

RECENTLY PATENTED INVENTIONS.

Engineering.

GAS, OIL, OR VAPOR ENGINE.—Frank S. Mead, Montreal, Canada. The giving of an impulse to the piston at every revolution of the crank shaft is the principal feature of a simple and durable engine designed by this inventor. A heated vaporizing and exploding chamber receives the fuel from a pump unmixed with air, this chamber heating and holding the oil, vapor or gas as the piston rises and presses fresh hot air into it, and the mixture being ignited when the piston is on the up center, by an electric spark, a heated pipe, or in some other suitable manner, so that the explosive charge passes into the working end of the cylinder to drive the piston down. The pump is particularly adapted for pumping the liquid oil, or taking the vapor of previously heated oil, or gas, and forcing it into the exploding chamber.

VAPORIZER FOR OIL ENGINES.—Isaac F. Allman, Jersey City, N. J. This vaporizer has a mixing chamber connected by a pipe with the cylinder of the engine, a suction being produced in the chamber on the outward stroke of the piston at the time the charge is to pass into the cylinder. The invention consists principally of a valve box or casing having air inlets, a valve seat into which opens an oil supply channel and a valve covering the orifice, but adapted to open upon suction from the cylinder to draw air in through the openings and through the valve seat, the air on its passage taking up the oil discharged into the seat through the channel. The engine exhaust pipe passes through the mixing chamber to vaporize the oil and mix its vapor with the air.

Railway Appliances.

CAR FENDER.—Rudolph C. Hoyer, Memphis, Tenn. Suspended just in advance of the wheels and beneath the car body, according to this invention, is a lower or receiving fender to receive any object that may be encountered by a moving car, while held above and in advance of this fender is a second fender, which is given a rotary reciprocating movement, causing it to act in the capacity of a rake to convey any object in the path of the car on to the receiving fender. The upper fender is constantly reciprocated from the car axle when the car is in motion, and has a yielding lower edge and elastic covering, so that it will not injure a body with which it comes in contact.

CAR FENDER AND BRAKE.—John Matzinger, Mount Vernon, N. Y. This inventor has designed a fender which will always be in position for contact with a person or object that may be on the track, preventing any one from being run over by the car, while the brakes are applied to immediately stop the car when any one is struck by the fender. The fender consists of a skeleton frame with bed of woven wire and rubber cushion, and is light and strong and readily transferred from one end of the car to the other. The fender is normally held in outward position by springs, but when an object is struck in the path of the car the inward movement of the fender causes a brake shaft to be carried downward, bringing a set of brake shoes beneath the wheels.

BRAKE.—Alexander H. Moyes, Ogden, Utah. This is an improvement in automatic fluid pressure brakes of the Westinghouse type, and provides a quick and positive action of applying and releasing the brakes, and for graduating the tension of the brakes without completely releasing them. The brake cylinder is rigid, with and projects at one end into an auxiliary reservoir within which is a second cylinder, while at the opposite end is a third cylinder communicating with the brake cylinder, there being in the side of the latter a double acting valve and cylinder connected with a branch pipe leading from the train pipe connected with the engineer's valve and the main reservoir.

CAR COUPLING.—Louis L. Moore, Calhoun, Ky. This coupling is adapted to automatically couple meeting cars, and permit of their ready uncoupling from either side of the car. Within the drawhead chamber is a rocking dog holding in receiving position a rocking arm, and a coupling block sliding in the drawhead is loosely connected to the arm, the coupling block dropping through the link when the latter pushes the dog rearwardly. This coupling is simple, durable, and inexpensive, and there are no exposed working parts to be obstructed by sleet or snow in the winter season. The improvement may also be used along with the ordinary link and pin car coupling.

SWITCH AND MATE.—David F. Carver, Brooklyn, N. Y. This invention is for an improvement on a formerly patented invention of the same inventor, in which a swing tongue has a certain novel arrangement of flanges of such length and breadth as give the tongue a contact along its whole length with either the guard rail or the running rail of a switch. The improvement provides for a modification by which provision is made for the entrance of a switch iron or equivalent device, mainly to facilitate the removal of dirt from between the opposing side edges of the tongue and rails adjacent to the pivoted end of the tongue.

SPEED INDICATOR.—Talbot O. Bate-man, Fort Worth, Texas. This device is specially designed for use on trolley cars or vehicles, indicating automatically to a following car or to any observer whether a car is running at a proper rate of speed or is going too fast. A governor, mounted in a casing is connected with moving part of the vehicle, and in the casing is a lever connected to the governor and an insulated plate having two contact points, past which moves a contact plate actuated by the lever, thus making signals and electrical connections. The governor is controlled by the running part of the car or vehicle, the device actuating a normal signal and an alarm or danger signal.

SCREW JACK.—Alexander H. Moyes, Ogden, Utah. This is an improvement more especially designed for use on railroads, for conveniently jacking up cars, engines, journal boxes, etc. The invention comprises a casing in which screws a post having at its upper end a head with a cap turning on ball bearings, while a sleeve on the casing has a handle and an extension through which slides a bolt adapted to engage the inside

of the wheel rim to hold the wheel down on the rail while jacking up the journal boxes. A weighted pawl pivoted on the sleeve is adapted to engage one of the exterior circular threads on the casing, and it is not necessary to use blocks and similar devices, as heretofore.

Electrical.

AMALGAMATOR.—Francis B. Austin, Temple, Arizona. According to this invention currents of electricity are applied to the amalgamating plates to attract and hold fine particles of gold, the apparatus providing an improved arrangement of the plates and mercury receiving pan. The sluice through which the pulp and water passes has a full width bottom opening adapted to receive a copper pan having inwardly extending and horizontal flanges at its sides, a cover plate resting on the flanges, and the plate being insulated from the pan. Spikes project from both the plate and the pan, there being in the pan a quantity of mercury, and means are provided for electrically charging the cover plates and pan.

LIGHTNING ARRESTER AND FUSE BLOCK.—Thomas L. Carleton, New Orleans, La. According to this improvement, the parts, after one operation, automatically place themselves in position for another operation, thus maintaining the circuit complete except at the instant of rupture by lightning or other cause. A pair of curved bars, one of insulating and the other of conducting material, are secured to a base, and shunts connect the insulating with the conducting bar, while an actuating bar resting against one of the shunts is capable of automatically passing to the next shunt on the destruction of the first, the metallic bar being connected with the line and the spring-pressed bar with the ground or line. A contact also engages with the arm after it has completed contacts with and destroyed all of the shunts.

Miscellaneous.

BOTTLE STOPPER.—Abraham L. A. Himmelwright, Middletown, Conn. The invention relates to an improvement in bottle stoppers, and the object of the invention is to provide a bottle stopper which will prevent the refilling of bottles by unscrupulous parties, who might replace the goods with inferior or counterfeit fluid and sell the same as the original contents and under the original label. In brief, the invention comprises a bottle stopper consisting of two sections mounted to slide longitudinally of one another, and of movable locking arms connected to one section and controlled by the other section to engage the bottle upon movement of one section in a predetermined direction, and means for preventing return movement of the said section.

BOOKBINDING.—John B. O'Riva, New York City. The object of the invention is to provide a binding for books which will be strong and durable, without necessitating the destruction of the grain in the leather used for binding. Heretofore it has been often necessary to so crimp and press the leather at the corners of book covers that the grain will be destroyed and the beauty of the binding very much impaired. The invention consists in a peculiar manner of constructing the binding, by which the corners are made as strong and durable as heretofore, and at the same time the grain of the leather is left in its original beauty. In brief, the improvement comprises a bookbinding corner having two flaps, one of which is folded inward and one edge of said flap being crimped against the main portion of the bookbinding, the remaining flap being folded over and secured above the crimped portion to hide the same.

SOLE AND HEEL SPRING FOR BOOTS OR SHOES.—George E. Swan, Beaver Dam, Wis. The invention relates to an improvement in springs for the soles and heels of boots and shoes, being especially adapted for application to the heels of footwear, and the object of the invention is to provide a spring pad or cushion which will serve to lift the heel of the boot or shoe as it leaves the pavement, road or other surface with which it is brought in contact, thereby preventing the shock or jar usually incident to walking on hard pavements or hard roads, and rendering the step easy, elastic and youthful. A further object of the invention is to provide a mechanical appliance to boots and shoes which will, in a great measure, compensate for the loss of elasticity in the cartilages of the knee and other joints incident to age. The invention consists of a spring tread for boots and shoes, in which the same consists of a strip of spring material bent upon itself to form a body or an attaching member, and a base member substantially parallel with the body member throughout a portion of its length, the free end of the base member being outwardly curved and carried in a direction to meet and pass the free end of the body or attaching member.

ADJUSTABLE BOOK SUPPORT.—David J. Wilson, Washington, D. C. The object of the invention is to provide an adjustable book support, designed to be screwed upon a desk or table and more especially intended for use in or by commercial houses, banks, record offices and similar institutions, for conveniently holding and manipulating ledgers and other heavy books, whose position the bookkeeper is required to frequently change in making the various entries and rulings thereon, obviating the necessity of using very high chairs and tilting the ledger on the edge of the desk in order to reach the top lines, which movement is very injurious to heavy books, and also obviating all moving and sliding of the ledger, as required in posting. In brief, the patent consists of a book support comprising a horizontal frame having parallel guide grooves or runways in the same, a sliding base moving in the same, a turntable mounted upon said base and a book holder mounted upon the turntable.

OPENER FOR ENVELOPES OR WRAPPERS FOR NEWSPAPERS OR THE LIKE.—Frank E. Munn, New York City. The invention relates to improvements in openers for envelopes, wrappers and the like, and has for its object to provide an opener of the character indicated, which is equally adapted for envelopes, newspaper wrappers, wrappers for boxes, parcels and packages of every description and boxes themselves. A further object of the invention is to provide an opener which will virtually form a portion of the envelope, wrapper or box, being so attached thereto that it can be readily grasped and drawn in direction of one or the other ends or sides of the en-

velope or wrapper, so as to sever the same and disclose the contents thereof without injury to the same. In brief, the invention consists of the combination with an envelope, wrapper or the like, of an opener, consisting of a fine wire, the main portion of which lies on the inside of the envelope or wrapper, each end of the wire being passed outside of the envelope or wrapper, then bent backward and passed inside of the same, and then again bent so as to run parallel with the main portion of the wire, whereby closed loops, consisting of three substantially parallel strands, are formed, the strands inclosing and lying close to the stock of the envelope or wrapper.

KNEADING AND ROLLING MACHINE.—William Dann Sprague, Black Mountain, North Carolina. This invention relates to improvements in that class of machines which are adapted for use in working dough, and the object of the invention is to produce a machine of the greatest simplicity, which is adapted to rapidly and efficiently knead and then roll dough, avoiding the necessity of working the dough with the hands, and, further, to construct a machine which is arranged so that it is not likely to get out of order and so that it may easily be kept clean. Another object of the invention is to produce a machine which manipulates the dough in much the same manner as it is worked by the hand, and which has its rollers adjustable so that they may bear upon the dough with the requisite pressure.

PRINTER'S ROLLER.—Benjamin Day, West Hoboken, N. J. This invention is for a flexible tube-form printer's roller, adapted to be put on and taken off the roller stock, the roller being of gelatinous material and having toughened surfaces inside and outside which protect the soluble flexible material in the body of the roller from the effects of moisture and air. The roller may be made of the ordinary roller composition, or for fine work is made of the finest gelatin and glycerin—one part of gelatin to two parts of glycerin—but the invention consists principally of the means of forming the roller with the least water in its composition, and the forming of an insoluble skin on its outer and inner surfaces.

MUSICAL INSTRUMENT.—Bruno E. Wollenhaupt, New York City. This improvement relates to former inventions of the same inventor, the invention being applicable to violins, violas, guitars, citharas, mandolins, etc., and being designed to greatly increase the volume and duration of the sound without rendering it more difficult to play the instrument. The shanks of graduated tuning forks are secured to a sounding support within the body of the instrument, the tuning forks being graduated according to a chromatic scale to form a sympathetic vibrating device, and sounding sympathetically and in unison with the corresponding strings played at the time by the performer.

CURTAIN POLE AND HANGER.—John H. Hilliker, New York City. This invention provides a superior curtain pole and fixtures, the curtain being mounted so that it may slide along the pole while being adjusted. The pole has a longitudinal slot in its under side, the slot being enlarged at the axial center of the pole, and an upwardly extending arm of a bracket secured to the window frame enters the slot. The curtain securing pins have at their upper ends a head fitting in the enlarged portion of the slot, the pins freely sliding in the slot. A cornice or ornament may be held in front of the pole by means of hooks on the pole and eyes on the rear of the cornice.

HOOK AND EYE.—John H. Akers, Washington, D. C. The hook, according to this invention, is made of a single piece of metal, bent in the middle to form attaching loops, while its ends are extended and bent over to form hooks converging toward each other to form spring jaws, and then turned away and bent outwardly to form locking recesses. The eye part has two eyes to receive the hooks, two shanks to pass between their spring jaws, and a cross loop adapted to lock in the recesses. This hook and eye will fasten the meeting edges of garments in an easy and secure manner, and the two members will not accidentally disconnect themselves when they are pressed together.

CAP.—Joseph Kornfeld, New York City. A cap which may be folded into small space without injury, which may be made very light, and which affords thorough ventilation, has been designed by this inventor. The body of the cap is formed of a series of sections, between which extend strips of perforated material, such as fibrous netting, the strips extending from the center to the lower edge, or extending entirely across the body, crossing each other at the center. The visor is preferably formed of a soft, pliable material.

NAPKIN HOLDER.—Nicholas F. Clarkson, New York City. This is a device by means of which the napkin may be conveniently held suspended from the neck, and which is adapted to hold the napkin when not in use, and rolled up. It consists of a back plate having a hook, while a transversely arched clamping plate has a hinged connection with the back plate at each side of the hook, a tongue extending through an opening in the shank of the hook to an engagement with a spring attached to the body portion of the back plate.

SHOE HOLDER.—Anthony B. Crocco, New York City. To hold a shoe in position to facilitate blacking and polishing it, this holder is made with two hinged last shaped parts, separated by a screw rod as in a shoe stretcher, to firmly engage the shoe, and the nut through which the screw rod passes affords a bearing for the end of a vertical screw rod in a suitable standard erected on a stand. The stand has a drawer for holding polishing and blacking tools, and the last parts can be opened or closed to fit any sized shoe, the shoe being readily turned to give the operator access to it on all sides.

SHOE.—David D. Toal, New York City. This is a shoe especially adapted for bicyclists and pedestrians, being designed to afford more than usual ventilation, and facilitate drying the stocking, should it become wet. The vamp of the shoe, just back of the toe cap, is made with two large tab portions, one crossing the other to form the covering for the top of the foot, the ends of these tab sections being extended to engagement with buckles or other fastenings at the sides of the ankle.

LAWN MOWER KNIFE SHARPENER.—Joseph J. Burke, Wilber, Neb. This is an easily manipu-

lated machine of simple and durable construction, which permits a ready adjustment of the knife supporting device so as to always bring the cutting edge in proper relation to the grinding wheel to sharpen the knives very accurately. The invention consists principally of adjustable bearings or supports for the knives to be ground, a movable knife rest, and a revoluble grinding wheel, both rest and wheel being mounted on a longitudinally movable carriage.

FENCE.—James N. Young, Parma, Mich. This invention relates to wire fences having pickets attached to the wires of the fence, and provides a fence which is very strong, easy to erect, and adapted to withstand and compensate for the contraction and expansion of the fence wires. The post is formed of angular bent plate metal, strongly braced against longitudinal and lateral strains, and the pickets are readily placed on and secured to the fence wires by hook headed staples.

HAMMOCK.—Thomas J. Woodcock, Philadelphia, Pa. This hammock has the end of the material of which it is formed doubled on itself to form a loop from which the tabs are formed, and then doubled upon itself to form a hinged adjacent loop divided to form two pockets, one for a pillow and the other for a spreader. The pillow may be thrown back over the tabs and partially over the suspension cords to lengthen the hammock when necessary, and the spreader pocket forms the connection between the pillow and the body of the hammock, all being formed of a single piece of material.

BRACKET FOR SWINGING STAGES.—Henry Witzgall, Pittsburg, Pa. For use in connection with the swinging stages employed by painters, etc., this inventor provides brackets capable of ready attachment to the stirrups of the stages, the attachment being so made that the stage will be readily adjustable on its brackets, permitting the stage to be carried outward to clear projections of the building, while the brackets have cushioned rollers adapted for constant engagement with the face of the structure. The brackets are also so constructed that they hold the stage firmly in the adjusted position, enabling one to walk on it as on a permanent fixture.

TABLE.—Max Lesser, Boston, Mass. This is an article of furniture devised more especially for the use or convenience of invalids, and is designed to be readily secured to a bedstead or other suitable support. Its construction is such that it may be readily adjusted and changed to make it serviceable for a dining table, a table upon which games may be played, or for a reading and writing table. The top of the table has hinged sections and rotates on a standard which is vertically adjustable in a sleeve on which are opposite arms carrying clamping devices.

OIL STOVE.—Eros F. Depuy, Port Richmond, N. Y. The combustion chamber of this stove has slots in its bottom through which extend the wicks, and a grated platform extends above the open top of the chamber to support the culinary vessels, the latter being held sufficiently high to permit sufficient air to pass to the flame and effect complete combustion, preventing any smell of oil. The wick tube has an oil chamber connected by a pipe with an oil reservoir at one side of the casing.

SAFE ATTACHMENT.—Abraham Obendorf, Jr., Centralia, Kan. This is an improvement on a former invention of the same inventor, in the nature of a portable attachment, which, when placed in a safe, vault, or strong room, will, in the event of an attempt to blow open the same, cause the generation of a stifling and poisonous gas, in which the burglar cannot live. A frame to be hung up or detachably fastened in the safe or vault forms a housing for a fanlike pneumatic trigger, which is acted upon by the concussion of the blast to trip a hammer and allow its descent from a spring to fracture a bottle containing the ingredients of poison vapors, allowing the poisonous gas to be generated and fill the safe or vault, so that to continue operations by the burglar would mean death or insensibility.

MECHANICAL MOTOR.—Archie D. Bryce, Lake City, Minn. This contemplates the use of an elastic cord in connection with pulleys or drums, the cord to be wound on one or more of the pulleys or drums and made to exert its tension in such manner as to become unwound from the first and wound on others, producing more power than may be ordinarily obtained in such manner. In a rectangular frame is a shaft carrying a cone with six concentric pulleys, there being a drum adjacent to the smaller end of the cone, and in the opposite end of the frame is a shaft on which is a cone. Fixed to the drum and to the largest pulley of the cone is an elastic cord, to be alternately wound on the drum or the pulleys of the cone, after being carried around the cone shaft in the opposite end of the frame.

BOTTLE STOPPER.—Wilber E. Cook, Middletown, N. Y. To prevent the refilling of a bottle and its use as an original package, this inventor provides a bottle with a double head, an inner and permanent head and a neck and outer head or hood, the latter being firmly connected with the former and the two so connected that the outer hood must be separated from the neck before the bottle can be opened, giving to the bottle an appearance very different from the original package. The outer hood and head may be readily separated from the neck and head proper of the bottle, but the hood or head cannot be replaced after the bottle has once been opened.

SUPPORTING AND MOVING INVALIDS.—Sewell S. Hepburn, Oliver, Va. To facilitate lifting and moving invalids to different points in a room this inventor has devised an apparatus which may be adjusted for use and taken down in a few minutes, and which comprises a sectional standard with clamping devices, a windlass of novel construction, and a hammock frame and hammock. The adjustments of which may be varied to a great extent. The hammock, suspended from its hanger, may be conveniently raised or lowered at its head or foot, as desired, and may be easily swung to any suitable position.

MOVABLE INDEX FOR RECORD BOOKS.—Bruce B. McCreight, Dubois, Pa. This invention comprises an index slip and a flexible guide having at

each end means for attaching it to the sections of a book, the index slip having movement on the guide. The movable or duplicate index is adapted to be carried over the face of one or more pages, to temporarily locate the names, letters or figures at a point distant from where they are entered on the book, economizing time and lessening the chances of mistakes.

POTATO CUTTER.—Oscar A. Bulette, Seattle, Wash. This is a simple and easily operated device for cutting potatoes into longitudinal blocks. The blades of the cutter are so arranged that they will cut all sides of the blocks, insuring a uniform shape and avoiding feather edges, which have a tendency to crinkle or become too crisply cooked before the entire block has been perfectly cooked. The several parts of the device may be readily detached to facilitate thorough cleaning.

INKSTAND.—Francis B. Pratt, Canton, Miss. This inkstand has an ink well and a supply well, a feeder duct leading from the bottom of the ink well to the bottom of the supply well, while an air duct leads from the upper portion of the ink well to the supply well. A cup shaped plug, closed at the bottom and open at the top, and suited to hold a sponge, has a screw thread engagement with a flange in the upper end of the ink well, and by screwing the plug downward the ink is forced into the supply well. The inkstand is easily cleaned and filled, and but a small quantity of ink need be exposed at any time.

PLAYING CARDS.—Charles B. Rosenberger, Pittsburg, Pa. This invention provides a plurality of suits of cards, each suit having an identifying character common to all the cards in the same suit, and each card having scoring numerals, one for an identifying character without color thereon, and the other for the same and its color. The game affords two grades of chance, and a commensurate degree of remuneration for the winning player.

TEMPORARY BINDER.—Jos. W. Wood, Baraboo, Wis. This improvement comprises a back piece from the ends of which metal clips extend forward, each clip being curved to form a channel providing seats for a lacing cord which is woven back and forth through the clips in the channels. A simple and inexpensive binder is thus formed for pamphlets and newspapers, in which the back edges and bottom ends of the matter bound will be protected from abrasion.

MOLE TRAP.—Jacob W. Reger, Charles W. Denison and George D. Denison, Judson, Mo. In a U shaped frame whose pointed ends are adapted to be pressed into the earth at opposite sides of a runway is held a sliding trip rod, on whose lower end is a head which is made to rest on the earth directly over the runway. The mole, in passing, raises the earth slightly, when the trip rod releases a spring pressed follower, which carries prongs or teeth that pass into the runway and through the mole or other animal.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 10 cents each. Please send name of the patentee, title of invention, and date of this paper.

NEW BOOKS AND PUBLICATIONS.

THE PRIMARY FACTORS OF ORGANIC EVOLUTION. By E. D. Cope. Chicago: The Open Court Publishing Company. 1896. Pp. xvi, 547. Price \$2.

This work by Prof. Cope is entitled to a far more extended review than we can possibly give it here. We hesitate, indeed, to say anything about the present book, feeling that a mere statement of its title and the author's name will be enough to give it standing. It is a very elegantly printed book, thoroughly indexed, elaborately illustrated, and is a valuable contribution to and presentation of the doctrine of evolution. Darwinism itself is in such a state of evolution, has been so modified by Weismannism, that what is known as a "New Darwinism" has been created, so that it really requires almost as much reading to keep pace with the modern science of evolution as with electricity or any other science. The author does not seem to be, by any means, a pronounced Weismannist. A cursory glance at the index inclines us to the belief that it is not very accurate in its paging.

AN EXAMINATION OF WEISMANNISM. By George John Romanes. Chicago: The Open Court Publishing Company. 1896. Pp. ix, 221. Price, paper 35 cents, cloth \$1.

As a companion to Prof. Cope's book, we here have Weismannism critically examined by one who figures as having produced more effect on modern Darwinism than all others, probably, put together, and to those who desire to study modern evolution, perhaps the reading of both these books will be of value.

ON GERMINAL SELECTION AS A SOURCE OF DEFINITE VARIATION. By August Weismann. Chicago: The Open Court Publishing Company. 1896. Pp. xii, 61. Price 25 cents.

This paper was read in the first general meeting of the International Congress of Zoologists at Leyden on September 16, 1895, as we are informed in the preface. We have put it with the other two books to complete the series which they seem to form.

THE CENTURY SCIENCE SERIES. James Clerk Maxwell and Modern Physics. By R. T. Glazebrook. New York: Macmillan & Company. 1896. Pp. vi, 324. Price \$1.25.

The students of the history of science have some favorite characters whose lives they are never tired of reading, either because of their interesting characters or because of their interesting work. Fleeming Jenkin is, perhaps, the most fortunate in his biographer, Robert Louis Stevenson having written a most graphic life of the scientist. Faraday and Maxwell form two kindred spirits whose lives will ever be favorites with all who admire the simple and gentle in humanity. As a supplement to the Campbell and Garnett more personal biography of Maxwell, the same publishers give us here, in brief, an account of his life in science and what he did in

the scientific world. We have just reviewed several books on evolution, and it seems a little peculiar to find in them, as well as in this, no apparent reference to Maxwell's physical demonstration of the difficulties attendant upon the acceptance of Darwin's theory based on the probable size of the molecule. As a supplement to the life of Maxwell, the present book will be quite indispensable.

THE SUGAR FACTORY MANAGER'S HANDBOOK OF NOTES, TABLES, RULES, AND DATA. For managers, engineers, chemists, overseers, panboilers, and others engaged in the manufacture of cane sugar and the distillation of rum. By B. R. Body. Manchester: Office of the Sugar Cane. 1896. Pp. 78. Price \$1.50.

This is one of those familiar little English books containing information relating to particular trades and businesses. It is written from the technical standpoint and can be recommended to sugar manufacturers and chemists as representing a most practical view of the subject.

VAN NOSTRAND'S SCIENCE SERIES. Sewerage and Sewage Purification. By M. N. Baker. New York: D. Van Nostrand & Company. 1896. Pp. iii, ii, 144.

This excellent little addition to Van Nostrand's Science Series is devoted particularly to the disposal of sewage from the American standpoint. It really relates as much to the laying of sewers as to the disposal works, and the disposal works themselves are very fully treated, the discussion of which is particularly to be commended.

AN ADVENTURE IN PHOTOGRAPHY. By Octave Thanet. Illustrated from photographs by the adventurers. New York: Charles Scribner's Sons. 1893. Pp. xi, 179. Price \$1.50.

There are few brighter writers than Octave Thanet, and to our mind the authorship of this book is an excellent recommendation. It describes the author's adventures in the South with her camera, details her troubles and her successes, and throughout is replete with hints as to photographic processes. The work throughout is couched in most lively language, and whether one understands photography or not, is most excellent and lively reading. There are numerous illustrations, many of which serve as pegs on which to hang the story.

DOMESTIC SANITARY DRAINAGE AND PLUMBING. Lectures on practical sanitation delivered to plumbers, engineers and others in the Central Technical Institution, South Kensington, London, under the auspices of the City and Guilds of London Institute for the Advancement of Technical Education. By William R. Maguire. Second edition. New York: D. Van Nostrand Company. 1896. Pp. 475. Price \$4.

Sanitary engineering from the scientific aspect is here excellently treated, for the book presents the practical application of scientific hydraulics to the plumbing of dwellings, and with much success. Instead of starting out with the practical presentation of its subject, the book opens with a reasonably good treatise on the elementary science, touches on the subject of the education of plumbers, passes on to sewage and sewage disposal, the rest of the work being devoted to sewerage and water supply. Throughout the plumber is kept in mind, and many useful hints may be gleaned by the workman of even many years' standing from the pages of this work. It has an index and a table of contents, is liberally illustrated, and is a tribute to the present desire of the public to have the best sanitary appliances in the dwelling house.

THE LOCOMOTIVE. Hartford, Conn. Published by the Hartford Steam Boiler Inspection and Insurance Company. New series. Vol. XVI. 1895. Pp. iii, 191.

The Locomotive is a trade publication and an example to all of how such a work can be conducted. It is a journal in which details of boiler accidents and explosions and much information in regard to boiler inspection, etc., are given; in which the practical points about boilers are discussed, and into which a considerable amount of interesting scientific matter relating to the subject finds its way. To our mind the journal is most interesting, and bound in book form, is a welcome addition to the library.

GESCHICHTE DER EXPLOSIVSTOFFE. Von S. J. von Romocki. II. Die rauchschwachen Pulver in ihrer Entwicklung bis zur Gegenwart. Mit vielen Abbildungen. Berlin: Robert Oppenheim (Gustav Schmidt). 1896. Pp. xi, 324. Price \$4.

This second section of this work is devoted to smokeless powders, and really gives a most admirable treatment of the subject. Those conversant with the language need not be troubled with the German type in reading it, the Roman type used in this book being one of its merits.

CHEMISTRY AT A GLANCE. A study in molecular architecture. Issued in series. No. I. Oxides. By Herbert B. Tuttle. New York. 1896. Pp. 59. Price 60 cents.

This is the first of some ten successive publications designed to cover the field of chemistry. The author works almost entirely with graphic formulae, and while this system of treating the subject is apt to lead one too far, yet the book, for a young chemist properly warned, will be, we believe, a most useful one, and will do a great deal to systematize his ideas. It will be easy enough for him to escape the danger of too great fixity by his work in the laboratory and his study of other books. Indeed, we believe that for the young chemist to start in this way, with chemistry as a purely mathematical science and then to find from investigation in the laboratory and in subsequent reading the numerous exceptions to the fixed theory which he will have formed, is perhaps the best and most useful way.

Business and Personal.

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Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

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(6908) S. E. E. says: I would like to know, first, what is the proper dressing or polish to use on kangaroo and goat or kid shoes to keep them from cracking. Also the proper dressing for patent leather to prevent cracking. A. Add some olive oil to some pure wax which has been melted in a water bath and then add lard. Mix thoroughly by stirring over a moderate fire. Add oil of turpentine, then a little oil of lavender. This will form a paste which should be put in boxes. Apply with a linen rag. The paste keeps the leather soft and restores the gloss.

(6909) R. G. writes: I have been experimenting with thin films. Thus far I have failed to secure a soap bubble mixture that would produce a lasting film. Can you give me a formula for a good mixture? A. C. V. Boys, in his interesting work on soap bubbles, says, "Common yellow soap is better than fancy soap." The mixture we like best is made as follows: "Fill a clean stoppered bottle three-quarters full of pure water (distilled water preferred). Add one-fortieth part of its weight of oleate of soda, which will probably float on the water. Leave it for a day, when the oleate of soda will be dissolved. Nearly fill up the bottle with pure glycerine and shake well. Leave the bottle stoppered for about a week in a dark place. Siphon off the clear liquid, add one or two drops of strong ammonia to every pint of the liquid. Use the mixture from a small working bottle. Do not get out the stock bottle every time a bubble is to be blown. Do not warm or filter the mixture." This mixture will keep for a year or so.

(6910) E. McD. asks: Can you inform me how to prepare a slide of crystals of Iodosulphate of quinine for microscopical examination? A. Mix 3 drachms of pure acetic acid with one drachm of alcohol, add 6 drops of diluted sulphuric acid (1 part acid, 9 parts water). Place one drop of this fluid on a glass slide and add a minute particle of quinine. After this has dissolved add a very small drop of tincture of iodine by means of a fine glass rod. After a time, chemical action ceases and the crystals begin to form slowly, without heat. These crystals are beautiful in polarized light.

(6911) J. D. asks (1) the meaning of ampere turns. A. The product of the amperes passing through a wire multiplied by the number of complete circles made by such wire. 2. Name some good open circuit batteries. A. The Leclanche is standard. Dry batteries are also excellent. For batteries see our SUPPLEMENT, Nos. 157, 158, 159, 792. 3. Where can I get catalogue of small electrical apparatus? A. Address any of our advertisers of electrical goods. 4. Name SUPPLEMENT number with simple ammeter and voltmeters. A. There are no really simple ones. For examples see our SUPPLEMENT, Nos. 652, 663, 618, 623, 668, 353, 734. 5. How many grains of copper does one ampere deposit? A. 0.33 milligramme per second. 6. Is T. A. Edison a college graduate? A. No. 7. Name SUPPLEMENT number with induction coils. A. Nos. 160, 569, 323.

(6912) A. J. E. writes: 1. Constructed as directed, which of the two motors, 759 and 641, would give more power? A. The motor of SUPPLEMENT, No. 759, is the more powerful. 2. Could motor 641 be wound so as to furnish $\frac{1}{2}$ horse power, with two cells of Edison-Lalande batteries? A. No. 3. For a drum armature would disks of tin answer as well as carriage washers or punchings? A. Disks of sheet tin would answer, as this is simply tin-plated sheet iron. 4. Are the disks insulated from the shaft in a drum armature? A. They need not be. 5. Which is better for the fields of motor 641: (a) the laminated sheet iron as shown, (b) cast iron fields, or (c) fields made up of a piece of wrought iron $\frac{1}{2}$ inch thick? A. For even cross section the solid wrought iron field is slightly the better.

(6913) S. & T. write: We wrote you about length and size of wire for resistance for Plante storage cells. You gave iron wire 10-12, but did not know potential or current. The dynamo is 110 volt current and is made to run 100-110 volt lamps. Is the number of lamps the machine is able to light the potential? A. There is no such thing as a 110 volt current. Potential is expressed in volts, current in amperes. You require about 50 amperes of current for 100 16 candle power 110 volt lamps. A No. 5 or even No. 6 copper wire would carry this—a No. 0 or No. 00 iron wire. The amount a wire will carry varies with its surroundings. If exposed to the air, it will carry more without dangerous heating than if insulated and tightly wound. The smaller iron wire would be quite large enough, if wound in a loose spiral. The potential of the machine gives the voltage of the lamps proper to go with it.

(6914) F. A. McL. asks how many vibrations it takes to produce the lowest note on a piano, say A, and if they increase regularly or not. That is, does each note increase with the same number of vibrations of its neighbor? Do every two notes differ with the same number of vibrations as you go up the scale? What is the number of vibrations to produce each of the notes of the piano keyboard? A. The middle C is taken generally as corresponding to 256 double vibrations per second. C one octave below has one-half this number of vibrations, C one octave above has double, two above four times and so on. Then for the musical scale, taking C as unit, the other notes are represented by fractions, as C=1, C sharp= $\frac{16}{15}$, D flat= $\frac{16}{15}$, D= $\frac{16}{12}$, D sharp= $\frac{16}{11}$, E flat= $\frac{16}{11}$, E= $\frac{16}{10}$, etc. Thus to get the number of vibrations in any of the above in the octave above middle C, multiply 256 by the fraction. All this is subject to variations in the standard pitch. Thus the French standard middle C has 261, the English 256 double vibrations. The lowest audible note is about 16 per second; under some conditions it is claimed that 9 vibrations per second have been audible. On some grand pianos A with 27 $\frac{1}{2}$ vibrations per second is included on the keyboard, and the range may go up to A \sharp with 3520 or C \sharp with 4324 vibrations per second. The intervals between notes are expressed by fractions, thus: C to D $\frac{9}{8}$, D to E $\frac{8}{7}$, E to F $\frac{4}{3}$, etc., each interval being the quotient of the ratio of the lower divided by the ratio of the higher note.

(6915) W. asks: 1. Approximately, what would be the dimensions of permanent magnets, giving an output of three or four 16 candle power lamps—alternating current? A. This question cannot be answered without knowing the quality of the magnets and voltage of lamps. You would need 20 square inches of pole area and 2,500 turns of No. 18 wire on the armature, taking low excitation of the magnetic circuit. 2. Driven by the same power, how many more 16 candle power lamps would an alternator furnish over a direct current machine? The fields being excited by a separate dynamo, the above power being figured on the basis of one-half horse. A. There should be little or no difference. 3. Will the power or current required to excite the fields equal the additional lights in the above? A. You cannot escape using power to excite fields, whether derived from an outside source or from the dynamo itself. 4. Would it not be better in small plants to use the alternator more extensively, of course double winding the armature, for current to excite the fields? Would there not be less fluctuation in the lights with the variations of the power, and would not less trouble be experienced in general management of dynamo and lights? A. Each type of generator and plant has its own advantages and disadvantages. The direct current is more convenient in some ways and is less liable to give bad shocks.

(6916) H. V. S. asks how to prepare a simplex or hektograph for producing copies of letters. A. Our SUPPLEMENT, No. 438, contains an illustrated description with full details of the hektograph. We can supply it by mail for 10 cents.

(6917) E. A. B. says: There is a preparation being sold by parties in different parts of the country, which, in solution, will preserve quite perfectly fruits and vegetables immersed in the solution and kept covered by it, sealing not being necessary. Can you tell me what this preparation is, and how to make it, or where to procure it in bulk? A. Use only fruits and vegetables which are thoroughly sound. The fruit or vegetables may be washed if desired. The fruit may be packed in jars, crocks, or kegs as desired. Put it in as closely as possible without injuring the fruit, as the more compact it is packed the smaller will be the quantity of liquid required to cover it. Take two ounces of salicylic acid and twenty-five pounds of sugar (coffee C); the acid and the sugar are dissolved in $6\frac{1}{2}$ to 7 gallons of hot water. See that both the sugar and acid are all perfectly dissolved, let the solution get cold and then pour on enough of the liquid to cover the fruit. The top of the vessel should be covered, but need not be sealed. The quantity of sugar is usually sufficient to make the fruit sweet enough for table use. The quantity of liquid named above is sufficient to cover about twenty-five gallons of fruit. For preserving pease, beans, tomatoes, sweet corn, pickles, etc., the quantity of acid remains the same, but twenty ounces of sodium chloride (common salt) are added and the quantity of hot water is reduced to five gallons; proceed as before. When cold, the vegetables can be covered with the liquid. It is very essential to see that the fruit or vegetables are completely covered by the solution at all times. Any fruit found floating on the top should be promptly removed, as it would tend to contaminate the contents of the vessel. If it is found that the solution is evaporating, more of the liquid should be added. It is perhaps as well to have the crocks, etc., have