

the weight and net price of commodities. The beam of the scale has a weight scale at its lower portion and a value scale at its upper portion. A price-beam is loosely suspended at its ends from the weight and value beam. A weight is mounted to slide on the price beam. An adjustable price weight is also used, comprising a beam and two price weights arranged above the weight and value beam and movable along the top edge thereof. A carriage is movable on a bar supported on the frame of the scale. The adjustable weight is connected with a hanger on the carriage.

**MUSIC-HOLDER.**—OLAVES I. BYE, Hillsborough, N. D. The purpose of this invention is to provide a simple and cheap music-holder which may be directly attached to the instrument so as to hold the music at all times in clear view of the performer, whether he move about or remain stationary. The music holder consists of a frame constructed of wire or light metal and provided with a spring-held slide adapted to clamp and hold the music, and with a hook which may be placed within the sound-port usually found in guitars and similar instruments.

**SUGAR-CRYSTALLIZER.**—EDWARD P. EASTWICK, Jr., New Orleans, La. The purpose of the present invention is the provision of an apparatus for crystallizing sugar in motion that will give a more complete movement to the mass than has hitherto been attained. The apparatus is so constructed as to avoid the grinding and breaking of the grains usual in crystallizers commonly employed, by reason of the arms, spirals or paddles scraping against the inner surface of the cylinder. In this improved device, the cylinder and its agitators turn together, thus effecting a thorough mixture of the masee-cuite without any tendency to injure the grain of the sugar.

**NECK-YOKE.**—SAMUEL J. McDONALD, Gallatin, Mo. In this invention, the center ring or loop has a swivel connection with the cross-pole of the neck-yoke, thus enabling the center ring or loop to adjust itself to any necessary position. The parts are so assembled as to operate freely with a minimum of wear and means are provided to prevent rattling. The center ring or loop is constructed so that it will not leave the tongue should the traces or tugs of the harness become broken.

**MILITARY EQUIPMENT.**—HENRY J. ROSE, Hythe, and WILLIAM GILBERT-COOPER, Dover, England. This invention provides an equipment for military and sporting purposes by means of which equipment a knapsack or handbag, great coat, canteen, ponch and the like can be carried with the utmost convenience and least discomfort. The knapsack or bag is carried on a back frame to which braces are fastened, passing over the shoulders down in front of the body and thence to the back, where they are made fast. A stay-strap adjustably connects the braces in front of the body below the chest, serves to keep the braces clear of the armpits, assists in supporting and distributing the weight carried, and maintains the whole equipment in position without the assistance of the usual waist-belt.

**SKIRT.**—BERTHA E. MARTIN, Asbury Park, N. J. The skirt provided in this invention is a bicycle-skirt, having the appearance of an apron front. The skirt is designed not to blow up over the knees and to be used upon drop frame or diamond frame bicycles, the skirt hanging gracefully whether the rider be mounted or unmounted. The skirt is made so that the front portion may be securely held while the back portion is dropped at the waist. The skirt is particularly adapted to bicycle saddles, since it is prevented from pulling or drawing at any part while the wheel is in motion, at the same time admitting all necessary freedom and elasticity.

**PASSAGEWAY FOR BULKHEADS.**—DALLAS DU BOIS, Montclair, N. J. In this invention, a device is provided whereby communication may be obtained between one compartment and another, at the same time maintaining a waterproof and fireproof division between the compartments. When the door in one compartment is opened, the door in the other compartment is closed. Both doors, however, may be sealed when desired. The openings of the opposing partitions are out of registry with each other, and between the partitions a car is mounted to travel and provided with opposing openings. A person desiring to pass from one compartment to another, enters the car. The car is then moved by actuating the proper devices, until the opposite door-opening in the car is brought in registry with the door-opening in the opposite partition, whereupon the person may step out into the opposing compartment.

**PENCIL HOLDER AND SHARPENER.**—CONSTANT E. COUSY, New York city. To provide a holder in which the pencil may be readily advanced as it wears and at the same time permits the sharpening of the point, this inventor employs a spirally grooved case having a longitudinal slot. A socket is provided capable of holding the pencil and of moving in the case. A ring encircles the case and is connected with the socket by a web. A nut works on the groove of the case and bears against the ring to advance the ring and parts connected therewith.

**Designs.**

**WIRE-FENCE.**—ALBERT HENLEY, Lawrence, Kans. This design consists of a series of horizontally disposed trapezoidal figures in which the parallel sides are approximately vertical, of the same length throughout the same rows and of gradually increasing length from row to row. The other two sides of each figure are of the same length throughout and converge from one of the parallel sides toward the other, producing meshes of trapezoidal form, uniform in length laterally throughout the fence, but increasing width vertically from edge to edge of the fence.

**BOTTLE.**—HERMAN TAPPAN, New York city. A circular base is provided for this bottle, from which base rises a cylindrical body slightly tapering inwardly at its upper end, terminating in a neck formed with raised spirals and ending in a reduced cylindrical mouth.

**JET FOR LIME LIGHTS.**—JOHN A. MANTZ, Jersey City, N. J. The leading feature of this design consists in a boss, from one side of which extends a bend of the base portion and from the top of which boss rises upwardly and forwardly a spout terminating in a contracted mouth.

**HOOK.**—EUNICE R. MORTON, Revere, Mass. This hook consists of a bar, from the upper end of which rise the spaced side members of a loop, from the middle portion of which extends upwardly the shank of a hook ranging in an opposite direction to a hook-plate depending from the upper edge of the bar first mentioned and from between the side members of the hook.

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(7474) F. W. M. says: I take the liberty of sending you a cutting of an ash tree I have, with a growth which I believe are eggs, and asking you what it is and for a cure. Last year this same tree, later in the season, had numerous small insects on some of the branches which looked like mould or moss, and which I scorched off, and now think perhaps they were a more advanced stage of the same thing I inclose. A. Mr. F. H. Chittenden, acting entomologist of the Department of Agriculture, says: The object sent on a cutting of an ash tree is an egg mass of the orchard tent caterpillar (*Cliocampa americana*, Harr.) It is a common species in orchards throughout the northern Atlantic States and Canada, and the peculiar habit of its larvæ of constructing tents or webs on the trees upon which they feed is well known to most fruit growers. These tents are used as shelter, and the larvæ retire into them when not engaged in feeding on the leaves. This habit of tent building furnishes an easy means of destroying the insect over limited areas, as in gardens and orchards, as it is not a difficult matter to cut off and burn these nests with their contained larvæ. The same object can be accomplished by scorching them with a torch, but it is more advisable to cut away the infested portions, as they destroy the good appearance of the trees. This is the simplest and easiest method of controlling the insect. It is also possible to detect most of the egg masses in the winter time and remove and destroy them. Still another method of control consists in the use of arsenical washes. The best time for the application of these washes, or sprays, is when the eggs first hatch, and to determine this point a few egg masses should be collected and kept under observation out of doors. Mr. Chittenden has mailed to our correspondent a copy of Farmers' Bulletin, No. 19, in which he will find full directions for the preparation and application of arsenical sprays.

(7475) F. G. G. asks: Is there any rule by which I can find the strength of an electromagnet, having given the size of the core and wire, the number of coils, and the amount of current? A practical formula for this case is

$$\sqrt{lb} = \frac{T \cdot C \cdot M}{2661 L} \sqrt{A}$$

T=number of turns of wire on magnet.  
 C=current in amperes.  
 M=magnetic permeability of the iron.  
 A=area of poles in square inches.  
 L=mean total length in inches all round the iron circuit.

The value of M varies greatly with the quality of the iron and the degree of saturation. For strong saturation of well annealed wrought iron its value may be as low as 400, and its value may rise as high as 3,000. For a horseshoe magnet the area to be taken is that of both poles. The mean total length is half the sum of the inside and outside distances around the core and armature. The armature should have as large an area of cross section

as that of the core of the magnet. No allowance is here made for the leakage of the magnetic lines; so that the actual result in any case will be somewhat less than is given by the formula. Much depends upon the accuracy with which the armature fits upon the poles of the magnet. The full calculations of the lifting power of an electromagnet may be found in S. P. Thompson's "Electromagnet," price \$6 by mail. The formula expressed as a rule is: Multiply the number of turns of wire by the number of amperes of current. Multiply this product by 400 for full saturation, and this in turn by the square root of the total area of the poles of the magnet. Divide the final product by 2661, and this quotient by the mean length of the iron circuit. The result is the lifting power in pounds.

(7476) J. H. L. writes: I wish to call your attention to the difference between an eighty gear on a bicycle or a sixty, backpedaling down a hill. Does it require any more strength to hold a large gear down a hill than it does a small one? A. It requires less pressure on the pedals of a low gear bicycle than on those of a high gear, in going down hill.

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**AN ELECTRICAL THEORY EXPLANATORY OF THE SOLAR SYSTEM.** By "Delta." Published by the author. 1898. Pp. 12. Cloth. 12mo.

This is a reprint from the Electrical Review of January 21, 1898, and embodies a theory that is at least ingenious.

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The second edition of "Die Schleif-, Polir-, und Putzmittel" has given the author an opportunity thoroughly to revise and enlarge his work, and to eliminate all that seemed antiquated when viewed in the light of improved methods. After having exhaustively treated the various polishing substances in the order of their hardness, the author passes to a description of the manufacture of polishing papers and cloths, of emery disks, rings, cylinders, etc. The polishing machines commonly used are illustrated by many engravings which constitute a desirable adjunct to the book. To the cleansing of various objects and to the manufacture of cleansing materials, such as salves, pastes, powders, etc., the author has devoted much care. Taken as a whole, the work will form a desirable acquisition to the libraries of technical schools and of mechanics.

We have received a new catalogue of photographic lenses, shutters, and accessories issued by the Bausch & Lomb Optical Company, of Rochester, N. Y. It is one of the finest catalogues which it has been our good fortune to examine. The lenses themselves are not only described and illustrated in a thoroughly scientific manner, but excellent examples of the work which is done with them are given. The intaglio plates and the half tones scattered through the book give an excellent idea of the range of the various lenses. The views in the factory show what patient care must be exercised in manufacturing high class lenses. The catalogue will be sent to any one who is interested in photographic lenses or shutters.

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AUGUST 9, 1898,

AND EACH BEARING THAT DATE.

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