RECENTLY PATENTED INVENTIONS.

Electrical Devices.

MEDICAL BATTERY.—C. W. TAYLOR, New York, N. Y. The invention relates to medical and surgical electricity. The object is to provide a battery exceedingly compact, and arranged for hand use, to enable a person to conveniently apply the apparatus to any part of the body, to cause a current of electricity to pass, by way of the hand holding the apparatus, to the body-part on which the device is applied at the time.

CIRCUIT-CONTROLLER.—E. S. MASSIE and J. H. HAWKINS, Quincy, Ill. In this instance the invention is in nature a circuit closing timer, or controller, employed in the sparker circuit of explosive engines. The object had in view is to provide means adapted for general circuit closing uses, but specially intended for use in sparker circuits.

Of Interest to Farmers.

PLANTING-MACHINE.—B. C. MCCOY, Pontiac, Mich. There is provision in this invention for planting seed-potatoes, corn, beans, or the like, an object being to furnish a practically automatic machine, by means of which two rows may be planted at a time, with the hills or planting at uniform distances apart, and in which the seeds are—before planting—at all times in view of the person on the planter, so that should a pocket not contain sufficient seed, more may be manually placed therein.

Of General Interest.

METHOD OF INKING PRINTING-FILMS.—B. DAY, West Hoboken, N. J. Mr. Day's invention consists of a novel method of converting a transparent sheet of any suitable material into a surface-printing and s medium, and then using this medium to print the inked design carried by it upon a surface to be subsequently printed from, as in the lithographic or other surface printing arts; or to print an inked design, or inked print, on metals such as zinc, copper, or brass, which are to be subsequently etched into the form of relief plates.

FILE FOR PAPERS.—E. STEBBINGS, Spencer, Iowa. The object of the inventor is to provide a file arranged to hold a large number of papers, to permit of conveniently placing the papers in position on the file-loop or removing any one of the papers from the loop without distributing the others, and to allow ready detaching of the loop and its contents from its support or replacing the same whenever it is desired to do so.

WINDOW-SHELF.—R. B. SMART, Chicago, Ill. This window support is more especially designed as an attachment for windows for supporting milk bottles, flower pots, boxes containing flowers and like articles, and it is arranged to permit convenient attachment to the window and allows placing the articles in position on the platform of the support or removing the articles therefrom.

BUCKLE.—G. E. RAWSON, Louisville, Ky. The object of the invention is to make a buckle strong and simple in construction, effective in operation and durable in use, and adapted to be used for all general purposes, for which any buckle can be used, and especially adapted to be used on belts, saddle girts, trunk and skate straps, and in other connections requiring a tight fastener.

BAND-SAW GUIDE.—J. J. CALLAHAN, St. Johns, Newfoundland. It is sought in the present invention to provide a guide for a band saw which is as free from friction as it is possible, and in which the band saw is held in its proper position and which is inexpensive to make and easy to adjust. It relates to guides used in wood working and other analogous arts.

DEVICE FOR FASTENING HEADS TO BUSTS.—E. T. PALMENBERG, New York, N. Y. This improvement has reference to display forms and its object is to provide a new device for conveniently, quickly and securely fastening the head of the bust of a display form without danger of disfiguring the external appearance of the head or bust.

MUSIC-LEAF TURNER.—J. O'CONNOR, New York, N. Y. The device is designed to be attached to a piano or similar instrument, or to a music rack, and is adapted to be operated by foot pressure, thus leaving the hands of the player free at all times to operate the instrument, the parts being so arranged that the leaves may be quickly turned one at a time as the music progresses, or simultaneously turned back to a closed position.

DISTILLING APPARATUS.—M. LLODRA, Manila, Philippine Islands. In this patent the improvement is in a distilling apparatus. The wash as it passes through the refrigerating column and the condensing cylinder, will condense the vapor from the distilling column, and the vapor will give up its heat to the incoming wash, thus gradually heating the same during its passage toward the caldron.

TRAY FOR STEAMING YARN.—W. E. LYFORD, Thompsonville, Conn. The aim of this inventor is to provide a tray for supporting printed yarn during the process of steaming the same, with a view to fix the color, the tray being arranged to allow the steam to readily penetrate all portions of the yarn in a comparatively short time and to allow compact nesting of a plurality of trays for steaming a large amount of yarn in a small space.

MANUFACTURE OF BLOCKS.—I. LUCAS, Passaic, N. J. This invention pertains to the manufacture of cement blocks, artificial stone blocks and the like, and its object is to provide certain improvements in the manufacture of blocks made from plastic material, whereby the blocks are rendered highly homogeneous and exceedingly strong and durable.

FLUSHING DEVICE FOR WATER-CLOSET BOWLS AND THE LIKE.—L. W. EGGLESTON, Appleton, Wis. The usual tank and supply tank are employed by the inventor. At the upper end of the pipe is a valve casing in which is a nozzle or injector discharging water into the tank. A plug valve having slidable movement within the casing and movably connected with which is an actuating lever, through whose medium the valve is caused to open the nozzle outlet and again close it. A controlling member is employed for the lever intermediate of which and a co-operating float are other members of special construction. The flushing devices are primarily actuated by the usual pull-chain.

BLADE-HOLDER FOR RAZOR-BLADES.—T. F. CURLEY, New York, N. Y. The object in this improvement is to provide a holder for razor blades used in ordinary and safety razors, and to be held in stropping and honing machines and other devices, the blade holder being arranged to hold a blade securely in position during the use of the razor, machine, or other device, and to allow an interchange of blades of different thicknesses.

MOLD FOR ARTIFICIAL STONE. — F. NELSON, Menoken, N. D. The invention has reference to improvements in molds for forming building blocks of concrete, the object being the provision of a mold by means of which the blocks may be readily shaped and so formed that a completed wall will have a continuous air passage or space from top to bottom.

VESSEL.—J. MCARDLE, San Francisco, Cal. The principal objects of the inventor are to provide a structure which shall be safe, readily controlled, and efficient, the speed developed being high as compared with the power applied. Propelling floats hold the hull clear of the water, entirely eliminating the pushing and dragging movement present when a hull is forced against the water by a small stern propeller.

STORAGE AND COOLING VAT FOR MILK OR CREAM.—Z. S. LAWRENCE, West Shefford, Quebec, Canada. The vat which forms the object of this improvement, is preferably of large capacity and of such construction that the milk or cream contained therein may be subjected to a slow or gradual cooling or be suddenly chilled, as desired; also providing for a thorough mixing of the contents, bringing the same to a uniform consistency before drawing it off.

OIL-CAN.—A. F. DEMORY, Houston, Texas. The aim of the inventor is to provide a non-explosive can from which oil can be readily poured, and which will be air-vented and the pouring and filling means will render the can non-explosive by preventing the passage of flame to the interior of the can through either the filling or dispensing means.

WATER-COLOR BRUSH.—J. W. HAWKINS, Passaic, N. J. The intention in this case is to provide an improved water color brush more especially designed for use in making wash drawings, and arranged to enable the user to readily apply the color with one brush and give the desired gradations of tone with a second brush.

NON-REFILLABLE BOTTLE.—G. FRASER, Jersey City, N. J. A valve is provided which is automatic in action and so located in the stopper that it will be in constant communication with the body of the vessel, but cannot be reached or tampered with from without, which valve acts to effectively cut off the supply of air to the vessel while the latter is in an upright position, but wherein as soon as the vessel is tilted air will be admitted in more or less quantities ample to permit the ready flow of liquid from the vessel.

FOOD PRODUCT AND PROCESS OF MAKING THE SAME.—F. H. L. CLARKE, Villa Bellerive, Cannes, France. The object of the invention is to supply an alimentary product which, besides having a high nutritive value, shall be cooling and very readily digestible, so as to be specially adapted for use as a diatetic in cases of dyspepsia. The ingredients afford all the essential elements of a complete food in a concentrated form, viz.: albuminous matters or proteids, fatty substances, and carbohydrates.

TRUNK-ROPE FASTENER.—E. W. CARROLL and F. S. BAIRD, Congress, Ariz. Ter. The device is adapted to be attached to trunks, boxes, chests, and the like, for tightening and holding the ends of a rope or cord used to firmly hold the trunk, box, etc., in its closed position. The object is to provide means easily applied to any container whenever desired, and which completely conceals and protects the ends of the rope, whereby the latter can not readily become disengaged.

CHAIN.—H. T. CURRIE, Chicago, Ill. The chain comprises interlocked links, each provided at the inner face of each end with a recess and an anti-friction metal filling the said recess, and conforming at its outer surface to the contour of the inner face of the end of the link. The chain is arranged to reduce the friction of the links to a minimum.

CURRYCOMB.—R. F. LAWSON, Effingham, Ill. Well rounded teeth arranged in alternate rows enable the operator to cover every part of the animal's hide without pain or injury to the tender skin in such manner as to thoroughly cleanse the animal of all dirt, dust, dandruff, dead hair, etc., with great facility. The comb should be moved sidewise over the parts and when drawn lengthwise through the mane and tail will most effectively comb the long hair.

Hardware.

FILE.—H. GETAZ, Schenectady, N. Y. The improvement refers to that class of files in which the teeth are composed of a series of cutting blades clamped together in an angular relation and adapted to be readily sharpened when dull. The object is to improve the files, especially in the matter of providing for the deflection of the blades in an effective manner.

NUT-LOCK.—R. D. BAKER, Las Vegas, Nevada. In the operation of this nut-lock, the nut is turned upon the bolt the required distance. The end of a lock is then inserted in the longitudinal groove of the bolt, until the shoulder at the end of the cut away portion is in engagement with the outer face of nut, at which point the transverse end of the lock will be in engagement with one of the grooves of the nut.

Heating and Lighting.

HEATING-STOVE.—W. HEUERMANN, Sedalia, Mo. There is provision in this stove for a relatively large heating surface, a long flue or passage for transverse of the heated gaseous products of combustion. The stove occupies a relatively small space. It comprises a combustion chamber and a superposed heating chamber connected and supported together from the top of the downwardly extended flues or pipes, the latter serving practically in the place of legs or other usual form of support.

EXPANSION-TUBE.—O. S. PEDERSEN, New York, N. Y. The aim of this invention is to produce a heating tube having a form enabling the same to take up the expansion or contraction of the tubes longitudinally, tending to make the joints leaky and otherwise defective, without affecting the joints at the ends of the tube. It relates to heating tubes, such as used in boilers and feed water heaters.

DOMESTIC AND INDUSTRIAL HEATING APPLIANCE.—C. J. ROUX, 85 Route d'Aubervilliers, Pantin (Seine), France. Complete combustion of fuel is effected by this invention and all heat furnished by the products of combustion is absorbed. The general arrangement of the apparatus permits of raising the reignition chamber to and maintaining it at a very high temperature, producing the reignition of the dead combustible products still contained in the products of combustion.

APPARATUS FOR CONSUMING SMOKE IN STOVES AND FURNACES.—C. J. ROUX, 12 Rue Doudeauville, Paris, France. The invention has reference to apparatus for consuming smoke in stoves and furnaces and is applicable to domestic and industrial heating apparatus of all kinds. By its means complete combustion may be obtained and absolute consumption of smoke, whatever the nature of the fuel may be, as soon as normal conditions have been established, even with the softest coals.

Household Utilities.

SKIMMER.—J. F. IRBY, Baltimore, Md. The skimmer is provided with a dished bottom, and at the upper portion of the bottom with an opening through which grease and other surface portion of soup may pass to flow into the bottom and be retained by the rim of the skimmer in the use of the device. In connection with the dished bottom the inventor prefers to provide a bell-shape flange at the base of the rim, and extending outwardly to increase the surface acted upon by the skimmer.

Machines and Mechanical Devices.

POWER-TRANSMISSION MECHANISM. — F. SEDIVY, Globe, Ariz. Ter. The invention relates to a former patent granted to Mr. Sedivy. The present has among objects to provide means whereby the stroke of the machine may be varied. An important feature is the provision for adjusting the position of springs so the stroke of the traveler may be varied by reversing the rockers at different points, and he prefers to make the means for supporting the opposite sets of springs independent so they may be independently shifted to enable reversing of the detent devices at any position.

MECHANICAL MOVEMENT.—A. LINDSAY and J. MEINERT, Davenport, Iowa. The improvement relates more particularly to that class of gearing designed to convert the rotary motion of the power shaft into alternating motion in the driven shaft. The principal object is to provide a gearing in which the reversal of the direction of the driven shaft is accomplished quickly and with the minimum amount of friction, the mechanism being easily operated. The gearing is particularly designed for washing machines.

PICKER-STICK CHECK. — N. VAILLANCOURT, Lewiston, Maine. In this instance the invention refers to looms, and its object is to provide a check arranged to insure an easy impact of the shuttle on the picker stick, thus preventing breaking of the filling, and to reduce the liability of the breaking of the picker stick and picker straps to a minimum.

WORK-GAGE.—F. M. CHAPMAN, R. W. CHAPMAN and H. W. CHAPMAN, Oldtown, Maine. The invention relates to a work gage intended especially for use in connection with wood working machines, particularly with circular saws, the gage being mounted on the saw table and adjustable toward and from the line of the saw so as to gage the width of the material sawn.

EXERCISING APPARATUS.—J. J. COOPER, New York, N. Y. The object of this inventor is to provide an apparatus arranged to produce an exceedingly healthy action of the various members of the human body, notably the muscles, intestines, and other vital organs, with a view to invigorate the body and to cure constipation, to reduce obesity, etc.

PASTING-MACHINE.—J. H. TRISMEN, New York, N. Y. The machine is more especially designed for pasting sheets of tissue paper or other material together to form ornaments, such as bells, festoons, lamp shades, and like articles, the arrangements being such that a large number of sheets can be quickly and accurately fastened together without skilled labor.

CORN-POPPER.—G. B. YOUNG and J. H. YOUNG, El Paso, Texas. This corn-popper device may also be used in roasting peanuts and chestnuts and as a cooker generally. Primarily the inventor's object is to provide for the cooking, roasting, etc., preferably by electrical means in a manner that the same may be carried out uniformly and also provide for the automatic release of the corn from the popper should the pan fill to overflowing. The Messrs. Young have also patented a corn-popper in which the subject matter of the present application is directed to improvements in corn-poppers divided from their copending application formerly filed. It is also not limited to the particular use of popping corn, as it may be employed in roasting peanuts, chestnuts, and as a cooking device generally.

STICK-FEEDER.—W. H. WALDRON, New Brunswick, N. J. The invention pertains to drying machines, such as used in the manufacture of wall paper and the like, and its purpose is to provide a feeder arranged for properly spacing the sticks used as supports in hanging up the freshly coated or printed paper for drying or other purposes.

CARTON-FILLING MACHINE.—R. SUNDERMAN, Buffalo, N. Y. The invention comprises mechanism for moving a carton into position to be filled, means for forcing into the carton, while in stationary position, the material to be filled into the carton, and mechanism for removing the carton after the filling thereof. While the present invention may be used in carton making machines of various kinds, Mr. Sunderman preferably employs it in a machine such as described in his pending application formerly filed.

COAL-MINING DRILL-POST.—P. ROMMES, Pittsburg, Kan. One of the objects in this instance is to provide means for determining the course the drill takes before the post is firmly set and to save work and time; another is to prevent the post from giving way when set on soft or infirm bottom; another is to secure firmness and obviate wabbling motion; another is to afford facilities for adjustment of threaded box; another to facilitate changing drills and removing borings from drill hole; and lastly, to afford means for attaching threaded boxings of various types and makes.

LOADING APPARATUS.—E. ROSENVALL, Salt Lake City, Utah. The coal or grain to be loaded passes down a chute upon the circular table, which is rotated by a shaft. Rotation of the table or hopper throws the grain from the side thereof, into different parts of the car, and by adjusting the inclination of the table to the carriage, and the position of the shield, the grain may be thrown up or down as desired. Any suitable mechanism may traverse the carriage upon the track.

FIRE-ESCAPE.—G. J. PITTS, New York, N. Y. The invention refers to improvements in the portable type, or that class placed in a room near a window, so as to be in position for instant use, the object being to provide a device automatic in its braking or retarding means, when used under a certain condition, and under control of a person when under another condition.

SAW-SWAGE. — J. HANCHETT, Sheridan, Mich. The invention comprises in a saw swage, in combination a block having a channel in the under face adapted to receive the edge of the saw blade, an anvil mounted in the block, a swaging device attached to the block and co-operating with the anvil, a lever actuating the device, a brace rotatably mounted in the block having an arm engaging between the teeth of the blade and having a second projecting into the lever's path and constituting a stop therefor.

MACHINE FOR VARNISHING EYELETS.—I. W. GILES, New Bedford, and C. W. TOBEY, Fairhaven, Mass. These inventors have found that a flat brush arranged to revolve in a plane parallel to the face of the eyelets is entirely effective in distributing varnish with uniformity. They employ two flat annular brushes arranged to revolve in opposite directions. Whereby the distribution is distributed more evenly than by a single brush.

ROCK-DRILL.—J. B. Marshall, Broken Hill, New South Wales, Australia. According to this invention the recess is made in two portions and its depth varied to give smaller escape for the air at the forward end of the piston, thus the front end of recess passing the front relief port permits not sufficient escape to cause sudden reversal of valve nor does reversal occur until a deeper part of the recess encounters the relief port. There is adequate escape at all parts of the stroke for reversing.

Prime Movers and Their Accessories.

TRACTION-ENGINE. — A. S. Wysong, Meade, Kan. The invention lies largely in the detail construction and arrangement of the transmission gear and in the frame and the bearing boxes for the shafts. Frame portions are secured adjustably in the main frame and the bearing boxes of the adjustment devices, all with the view to facilitate the adjustment of the tension of the sprocket chains.

Railways and Their Accessories.

VENTILATOR FOR CARS.—H. Van Ness, New York, N. Y. When the ventilator is properly set to the roof of a car and particularly when the car is in motion, a current of air will enter the ventilating chamber at one end and pass over the ventilators, creating a suction to draw all foul air upward and conduct it to an exit at the opposite end of the car, thus providing a perfect ventilation without drafts.

TRACK-SPREADING SIGNAL.—I. M. Bond, Tacoma, Va. The object of the invention is to automatically indicate the spreading of the rails of railways at any particular point at which the device is applied. It frequently happens that one of the rails of railways under constant usage, especially on sharp curves, is loosened and sprung outward, and if unnoticed and neglected causes derailment at this point. Mr. Bond's novel device secures the avoidance of this trouble.

SMOKE AND CINDER CONDUCTOR.—H. L. Larisey, Charleston, S. C. The aim of the inventor is to provide a conductor, arranged to conduct the smoke and cinders from the smoke box of the locomotive back over the locomotive tender and cars, to increase the draft and to prevent back draft in the fire box when the doors thereof are opened, to insure a free exhaust and thus relieve the locomotive engine of back pressure.

Pertaining to Recreation.

ADJUSTABLE SWING.—C. F. Bean, Port Tampa City, Fla. In this swing the character and degree of the tilting motion may be varied at will. The invention admits of general use, but is of peculiar value in reference to swings used for recreation and comfort, and in which an oscillatory motion is accompanied by a tilting motion.

GAME DEVICE.—F. W. Moseley, St. Hyacinthe, Quebec, Canada. The aim is to provide a puzzle of that type which is manipulated by the hands of the operator to bring rolling objects to predetermined positions, wherein magnets are employed at the various stations for the rolling objects, and to provide rolling objects attractable by the said magnets.

TOY.—W. F. Schoenhut, Philadelphia, Pa. The aim in this instance is to provide a toy in the form of human or animal figures having movable body parts, to allow a child to conveniently and readily change the position of the body parts relative to each other, with a view to give different appearances to the figures to suit the mood of the child.

PUZZLE.—R. W. Kemp, Jr., New York, N. Y. In the present patent the invention relates to puzzles, the more particular object being to produce a device provided with rolling bodies and so arranged as to enable the operator, by a little skill, to place the rolling bodies in various predetermined positions.

Pertaining to Vehicles.

AUTOMOBILE DRIVING-GEAR. — R. S. McIntyre, Riverside, Cal. The invention pertains particularly, though not necessarily, to a means for driving motor vehicles, in which a countershaft is employed with the engine or motor by certain means for driving the shaft and for changing the direction of revolution, and connected with the rear or other traction wheels of the vehicle by means of chains running over sprockets, connected with the traction wheels.

FRAME FOR AUTOMOBILES.—E. Sanchis, 60 Rue Pierre Charron, Paris, France. The object of the invention is a system of motor car with three or four wheels characterized by the special construction of its frame and its method of suspension. These arrangements permit of doing away with the ordinary construction of car-body while giving the driver's seat the form of seats used for large carriages, of suspending it comfortably and bringing to the driver the mechanism of the control and steering gears, which can be arranged in the same manner as in a large vehicle and without diminishing the simplicity of construction of the tri-car, while giving it definite solidity.

HARNESS.—W. H. Sneed, Pensacola, Fla. The purpose of the inventor is to provide shaft-supporting collars, or shaft holders for vehicles, adapted for attachment to the saddle straps, so constructed that in harnessing a horse to a buggy it is simply necessary to raise a shaft and snap the holder thereon, thereby greatly facilitating the work, since necessity of backing the animal to a predetermined position between the shafts is not necessary.

NUT-LOCK.—D. B. Hanlon, New Liberty, Ky. The invention relates particularly to improvements in locking devices for nuts on vehicle axle skeins, an object being to provide a nut lock that may be readily and quickly adjusted for locking the nut in position and as readily detached when it is desired to remove a wheel from an axle.

MOTOR-VEHICLE STEERING-GEAR.—W. E. Slater, San Francisco, Cal. In its preferred embodiment the steering road wheels of the vehicle are connected with the motor cylinder; the admission or exhaust of fluid pressure to and from the same being under the control of a multiple valve placed convenient to the driver, and the fluid pressure being stored in the reservoir which in turn is charged by a pump coupled with the engine of the vehicle or with some other suitable driving element.

COLLAPSIBLE BABY-CARRIAGE.—G. A. Svanberg, Fort Lee, N. J. The principal object of the inventor is to provide a carriage or cart propelled by hand, of which the parts are few and arranged to be conveniently packed and folded so as to occupy but a small compass and which will then be in condition to be conveniently, quickly, and easily readjusted in operative positions and securely held in place for use.

Note.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

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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(10587) W. B. M. says: Will you kindly answer the following inquiry? Is the weight of water in a boiler "under steam pressure," additional pressure on bottom of boiler? Is the result the same when the water is above boiling heat, and when it is not? What makes a good belt dressing? A. The weight of water in a boiler under steam pressure *is* additional pressure on the bottom of the boiler, and the result is just the same when the water is above the boiling heat. Heating water does not change its weight. One-half neatsfoot and one-half castor oil makes a good belt dressing.

(10588) C. S. says: I have a blower making 100 revolutions per minute; discharge pipe is 24 inches in diameter; the blower is used for a pneumatic cash system of 75 stations. Now I would like to know if I can discharge the exhaust air from the blower into my smokestack without interfering with the draft of my furnaces. I have in use two boilers, 125 horse-power each; the stack is square, 3 feet x 4 feet 6 inches, and also has an offset a little above the center of the stack. The only place where I could exhaust into the stack now is about five feet *below* the boiler flue, that would be at the bottom of the stack. If I can't exhaust in this place, I would have to carry a line of pipe up on the outside of the building to a point above the boiler flue. Which would be the best? And would I need an elbow in the stack, so the air shoots up, or is it unnecessary? A. You do not give the height of your stack, nor the velocity, pressure, and volume of the air from the Root blower, so that it is impossible for us to make any exact calculation; but unless you have a draft very considerably in excess of what you actually require when forcing your boilers, it would not be wise for you to discharge the blower into the stack, because that would have the effect of materially reducing the size of your chimney. On account of the distance of the stack from the boilers, it is more doubtful if you have the draft to spare. In case you try the experiment, insert the discharge pipe from the blower at the base of the stack, with an elbow pointing upward.

(10589) C. J. S. says: How long is the scaling ladder in use in the New York Fire Department, and where was it invented, and how long is it in use in Berlin? Which is more improved—New York or Berlin? A. The scaling ladders used in the New York Fire Department were first used in 1883, and they run from 12 to 20 feet—12, 14, 16, 18, 20. At about the first time they were used, a very successful rescue was made by Chief of Battalion Binns. We have no information relative to the scaling ladders in use in Berlin, except that they are used. In general, we may say American-built fire engines are the best made, and we have never heard it questioned that the secondary part of the fire equipment was any less good. Owing to the methods of construction employed abroad they have fewer fires, therefore there is no such demand for improvements in fire apparatus as here.

(10590) O. N. writes us: Is a 16 candle power bulb frosted more luminous than one that is not frosted? That is to say, will one 16-candle-power frosted bulb give more light than one that is not frosted? A. An incandescent electric lamp with clear glass bulb will emit more light than one with a frosted bulb. The bulb cuts off light. No arrangement of the bulb can increase the light of the filament. It is the filament which gives the light, and not the bulb. Even a bulb of clear glass absorbs some light. One of partly opaque glass will, of course, absorb more light.

(10591) N. A. N. says: Will you please decide if there is a difference between a mile square and a square mile? I hold that a mile square is a mile around it, and a square mile is four miles around it. A. A "mile square" and a "square mile" have each the same area, but the phrases have very different meanings. A mile square is a figure one mile on each side, and all its corners right angles. A square field one mile on a side is a mile square. A square mile contains 640 acres, and may be in any shape whatever, circular, rectangular, etc., or of any irregular form.

(10592) F. A. F. asks: Kindly answer the following mathematical problem to set your readers right: We have an aquarium, a globe, 6¼ inches in diameter, 6½ inches high; the question is, How many pellets or buckshot ¼ inch in diameter will this globe or aquarium hold? A. The problem you send us may admit of a mathematical solution, but so far as we know it only admits of solution by experiment. Fill the globe with shot and count them. The globe is apparently an irregular solid. You give the dimensions as 6¼ x 6½ inches. This is not a spherical solid, and its shape is not determined by two dimensions only. The rate of curvature of its parts is not given by knowing two dimensions only. If it be assumed that the dimensions are the axes of an ellipse, then the solid is an ellipsoid of revolution and its form is definitely known. But it can hardly be assumed that a globe of glass blown by ordinary processes of the shop is an ellipsoid of sufficient accuracy to base a mathematical calculation upon. If its solid contents simply are known, the number of spheres which it would contain could not even then be calculated without more data. And if the problem were solvable, what would be the use of doing it? We are fond of working upon problems which lead to results of practical value, and though we sometimes work out problems for correspondents, which are simply puzzles, we always feel that the time is misspent, since we are beyond the age when we do such work simply for mental gymnastics.

(10593) W. H. asks: I would be obliged to you for a little information on following: Suppose we take a motor, and from the same motor get the power to run a dynamo, and place both pieces of machinery in a receptacle from which we could extract the air, and therefore form a vacuum. Do you think that we could get more return for the power expended, on account of relieving both machines of the atmospheric pressure, and by depriving the bearings of the oxygen, would they be less liable to heat? A. We know no reason to suppose that a dynamo will perform any better or worse electrically in a vacuum than in the open air. This idea has been advanced very many times. We usually reply that any one can easily try the experiment and find out if it be so. Nor has oxygen anything to do with the heating of bearings. Friction is the cause of hot bearings, and this is as operative in a vacuum as in the air. The friction of the air retards the motion of a machine somewhat. This retardation would be absent in a vacuum. The work of pumping the air out of the receptacle and maintaining the vacuum must be paid for. We feel sure that this would cost more than overcoming the friction of the air.

(10594) E. C. R. asks: If a sealed glass globe containing atmospheric air is weighed in air, and then a vacuum is produced in said globe, and the globe reweighed, will it weigh the same, or more, or less than when filled with air? All other conditions assumed to be equal, and also assumed that the experiment is mechanically possible. A. If a glass globe be weighed with air in it, and the air be then pumped out, the globe will weigh less than it did with the air in it. Air has weight just as really as iron or water. The experiment is not only mechanically possible, but nearly every high school student in the country who studies physics performs it. It is the usual method of determining the weight of air.

(10595) C. R. S. asks: 1. I understand that a pure red pigment should reflect only those lengths of waves which would give the sensation of red. Similarly with green and violet pigments. Do we possess such pigments? And further, in the case of intermediate colors, such as orange or violet, have we pigments which would give waves of nearly one length, or with the orange pigment a reflection of waves confined between the red and green, etc.? A. We probably have no perfectly pure colors in pigments, but the aniline dyes, vermilion, emerald, and Hoffmann's violet RB come very near it. Any pigment may be a combination of two or more pigments, and give a color corresponding very closely to a color in light which has but one wave length. A compound color may appear just like a simple color until it is analyzed. 2. Explain how red and blue pigments mixed give violet instead of black, as would seem to be the result. A. Red and blue give purple, as they should, and not black.

NEW BOOKS, ETC.

A Manual of Hydraulics. By R. Busquet. Translated by A. H. Peake. New York: Longmans, Green & Co. 12mo.; cloth; 312 pages, illustrated. Price, $2.10.

The price of coal has risen so steadily that the ratio of the efficiency of steam engines to their running cost has remained almost a constant, in spite of their wonderful improvement in construction and design. This has caused attention to center upon hydraulic power as a convenient energy source, especially since the developments in electrical science have enabled energy to be conveniently transmitted from the spot where it is produced to the region where it is needed. This book expounds the principles underlying the use of water-power, and discusses the application of these principles to almost every type of hydraulic prime mover in commercial use, showing the relative merits of each type and the circumstances favorable to it. The methods are simple arithmetical ones, and only a very elementary knowledge of arithmetic and geometry is necessary in order that the whole of the many examples may be followed. The measurements have all been changed to "British units," and the constants occurring in the various formulæ modified to suit the reduction. The book occupies the middle ground between the popular descriptive work and the abstruse treatise.

Theory and Practice of Pianoforte Building. By William B. White. New York: Edward Lyman Bell. 8vo.; cloth; 160 pages; illustrated. Price, $2.

The development of the American pianoforte is a study which is interesting to the artisan as well as to the pianist, since the skill of each re-acts upon the work of the other. There has not been wanting a number of writers who have treated of the history of the subject, but an exposition of the correct principles of design has not hitherto appeared in the English language, at least in a form that possesses permanent value to the American manufacturer. "The Theory and Practice of Pianoforte Building," the result of more than two years of conscientious study and research, is a work of technical knowledge in a concrete form. The general outline of the book can be explained with little detail. After a short historical sketch, follows a general statement of the laws that govern the propagation and transmission of sound. This leads to a concise explanation of the peculiarities of stretched strings and their behavior under varying conditions. From this it is but a step to the subject of pianoforte strings, their dimensions, and the manner in which they become the agents of a sound-production in the instrument. The next department is that of resonance and the resonating apparatus of the instrument. The framing that holds together the elements is next subjected to analysis and explanation, with the mechanisms of touch and percussion. The volume closes with the draughting of scales, and the calculations for shrinkage that are rendered necessary by the vagaries of cast iron.

The Steel Square Pocket Book. By Dwight L. Stoddard. New York: The Industrial Publishing Company. 32mo.; cloth; 159 pages. Price, 50 cents.

Many books have been written upon the steel square, but one of pocket size will be met with joy by all who use the tool. Although in this little volume it has not been attempted to describe all the various operations that can be performed with the steel square, the endeavor is made to place those that it does deal with before the eye by illustrations rather than to confuse the mind by complex printed descriptions.

The Architects' Directory and Specification Index for 1907. New York: William T. Comstock. Quarto; cloth; 192 pages. Price, $3.

This directory, known among architects, manufacturers, and dealers in building materials as the Red Book, has just come out for the year 1907, and is gotten up in a very commendable manner. The general list of architects shows an increase, and the change of addresses and of firms has been very considerable during the last year. The activity in building has evidently resulted in many rearrangements among the members of the profession. The list of architectural societies has