed and arranged in a special manner with the effect that the weight of the top will be evenly distributed to prevent jolting and distortion of the top when the vehicle is traveling over rough or uneven ground.

BRAKE-LEVER ATTACHMENT.—R. W. COOKE, Condon, Ore. The purpose of this invention is to provide a brake-lever pawl which may be thrown into or out of action by momentum due to the movement of the brake-lever. This enables the lever to be operated from a distant point through the medium of a rope or other connection, so that by simply giving the lever a jerk the pawl is thrown into inactive position and the lever may then be released.

Railways and Their Accessories.

RAILWAY-SWITCH.—W. K. SMITH, Denver, Col. Primarily, the invention consists in switch mechanism for street-railways in which there is combined a lever pivotally secured in position between the railway-tracks connected to the switch-point and adapted to be operated by means secured to a tram, electric, cable, or subway car and under control or manipulation of the carman.

NUT-LOCK.—J. D. BRENT, Raymond, Miss. The improvement consists of new and simplified nut-locking means. A spring turn-button is turned down against the nut so that the latter will be securely locked against reversed turning on its bolt. The button will be held by a groove or recess thereon, engaging a projection or lug on an elongated plate. However, under ordinary circumstances a turn-button having a yielding engaging end so rendered by its transverse bent position will engage the nut with friction sufficient to hold it in locking position.

TRIPLE VALVE.—J. V. WELLS, Braddock, Pa. In this instance the invention relates to a triple valve applicable to the ordinary air-brake apparatus and by which means service, emergency, and high-speed brake applications may be made more rapidly and effectively than heretofore. Mr. Wells has also made another invention which relates to a triple valve applicable to the ordinary fluid-pressure brake apparatus operating the same as the usual triple valve and also capable of additional functions in that an application of the brakes may be made not only by a train-line reduction but by a train-line increase. The present invention has a certain reference to the organism disclosed in a prior patent granted Mr. Wells. The present valve is especially adapted to be used with the brake-valve shown in this inventor's copending application recently filed.

BRAKE-VALVE.—J. V. WELLS, Braddock, Pa. In this patent the invention relates to a brake-valve the principal object of which is to obtain by a relatively simple construction a greater control over the train-line pressure—that is to say, to be able to increase or diminish and to hold the pressure at any desired degree. It is designed especially for operating Mr. Wells' triple valve as disclosed in a prior patent, and in his copending application filed later.

Steam Engineering.

STEAM OR GAS ENGINE.—O. B. THORSON, Near Thor, Iowa. The aim of this improvement is to provide an engine arranged to permit the use of either steam or an explosive mixture as the motive agent, or steam at one end of the cylinder and an explosive mixture at the other end, at the same time allowing the engineer to reverse the engine whenever desired. The engine can be readily changed from a steam to an explosive engine, or vice versa.

ROTARY ENGINE.—F. P. UHRIG and B. F. UHRIG, St. Johns, Ore.—The intention in this improvement is to provide a rotary engine arranged to utilize the motive agent to the fullest advantage without danger of back pressure, and to permit convenient and quick reversing of the engine whenever it is desired to do so.

ROTARY ENGINE.—J. J. HORAN, New York, N. Y. In this patent the invention refers to improvements in rotary engines, an object being to provide an engine of this type that shall be simple in construction, having no parts liable to get out of order, comparatively inexpensive, and in which high speed and efficiency are secured with an economical use of motive agent.

ROTARY ENGINE.—A. F. FORD, Colfax, Wash. In the preferred embodiment of this invention Mr. Ford employs, briefly stated, a suitable casing or cylinder, in which is arranged a disk-like wheel carrying suitable buckets or pistons and peculiar shifting abutments, the cylinder being provided with opposite rotatable valves, ports adapted to feed and exhaust, and mechanism whereby the rotatable valves and shifting abutments may be worked.

CONDENSER.—T. DOUGLAS and G. L. CONROY, Baltic Wharf, Putney, London, England. This invention relates to a condenser of that class in which one pipe is run through a second pipe, one pipe carrying the gas or vapor to be condensed and the other pipe the condensing medium. Heretofore great difficulty has been experienced in connecting the outer to the inner pipe. Stuffing boxes and glands have been employed, and owing to the pressure of the high-tensioned gases being cooled or condensed it is extremely difficult to keep the connections tight. The present invention remedies this defect.

STEAM-TRAP.—C. A. DUNHAM, Marshalltown, Iowa. The object in this invention is to provide a trap adapted for low-pressure or vacuum work or in places where there is oil mixed with the condensation; to provide the trap with a by-pass adapted to be closed and opened at will; to provide means for holding the chambered diaphragm in place without interfering with its operation and to secure a steam-tight joint to the inclosing casing; to provide the trap with a strainer device, and to provide for construction movement of the diaphragm which is utilized in opening the valve. The invention relates to drain-valves and steam-traps disclosed in a prior application for Letters Patent filed by Mr. Dunham.

FEED-WATER HEATER.—W. A. MCKEE, Hinckley, N. Y. The invention relates to improvements in feed-water heaters for steam-boilers, an object being to provide a device of this character in which the water is rapidly heated by exhaust-steam and in which the water is purified of sediment, oil, and the like. It makes it possible to retain to a greater degree the heat units by having the cold water on the outside of the heater. The feed-water leaves the heater where the steam is the hottest.

STEAM-BOILER.—C. E. CHAPMAN, Fort Edward, N. Y. In this patent the invention refers to improvements in steam-boilers, an object being the provision of a boiler of comparatively small dimensions, but having a large heating area, so that steam may be quickly generated. The shell of the boiler is provided with manholes, so that the interior may be examined or to facilitate interior repairs.

Of General Interest.

HOLDER FOR FORMING ORNAMENTAL ARTICLES.—A. A. VON RENTHE-FINK, 14 Fürstengraben, Jena, Germany. This is an apparatus for the manufacture of ornamental articles from interlaced threads, strips or bands of materials of any kind by engagement thereof with needles or pins secured in a working or pattern plate, with means whereby the work-holding pins or needles may be moved with the work, so as to allow of its easy removal and of regulating the tension of the threads or bands during the working. The apparatus may be used for work made by hand or machinery.

HORSESHOE.—O. SCHRAMM, New York, N. Y. The shoe is formed with a removable and adjustable frog. The inventor has particularly in view the provision of a shoe with a resilient removable frog, the latter being designed to be held in position through the medium of a plurality of retaining bars or plates, these in turn being secured to the shoe by the removable calks with which the ends of the shoe are fitted. The shoe lessens shocks, etc., ordinarily borne by a horse.

COMBINED SIGN AND BIRD-HOUSE.—I. MASON, New York, N. Y. The purpose is to provide a device designed to be attached to a building or similar support, and to so construct as to not only display advertising matter to good advantage, but to provide a housing in which birds may build, and thus by their flights from their nests will serve as an agency to draw attention to the signs.

RACK.—C. D. LYON, St. Louis, Mo. The rack is designed especially for use in printing-offices to hold the printed sheets while they are

drying. The invention is applicable in various other arts, as will be apparent to skilled mechanics. The improvements reside in features of the construction by which a rack of large capacity compared to its size and adjustable to hold sheets of any standard dimensions is provided.

BOTTLE.—A. FRIEDMANN, Shreveport, La. In this case the object of the invention is the provision of a new and improved bottle of novel features and parts adapted to be readily destroyed when emptied of its contents, to prevent reuse of the bottle by any unauthorized and unscrupulous persons.

WINDOW-SCREEN.—W. A. CASSIDY, Fort Worth, Texas. The object of the invention in this instance is the provision of novel details of construction for a screen, that afford means for the escape of insects, prevent their free entrance, and also provide novel means for slidably connecting the screen with the casement of a window in a superior manner.

MEANS FOR REMOVING SAND-BARS.—E. H. ALLMAN, Mobile, Ala. The apparatus is adapted for use in removing sand-bars beneath the water where there is a sufficient current to wash away the sand loosened by the apparatus. A series of plows are employed for furrowing the sand, the same attached to beams which are pendent from and adjustable vertically in a framework secured to a scow or other floats and projecting beyond the bow and stern. The framework is peculiarly constructed and arranged, and the plow-standards are adjusted and supported by special mechanism. It is also adapted for use in finding and removing torpedo cables or conductors.

DIE FOR PRODUCING ARTICLES FROM PLASTIC MATERIALS.—L. STEINBERGER, New York, N. Y. The object in this improvement is to produce by molding perforated insulating-strips having both vertical and slanting holes in an efficient manner and to obtain a positive uniformity in location of holes and their given diameters. Vertical holes are adapted for receiving fastening devices, slanting holes are intended for receiving wires or cables. The insulating-strip is attached to the cable-box in a manner to prevent rain or moisture entering the box.

HANGER.—G. NISSENSON, New York, N. Y. This hanger is intended for supporting pipes, electric wires, electric lamps, and the like from ceilings and other supports in buildings. The object of the invention is to provide a hanger very ornamental in appearance, and arranged for convenient attachment to the supporting structure such as iron and wooden floor-beams. The device may be used as a junction-box for electric connections.

DENTAL-PLATE MOLD.—O. E. DRISCOLL, Charlottesville, Va. In the present instance the invention is in the nature of a mold to be used in molding plates for artificial teeth after the impression has been taken. It consists of a palate portion made in two sections of metal fitting together, the inner section of which is made one of an interchangeable series, each having an arch of different height to be selected and used according to the shape of the particular impression.

CONVEYER.—J. G. DELANEY, New York, N. Y. The invention has reference to an improvement in hoisting and conveying devices. The device is applied to a conveyer in which a cable is used as the trackway, although the invention may be applied to any form of hoisting and conveying apparatus in which a carriage is employed running upon a trackway, whether that way be a cable or other flexible member or is composed of rigid bars or beams.

HOISTING AND CONVEYING DEVICE.—J. G. DELANEY, New York, N. Y. This improvement is applied to a cableway, although it may be employed as well in connection with any form of tramway. The draft of the hoisting-chain is always kept in a direct line beneath the trackway rope and there is no side strain tending to pull the chain off the wheel. Draft is always central, the power constant. A chain of sufficient length brings in loads from great distances on either side of the line of cableway, thus increasing its efficiency. The guide rollers each side of the chain are not needed after the chain becomes strained, as then the carriage swings so that the draft is central.

SPOOL HOLDER AND CASE.—M. MAAS and F. RICAUD, Baton Rouge, La. The purpose of the invention is the provision of a compact case for receiving, holding, and protecting spools or reels of ribbon, tape, or like material, the body of the case being revoluble upon its support, and also to provide a perfect system for automatically measuring the material as it is drawn out from the case through suitable openings therein.

OBSERVATION-WHEEL.—D. W. BLAIR, Perth Amboy, N. J. Mr. Blair's invention relates to observation-wheels, his more particular object being to produce such a type of wheel as will afford amusement and recreation and will be distinctly adapted for public use. Passengers going forward only a few yards will have the sensation of traversing a great distance, the device thus acting to some extent as an illusion apparatus.

HORN.—W. GEBERT, Trenton, N. J. The object in this instance is to provide a reed horn or trumpet the tone of which may be regulated at will. It has been sought to attain this by providing a reed-adjusting member attached to the reed and projecting beyond the reed-box, so that the member may be grasped and the reed manipulated according to the tone desired. Mr. Gebert provides a horn in which this regulation of the reed may be effected by the tongue and lips whereby a much more delicate action is attained and a neat, compact instrument provided.

DESK.—O. C. DORNEY, Allentown, Pa. Mr. Dorney's invention pertains to improvements in desks designed to be used in school-rooms, libraries or the like; and the object is to provide a desk of simple construction that may be readily and quickly adjusted as to height and having all conveniences for a person in reading, writing or study.

KNOCKDOWN CHAIR.—E. BEHN, New York, N. Y. In this patent the improvement refers to chairs or seats that have detachable legs, and has for its object to provide novel details of construction for a chair which affords means for the quick and convenient detachment of the legs from the seat of the chair and for securing them thereto in a reliable manner when the chair is to be set up for use.

Designs.

DESIGN FOR HAMMOCK-CLOTH.—D. W. SHOYER, New York, N. Y. The design in this case is intended to produce an attractive effect by running bands mainly of checker-board pattern across parallel cords. The plain and other bands are irregularly spaced and present a clear ornamental field.

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(9326) J. F. S. says: I have been called on to investigate a peculiar case which has puzzled me, and I would ask your advice on the same. The case in question is a house which seems to be a veritable frictional machine. By walking on the carpet a spark can be produced by bringing the finger near any metal substance, whether grounded or not, such as a brass tack in furniture, picture frames, etc. If this condition existed to a small extent, nothing would be said, but it is to such an extent as to be very objectionable. The house is heated by a hot-air furnace, and everything about the house is very dry. I have suggested keeping water pan in furnace constantly filled with water, as I believe that the moisture produced will tend to allow the charge to neutralize itself. Two persons coming in contact with each other produce a spark. Can you suggest a remedy for this, or something which will make it less pronounced? If so, you will oblige a constant reader of SCIENTIFIC AMERICAN. A. It is most likely that moistening the air of the house which you describe will free its occupants from the trouble with static electricity. We have no other suggestion to make. Moisture is relied upon to cure this condition, which is universal at this season of the year.

(9327) H. G. A. asks. 1. In a recent issue you explained how to demagnetize a watch with direct current. Will you explain fully how this may be done with alternating current? A. A watch may be demagnetized by an alternating current by sending the current through an electromagnet, and holding the watch near the wire core of the magnet. Now turn the watch over and over as you slowly remove it from the field of the magnet, till it is quite out of the sphere of influence. 2. In a direct-current electric plant I understand the current flows continually in the same direction through the circuit. Which wire carries the outgoing current, and how may this be known at the dynamo? A. The current is taken to flow out from the positive pole of a direct-current dynamo and return to the negative pole. The positive pole may be found by a voltmeter or by a pole detector. These can be bought of dealers in electrical supplies. 3. If the armature of an alternator runs 1,500 R. P. M. and is surrounded by ten field magnets, would the alternations be 15,000 per minute, or would the current only change five times per revolution, as the magnets must be in pairs? A. At 1,500 turns per minute with ten field magnets, an alternator will have 15,000 alternations per minute, and half as many cycles per minute.

(9328) C. A. R. asks: What power or voltage, if any, has a gravity battery, the jar of which is 6 inches x 8 inches and has a 3-pound zinc? A. A gravity cell in good condition will have from 1.07 to 1.10 volts. The size of the jar and the plates has no effect on the voltage, which depends only upon the materials used.

(9329) F. A. B. writes: We are much troubled with water hammer in the hot-water pipes. It can sometimes be stopped by turning on the hot water and then turning it off very slowly. I found a loose gland on one of the faucets the other day. When I tightened this gland, the water hammer became very faint but much more rapid. What can I do to remedy this matter? A. The hammer or rattle in house pipes may be due to the generation of steam in the water back, which in passing into the boiler condenses suddenly, producing the hammer action. The noise from open faucets is caused by looseness of the valve in the faucet. The remedy for the first is less fire or the use of more hot water or its waste by drawing off. For the latter use solid plug faucets or valves without loose disks. 2. What size fuse wire should be used in connection with a 5-ampere 100 to 110-volt wattmeter? A. Fuse wire if of lead should be 2 inches long, No. 16 wire gage or 1-20 inch diameter. 3. Why do our hot-water pipes freeze before the cold water pipes when they are both in the same place and subject to the same cold? A. The water in the hot-water pipe is free of air, which is discharged by heating, and the pure water freezes quicker than the cold or aerated water.

(9330) W. J. H. asks: Can you give me the names of the ingredients of a light which is confined in a bottle, as used in the powder magazines in France? Not being exposed to the air, it lessens the danger of explosion. When dim it is replenished by a supply of fresh air by removing cork of bottle. A. The light to which you refer is probably produced by phosphureted oil. A piece of dry phosphorus about the size of a pea is placed in a test tube, and a little pure olive oil poured upon it. The tube is held in a water bath till the oil is heated above the melting point of the phosphorus. Now shake the tube till the oil will take up more phosphorus. After the oil is cooled, put it into a glass-stoppered bottle. When the small quantity of oil in the bottle is shaken about so as to coat the sides of the bottle, a good amount of light is given, and when this becomes dim it may be made luminous again by removing the stopper and admitting fresh air. Use care in handling phosphorus.

NEW BOOKS, ETC.

TABLES GIVING THE LENGTHS OF BARS FOR SKYLIGHTS AND RAFTERS FOR ROOFS. By H. Collier Smith. New York: David Williams Company. 1903. 18mo. Pp. 84. Price $2.

The author of these tables is a practical sheet-metal worker of many years' experience in the manufacture of skylights. In order to save time during the day, he devoted his leisure hours in the evenings, for several years, to computing tables, from which the length of bars for any ordinary pitch of skylight could be copied, and thus avoid the loss of time and chance of error involved in working out the length of bars for each separate skylight during the rush and stress of working hours. A labor-saving book of this nature is invaluable to those in the business.

ELECTRICAL ENGINEERING. An Elementary Textbook. By E. Rosenberg. Translated by W. W. Haldane Gee, B.Sc., and Carl Kinzbrunner. New York: John Wiley & Sons. 1903. 8vo. Pp. 267. Price $1.50.

The present book will be distinctly helpful to less advanced students of electrical engineering in English-speaking countries. It is the work of an electrical engineer, and is written from an engineering standpoint. The explanation of principles is particularly clear. In polyphase work the author has been specially careful to make his explanation easy to follow. Particular attention has been given to alternating currents. The diagrams are very clear, and this new book will certainly prove helpful to the young electrical engineer.

INTERNATIONAL EXCHANGE. Its Terms, Parts, Operations, and Scope. By Anthony W. Margraff. Chicago: Fergus Printing Company. 1903. 8vo. Pp. 299.

The exporter and importer can, with the present textbook and the daily journals, quoting the rates for interest in the financial centers of the world, readily determine the approximate value of any foreign bill of exchange. The examples which are given are admirable, and the book can be safely recommended to all those who have financial transactions with banks, firms, or individuals in foreign countries.

LEHRBUCH DER BAUMATERIALIENKUNDE ZUM GEBRAUCHE AN TECHNISCHEN HOCHSCHULEN UND ZUM SELBTSTUDIUM. Von Max Foerster. Heft 1. Die Natürlichen Gesteine. Mit Einer Tafel. Leipzig: Verlag von Wilhelm Engelmann. 1903. 8vo. Price $2.

The book which lies before us discusses structural materials, and is intended for civil engineers and architects. The first volume issued is devoted to a treatment of natural stones. The author has laid particular stress upon the adoption of a scientific nomenclature, as well as upon the physical and chemical constituency of the various stones. Prof. Foerster holds, and holds rightly, that only by this means is it possible to obtain anything like a definite knowledge of the composition, structure, and durability of various stones as structural materials. A chapter of the book is devoted to testing methods and processes of determining the resistance of structural materials. The various applications of structural materials are also discussed in a coherent manner. Considered as a whole, the work bears the mark of the same accuracy and thoroughness that characterized Foerster's Handbook of Engineering, which we had the pleasure of reviewing some time ago.

THE PHOTOGRAM. Vol. X. London: Dawbarn & Ward, Ltd. 1903. 8vo. Pp. 380.

The Photogram is always a most welcome visitor. The present volume, which consists of the numbers for 1903, is filled with useful information. The artistic presentation of good examples of up-to-date photography will be appreciated. The photographs chosen for reproduction are particularly well selected.

A MANUAL OF MECHANICAL DRAWING. By Philip D. Johnston. New York: David Williams Company. 1903. Oblong 8vo. 69 plates. Price $2.

Of the making of books on mechanical draw-