RECENTLY PATENTED INVENTIONS.

Engineering.

EXCAVATOR. — Alexander McDonald, Cambridge, Mass. This is a machine for making ditches, canals, tunnels, etc., and comprises a swinging supporting frame, revoluble picks mounted on shafts, and an endless carrier on the frame under the picks to receive and carry away the loosened material. The material is undermined by the picks and falls by gravity into the buckets of the carrier, and the swinging frame supporting the picks and the carrier may be swung above a horizontal line, so that the material can be removed to any desired height.

Railway Appliances.

CAR FENDER.—James W. McKinnon, New York City. This is a tilting fender slidingly mounted in guides under the car, the forward end of the fender being depressed when in its outer position. When the brake is applied the fender is automatically carried out beyond the front of the car, although it may be readily disconnected from the brake mechanism and projected outward independently thereof. The fender is ordinarily carried beneath the car platform, and may be readily attached to a car without interfering with the usual fittings of an electric or cable car.

STORM CURTAIN FOR STREET CARS.—George Maust, Philadelphia, Pa. This improvement comprises an inclosure for car platforms, including standards extending from the dash to the roof, there being adjustable brackets on the standards and a stretcher carried by the brackets, while a curtain connected with the roof extends down over the stretcher. With this improvement the platform may be quickly housed in to protect its occupants from the weather, and when the curtains are not required they may be removed entirely out of the way.

Agricultural.

CULTIVATOR.— David A. Lenox and James A. Underwood, Salem, Mo. This cultivator has spring teeth adjustably attached to frames which may be moved either to the right or left to pass obstructions. The teeth are so made as to be very durable, and less liable to breakage than usual, and the depth to which the teeth enter the ground is regulated entirely by the draught, thus dispensing with lock levers and similar devices. The entire bed or body of the elevator carrying the teeth may be adjusted to compensate for any wear that the teeth may sustain.

WEED PULLER.—Frederick W. Read, Marquette, Mich. This is a simple implement, made preferably of a rod of steel, twisted to form a handle, twin shanks, and fork-like points, the tool to be worked something as an auger around the root of a plant or weed. When the tool is buried deep enough, a quick upward movement removes the weed, foliage, and surrounding earth, facilitating the cleaning of a lawn from any objectionable plant.

PEA AND CORN SHELLER.—Benjamin F. O'Kelley, of Planter, and George W. O'Kelley, Jr., of Harmony Grove, Ga. This machine comprises a separating drum with which is connected a flail wheel separated from the drum by an annular partition, while a picker wheel acts in conjunction with the flail wheel, there being a screen or sieve beneath the drum and flail wheel and independent hoppers leading to the drum and flail wheel. When the separation is made the peas or corn kernels are subjected to a blast of air to remove foreign matter, a second blast of air being delivered just prior to delivery to the receiving chute.

Miscellaneous.

MIXING APPARATUS.—Marie J. E. Laurans, Eugene J. B. Paul E. Jodelay, and Jules A. Tournel, Paris, France. This invention relates to apparatus for mixing water with an antiseptic liquid to form a disinfecting mixture, the mixture being made of uniform proportions and the pressure of the water utilized to produce the mixture or spray the disinfectant. The apparatus may be used for sprinkling streets, sidewalks, buildings, etc., and for a great variety of other purposes.

CIGARETTE MACHINE.—Domingo Perez y Buñol, Havana, Cuba. This machine fills the requisite quantity of tobacco into a receiver, and winds the wrapper around the tobacco filling. A conveying device separates and feeds the right quantity of tobacco to a receiver section, where it is compressed by a plunger, and the receiver is carried to a wrapping device, to which also a cut wrapper is brought, a finishing device tucking the wrapper ends inward when this is desired. Long cut tobacco may be used in the cigarettes made in the machine, or, by means of an accessory part, it may be made into fine cut before being fed into the receiver.

BICYCLE FRAME.—Henry and Frederick Mesinger, New York City. The principal members of this frame are made of two pieces of wood united by suitable metallic joints and clips, the frame being designed to be of great durability and lightness, while possessing ample strength. The frame conforms to the usual diamond shape, and the ends of the pieces are spread apart to form the forks for the rear wheel.

BRAKE BLOCK.—Augustus F. Schilly and Reuben Cave, Newcastle, Cal. This improvement relates to brake blocks in which the shoe is removably connected to the block, and provides means for holding the shoe securely in place or readily removing it. Two hook sections are fixed to the brake block, and one of them is hinged so that it may move toward and from the shoe and lock with it.

THILL COUPLING. — Joel Johnson, Sunny Side, Ark. This is a coupling especially adapted for buggy shafts, permitting the disconnection of the shaft or pole in a quick and convenient manner, and leaving the knuckle carried by the thill iron in position for quick coupling with the receiving members of the axle. A simple and efficient form of anti-rattler is also provided.

SEAT OR CUSHION. — Morris Strauss, New York City. This invention provides an improved construction whereby seats or cushions may be more readily upholstered, bands extending inwardly from the frame, and coiled supporting springs being connected to the bands, while there is an upholstery support on top of the springs, and coiled springs connect the lower convolutions of the supporting springs. The improved construction is applicable to seats and cushions of every description.

DOOR BELL.—Emerson C. Tibbals, Cobalt, Conn. This is a mechanical construction arranged to positively and regularly sound a bell upon releasing a push button, the latter operating a segmental gear wheel attached to a spring-pressed shaft, and a pawl and ratchet mechanism connecting the shaft with the striker, to operate the latter after the button is released. The bell preferably forms a cover or casing for the mechanism, to protect it from dust.

REAGENT FOR GOLD OR SILVER ORES.—Eloy Noriega, Mexico, Mexico. To facilitate the working of these ores, reducing the time for thorough amalgamation and effecting a saving of mercury, this invention provides for making a reagent by mixing a chloride, an acid, the sulphate of a metal, and the metal which forms the base of the sulphate, and subjecting the mixture to the action of steam until the resulting product is reduced and crystallized, the base of the chloride being stronger than that of the sulphate.

MUSIC BOX DRIVING GEAR.—Henry Langfelder, Jersey City, N. J. To drive music boxes for a considerable length of time without rewinding, this improvement provides for a segmental gear wheel in mesh with a train of gear wheels for driving the pin cylinder, the segmental gear wheel having a slotted arm and a pin engaging the slot in the arm, while a sliding bar carries the pin, and a cross bar connected with the sliding bar is adapted to compress one or more helical springs.

Designs.

WOVEN FABRICS.—James Phillips, Jr., Fitchburg, Mass. Two design patents in this class have been granted this inventor, both for fabrics with tuft-like figures raised from the body and arranged in waved and parallel lines.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

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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.
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.

(6642) A. H. writes: A steel spring (spiral) is wound as tightly as possible and then fastened with a piece of copper wire, in such a way that if the wire were unloosened, the spring would exert power which might now be considered as stored. This spring is, however, inserted in a jar of muriatic acid, which dissolves the iron but does not affect the copper band. What becomes of this latent energy? A. The spiral spring when wound up becomes heated, because work is done upon it. If released, it does work and becomes cool. The spring may be wound and left to attain the temperature of the air. Now, if released so as to do work, it will become cooler than before; but if dissolved in acid, no such reduction of temperature will occur, because it does no work. In other words, a coiled spring, when wound up, has, properly speaking, no energy imparted to it by such winding, but only the capacity of converting a portion of its own heat energy into mechanical energy.

(6643) C. A. C. asks: How many feet per minute should milling work be fed to cutter? How fast should 3 inch milling cutter run or how many revolutions per given movement of bed? How are tangent bicycle wheels strung or trued up? A. As much depends upon the material to be milled as to speed of cutters and rate of feed, as will also the depth of the cut. There is a wide margin in the range of milling work, according to the condition of cutters, hardness of material and kind of lubrication. Ordinarily the peripheral speed of milling cutters may be for steel 36 feet or for a 3 inch mill 48 revolutions per minute, with a half inch feed per minute. For wrought iron 48 feet and 1 inch feed. Cast iron 60 feet and 1⅝ inch feed per minute. For light finishing cuts these figures may be increased by 30 per cent. Very small cutters should have less speed and large cutters of 5 or 6 inch diameter may have a greater speed than as above. It is not easy to impart instruction on the adjustment of bicycle wheel rims. The letting out and drawing in by the spoke nuts, on the proper sides, will bring the rim to its plane of revolution.

(6644) R. W. C. writes: By what branch of mathematics is the following problem solved? Also solve and explain it. A tree one hundred feet high breaks off, and hanging to the stub, the top resting upon the ground at a distance of thirty feet from the base. Required, the length of each part. A. The tree problem is solved by algebra, as follows: Let x = the height of the stump. We have: $(100-x)^2 = x^2 + (30)^2$. Solving, we find: $x = 45\frac{1}{2}$ feet (answer).

(6645) J. H. F. asks: How many volumes of gas at atmospheric pressure will one gallon of 74° Baume gasoline make when evaporated, with no admixture of air? How many volumes of air should be mixed with above gas to make proper explosive mixture for gasoline engine? What is maximum theoretical pressure of explosion of proper mixture of gasoline and air when exploded at constant volume with charge at atmospheric pressure and no loss of heat by radiation? Ditto, when charge compressed to 15 pounds above atmospheric pressure? Can you give rule or formula for determining above? Would there be much difference between theoretical and actual pressure? A. One gallon of gasoline produces from 60 to 80 cubic feet of vapor, according to the temperature and density of gasoline. From 5 to 6 volumes of air per volume of vapor is used, and even 12 volumes is claimed as the most economical mixture of air with gasoline vapor for explosive power effect. The explosive pressure varies with the ratio of mixture of air and vapor, and also with the ratio of charge volume to the volume of the cylinder; in practice it varies from 90 to 150 pounds per square inch. Compression, as in the four cycle engine, adds its own pressure to the explosive effect and increases the mean piston pressure in a large degree. The theoretical pressure is somewhat greater than the actual pressure, owing to the uncertainty of perfect mixture in the gases and undefined limit of absorption of heat in the cylinder walls. See Donkin's work on "Gas and Petroleum Engines," $6.50 by mail.

NEW BOOKS AND PUBLICATIONS.

THE FORCES OF NATURE: A STUDY OF NATURAL PHENOMENA. By Herbert B. Harrop and Lewis A. Wallis. Columbus, Ohio: Harrop & Wallis. 1895. Pp. 159. 12mo. Illustrated.

The preface says: "There is a class of persons who have acquired a thorough knowledge of their special callings and who would become better acquainted with Mother Nature in all her aspects if this acquaintanceship might be brought about without tedious delving among learned volumes which they have probably neither the time nor the inclination to read. Bearing in mind these facts, we have attempted to supply all necessary explanations, and to solve the problems which these difficulties present, with what success remains to be seen."

ALTERNATING ELECTRIC CURRENTS. By Edwin J. Houston, Ph.D., and A. E. Kennelly, Sc.D. New York: The W. J. Johnston Company. 1895. Pp. 225. 16mo. 77 illustrations. Price $1.

This is the first of ten volumes of an "Elementary Electro-Technical Series," designed to give concise and authoritative information concerning those branches of electro-technical science having a general interest. The subjects to be treated are alternating currents, electric heating, electro-magnetism, electricity in electro-therapeutics, arc lighting, incandescent lighting, electric motors, electric street railways, telephony, and telegraphy. The authors state that though the several volumes form a series, each is, nevertheless, so prepared as to be complete in itself, and can be understood independently of the others. The authors of "Alternating Electric Currents" treat the fundamental principles underlying this difficult branch of electrical engineering in the simplest language and without the use of mathematics any further advanced than ordinary arithmetic.

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October 15, 1895,

AND EACH BEARING THAT DATE.

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