The Acetylene Gas Hazard.

The National Board of Fire Underwriters, at its recent annual meeting, approved a set of rules for governing the acetylene gas hazard, because of the attempts to introduce acetylene gas as an illuminant in various parts of the country. These rules are based upon a special investigation of the gas by Prof. Henry Morton, of the Stevens Institute of Technology, undertaken at the request of the National Board.

The special sub-committee of the board, in its report upon the work of Prof. Morton, stated that there was a growing demand from department stores and other general stores, where bicycles or bicycle sundries are dealt in, for permits to keep and sell calcium carbide and portable lamps for its use.

Acetylene gas is produced by the action of calcium carbide on water, and is rapidly coming into use for illuminating purposes. Various bodies of insurance men have attempted to control the conditions of its installation, on account of its great instability and tendency to cause destructive explosions.

The rules adopted by the National Board last week for its regulation will now be referred to the several associations throughout the country, with the hope of obtaining a uniform standard.

The more important of these new requirements for the installation and use of acetylene gas are as follows:

The generating and gas-holding apparatus, when installed for lighting buildings in the closely built-up portions of towns and cities, must be situated in an outside, fire-proof, and well ventilated building.

All generating apparatus should be in charge of persons properly instructed in their management.

No artificial light should be used inside of the building in which the gas is generated, and no heat except steam.

Bicycle and other portable lamps, in which acetylene gas is generated and supplied direct to burners, should not be approved until such lamps are so constructed that they will cease to generate gas immediately upon the extinguishment of the flame.

The storage of liquid acetylene in any building, or the use of liquid acetylene gas, should be absolutely prohibited.

In regard to the construction of the generator and gasholder, it is recommended that only wrought iron or steel, capable of resisting an internal pressure of twenty pounds to the square inch, should be used, and under no circumstances should copper or any alloy containing copper, such as brass or bronze, be employed, since acetylene sometimes forms a compound with copper with great violence when heated or struck.

It is also recommended that the generator be so designed that it can be supplied with calcium carbide, and the residuum withdrawn without the escape of gas or the admission of air, in order to insure the prevention of dangerous explosive admixtures of air with the gas in the generator.

Technical Education in Germany and America.

The war upon which we have entered will change, has indeed already changed, our relations to foreign countries. We shall undoubtedly be drawn more deeply into the stream of competition with respect to the arts of peace. It is difficult for us to realize how much these depend upon the system of public education, nor how deficient we are in provision for certain lines of scientific and technical training which are essential to their full development. This is a lesson that England has learned on her part, through the sudden rise of German manufactures, and the lesson that Germany learned in view of the artistic superiority of her French competitor. It is evident that Germany intends to excel in manufactures, as she has in arms, and she goes about it with the same masterful thoroughness. A recent deputation from Manchester to investigate the technical schools of Germany, reports extraordinary development in electrical sciences as applied to electrical engineering industries. Darmstadt, with a population of 57,000, capital of a duchy numbering in all but 1,000,000 people, maintains a technical high school of university rank. It has the most elaborate equipment for electro-chemical studies and is attended by more than 1,000 day students above eighteen years of age. They enter after thorough preparation in the secondary schools, and the general industry of the country gains by the extended time given to scientific technical training. In this way alone can there be maintained an adequate supply of men competent to direct the great manufactories.

The development of textile schools, including all the various branches of spinning, weaving, designing, dyeing and finishing, particularly impressed the Manchester committee. Laboratory methods, they note, have been discarded in those branches in which chemistry plays a part; the equipment is on a scale approaching that of the works themselves, and affords the same kind of practice as that obtained in the spinning and weaving schools. Thus, students get a practical and effective knowledge of the processes employed. At the renowned Crefeld school, the Prussian government has recently built and equipped a large three-story building as a dyeing and finishing school. Besides the chemical and physical laboratories, drawing rooms, lecture and testing rooms, it contains a fine chemical museum, and a library in which are to be found the technical books of all nations. The instructors are carefully selected and are men of distinction in their specialties. As proof of the esteem in which the school is held, the fact is noted that it is intrusted by the Royal Gobelins factory, in Berlin, with the dyeing of the yarns used in its special productions; also that many manufacturers send yarns to be dyed in shades that they cannot produce. The weaving school is supplied with one hundred and thirty looms. The fees for Prussians are $30 and $45 per session; for other Germans, $45 and $72; and for foreigners, $120 and $180. Recently it was proposed to exclude all foreigners from this and similar schools in the kingdom. The committee observe that these various arts, and especially dyeing, are matters of far greater moment to Manchester than to Crefeld. At the Berlin Municipal Higher Weaving Schools they found the students engaged in manufacturing materials for which Berlin enjoys special repute; namely: buttons, gimp, braids, gold and silver thread, etc., many of which, they regretfully observe, were formerly made at Manchester.

The trade in mantles and ladies' clothing, in which these small wares are used, amounts to $5,000,000 annually. The jealousy with which the secrets of the manufactures are guarded is shown in the exclusion of visitors from the department of the Bureau of Education (Berlin), where models, diagrams and other means of illustration are prepared for distribution to the technical schools of the country. The commercial importance of this elaborate provision of appliances and training is illustrated by the single fact that the world's market in coloring matter and pharmaceutical products derived from coal tar is commanded by Germany. The annual value of these products is estimated at $50,000,000. Germany controls three-fourths and sends 75 per cent of her share abroad. The feature of their system upon which the Germans themselves place great stress, and which the Manchester committee emphasize in their report, is that of thorough general instruction as preliminary to the technical. Money inducements are offered to enable young men of promise to give the time required for adequate preparation as "captains of industry."—The Independent.

RECENTLY PATENTED INVENTIONS.

Bicycle Appliances.

BELL.—William G. Toepfer, New York city. This bell is operated from one of the supporting wheels of the bicycle and is so constructed that two gongs shall be alternately operated by a single trip-wheel. To opposite sides of a rocking support, attached to the frame of a bicycle, the gongs are fastened. The trip-wheel carried by the support engages with the wheel of the bicycle. Levers are connected with the striking arms of the gongs, and are fulcrumed on the pivot of the rocking support. Trip devices carried by the trip-wheel at at its opposite sides extend into the paths of the striking arms and are arranged to operate the latter.

MUD-GUARD.—Charles L. and Alfred A. Seaquest, Portland, Ore. The mud-guard provided by this inventor is designed to be attached to the axles of bicycle wheels and to prevent mud from flying against the rider. The mud-guard has a length of wire bent at an intermediate pomt. A web attached to the wire adjacent to the bend forms the mud-guard proper. Two additional wires are respectively connected with the arms of the first-named wire. Each of these additional wires and each arm of the first-named wire are embraced by a link. Each end of the first-named wire and the free ends of the second-named wires are bent transversely to fit into the tubular portions of two clips by which the guards are held in place.

RAILWAY-ATTACHMENT FOR BICYCLES.—Charles E. Nichols, Milan, Wash. This invention provides for an attachment by which an ordinary bicycle may be ridden upon railway rails. The attachment comprises essentially a balancing-wheel and a guide-wheel. The balancing-wheel is unflanged and travels upon the rail opposite that over which the bicycle runs. The guide-wheel is flanged and located in advance of the steering-wheel. The wheels are connected to the frame by bars or rods, means being provided for uncoupling the latter. A cord enables the rider to lift the guiding wheel from its track.

Mechanical Contrivances.

ADDING AND RECORDING APPARATUS.—William J. Ensworth, Erie, Pa. The purpose of this invention is to provide an apparatus for registering and recording figures, and to such an end it embodies printing devices for impressing individually the numbers and registering wheels for casting the individual numbers into a total or aggregate sum. The printing devices comprise a series of wheels with printing keys, adjustable by turning the wheels and coacting with an inking ribbon to effect an impression. The registering devices comprise peculiarly constructed registering wheels, always serving to show the sum of the numbers impressed by the printing devices. The two divisions of the apparatus are geared with each other, so that the registering wheels act promptly upon the initial movements of the printing wheels. The machine is useful in banking and mercantile establishments, where it is desirable to dispose many individual numbers in a single column and at the same time to add them into a sum or total.

COMBINED ORE CONCENTRATOR AND SLIMER.—Franklin W. Harlow, Eureka, Col. This apparatus is designed to separate the tailings from the ore in a very simple manner, without causing a great running expense. The apparatus is provided with a bed or pan having a pocket in its bottom and outlet funnels having spouts, the outer ends of which extend through the bottom of the bed at the pocket. The funnel-bodies are held above the bottom of the bed and extend upward to allow the concentrates to settle in the bottom of the bed and to permit the water and tailings to flow down through the funnels. A caisson is arranged over each funnel and is open at the top and bottom. The lower end of each caisson is located a short distance above the top of the corresponding funnel-body. A hopper, located beneath the bed, receives the material passing through the funnels and an endless apron traveling beneath the hopper receives the material discharged upon it.

Miscellaneous Inventions.

ELECTRIC ARC LAMP.—Frederic Wright, Newburg, N. Y. The object of this invention is to provide a lamp having a series of carbons arranged in magazines and having a central main for feeding the carbons automatically one after another as they are consumed. The carbon-magazines are mounted on a casing and carbon-holder tubes extend from the magazines and converge. Carbon locking plates are located on the tubes. An arrangement of solenoids and levers automatically controls the locking plates.

BOILER-FLUE CLEANER.—William Semke, Harrison, Kan. The purpose of this invention is to provide a flue-cleaner in which steam from the boiler may be discharged through a suitable head in the interior of the flues to loosen and remove all adhering foreign matter. The head has an outer section flaring toward and approximately to its front edge. An inner section screws into a nipple formed in the rear of the flaring portion and is closed at its outer end. This section, furthermore, flares forward to a point near its front edge, where it is given a strong outward flare and closely approaches the beveled edge of the outer section, forming therewith a steam passage provided with annular series of openings through which steam passes to flow into the space between the shells.

GARBAGE-CLOSET.—Cornelia S. Robinson, New York city. This garbage-closet is formed in the wall of a building and has a portion of its outer wall inclined downwardly and outwardly, forming a hood projecting out beyond the outer face of the wall of the building and having its bottom closed by a screen. The closet is provided with a flue at the top to carry away the odors.

VENTILATING ATTACHMENT FOR WINDOWS.—Karen C. Sanborn, Brooklyn, N. Y. This attachment is adapted to be fitted in the space between the inclined lower sash and window-frame, provision being made for protection against the entrance of insects. The window-frame is provided with stop-beads hinged to the inner edge of the frame and adapted to be carried parallel with the inner vertical faces of the sides of the window-frame. The lower sash, held to slide in the frame, can be inwardly inclined when the stop-beads are swung inwardly on their hinges. Between the space produced between the sash and frame the attachment is fitted. This attachment comprises a framework covered with a perforated material, locking devices being provided to secure the attachment in place.

ANTI-RATTLING NUT-LOCKING DEVICE FOR THILL-COUPLINGS.—Charles T. Redfield, Glenhaven, N. Y. The purpose of this invention is to provide a device which can be easily applied to the pivot-bolt of a thill-coupling. When the nut of the bolt is screwed up, it will force the device to a positive bearing on the barrel of the coupling and at the same time hold the nut on the bolt in the adjusted position, the bearing of the device on the barrel and its bearing on the nut being independent in action. The device consists of a spring body provided with a tongue-section between its ends and with wings at the ends, one adapted as a means of support and the other for locking engagement with the nut of the pivot-bolt of the thill-coupling.

EXTENSION TABLE.—Charles Poupon, Eagle Lake, Fla. This invention provides for an improvement in extension tables, particularly those which are circular in form, the purpose being to enable a table to be adjusted to any diameter within its capacity by turning a crank or adjusting wheel. The table has its top formed of a large number of sectors, so connected and guided that they may be moved radially inward and outward. The central portion of the table is formed of a thin metal plate covering the sectors, from beneath which they project when the table is extended. In connection with the sectors, adjustable rails or rings are used, which support the outer ends of the sectors, and to which are attached the adjusting means and legs for supporting the outer ends of the sectors. The sectors are also provided with springs to separate them when they are extended and also with a flexible connector by which undue separation is avoided. The bars attached to these rings and to the legs lie radially. The bars are toothed and engage with a central pinion by which all of the bars are forced outwardly or inwardly at the same time and at the same rate.

FOLDING UMBRELLA.—Frank E. Stover and Frank G. Grove, Luray, Va. This invention is an improvement upon that class of folding or collapsible umbrellas in which the ribs are made in sections adapted to slide on one another, rendering it possible to fold the umbrella into half its normal length. The umbrella is provided with a stick formed of telescoping sections provided with longitudinal slots, the slot of the inner section being the longer and sliding in the outer section and formed of two members connected by a link. Ribs are carried by the outer stick section and are formed of sections sliding upon one another. Runners are located on the outer stick section. Two sets of stretchers are pivoted to the runners and to the lower rib-sections. A latch is pivoted in the slots of the stick sections and serves to lock the lower runner in position and the sections of the stick together when the umbrella is opened. A cover is secured to the lower rib sections and is provided with a central opening in which the upper end of the inner stick section is free to slide.

APPARATUS FOR PLAYING DUPLICATE GAMES OF CARDS.—George L. Castner, Brownsville, Tenn. In this apparatus a tray is provided with holders for the reception of the cards. An extension from the body of the tray receives the index projections of a guide board for the purpose of determining throughout the game a certain preferred position of the tray. The projection from the tray has indicators whereby it may be readily determined whether the reverse or the obverse side of the tray is uppermost. This device is of service in playing games similar to duplicate whist.

BINDING FOR BLANK BOOKS.—William B. Boorum, New York city. This invention is an improvement in temporary or refillable bindings for blank books and is particularly intended for use in connection with pads or loose sheets, to form a book for the reception of memoranda. The binding comprises boards forming the sides of the cover, one of the boards being of the full width of the book and the other being narrower. Flexible connections are provided between the boards. There are also means for securing an intermediate portion of the flexible connection to one side of the book-body near its back, whereby either board may be folded about the back and lie smoothly against the other.

BELT-BUCKLE.—Emma B. Winter, New York city. The object of this invention is to provide a buckle which can be conveniently attached to and adjusted on a belt without requiring any sewing. The invention consists principally of a buckle-frame provided on its back with a hook, a toothed bar for engagement with the belt material, the bar being spaced from the back of the frame, and a plate projecting at one side and likewise spaced from the back of the frame, for the passage of the belt between the frame and the plate and for doubling up the end of the belt over the plate, finally to engage the doubled up end with the teeth of the bar.

BOTTLE STOPPER.—John F. Perry, Chicago, Ill. The purpose of this invention is to provide a bottle stopper of simple and cheap construction, which shall require neither the use of external wires or bails, nor the use of a corkscrew, and which shall tightly close the bottle without allowing the contents to come into contact with cork or rubber. The stopper consists of a rigid top-portion with lugs on its sides and a lower elastic plug portion with a rigid facing on its lower end. The bottle-neck has vertical channels and transverse locking grooves, a shoulder lower down in the bottle-neck being adapted to receive the rigid facing on the lower end of the elastic plug to compel the lateral expansion of the plug.

DOOR-HANGER.—James E. Owen, John C. Gabel, Jr., and George F. McKinney, Onarga, Ill. According to this invention a hollow track is provided with a slot in its bottom and with brackets extending around the track from one side of the slot to the other. A carriage is held to travel in the track and consists of a body-bar which extends within the slotted portion of the track. Wheels at each side of the carriage travel in the bottom portion of the track. A drop-door is connected to the carriage by hinges, each hinge consisting of three members

having a knuckle connection. The lower member of each hinge is secured to the upper portion of the door, the upper member of each hinge being attached to the carriage. A rod connects a lift-lever fulcrumed upon the door with the carriage. A bolt held to slide and rock upon the door is provided with a lateral cam projection adapted to engage the door when the bolt is rotated. A keeper is provided for the bolt independently of the door and also a locking device for the bolt. The device is applicable to freight cars, barns, refrigerators, etc.

Designs.

ANTI-RATTLER PLATE. — Charles T. Redfield, Glen Haven, N. Y. The leading feature of this design consists in arranging an upright wing at an angle slightly less than a right angle to the lower or base wing, which is tapered toward its free end. At its upper end the upright wing is provided with a lateral forked extension.

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References to former articles or answers should give date of paper and page or number of question.

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(7461) M. R. B. asks how to prepare a drill for making holes in glass. A. A flat drill, made of new steel and heated to a dark red and plunged in the ordinary zinc chloride soldering solution, will drill glass readily. The drill must be sharpened before it is hardened.

(7462) R. A. C. says: 1. How can a fine telescope lens be cleaned without injuring it? A. A very soft old linen handkercbief is best; if greasy, wipe with a little tissue paper wet witb weak alkali. Lenses should be cleaned as rarely as possible; use old linen, not silk. 2. How can ranges of vision at sea, from different elevations, be estimated? A. You will find a full description of range finders in our COAST DEFENCE SUPPLEMENT. Mailed for 25 cents.

NEW BOOKS, ETC.

THE STORAGE BATTERY. A Practical Treatise on the Construction, Theory and Use of Secondary Batteries. By Augustus Treadwell. New York: The Macmillan Company. 1898. Pp. xix, 257. Price $1.75.

In pursuing his work with storage batteries the author found himself greatly hampered by the lack of any compact data concerning the construction of many cells which have been and which are on the market and by the paucity of reliable discharge curves. Believing that a book containing such data and curves would prove valuable, not only to the student and manufacturer, but also to all who are interested in storage batteries, he began the compilation of the book and has succeeded admirably. American and foreign patents are cited at the bottom of the pages.

A TREATISE ON MAGNETISM AND ELECTRICITY. By Andrew Gray. In two volumes. Vol. I. London and New York: Macmillan & Company. 1898. Pp. xvi, 472. Price $4.50.

The author of the present work deals with the subject largely from a mathematical standpoint. The work is not a treatise on the mathematical theory of electricity only, but successfully brings theory and practice together. Some elementary acquaintance on the part of the reader with electrical phenomena and their laws is presupposed, and a considerable knowledge of mathematics is also needed. By those who can understand a work of this kind it will be warmly welcomed.

COAL CATECHISM. By William Jasper Nicolls. Philadelphia and London: J. B. Lippincott Company. 1898. Pp. 218. Price $1.50.

The "Coal Catechism" is intended for a great number of intelligent readers who have no technical training and yet who prefer to seek knowledge by reading special subjects rather than fiction. A large proportion of them have neither time nor inclination to peruse the great geological and statistical reports of the coal industry of the United States or to study the subject in technical works. Information is conveyed in the popular question and answer form. It is rather a good idea to have a series of books on similar subjects, and it is to be hoped that this volume may be the precursor of many others dealing with similar subjects. The book is attractively printed and bound and is provided with a comprehensive index.

THE TRACTION ENGINE: ITS USE AND ABUSE. By James H. Maggard. Revised and enlarged by an expert engineer. Philadelphia: David McKay. 1898. Pp. 128. Price $1.

A book of instruction for operators of farm engines has been needed for some time, and the present work appears to deal with the subject in a practical manner. First a general description of trucking engines is given, followed by general directions for the proper use of engines and boilers, telling what to do in case of an emergency.

TALES FROM McCLURE'S: WAR. Being true stories of camp and battlefield. New York: Doubleday & McClure Company. 1898. Pp. 193. Price 25 cents.

A charming series of little books is now being issued by the publishers of McClure's Magazine. The present volume, of almost vest pocket size, contains a number of thrilling stories by Major-General Nelson A. Miles and others.

AMERICAN CEMENTS. By Uriah Cummings. Boston: Rogers & Manson. 1898. 8vo. Pp. 299. Price $3.

Since the publication of Gen. Gillmore's classic work, many years ago, no book has been produced which deals with the subject of American rock cements. The period since the publication of Gen. Gillmore's treatise has been far the most important in the history of the industry. The changes which have taken place during this time, the marked advances which have been made and the new processes which are being employed and the marvelous growth of the trade resulting from a widening of the markets for the production, clearly present a profitable field for investigation, and furnish many facts worthy of record. In the present book adequate consideration has been paid to the claims and merits of American rock cements. The arrangement of the book is excellent, and it is a fine piece of technical book-making. The subject of cements is treated in all its bearings and special attention is paid to tests of all kinds. Another section of the book is devoted to various cement works, including artistic views of them. There is quite a full list of structures made in American rock cement, giving the location of the various cement works from which the cement was obtained.

OUTLINES OF PRACTICAL HYGIENE. By C. Gilman Currier, M. D. Third edition, revised and enlarged. E. B. Treat & Co. 1898. Pp. 461. Price $2.

Practical hygiene is one of the most important subjects which the architect or physician has to encounter. The present work appears to be an eminently thorough and practical treatise upon the subject, dealing with soil and climate, clothing, bathing, exercise, occupation, lighting, heating, ventilating, building and streets, foods, diet, water, the disposal of wastes, the disposal of the dead, bacteria, disease and disinfection, longevity, etc. The book does not discuss therapeutical measures, except in so far as they belong legitimately within the domain of hygiene.

A MANUAL OF HYGIENE AND SANITATION. By Seneca Egbert. Philadelphia and New York: Lea Brothers & Company. 1898. Pp. 368, vii. Price $2 25.

The present work contains a plain statement of the fundamental principles and facts of hygiene and sanitation, together with such explanations and details based on American practice as serve to make the work clear and readable. Of all the medical sciences, clearly the most important is that which prevents disease instead of curing it, and which deals with entire communities as well as with individuals. We cannot have too many good books on this subject. The present book appears to be an excellent one and fully up to the times.

HAND-BOOK OF NATURE STUDY. For teachers and pupils in elementary schools. By D. Lange. New York and London: The Macmillan Company. 1898. Cloth, 12mo. Pp. 329. Price $1.

This work is a valuable primer to natural history and science, and is calculated to afford teachers the means of inculcating their pupils with desirable and essential knowledge regarding the more common plants, trees, birds, insects and quadrupeds, without entailing upon themselves special courses of study. The book is thoroughly practical, and as valuable to the instructed as to the instructor.

THE GENERAL MANAGER'S STORY. Herbert Elliott Hamblen. New York: Macmillan Company. 1898. Pp. 311. Price $1 50.

We cannot have too many good stories about American railway life, which differs in many respects from that in other countries. The book is very interesting and, at the same time, gives a great deal of information about railroading which the ordinary individual is desirous of acquiring, when he can obtain it with little mental effort. After reading this book, one can discuss learnedly about "broke in two," "flagging" and other mysteries of the rail.

ELECTRIC CATALOGUE OF ELECTRICAL PLANTS AND MACHINERY FOR ELECTRIC LIGHTING, TRANSMISSION OF POWER, ELECTRO-PLATING, DEPOSITING, WELDING, ETC. By Ernest Scott & Mountain, Limited. Newcastle-on-Tyne.

The volume before us is a bound collection of catalogues, and is interesting as showing the use of electric power for many purposes. It is handsomely got up and is freely illustrated by wood engravings, half tones and line drawings. It probably illustrates some of the best examples of British engineering practice.

THE DIFFERENTIAL. Published by the Junior Class of Case School of Applied Science. Cleveland, Ohio. Pp. 147, xxxiii.

THE MDCCCXCIX CORNELLIAN. The book of the Junior Class of Cornell University. Vol. xxx. 1898. Pp. 284, 49.

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