

RECENTLY PATENTED INVENTIONS.

Electrical Devices.

COMPOSITE INSULATOR.—L. STEINBERGER, New York, N. Y. Mr. Steinberger's invention relates to insulators and admits of general use, but applies more particularly to a type of composite insulator in which there are a plurality of hoods detachably connected together. Further, it relates to means for thorough insulation of the parts supporting these hoods and of the wires or cables to be supported by the insulator.

ELECTRIC-LIGHT HANGER.—H. R. BERRY, Greenville, Miss. This improvement refers to means intended for hanging incandescent lights. The object is to construct a hanger of that general character which in addition to being adjustable, extensible, and made to effectively support the light as adjusted by improved means is inexpensive to manufacture and as an article neat in appearance.

Of Interest to Farmers.

LIQUID-AGITATOR.—A. Good, Claflin, Kan. The improvement of devices for agitating liquids for various purposes—such as mixing liquids, churning butter, etc., is the object of the inventor. It may also be used for aerating milk and other liquids. In operating upon some liquids the agitation required is quite great, while in others it is slight, and too great an agitation is objectionable. For this reason a relief-valve is used, and by means of it the pressure required for the particular liquid can be nicely adjusted.

COTTON CUPPER OR SPACER.—J. W. GILLELAND, Athens, Ga. In this instance the object is to provide a new and improved cotton cupper or spacer designed to cup or protect the stand during the operation of cultivating and spacing the plants by covering up and arranged to leave the cotton-plants in a properly cultivated state. The machine is very simple and durable in construction, and is not liable to get easily out of order.

SICKLE-HOLDER.—J. WALTER, Yates Center, Kan. One purpose is to provide a device so constructed that the sickle-bar can be readily introduced, adjusted in the device and locked in adjusted position or removed therefrom, and further to provide a construction whereby the sickle-holder can be adjusted to any desired angle or to any bevel and can be vertically adjusted to accommodate it to any size of stone, and also moved forward and backward to impart the necessary movement to the knives over the grindstone.

MUZZLE.—F. M. ROWLAND, Webbers Falls, Ind. Ter. The invention is an improvement in muzzles for horses and horned cattle, and particularly in that class of muzzles which are composed of hinged sections that remain normally closed, but are caused to open automatically when the animal lowers his head, so as to cause certain portions of the muzzle to strike or press the ground, with the result that the animal may then graze without restraint.

Of General Interest.

A NAILLESS DEVICE FOR ATTACHING HORSESHOES.—J. D. W. ELLIOTT, Toronto, Ontario, Canada. Referring to the article in our issue of December 2, introducing the above device to the notice of our readers, the inventors have drawn our attention to the fact that in the details contained in the article in question, we mention that the carrier is stamped out of $\frac{1}{8}$ inch mild steel and leave the reader to conclude that the side bands and toe piece are left of that thickness. This is quite incorrect, the side bands, etc., being drawn out and filed down to give lightness and finish to the completed "carrier." Any one wishing to obtain further information on the subject of this nailless horseshoe is requested to note that such information can now only be obtained by applying to Mr. J. D. W. Elliott, care of The Union Bank of Canada, Wellington Street, Toronto, Canada, Mr. Gibb having been called away to England.

BUTTON-CABINET.—I. STEINAU, New York, N. Y. One of the purposes of this invention is to provide a cabinet adapted as a storage-receptacle for buttons of all descriptions, especially collar and cuff buttons, the cabinet being also provided with a display-compartment having spring-clamps for individual buttons of a series of buttons.

APPARATUS FOR FORMING CONCRETE WALLS.—C. E. RUSSELL, Chicago, Ill. The apparatus comprises parallel boards spaced apart a distance corresponding to thickness of wall. Cross-bolts pass transversely through the boards at points above their lower edges, and nuts applied thereto, the bolts holding the boards detachably connected and yet adapted for adjustment toward and from each other, the hollow core-box having inner side open and arranged in contact with one of the boards, and a device attached to the upper side of box and engaging a pin set in the upper edge of board whereby the box is supported detachably and adapted for lateral adjustment with the boards as required for walls of different thicknesses.

TUBULAR WELL-PLUNGER.—E. R. LOCKWOOD, Pratt, Kan. This invention pertains to improvements in tubular well-plungers, and the object of the inventor is to provide a simple device in connection with a plunger for raising and holding the valve open to permit water

to pass through the plunger when it is withdrawn from the well-tube.

FLEXIBLE FABRIC AND PROCESS FOR MAKING SAME.—J. G. JACKSON, New York, N. Y. This invention relates to the manufacture from silica, glass, or other fusible materials similar thereto of fabrics possessing considerable flexibility. More particularly relates to a flexible fabric suitable for use as substitute for solid glass and the like, and more especially for use as an electrical insulating material somewhat analogous to sheet-mica. More particularly relates to the manner in which fusible material when heated is drawn out so as to form sheets or films so thin as to be quite flexible and in building these thin sheets or films so as to form a laminated fabric.

JAR.—E. HOUGHTON, Dalton, Ohio. In this instance the invention refers to jars of the kind used for containing butter and all kinds of goods usually shipped in jars, cans, or other analogous receptacles. It embraces quite a number of improvements in construction, and relates especially to means for closing the jar and for enabling a bail to be readily attached thereto, whereby the jar may be easily handled.

PIPE-BENDER.—S. M. GREEN and W. T. MCFARLAND, New York, N. Y. The invention has reference to improvements in tools for bending pipe, the object being to provide a tool of this character having its head so shaped as to adapt the tool for bending pipe of different sizes without danger of kinking or flattening the same.

BIRD-KILLING DEVICE.—J. A. BEYER-SCHMITT, Lester Township, Iowa. The object of the invention is to provide novel details of construction for a mechanical device which will stab and kill a bird that alights upon it, the device being adapted for dislodging the stricken bird and resetting its mechanism, so that it will kill a number of birds successively. It is intended for the destruction of crows, blackbirds, and sparrows, that commit depredations on fruit, garden stuff, and cereals.

ARCH-FILE.—E. M. ANDERSON, New York, N. Y. The invention relates to a means for filing loose leaves in book form, so that they may be convenient for observation and removal whenever desired, the device constituting what is commonly known as an "arch-file," owing to the employment of filing pins or rods of part-circular form.

PIPE-TONGS.—H. R. HILL, Caldwell, Ohio. This improvement pertains to pipe tongs or wrenches, and especially to such tongs as are used in oil regions for screwing and unscrewing sections of oil pipes or casings. The device is simple in construction and will operate to apply a powerful gripping force to the pipe when the lever of the tongs is used to produce the desired rotation of the pipe.

Household Utilities.

CURTAIN-POLE RING.—J. KRODER, New York, N. Y. The invention has reference to curtain-rings having anti-friction-rollers traveling on the curtain pole; and the object of the invention is to provide a new and improved curtain-pole ring which is simple and strong, cheap to manufacture, and arranged to securely hold the bearings for the anti-friction-rollers in proper position on the ring.

SHADE-BRACKET.—H. KIRCHHOFFER, Parnassus, Pa. One purpose here is to provide a form of shade-bracket which can be secured to a window-casing at any convenient point between the longitudinal edges of the side members of the casing whether the shade to be hung has a longer or shorter roller than required for the window, thus not only enabling the brackets to be used in connection with different lengths of shade-rollers, but also enabling the brackets to be attached to the firmest portions of a casing to which brackets have been previously many times applied.

COMBINED HOLDER AND LOCKING DEVICE FOR WINDOW-SASHES.—D. G. FREEMAN, Canastota, N. Y. One object of the invention is to provide a device which may be set or adjusted to automatically engage and lock the sash to prevent either the lowering of the same after being raised or the raising thereof after being lowered, irrespective of the position originally occupied thereby. The device is capable of being applied for use in connection with window-frames and sashes as ordinarily constructed.

DUST-PAN ATTACHMENT FOR BROOMS.—L. B. DESPAIN, Pacific Grove, Cal. The aim of the inventor is to produce a dust-pan attachment for a broom which can be readily applied to the broom and which may be operated readily to enable the dirt to be swept into the pan conveniently and without necessitating the sweeper to stoop closely over the dust-pan during the operation.

Machines and Mechanical Devices.

MINING-MACHINE.—W. H. SEXTON, Sullivan, Ind. This machine properly placed with respect to the face of the coal, the motor is started, the clutches being in proper position to drive the carriage forward by means of the engagement of the gears and pinions. When the cut has been made to a sufficient depth, the machine is reversed by means of the clutches and the sliding frame is withdrawn and the machine is moved far enough to the side so that it will be in position for a second cutting. In providing active portion of chain-cutter with

roller-support friction is reduced, while the rollers afford firm support for the back of the cutter.

APPARATUS FOR TESTING AND REGISTERING THE DEGREE OF INEQUALITY OF YARN, ETC.—E. HERZOG, Erlach, Austria-Hungary. By means of this apparatus the degree of inequality of a cord—such as a thread, wire, or ribbon—or of a similarly-formed body may be measured and indicated, this indication being preferably registered by passing the cord between a relatively fixed surface and a movable surface, the movable surface being utilized to effect the measurement. The latter surface may be formed by a pendulum, which is caused by the inequalities of the cord to make corresponding movements and that can be used to produce the indication or registration.

ATTACHMENT FOR DREDGERS.—H. P. FRANCIS, Oroville, Cal. Heretofore dredgers and especially those for taking sand from the sluices and depositing it upon the stacker ordinarily employed, have been supplied with sand-pumps which take sand and water from the sand-box directly to the tailing-pile. Water thus thrown on the pile washes the sand and gravel into the pond behind the boat and prevents proper piling up of material. These pumps are expensive to run, and to keep in repair. This inventor's purpose is to provide a device which will obviate the necessity for using these pumps.

HAT-MAKING MACHINE.—M. A. CUMING, New York, N. Y. The invention relates to hat-making machines and admits of general use, but relates especially to hat-making machines in which dies are employed for the purpose of forming bell-crown hats for ladies. By the means employed there is little or no probability of forming any creases, kinks, or folds in the hat material, as the same is fully expanded and not strained at any given point.

FILTER-PRESS.—R. PICK, Buffalo, N. Y. The object of this invention which relates to improvements in devices for filtering under pressure sugar-cane or beet-juice or other liquids, is to provide a filter by means of which the liquid may be rapidly and thoroughly filtered with a minimum quantity of water for washing and having high efficiency under comparatively low pressure, which permits the use of small pumps and a saving in the filter-cloth.

CASTING-BOX FOR STEREOTYPES.—F. SCHREINER, Plainfield, N. J. The invention constitutes an improvement upon the device formerly patented by Mr. Schreiner in which he described a mold comprising a movable section-gage which enables plates of irregular dimensions to be cast in the same box. This invention provides a lifting device for the cover of such a casting box. Whatever be the width of the plate cast in the mold the lifting-bar will afford means for freeing the cover with facility, as the lifting-bar will always engage with the section-gage placed at any point.

MUSIC-LEAF TURNER.—R. C. GALLINANT, Ridgefield Park, N. J., and J. DUKAREVICH, New York, N. Y. In this case the invention refers to improvements in devices for turning the leaves of bound music, the object being to provide a leaf-turner of simple and inexpensive construction and which may be conveniently operated by a musician without removing his hands from the instrument on which he may be playing.

Prime Movers and Their Accessories.

ROTARY ENGINE.—J. M. ELLSWORTH, New York, N. Y. The invention relates particularly to a rotary engine intended to be operated by steam or other elastic fluid, but by a change in the manner of operation the apparatus may be employed as a pump or compressor. In its preferred embodiment the apparatus comprises one or more circular cylinders, in which operate pistons intended to move continuously through the circular cylinder or cylinders around the common axis. These pistons are connected with the rotating element of the motor from which its power is taken, and co-acting with the cylinders are peculiar means for controlling steam supply and distribution.

Railways and Their Accessories.

CAR-FENDER.—J. J. HOBY, New York, N. Y. One purpose in this patent is to provide a fender capable of ready attachment to a car and in the construction of which complicated springs are not employed. Another is to provide a fender which will include a buffer of nested ring members of more or less yielding material, which will lighten the shock to a person or object struck, and also to provide a downwardly-extending apron at the end of the car, which apron normally closely approaches the road-bed and will remain in normal position under ordinary conditions, but which will yield rearward under impact and in so yielding will cause a scoop to drop and receive and retain the body.

RAIL-JOINT.—J. E. ALEXANDER, Covington, Va. The novel features of this invention reside in a special form of one of the fish-plates which has an elongated lug that is received in a corresponding opening in the web of the rail; and a key that tapers longitudinally and has a dove-tail form in cross section, said key engaging between undercuts in the opposing portions of the fish-plates and a clamping chair in which the rail is seated.

CAR-FENDER.—W. G. WINANS, Spokane, Wash. The invention pertains to improve-

ments in car-fenders, being particularly adapted for use in connection with electric or other power-driven street cars. Mr. Winans has provided an extremely simple and efficient fender, one which can be instantly manipulated by the motorman and one in which the necessity for swinging out of the way at the end of the line is done away with. It can be drawn entirely under the platform of the car and housed to protect against the elements.

Pertaining to Recreation.

FIREARM.—E. E. REDFIELD, Glendale, Ore. The particular purpose here is to improve upon the magazine-rifle to the extent that a small-sized frame usually adapted to receive a short cartridge is made to receive a much longer one by reason of the finger-lever having a peculiar pivotal support with reference to the frame, which imparts a much greater throw to the breech-bolt than heretofore, the trigger remaining pivoted in the frame independent of connections between lever and frame. Means are also provided for preventing the bullet being battered, as when the point is marred it interferes with its accuracy in flight.

EXERCISING APPARATUS.—C. C. PERCY, Rochester, N. Y. This is an improved exercising apparatus adapted for partial or complete suspension from any stable object having sufficient height and which will receive the hooks secured in an overhead stationary support. The apparatus is well adapted for convenient and safe use to strengthen the muscles of the upper portions of the human body, and the tension applied to the muscular system may be accurately graduated to suit the treatment appropriate for a patient, permitting the several details of the apparatus to be adjusted accurately for such a purpose.

Pertaining to Vehicles.

WHIP-HOLDER.—R. SCHROEDER, Morrisonville, Wis. The object in this invention is to provide a simple means for supporting and operating a whip so that it may be applied to draft-animals at too great a distance from the driver to be reached by the ordinary whip. The invention is especially applicable where lead-horses are used.

LOCKING DEVICE FOR BICYCLES.—E. F. KAISER, Fresno, Cal. The invention has for its object to provide a locking device for bicycles or the like having novel simple details of construction which afford a very secure means for preventing the rotation of either the front or rear wheel of a bicycle, and thus render the bicycle useless as a vehicle until the device is unlocked with a suitable key.

LAMP OR HEADLIGHT FOR VEHICLES.—E. C. GIESSEBERGER, New York, N. Y. One of the principal objects in this instance is to provide means whereby the light-rays emanating from the flame of the wick or burner of the lamp or headlight may be caused to be projected in the direction of travel of the machine, whether in a straight course or the turning of corners or rounding of curves, thereby lessening the danger of accidents and liability to collisions. The invention refers more especially to lamps or headlights for motor-vehicles, as automobiles and the like.

SPEED-INDICATOR.—H. ANDREWS, Hollis, District of Alaska. This invention pertains to improvements in devices for indicating the speed of bicycles, automobiles, racing-sulkies, and other vehicles, the object being to provide a device of this character that will be simple in construction, inexpensive, and that will accurately indicate the number of miles traveled per hour and the number of minutes per mile.

ADJUSTABLE SADDLE FOR HARNESS.—P. Y. MILLER, Hermannville, Miss. As the contours of the backs of working animals vary, it is essential for the proper engagement of the harness-saddle that it be made adjustable, so that the pads of the saddle may be given a proper degree of divergence for comfortable engagement with the back whereon the harness is placed and avoid contact with the spine. This inventor provides details of construction which afford an adjustable saddle, simple, practical, and quickly adjusted automatically. Chafing and improper distribution of load strain is prevented.

WAGON-HOUD.—J. R. DAVIDSON and B. C. KELLY, Monticello, Ga. It is the object of this invention to provide a hound in which the wood portion consists of straight strips, which are not easily broken, as there are no cross-grain curves, and if broken may be replaced at a comparatively small cost by either a wagonmaker or a person not skilled in the art.

METALLIC OVERSHOE FOR VEHICLE-WHEELS.—H. L. CANNE, Dingman Township, Pa. The object of this invention which relates to automobiles, bicycles, and all other vehicles having wheels with solid or pneumatic tires, is to provide an improved metallic overshoe for vehicle-wheels, to increase their traction power without impairing the flexibility of the tires, to prevent undue wear of the tire and puncturing thereof, if pneumatic, and to prevent the wheels from skidding or slipping on wet or slippery roadways.

Designs.

DESIGN FOR A DISPLAY-CARD.—C. J. STEINAU, New York, N. Y. This very attractive, unique, and effective ornamental design comprises a scroll-bordered card at the central bottom portion of which a collar button is prominently displayed. On each side of the

latter and mainly higher up is a celluloid tessellated panel for the purpose of holding the heads of a number of buttons for display.

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.

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. In every case it is necessary to give the number of the inquiry.

MUNN & CO.

Marine Iron Works. Chicago. Catalogue free.

Inquiry No. 7590.—For manufacturers of shingling machines used for nailing shingles on a roof.

For logging engines. J. S. Mundy, Newark, N. J.

Inquiry No. 7591.—Wanted, information concerning India Oil Stone.

"C. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 7592.—For manufacturers of concrete and iron hitching posts; also revolving clothes-line stand for drying clothes out of doors.

Drying Machinery and Presses. Biles, Louisville, Ky.

Inquiry No. 7593.—For manufacturers of charcoal burners for making charcoal out of refuse wood.

Handle & Spoke Mch. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

Inquiry No. 7594.—For machines to make stapled and drawn push brooms.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

Inquiry No. 7595.—For manufacturers of tubes (steel and iron) and angle iron for manufacturing bedsteads.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Machine Company, Foot of East 138th Street, New York.

Inquiry No. 7596.—For manufacturers of steel fence wire and other wire for export to Europe.

I sell patents. To buy, or having one to sell, write Chas. A. Scott, 719 Mutual Life Building, Buffalo, N. Y.

Inquiry No. 7597.—For dealers in tar oil suitable for high lubricants, and cutaneous troubles.

WANTED.—Purchaser for Monazite, Molybdenite and Wolfram. Apply Monasite, Box 773, New York.

Inquiry No. 7598.—For manufacturers of wire buckles.

WANTED.—Ideas regarding patentable device for water well paste or mucilage bottle. Address Adhesive, P. O. Box 773, New York.

Inquiry No. 7599.—For manufacturing of metal tubing.

I have for sale the U. S. and all foreign rights of new patent improvements in Water Tube Types of Boilers. Great economizer. J. M. Colman, Everett, Wash.

Inquiry No. 7600.—For manufacturers of automatic funnel which closes when bottle is full.

LATEST ADVERTISING.—High-grade Illustrating, Designing, Printing. Catalogues a Specialty. Smith Motion Picture Adv. Co., 505 Panama Bldg., St. Louis, Mo.

Inquiry No. 7601.—For manufacturers of metal collapsible tubes for putting up tooth paste.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery tools and wood fibre products. Quadriga Manufacturing Company, 18 South Canal St., Chicago.

Inquiry No. 7602.—For manufacturers of blow pipes run by foot power and pressure.

Absolute privacy for inventors and experimenting. A well-equipped private laboratory can be rented on moderate terms from the Electrical Testing Laboratories, 548 East 80th St., New York. Write to-day.

Inquiry No. 7603.—For manufacturers of gas machines for small plants for making gas.

WANTED.—Interest in flourishing manufacturing business; or join with reliable party starting industry of merit. References of both must be satisfactory to each other. Every reply positively confidential. State nature of business. Address Flourishing, Box 773, N. Y.

Inquiry No. 7604.—For dealers in rare metals, such as platinum, etc.

WANTED.—A man of experience; capable of running a factory that is manufacturing heavy machinery. Should have \$25,000 to invest in the business which can be shown to be profitable. We don't want the money without the man. The experienced man is the first essential. Address Heavy Machinery, Box 117, Station A, Hartford, Conn.

Inquiry No. 7605.—Wanted, printing wheel same size and character as used on a stock printer.

Inquiry No. 7606.—For manufacturers of celluloid watch cases.

Inquiry No. 7607.—For dealers in snakewood and boxwood in the log, and cut into pieces.

Inquiry No. 7608.—For manufacturers of experimental and electrical apparatus, such as lecture sets for schools and colleges.

Inquiry No. 7609.—For manufacturers of novelties, such as aluminum markers cut, pressed and enameled.

Inquiry No. 7610.—For manufacturers of case makers' canvas; also suitable cloths for box covering.

Inquiry No. 7611.—For manufacturers of box-making machinery, clasps and catches.

Inquiry No. 7612.—For manufacturers of a foot press for imprinting names on rubber holders and lead pencils.

Inquiry No. 7613.—For manufacturers of combination padlocks.

Inquiry No. 7614.—For manufacturers of drying machinery for fish products.

Inquiry No. 7615.—For manufacturers of machinery for heading square head machine bolts and carriage bolts, and for cutting and rolling threads for same; also machinery for punching and tapping nuts.

Inquiry No. 7616.—For manufacturers of glass balls and marbles, both in United States and Germany.

Inquiry No. 7617.—For manufacturers of steel tubing and materials suitable for aeroplane surfaces.

Inquiry No. 7618.—For manufacturers of induction coils.

Inquiry No. 7619.—Wanted, address of parties who bend sled runners.

Inquiry No. 7620.—For manufacturers of peppermint.

Inquiry No. 7621.—For manufacturers of nails, saws, wire, hinges; also cotton goods.

Inquiry No. 7622.—For manufacturers of ball bearings.



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.

(9857) R. D. F. asks: Would you kindly answer these questions? Why will a rainbow form a half-circle at sunset? Why does a rainbow usually show less than a half circle? Why would a bow form a complete circle seen from a balloon? A. A line drawn through the center of the sun and the eye of the observer passes through the center of the rainbow. This line is called the axis of the bow. An angle is formed with this line, the vertex of the angle being at the eye. At an angle of 40 degrees from this line in every direction violet may be seen, and at 42 degrees from this line red may be seen. It should be obvious that all the points which are at the same angle from the axis will lie on the circumference of a circle. The rainbow is for this reason a circular arc. When the sun is on the horizon, the axis will be in the horizon and a half circle is above the horizon whose other half is below the horizon. At sunset then a rainbow will be a half circle. If the sun is high in the heavens, the axis line will go below the surface of the earth before it reaches the horizon, and the part of the rainbow seen will be less than half a circle. If one is upon a mountain top, so that the axis extends far out above the horizon, more than half of the circle of the rainbow will be seen, and from a balloon it is possible to look down upon a cloud and see a circular rainbow, or the whole of the bow. Looking down upon the spray of Niagara Falls, one may see more than half a circle of a rainbow formed by the sun's rays in the gorge below.

(9858) W. W. asks: What is the scientific explanation of the fact that if an egg is held between the hands and compressed along its longitudinal axis, it is almost incapable of being crushed, while a pressure on a transverse axis readily accomplishes a contrary and expected result? A. The ends of an eggshell are domes, and are filled with an incompressible liquid. If these domes are fitted into the soft palms of the hands, and pressure evenly applied to the shell in the direction of its longitudinal axis, it will require considerable force to crush the shell. The liquid contents prevent the shell from collapsing inward; the soft palm prevents it from bursting outward. The part of the shell which is not covered by the hands is very nearly a cylinder, and although it is thin it has considerable strength to resist crushing.

(9859) A. E. S. asks: Kindly advise if an electric doorbell circuit can be formed with the ground and a single wire for a distance of two blocks. Also the formula for the solution of saltpeter used in destroying tree stumps by boring a hole and allowing the fluid to remain all winter, and in the spring pouring in kerosene and setting afire. A. An electric circuit can be completed through the earth for any purpose. Make a good ground at each end of the line in water or moist earth, and the bell will ring as well as if a return wire is used. There is no formula needed for using saltpeter on a tree stump. Bore deep holes in the stump, fill them with saltpeter and then with water, and plug the hole. This is done at any time. After six months or longer open the hole, fill it with kerosene oil, and set this on fire. The saltpeter causes the fire to smoulder in the wood.

(9860) R. R. asks: Will you please answer the following question in physics for me? What is the difference, if any, between "mass" and "weight"? For instance, what is the difference between 10 pounds mass and 10 pounds weight; or between 10 kilogrammes mass and 10 kilogrammes weight? A. The mass of a body is determined by the quantity of matter the body contains. Any body has an invariable mass. The weight of a body is not invariable but is affected by the force of gravity at the place of the body. The same mass, 10 pounds of lead, for example, will be the same all over the earth, but it will not weigh the same. It is customary to consider the unit of mass as the weight at a place where the intensity of gravity is unity. At Paris, France, the intensity of gravity is 980.96 cm. The weight of a body at Paris is then 980.96 times its mass. Mass is defined as weight divided by gravity; or weight at any place is its mass multiplied by gravity at that place. Gravity at Washington is 980.10.

NEW BOOKS, ETC.

THE PHYSICAL CONSTITUTION OF THE SUN. By William Appleby. San Francisco, Cal.: The Whitaker & Ray Company, 1905. 8vo.; pp. 510. Price, \$4.50.

Mr. Appleby has a theory, and his theory, to use his own words, "has for its foundation one single act of nature, which is effected and completed by three laws. These three laws are: Impregnation, Fermentation, and Condensation; all other effects being subordinate to these or natural consequences thereof." From this it may be gleaned that the book does more credit to Mr. Appleby's vivid imagination than to his achievements as a scientist.

LEHRBUCH DER GEWERBE-HYGIENE. By Dr. Josef Rambousek. Vienna: A. Hartleben's Verlag, 1905. 8vo.; pp. 135.

The author's very practical book is divided into two main parts, the first of which is devoted to industrial hygiene, and the second to installations tending to improve the welfare of laborers. In this first division we find an elaborate discussion of ventilation of factories and workshops; disposal of refuse; injuries sustained by workmen due to improper regulation of temperature; bad illumination, overstraining of the muscles, and evil influences in general. In the second division excellent chapters will be found on workingmen's dwellings; hours of labor; division of labor; proper food of the laborer, and the proper care of the body.

SMOKE ABATEMENT. By William Nicholson. Philadelphia: J. B. Lippincott Company, 1905. 8vo.; pp. 256; 59 illustrations. Price, \$2.

In the present volume the author has endeavored to give, as concisely as possible, an account of the smoke abatement movement, and to indicate the means by which the smoke nuisance may be combated. The author contends that so far from being a necessary evil, it is one that is easily remediable, and for the removal of which adequate machinery actually exists. Three chapters are given to the legal aspects of the subject. The leading types of the various appliances now on the market for the purposes of smoke abatement and fuel economy are illustrated and described.

THE PRINCIPAL PROFESSIONAL PAPERS OF DR. J. A. L. WADDELL, Civil Engineer. Edited by John Lyle Harrington, C.E. New York: V. H. Hewes, 1905. 8vo.; pp. 991.

This valuable collection of papers, by one of the foremost civil engineers of his day, represents some of his best literary work during a lengthy professional career. It is a fact well understood among the members of the profession that much of the most valuable published engineering data of a practical kind appears in the form of papers that are read at the meetings of engineering societies, or in the form of addresses delivered to engineering schools. Although many of these addresses appear in the printed proceedings of the engineering societies, there are others that never secure even that much permanent record. Moreover, the proceedings are generally only to be found in the possession of those who were members of the society at the time of publication. The information contained in such papers is of the kind that is gathered by the engineer after his graduation. Much of it is sought for in vain in the current text books, and it possesses a value that can only be fully appreciated when search has been made for it, often in vain, among the standard publications. It was considerations of this nature which led the editor to gather Mr. Waddell's papers into book form; and it is sufficient to say of its contents that their range of subjects is as wide as that of the experience of their gifted author. The work is beautifully printed, and is enriched with half-tones, line drawings, and an elaborate series of diagrams and statistical tables. Among other chapters may be mentioned Notes on Railroad Drainage, and General Notes on Railroad Engineering; four chapters on Civil Engineering Education; a chapter on the Compromise Standard System of Live Loads for Railway Bridges and the Equivalents for the Same; an excellent chapter of advice to the intending bridge engineer as to the best way to furnish himself, after graduation, with the necessary experience to render him a competent consulting bridge engineer. One of the most lengthy and important chapters is an elaborate discussion of the design and construction of elevated railroads.

GEOLOGY OF WESTERN ORE DEPOSITS. By Arthur Lakes. Denver, Col.: The Kendrick Book and Stationery Company, 1905. 12mo.; pp. 415. Price, \$2.50 net.

This is the second edition of a meritorious book. The author is a well-known geologist. The clear style in which the book is written will make it easier for miners to understand. Every prospector should have a copy. A marked feature of the book is its copious illustration.

RAFTER AND BRACE TABLES. By H. J. Auer. New York: Industrial Publication Company. N. D. 18mo.; pp. 29.

METHODS OF CHEMICAL CONTROL IN CANE SUGAR FACTORIES. By H. C. Prinzen Gierligs. Manchester, England: Norman Rodger, 1905. 8vo.; pp. 85. Price, \$1.40.

THE HONORABLE PETER WHITE. A Biographical Sketch of the Lake Superior Iron Country. By Ralph D. Williams. Cleveland: Penton Publishing Company N. D. 8vo., pp. 205.

THE EXPERIMENTAL BACTERIAL TREATMENT OF LONDON SEWAGE. Being an Account of the Experiments Carried out by the London County Council between the years 1892 and 1903. By Prof. Frank Clowes, D.Sc. (Lond.), F.I.C., Chemist to the Council, and A. C. Houston, M.B., D.Sc. London: Printed by James Truscott & Son. 8vo.; pp. 242. Price, \$4.

MATTONI E PIETRE DI SABBIA E CALCE. By E. Stoeffler. Milan: Ulrico Hoepli, 1905. 32mo.; pp. 232.

CONTI E CALCOLI FATTI. By Italo Gherst. Milan: Ulrico Hoepli, 1904. 32mo.; pp. 191.

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