

RECENTLY PATENTED INVENTIONS.

Agricultural Implements.

PEA-THRESHER AND CLEANER.—SAMUEL H. WILLIAMS, Barnardsville, Tenn. This machine threshes peas on the vine just as they are mowed and raked in the field, and cleans them with little waste, or breakage. One portion of the concave is adapted especially for cutting the pods from the vines, and the other portion for threshing the peas from the pods. Any pods which may pass through the machine without having the peas removed from them are automatically returned to a portion of the concave and cylinder especially adapted to finish the threshing. The vines are completely separated from the unthreshed pods and shelled peas; and the shelled peas from the pods after the vines, peas, and pods have passed between the concave and the cylinder.

Engineering Improvements.

EXPLOSIVE-ENGINE.—SAMUEL F. BEETZ, Mendota, Ill. The main cylinder has a partition forming separate cylinders. Pistons reciprocate in unison in the cylinders and are connected with the main driving-shaft. A rotary valve is driven in unison with the pistons and has an inlet and an exhaust port arranged alternately to connect the working-chambers with the motive agent and with the exhaust. At the ends of the cylinder are valve-casings, each provided with a chamber leading to the port and connected through valved openings with the motive-agent supply and with the rotary admission-valve, so that the compressed charge from the compression-chamber of one cylinder can pass into the working-chamber of the other cylinder.

Mechanical Devices.

MECHANICAL MOVEMENT.—JOHN SCHIES, Anderson, Ind. The invention provides a novel construction whereby a plunger within a revolving carrier or body is caused to move longitudinally within the body or carrier as the latter is revolved. The device is to be employed in glass-making. The plunger is used on the top and partly makes a bottle or jar in connection with the necessary mold. When this first operation is completed, the carrier is to be turned half-way over, whereupon the plunger will be out of the way, so that air can be applied to allow the next operation to be effected by blowing and the bottle or jar completed.

ROAD-MAKING MACHINE.—SEPTIMUS T. WILLIAMS, Beaver Dam, Ky. The machine requires only about one-half the team power ordinarily employed. It belongs to a class of machines employing a gang of concave disk-shaped plows in connection with a scraper-blade. In this particular machine, however, the gang is made adjustable as to the angle of inclination to the line of draft. And the trailing scraper-blade, fulcrumed about a vertical axis on the side opposite the gang, is made adjustable as to inclination to the line of draft to neutralize the lateral thrust of the gang of disk-cutters.

WALL-PAPER TRIMMING, PASTING, AND MATCHING MACHINE.—WILLIAM D. TABER, Cranston, R. I. The trimmed or slit paper after leaving drawing-rollers, passes over an upright table, the printed or ornamental side of the paper being on the table and the back of the paper being in contact with a revoluble brush which serves to apply paste to the back of the paper. The brush receives its supply of paste from the peripheral surface of a fountain-roller, the lower portion of which extends into the paste contained in a receptacle. The trimmed paper with the paste applied, after leaving the table, reaches a traveling apron, by which it is carried along. By providing side-rails with graduations, the operator is enabled readily to match the paper by cutting it in proper lengths.

REVERSING-GEAR.—ELGAN S. SLOAN, Elk City, Penn. This gear, by means of which a pulley or other revoluble member can be driven in either direction consists of a clutch member adapted to engage the clutch member of a loosely mounted pulley so as to turn the pulley with the shaft. In order to drive the pulley in the opposite direction another clutch member is provided, which, when thrown in, turns the pulley in the desired direction by intermediate gearing.

WRENCH.—THOMAS H. BROSNIEAN, Livermore Falls, Me. On the shank a bearing is held, in which a screw-rod, engaging the movable jaw to adjust it on the shank, is held to turn and slide. The screw-rod is turned by a head normally separated from the bearing. A spring is held in opposing recesses in the head and the bearing to move a cheek-piece on the movable jaw into engagement with the work. The wrench can be quickly adjusted to grip the object, especially a pipe, without slipping.

MATCH-MACHINE.—FRANK L. VAN DUSEN, Hull, Canada. This machine is the invention of a match expert. It automatically cuts splints from a wooden block, dips the splints, dries the tips, and then ejects the completed matches. The prominent features are: provision of improved means for intermittently feeding or advancing the endless chain which receives and carries the splints; a construction whereby the vertical traverse of the splint-cutter and connected devices is shortened, the friction lessened, and the rapidity and efficiency of the operation of the machine increased; improved mechanism for effecting the movement of the cutter; an improved form of the sockets for receiving and holding the splints, whereby defective splints are dropped and the perfect ones retained; improved means for pushing up the matches in the sockets, preparatory to ejectment therefrom; improved match-ejecting mechanism; an improved heater for the match composition; and an improved arrangement of composition vats or pans in the heater, whereby removal and substitution or change of the vats may be quickly made, in case one becomes ignited, or other necessity for it arises.

Railway Appliances.

ANTI-FRICTION-BEARING FOR CAR-TRUCKS.—JAMES S. PATTEN, 403 Equitable Building, Baltimore, Md. Mr. Patten has, among other things, provided a special construction of the casing of the lower portion of the outer bearing, by which the bearing casing readily wears off with the ordinary wear of the bearings, thus maintaining a tight fit to exclude dust without interfering with the proper supporting of the weight upon the

balls held in the outer bearing. The bearings are provided with a separate socket for each ball, so that the balls will be maintained generally in the desired position and will not roll together by the tilting of the lower bearing portion in one direction or the other.

Vehicles and Their Accessories.

FIFTH-WHEEL.—HIRAM C. FOUTS, Emory, Tex.—The fifth-wheel comprises a turn-table with two circular raceways and series of balls, and a raised series of balls in the middle. The inner series of balls is in a plane higher than the outer one. A ring-shaped plate bears with its under surface on the outer series of balls and at its inner edges against the inner series of balls. A cap-plate bolted to the central boss overlaps the inner edge of the ring-shaped plate. The wheel thus formed is simple, strong, and sensitive.

Miscellaneous Inventions.

JOINT FOR PIPING.—JOHN W. WIGGINS, 118 President Street, Savannah, Ga. The invention is an improvement in joints for plumbing. A tapered ferrule is used provided with longitudinally-extended ribs and an end-flange. The ferrule is inserted in one of the pipe-sections and fitted therewith in the fitting of the other pipe-section. Calking completes the joint. When the connection is completed the joint is perfectly smooth on the inside. The longitudinal ribs prevent the ferrule from turning; while the tapered exterior enables the ferrule to be readily fitted to any size of lead pipe.

ANTISEPTIC BROOM.—OSCAR S. KULMAN, Savannah, Ga. The invention is an improvement on the broom previously patented by Mr. Kulman and described in the SCIENTIFIC AMERICAN for June 24, 1899. The improved broom contains in its straws a bag filled with antiseptic material and supported below the lowest line of stitching by a bow or loop. The arrangement is such that the broom is rendered as flexible as the ordinary broom, which flexibility is extremely desirable, since it allows a slight lateral motion of the antiseptic bag in sweeping, to feed the antiseptic material. The bag when empty can be replenished.

HANGER FOR BATTERY ELEMENTS.—JAMES L. HAYES, Salida, Colo. Wooden hangers become saturated with the oil placed over the top of the solution in a battery jar. Moreover their clumsy structure interferes with free access to the jar when renewing the blue-stone or other chemicals. To overcome these objections, the inventor employs a hanger consisting of two inter-twisted pieces of wire having a central eye to receive the element and hooked divergent ends to engage the jar so as to hold the parts in place.

PORTABLE CABINET.—CHARLOTTE G. SIMPSON, 59 West 88th Street, Manhattan, New York city. The cabinet is of the portable type used for holding family medicines. It may readily be carried about or held stationary, as preferred, and is well adapted to receive a large number of vials and articles for family use, all disposed in compact order for ready access.

FISH-TRAP.—JOHN O. SHARPLESS, Fairhaven, Wash. The invention is a peculiarly-constructed fish-trap adapted to be set in a body of water and furnished with a lead to cause the fish to enter the trap. The trap may be changed as the tide changes, thus permitting it to be used at all times. The lead, it should be remarked, is entirely flexible and can accommodate itself to all movements.

HYGIENIC BEER-PRESSURE APPARATUS.—CHARLES PETERS, Brooklyn, New York city. The invention provides a new hygienic beer-pressure machine arranged to cool and purify the air before passing it into a barrel or keg, to keep the beer in a natural condition, and to prevent raising its temperature by the compressed air, the beer in its passage from the barrel or key to the faucet being cooled to the desired degree, so that when finally drawn it is in perfect condition.

FORM FOR BOILING MEATS.—FREDERICK A. LANSING, Brooklyn, New York city. In boiling hams it is the common practice to remove the bone before boiling and to tie the meat with strings to keep it in shape. The several steps consume much time and render it necessary to trim off portions of the outer part of the ham. Mr. Lansing avoids these requirements by employing a casing of the general form of the meat, the casing having a longitudinal opening in its upper portion, permitting expansion and contraction. Clamps are provided for drawing the edges of the opening together.

ADJUSTABLE NAILLESS HORSESHOE.—HARRIET R. FENLEY, Dallas, Tex. A tread-plate is employed provided with a superposed hood, both bisected at their front; the tread-sections are hinged together. Upon the tread-plate a wear-plate, comprising two side-plates and a toe-plate, is secured. The hood is fitted on the exterior of the animal's hoof, so that the tread-plate is drawn against the bottom when the hood is in place. All injury is avoided to an animal thus shod.

CIGAR-BOX OR PACKING.—LOUIS AND MORRIS BERGER, Manhattan, New York city. The invention provides a simple means in connection with a box to prevent fraudulent refilling or partial refilling with cigars from another box. Arranged in the box are strips of paper attached alternately in pairs at opposite sides of the interior of the box, one edge of each strip being free and each strip being adapted to cover a layer of cigars in the box. As the cigars are sold, each strip is to be torn off, thus indicating that no cigars other than those of the previous layers have been removed.

ADJUSTABLE COMBINED GATE-HINGE AND ROLLER.—GEORGE O. CULVER, Quarryville, N. J. Mr. Culver has devised an ingenious gate which is supported by rollers mounted upon posts. One of these rollers—the main supporting roller—is pivotally mounted, so that the gate, after having been pushed back, can be swung around. The gate can be adjusted vertically to permit the passage of small stock, or in time of winter when snow or ice may clog the gateway. The gate is so nicely balanced that little effort is required to operate it. Cattle cannot interfere with the operation of the gate; and there is but little strain upon the posts.

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.

Business and Personal.

Marine Iron Works. Chicago. Catalogue free.
 "U. S." Metal Polish. Indianapolis. Samples free.
 Yankee Notions. Waterbury Button Co., Waterbury, Ct.
 For bridge erecting engines. J. S. Mundy, Newark, N. J.
 Handle & Spoke Mch. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.
 Most durable, convenient Metal Workers' Crayon is made by D. M. Steward Mfg. Co., Chattanooga, Tenn.
 Machine Work of every description. Jobbing and repairing. The Garvin Machine Co., 141 Varick St., N. Y.
 The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.
 The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4. Munn & Co., publishers, 361 Broadway, N. Y.
 Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

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.

(7959) W. E. H. asks: Where can I find particulars for making an electric machine? How much would one cost that has power enough to run the electric top or the electric motor which you give a description of in the SCIENTIFIC AMERICAN of August 11, 1900. A. You will find a full description of a Holtz machine with working drawings quite powerful enough for your experiments in the SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 278, 279, 282, price ten cents each. Besides the details of the machine, many experiments are described, which may be performed with it. Its cost depends entirely upon how much of the work you can do yourself. The materials will cost but a few dollars.

(7960) H. B. S. writes: Some time ago I saw an account of an electrical invention that could be used alternately as a stove or an ice cream freezer, by simply reversing the current. What I wish to know is if it is possible to obtain a low degree of temperature by the electric current, and if so, how? A. We have not known anything of the invention to which this refers. It is, however, possible to produce cooling by means of the electric current. If a current of electricity is sent through a thermo-electric junction in the direction opposite to the current produced by heating that junction, a cooling of the junction takes place. Whether this has been or can be carried to the extent of freezing water we do not know. It is doubtful if it can be done economically.

(7961) P. S. D. asks where was the first electric railroad operated? A. The first electric railroad was from Port Rush to Giant's Causeway, Ireland.

(7962) R. E. asks: 1. Does the substance selenium lose its conductive power for electricity instantly as it is surrounded by darkness? A. The action of light upon selenium is instantaneous. 2. Does it change instantly to a conductor when again surrounded by light? A. Selenium does not become like a metallic conductor when light strikes it. Its resistance is greatly reduced, but is still much greater than that of metals. 3. What is its cost, and where can I obtain it? A. We are not able to quote you the price. Any dealer in chemicals can furnish it. 4. I wish to make two disks isolated from each other, turn in perfect synchronism. Is there any simpler way than the use of an alternating current dynamo for one disk connected with a motor for the other disk? A. You can connect two disks by a rod of insulating material, hard rubber, for instance, and run them together. 5. Where can I procure so small a dynamo and motor, single phase alternating? A. Small dynamos and motors can be obtained from any builder of dynamos.

(7963) D. D. S. asks: 1. Can electric lights burn by batteries which go by blue vitriol? A. A small electric light of one or two candles can be lighted by a copper sulphate battery, but it is a most expensive and laborious mode of obtaining light. 2. Are not a horse (Equus caballus) and an ass (Equus asinus) necessary for the production of a mule? Are not all mules wholly sterile? A. Mules are the offspring of an ass and a mare. The offspring of a stallion and an ass is called a hinny. See Webster's Dictionary. These hybrids are usually sterile.

(7964) H. N. asks: Will you kindly inform me through Notes and Queries the composition of a liquid which, when applied to metals such as brass, copper or steel, gives a coating of silver? An article is on the market called Silver-all which does this by applying the liquid on a rag and rubbing the article, which produces the silver effect. A. Small articles may easily be coated with silver by dipping them first into a solution of common salt, and rubbing with a mixture of one part of precipitated chloride of silver, two parts of potassa alum, eight parts of common salt, and the same quantity of

cream of tartar. The article is then washed and dried with a soft rag.

(7965) J. N. H. asks: 1. If a magnet be applied to the end of an iron bar of indefinite length, how far along the bar will the magnetism extend and what is the formula for determining what the magnetic strength would be at any point along the bar? A. We do not know. The subject of magnetic force is treated in Fleming's "Magnets and Electromagnets," price \$3 by mail. 2. Where can I get information on the relation between magnetism and light? A. Consult any of the larger text books of physics, Barker or Ganot. The works of Clerk Maxwell contain the original presentation of the subject.

(7966) W. W. P. asks: 1. What will prevent films and plates getting soft during development and fixing? I use cold water with ice in the fixing bath. A. Use a cold developer. It is too late to apply the remedy when the plate has reached the fixing bath. The acid fixing bath, now commonly prescribed in all circulars of instructions, will harden the gelatin and usually prevent trouble. 2. What will prevent holes forming in the film on the plate during drying. While drying the last plates I set some down face up on a table where nobody touched them, but several hours later they were full of holes varying in size from 1/16 to 1/8 inch. Can you explain the cause? A. Transparent spots or pin holes arise from a variety of causes. Dust on the plate when exposed, air bubbles on the plate not detached when it is put in the developer, impure water used in making the developer, are the principal causes. Each of these causes has its obvious remedy. The principal plate makers issue small manuals for the guidance of those using their plates. Write to the maker of your favorite plate and ask for a copy. You can then study the mode of handling the plates. 3. Is it possible to save any nitrate of silver from the first washing and from the hypo bath? If so, please tell me the method? A. Precipitate the silver from the solution by adding sodium bicarbonate or sodium chloride. Then reduce by any of the processes for reducing silver, for which see the chemistries. 4. In a recent issue of the SCIENTIFIC AMERICAN I saw that gold could be saved from the toning bath by means of sulphate of iron. It said to dissolve two ounces of iron sulphate in a quart of hot water, so I tried it but the iron sulphate would not dissolve but turned red and sank to the bottom of the bottle. Will you please tell me the reason? A. Use ferrous sulphate with which to precipitate the gold in a finely divided state. The ferrous sulphate absorbs oxygen very rapidly and changes to the red ferric compound.

NEW BOOKS, ETC.

PHYSICS OF THERMO-CHEMISTRY. By Gustaf M. Westman. New York. 1900.

Energy manifests itself in many forms, and universal science has adopted the name of potential energy for the absorption of kinetic energy. Physical energy can be stored in matter; for example, in the form of latent heat, but we have another form which is dealt with particularly in this treatise, namely, the potential energy, which is called volume energy, and which in chemistry takes an important part. The purpose of this work is to find a relation between the change of volume, which takes place in the matter, and the potential energy, which is liberated or taken up by such change. The author's calculations are based entirely upon the values of heat and energy found experimentally, and he has found the mathematical expression for the latent heat. He uses the ordinary adiabatic formula, in which the inner as well as the outer work takes place. The application of the formula perfectly agrees with values of latent heat, which for certain bodies have been experimentally found. For as many reactions as complete data in regard to specific weights and combination heat have been found, the author shows that his formula either directly or indirectly applied, will give a correct mathematical expression of the changes in volume which the constituent parts in the reaction are subjected to. It is, therefore, claimed that his formula represents the general law for chemical mechanism, and moreover that by analogies the heat of the reaction can be determined, which could not be done by experiments.

A FRENCH-ENGLISH MILITARY TECHNICAL DICTIONARY. By Cornélie De Witt Willcox. First Lieutenant of Artillery, U. S. A. Washington: Adjutant General's Office. 1900. Octavo. Pp. 492.

Lieutenant Willcox has performed a task for which he deserves the thanks of every scientific translator. He has compiled a technical dictionary of French-English military terms, which for scholarly completeness and accuracy of definition merits unstinted praise. We have used the first two parts of his work for the past year and found them trustworthy guides. In these parts a few terms have been omitted which might possibly have been inserted. Among them are to be noted *carter*, *carriage*, *chasse-corps*, *commutatrice*, *métal déployé*, *fringalage*.

THE UNIVERSAL SOLUTION FOR NUMERICAL AND LITERAL EQUATIONS. By which the Roots of Equations of all Degrees can be Expressed in Terms of their Coefficients. By M. A. McGinnis. Kansas City, Mo.: The Mathematical Book Company. 1900. Pp. 195.

By an ingenious combination of geometry and algebra, Mr. McGinnis seems to have considerably simplified the problem of solving biquadratic and the higher algebraic equations. His explanations are not always perfectly clear, nor are his definitions faultless. The explanation of an imaginary quantity (definition 22) is decidedly obscure. It is difficult to understand what advantage the definitions on page 5 of his book have over those ordinarily in use, or what a "proposed proposition" may be (definition 33). On page 230, section 273a, an equation is given in which an x is clearly missing. These *gaucheries* are pointed out, not for the sake of being hypercritical, but because they materially detract from an otherwise very valuable contribution to mathematical science.