RECENTLY PATENTED INVENTIONS.

Agricultural Implements.

GRAIN-DRILL.—Frank A. Placek, Milligan, Neb. The drill is designed to work equally well in hard, soft, trashy, or stubble ground. A sharp diamond-shaped runner is combined with the grain-tube. The runner clears the way for the shovel; the shovel opens the furrow; and the grain-tube delivers the seed into the furrow in two distinct parallel rows.

HARROW. — Hans H. Larsen, Campbell, Minn. The object of the invention is to improve harrows as regards the frame, teeth, and wheels or rollers, which are thrown down to elevate the teeth and support the harrow in traveling to and from the field. The parts are few in number, readily interchangeable, and are so arranged as effectively to brace the teeth. The form of the teeth makes them self-cleaning; and the novel mounting of the wheels, which are arranged in pairs on independent shafts to be separately rocked, facilitates the throwing down of the wheels and the raising of the frame by dividing the labor into two simple and easy operations.

WEED-CUTTER.—James McCorkell and Neil McEachern, Helix, Ore. The weed-cutter will also serve as a cultivator and will not clog. The construction is such that the blades or shares can be adjusted for effective work in all kinds of soil. The device automatically accommodates itself to any inequalities of surface and may be made in a group of independent sections.

Electrical Apparatus.

LIGHTNING-ARRESTER.—Charles M. Taylor, Georgetown, Ky. The object of the invention is to provide an arrester of simple construction which will carry off a lightning-current from telephone or telegraph line-wires, without grounding the line-wire. The lightning-arrester comprises vertically-extended grounding-plates insulated one from the other. A sleeve or collar holds the plates in their proper relation to one another. One of the plates is arranged in a frame of insulating material. The plates are electrically connected with a line-wire and with a grounding-wire.

TELEPHONE SWITCHBOARD, ANNUNCIATOR AND JACK.—Charles T. Mason, Sumter, S. C. The invention consists of a spring jack and indicating instrument or annunciator; springs and metal strips controlling the operator's talking and ringing circuits; and means for automatically restoring the annunciator or drop-shutter. All parts are operated by the application and adjustment of the plug. The object of the invention is to furnish a combination instrument capable of being adapted to any of the various arrangements of circuits which are assembled to constitute a telephone-exchange switchboard. The instrument embodies all the requisites of a metallic or single-circuit system.

ELECTRICAL RAILWAY.—James D. Robertson, La Salle, Ill. The invention is an improvement in electric railways, in which an electric supply-conductor is arranged in a conduit or between the track-rails, the object being to provide an electric railway which will be comparatively cheap to construct and maintain in order. A conductor for a heating medium is provided to prevent an accumulation of snow or ice around the distributing rails or cables. The heat-conductor is so arranged that it may also be used to supply current to a car-motor.

Mechanical Devices.

WAVE AND TIDAL ENGINE. — Joseph J. McIntyre, Brooklyn, New York city. The invention provides a simple power device adapted to be placed upon or over a wharf and designed to be operated by the rise and fall of the tide. The machine is so constructed that the power derived from the rise and fall of the water will be multiplied and communicated to a shaft from which power may be taken. The machine may be connected with the deck of a boat or a float, so that the vessel may careen, rock, or toss without interrupting the operation of the machine and without injury to any of the parts.

Packing Appliances.

CUSHIONING-BODY.—Robert I. Stewart, Xenia, Ohio. This invention is an improvement in cushioning-bodies formed of corrugated sheets and adapted for use in egg-crates and in packing bottles and other fragile articles. The sheet is made so that its corrugations are held in the desired form. Such sheets, when formed of a number of layers, will not split.

WOODEN SHIPPING AND PACKING BOX. — Russell B. Fuller, Holland, Mich. It has been the inventor's object to devise a wooden shipping and packing box, designed for perishable goods and arranged to insure a perfect ventilation of the goods and to permit the convenient storing and packing of a large number of boxes in railroad-cars without the use of shelves and without danger of crushing the goods or injuring them by rough handling.

DEVICE FOR PACKING CIGARS.—Frank P. Folsom, Ashland, Neb. In a table or support a top plate is mounted to slide. Pivotally connected with the top plate is a bottom plate. Lever mechanism presses the plates together. A box of cigars is placed between the plates; and the cigars are pressed into the box by the two plates.

Vehicles and Accessories.

ICE-CYCLE. — Dietrich W. Tietjen, Milwaukee, Wis. The purpose of the invention is to provide an attachment for bicycles so that they can be employed on ice. To this end Mr. Tietjen employs detachable runners for raising the tires of the bicycle above the ice-rim for the rear or traction wheel of the bicycle, such rim being arranged to engage the ice in order to propel the bicycle.

FIFTH-WHEEL.—Monroe Hoagland, Henderson, Ky. The construction of this fifth-wheel is such that it can be placed rearwardly of the front axle, thus mounting the front axle so that the vehicle can be turned much shorter than would be possible were the center of movement coincident with the longitudinal line of the axle.

MOTOR-VEHICLE.—Avon M. Coburn, Daunt, Cal. The inventor mounts his engine horizontally and causes it to drive a power-shaft journaled in the middle of the vehicle below the seat. The power is transmitted by belt and pulley to an intermediate shaft and then by sprocket and chain to the rear axle. By this arrangement power is transmitted without jerk or jar to the driving-wheel.

VELOCIPEDE.—James Preston, Tuckahoe, N. Y. In this vehicle the driver's weight is used as a propelling power. The saddle is secured to a rocking frame which transmits its movement by a crank mechanism to the rear wheel of the bicycle. When the rider propels the wheel he obtains a very uniform and healthful exercise of the legs as well as of the body, owing to the alternate shifting of the weight from the seat to the pedals and *vice versa*.

BICYCLE.—Joseph P. Schooler, Grant's Pass, Ore. Lever-power is utilized in the form of a treadle to drive the ordinary form of safety-bicycle in such manner as to enable great force to be exerted and to secure a high speed with small expenditure of energy.

Miscellaneous Inventions.

SQUARE.—Armand P. Dubus, New Orleans, La. This square is adapted especially for marking key-ways on shafting. The square comprises a head having two straight edges at right angles to each other and provided with two legs at right angles to each other and with an aperture. In each straight edge is a spirit-level; and in the aperture of the head a spirit-level is adjustable. A scale slides in the head with its reading edge equidistant from the legs.

SPRING SHADE-ROLLER.—Edward C. Cordes, La Grange, Ill. The spring attachment for shade-rollers is so constructed that simplicity, durability, and economy are combined; that when the roller rotates, wabbling is prevented; and that the dogs ordinarily employed may be dispensed with in favor of more positive and quicker checks.

HOTEL-REGISTER.—John Bullock, Manvel, Cal. Mr. Bullock has invented a simple arrangement by which keepers of hotels and boarding-houses will be able correctly to prepare and preserve a record of the time their several guests or lodgers stay with them and of the number of meals taken, so that bills may be made out properly.

DINNER-PAIL.—May Welkee, Oakland, Cal. In order that the food may be heated before it is eaten, the pail is provided with a detachable bottom section carrying a heating device, preferably an alcohol lamp. Within the pail a water-pan is placed to be heated by the lamp, over which pan the vessel carrying the food is arranged. The top of the food-vessel is provided with compartments for liquids.

MEANS FOR DISCHARGING FIRE-EXTINGUISHING LIQUIDS THROUGH GAS-DISTRIBUTING PIPES.—Alexander Reid, Jersey City, N. J. The invention relates to a means for directing water or other fire-extinguishing liquid through the gas-pipes of a building. In case of fire, the water-pressure on being turned on, automatically cuts off the gas supply, leaving the gas-distributing pipes free to receive and discharge the extinguishing liquid into a room. Thus a fire-extinguishing system is provided at a small cost.

CURTAIN-POLE RING.—John Kroder, 268 Canal Street, Manhattan, New York city. Mr. Kroder has devised an improvement in curtain-pole rings having inside antifriction rollers adapted to travel on the pole. His ring is provided with recesses at the inside, into which recesses sockets are driven and held in place by frictional contact with the walls. A ball is held against displacement in each socket and is mounted to turn freely and to project beyond the inner side of the ring.

INCUBATOR. — John H. Hughes, Mianus, Conn. The heated fresh air, after passing through the egg-chamber, is carried from a foul-air chamber to discharge-chambers connected with the outer air by the pipe. Consequently a uniform and natural circulation of air is obtained without the slightest danger of the contact of foul air with the eggs. No dampers or other mechanical contrivances are required for regulating the air passing through the egg-chamber.

CUE-TIP FASTENER. — Romeo Ghezzi and Virginio Bianchi, Manhattan, New York city. The tip is provided with a spring-yielding loop which is inserted in the recessed head of the billiard-tip cue and held in place by frictional engagement with the walls of the recess. By this construction the tip can be readily attached to or detached from a cue.

SCHOOL DESK AND SEAT.—Paul S. McAulay and Martin Anderson, South Omaha, Neb. The invention relates to an improved form of desk and seat for schools, and consists in forming the end frames with sockets adapted to receive bars which respectively carry the seat and the desk. These bars are made independently adjustable, so that each may be moved to the height desired without affecting the other.

MEANS FOR FACILITATING HERMETIC SEALING OF TINS OR OTHER RECEPTACLES.—John R. Croft, 20 Mark Lane, London, England. This invention provides a simple means for sealing a tin can designed to contain food preserved without cooking, by exhausting the air and substituting an inert gas or melted fat. The invention consists of a means for effecting a preliminary sealing of the can and a final hermetic sealing. The preliminary sealing is accomplished by means of a bush or bung seated in the top of the vessel and provided with a straight passage and an oblique branch passage. A wooden plug is fitted in the straight passage and designed to close both passages. A final seal is applied after the plug has been driven in.

Designs.

CORN-CUTTING SCOOP.—Fred B. Crittenden, Brooklyn, New York city. The scoop consists essentially of a spoon provided with a row of triangular teeth.

CAMPAIGN BADGE.—Magne Forde, Osage, Iowa. The badge consists of two ox-eye daisies in which the bust pictures of McKinley and Roosevelt are inserted.

Note.—Copies of any of these patents can 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.

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.

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.

(7976) A. K. D. asks: Have you any Supplements giving the reasons why a spark coil must be so to do its work, why so long, so thick, why such a sized wire, etc.? A. We have no Supplement giving reasons for the dimensions of a spark coil. These dimensions are determined by the object in view of the designer of the coil. This is primarily the largest possible number of amperes revolving around the iron core the largest number of times within a given space. To obtain the largest current, the resistance must be as low as possible; hence as large a wire as possible must be used. But if too large a wire is used, there will be too small a number of turns to magnetize the core strongly, or else the coil must be made very long, in order to get the desired number of turns upon it. The reason for all this is to obtain as large a self-induction as possible. On breaking the circuit, the current of self induction, or extra current, flows with the main current and aids in forming the spark. To balance up the various conflicting conditions, such coils are made eight or ten inches long and wound with No. 12 to 14 wire. The winding is usually not deeper than the thickness of the core. This practice is largely the result of experience on the part of the maker of spark coils, and gives good results.

(7977) A. S. L. asks: 1. What is the cause of the earth's magnetism and the shifting of the magnetic poles? A. Causes not known. You can find all that is known on this subject in Thomson's Electricity, price $1.40 by mail. 2. Where are the north and south magnetic poles situated? A. The north magnetic pole was found in 1831 in lat. 70° 5′ N. long. 96° 40′ W. in Boothia Felix, just within the Arctic Circle. The south magnetic pole has not been found. 3. How is it that the planets move in ellipses, instead of circles? A. The proof that the planets move in ellipses is mathematical, and was first shown by Kepler, who also proved that they did not move in circles. See some higher text book of astronomy.

(7978) O. P. A. asks: 1. In making a Holtz machine from directions in Supplement, Nos. 279 and 282, does it make any difference if the glass plates are slightly convex or bowed? I can't get any that are flat. A. Yes, a great difference. You cannot run a plate of glass which is not flat with any considerable speed without danger of breaking it from the centrifugal force, which tends to bring the plate in to one plane. 2. Can you tell me what is used to polish the sheet iron parts of new stoves? A. Sheet iron stove pipe is usually made of Russia iron, which is polished in the process of manufacture. See Scientific American Supplement, No. 966, on the "Manufacture of Russia Sheet Iron," 10 cents mailed. 3. I made a battery of a half gallon jar about 7 inches high, with a cylinder of copper in water and sulphate of copper for one element and a rod ¼ inch square of zinc in water slightly acidiferous in a porous cup about 2 inches in diameter and 6 inches high for the other; what was the reason I only got a weak current? A. The trouble with your battery is the small size of your zincs. It is a mistake to expect a piece of zinc ¼ inch square to do much work.

(7979) C. D. C. asks: 1. Why is it that the current from a battery, after passing through the primary coil of an induction coil, apparently becomes much stronger? A. The effect is due to the self-induction of the primary circuit. A current flowing through the turns of wire in a solenoid, such as the primary coil of an induction coil, induces a current in the turns of the secondary. It also induces a similar current in the turns of the primary coil, that is, in its own turns. When the circuit is closed at the vibrator or break circuit, the current of self-induction flows in a direction opposite to the primary current in the same coils, and thus reduces it. When the circuit is broken, the current of self-induction is in the same direction as the primary current, and reinforces the primary current. This is the course of the spark on breaking a circuit of a primary coil. The induced current is added to the primary. Spark coils work by this method, without any secondary coil at all. 2. In making drawings of machinery, how are the radii of the various curves found, so as to be drawn properly? A. The designer of a machine selects the curves he will use so as to have the machine strong and also present a neat and attractive appearance. Of course he knows the radii of the curve he has chosen. A draughtsman will have a number of rulers for the purpose of drawing curves, principally those for irregular curves. These can be purchased from dealers in drawing materials, and are known as "Irregular Curves." Then too there are flexible rulers, which can be bent so that the edge will pass through a series of points through which a curve must be drawn. The pencil will then follow the ruler and trace the curve desired. Thus the radii of the different sections of the curve need not be known.

(7980) G. R., Phila., writes: Please give me the correct method for applying temperature sag and pull corrections to chains and tapes. I have consulted several books in surveying, they all gave me the corrections, but not the method of applying them, i.e., which correction to make first, etc. A. The corrections can be made for temperature pull and sag in a tape and chain only from the known conditions under which it was tested. The expansion of a tape or chain should be deducted from the record for temperatures above the tested temperature, and added for temperatures below the test; for steel this should be 0.00763 of an inch in 100 feet for each degree Fah. variation above or below the test temperature. The sag and pull should be the same as given in the test. Any variation must be corrected by observation from trials from fixed measured points. The temperature correction should be first made. Sag and pull should be tabulated together.

(7981) W. C. W. asks how to restore dry batteries; how much acid and what kind of acid do you use, and do you close nail holes when charged? If so, with what? A. The method of restoring dry cells does not permit of their use as dry cells again. They are wet cells, in which the zinc of the former dry cell is the positive plate immersed in dilute acid, which penetrates the nail holes and comes in contact with the carbon inside the case. The acid should be sulphuric acid in 10 parts of water. The cell will work for quite awhile. This seems to be the best way to treat exhausted dry cells. Of course, the holes made by the nails are left open. The dish in which the cell is placed should be of glass, hard rubber, or of asphalted wood.

(7982) E. M. asks: 1. What will prevent the hard rubber end blocks of a spark coil from fading? A. We do not know how to keep hard rubber from deteriorating. Chemical action of the gases in the air ultimately ruins it. A coat of shellac will protect it. 2. What advantage, if any, would there be in winding a primary coil with two No. 15 wires instead of one No. 12 wire? Two wires being connected in multiple. A. There is no advantage in conductivity in using two No. 15 wires in place of one No. 12 wire, since the sectional area is almost exactly the same in each case. The two wires are easier to handle than the larger one. They will also radiate their heat more quickly, since they expose more surface than the one does for radiation.

(7983) W. B. asks: 1. How many grains of sperm the standard candle burns per hour? A. A standard candle is one that consumes 120 grains of spermaceti per hour, made six to the pound, and seven-eighths of an inch in diameter. 2. Where can sperm candles be obtained? A. They can be obtained from any dealer in physical apparatus. Paraffine candles do not give as much light for the same consumption of material.

(7984) D. D. asks: Will you please tell me the capacity in ampere hours per pound of the best storage batteries? A. A storage cell should give 2½ to 3 ampere hours per pound of charged cell, with an efficiency of about 85 per cent when discharged at a current density of 4·8 amperes per square foot of negative plate surface, reckoning both sides of the plates.

NEW BOOKS, ETC.

Analyses of Pig Iron. Collected and published by S. R. Church. San Francisco, Cal. Quarto. Pp. 173. Price $2.50.

The work comprises the analyses of pig iron made in the United States, Great Britain and other countries and also gives important statistics relating to the production. The collection of these analyses must have required a vast amount of labor. The publication of a portrait of the person to whom the book is dedicated is a decided novelty.

The Story of the Heavens. By Sir Robert S. Ball, LL.D., D.Sc. New York and London: Cassell & Company. 1900. 8vo. Pp. 568. Price $3.50.

This book is illustrated with twenty-four colored plates and numerous illustrations. The author is a well known astronomer, and he has produced a very readable book, which is not always the case with books on astronomical science. It is one of the best books which we could recommend for use in a library, and it will prove valuable to the beginner and the full-fledged astronomer as well. It has been vouchsafed to but few men to clothe scientific facts in such excellent English and in such a comprehensive manner as has Sir Robert.

Year Book of the School of Architecture of the University of Pennsylvania. Published by the Architectural Society. 1900. Quarto. Pp. 65.

The architectural course of the University of Pennsylvania is well known, and at the present time Philadelphia has become quite a center of architectural education. The designs given in the pamphlet are many of them excellent, and they are all beautifully reproduced.

Furniture Designing and Drafting. By Alvan Crocker Nye, Ph.B. New York: W. T. Comstock. 1900. Pp. 110, 21 plates. Price $2.

While there have been quite a number of books written upon cabinet making, and while we have splendid

volumes devoted to the historical side of furniture, we have never seen any book which goes into the question of the construction of furniture so thoroughly. The author is an instructorin furniture designing at Pratt Institute, Brooklyn, and his book shows that he has most excellent ideas regarding the building of furniture. The book is fairly well printed, the half-tones being specially good.

ENGLISH AND AMERICAN LATHES. By Joseph G. Horner, A.M.I.M.E. London: Whittaker & Company. New York: The Macmillan Company. 1900. Quarto. Pp. 166, 300 illustrations. Price $7.

The author states that the reason for the publication of this book is the growing importance of the American lathe trade in England, and the consequent interest with which the distinctive features of the lathes of both countries are regarded. The American lathe has now found its abiding place in large numbers in British service. It is gratifying to note that the American lathe has been received with such favor abroad. They are certainly magnificent specimens of machine tools. The present work deals with both English and American lathes; and special attention is paid to the internal construction. It is a book which will prove of great value to the mechanical engineer. It is excellently printed.

ONE THOUSAND OBJECTS FOR THE MICROSCOPE. With a Few Hints on Mounting. M. C. Cooke, M.A., LL.D., A.L.S. London and New York: Frederick Warne & Company. 1900. 16mo. Pp. 179, 12 plates. Price $1.

The earlier editions of this book are well known to microscopists, and the former editions consisted only of what is now Part II. The author has now introduced an introductory section dealing with the manipulation of microscopes, mounting of objects, etc. In its new form the book furnishes one of the simplest and best treatises for the beginner in microscopy. The plates, which are newly reproduced, are excellent. It is worthy of a large sale.

UP-TO-DATE DOMESTIC AND INDUSTRIAL APPLICATIONS OF ELECTRICITY. Popularly Explained. By Alpha. London: S. Rentell & Company, Limited. 1900. 16mo. Pp. 90.

F. BERGER'S FRENCH METHOD. (1900.) By François Berger. New York. 1900. Author's edition. 12mo. Pp. 190. Price 75 cents.

MÉLIE. By Jules Lemaître. Translated by François Berger. New York. 1900. Author's edition. 12mo.

In the preface to his book, the author has in no very gentle terms attacked his foremost competitors in his particular field. His accusations may or may not be well founded; at all events, they should find no place in the preface of a text-book. We can perhaps forgive M. Berger for this exhibition of bad taste; but his awkward rendering of Jules Lemaître's "Mélie" we cannot pardon. In the badly-mangled translation of this exquisite, pathetic little story, we find, besides numerous errors in English spelling, the following specimen of English impure and defiled: "From that day, every time they made 'a dish' at her house, she brought me some in a paper. She would draw it from her pocket with a mysterious air, but they were no more the potatoe sandwich! They were the victuals of poor folks, which smelt decidedly too strong. I tried to taste them, but they would not go."

THE SEPARATE SYSTEM OF SEWERAGE. Its Theory and Construction. By Cady Staley and George S. Pierson. New York: D. Van Nostrand Company. 1900. Third edition, revised and enlarged. 8vo. Pp. 324. Price $3.

The subject of thesewerageof towns is attractingmore attention than formerly. Various plans have been employed, and many of them are objectionable. The moderate cost of the separate system makes it possible to carry out a system of sewerage in many cases where the expense of the combined system would make the construction of sewers impossible. The authors have produced an admirable book, which has stood the test of time, and which has proved very useful to sanitary engineers. It is a book which can be heartily recommended.

A TEXT BOOK OF MECHANICAL DRAWING AND ELEMENTARY MACHINE DESIGN. By John S. Reid and David Reid. New York: John Wiley & Sons. 1900. 8vo. Pp. 389, 301 illustrations. Price $3.

The volume before us is one of the best we have ever seen on mechanical drawing. The illustrations are admirable and the methods for obtaining proportions, etc., are also extremely valuable. The principles of mechanical drawing are applied to the solution of practical problems in machine construction.

ENCYCLOPEDIA OF MEXICAN MINING LAW. A Digest of Mexican Mining Code. Also a Glossary of Mining Terms. By Richard E. Chism. City of Mexico. 1900. 18mo. Pp. 170. Price $2 in United States currency.

The mining laws of Mexico are complicated, and the author has done a signal service to all those who are engaged in any way in mining, in bringing together the various laws, etc., in alphabetical form. The work appears to have been excellently done, and the glossary of mining terms will prove very valuable.

AMERICAN FOUNDRY PRACTICE. By Thomas D. West. New York: John Wiley & Sons. 1900. 12mo. Pp. 408. Price $2.50.

The tenth edition of American Foundry Practice is now before us. It is an eminently practical book, and a large sale of a technical book of this kind is sufficient guarantee of its value. The latest American practice is described. It is filled with illustrations and tables.

THE KNIGHT OF THE GRIP. New York: David Williams Company. 1900. 16mo. Pp. 179. Price 60 cents.

The book comprises a series of papers relating to the personal methods and experience of the traveling salesman, and is reprinted from The Iron Age.

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OCTOBER 16, 1900,

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