

ENGINEERING INVENTION.

A car coupling has been patented by Mr. Reuben E. Woods, of Montgomery, Minn. Combined with the drawhead and its coupling pin, a hook is pivoted within the drawhead above the link chamber, and a block arranged to swing downward within the link recess, and beneath the coupling pin when the link is withdrawn, making a coupler wherein the parts may be set for automatic coupling.

AGRICULTURAL INVENTIONS.

A potato planter has been patented by Mr. William C. Davidson, of Grandville, Mich. This invention covers a novel construction and combination of parts in a machine adapted to open furrows, drop the seed, cover them, press the soil down, and mark the rows as the machine is drawn across the field.

A thatched cover for stacks has been patented by Mr. Robert Griswold, of Woody, Kansas. It is made in sections, of vegetable fibers sewed together, with ropes having loose upper ends to be tied, and loose lower ends to receive balancing weights, making an adjustable cover which will allow steam to escape, while excluding rain.

A fertilizer distributor has been patented by Messrs. Bryant Smith and Henry C. Jenkins, of Brownville, Ala. It may be drawn by a horse or operated by a man to distribute the fertilizer in drills over from three to five acres of land in a day, the machine being inexpensive, and using the fertilizer without waste.

A reversible sulky plow has been patented by Mr. James Willson, of Tomah, Wis. Its construction is such that the plows can be easily reversed, the main frame leveled on laterally inclined ground, the plows raised from the ground or adjusted to work to any desired depth, and the plows tilted laterally to adjust them to lateral inclination of the ground.

MISCELLANEOUS INVENTIONS.

A saw mill dog has been patented by Mr. Thomas Manley, of Prince Albert, Northwest Territory, Canada. It has novel features of construction, and is particularly intended for dogging small tapering logs, but is also adapted for dogging large straight logs or for holding the half sawed log.

A windmill has been patented by Mr. Peter Kohuz, of Avon, Ohio. It is self-governing, and all the sails of each section have a uniform motion in moving in or out of the wind, the platform carrying a number of rollers on which there is mounted a turntable with two boxes or bearings, in which is mounted the main shaft.

A cork fastener has been patented by Mr. Abraham Denebeim, of Evansville, Ind. It is a plate with right-angled arm and disk to fit on top of the cork, the plate being apertured at one end and having a tongue at the other end, the device being a single piece of tin, which can be readily bent to form an effective fastener.

An ant trap has been patented by Mr. Walter R. McCallum, of Waelder, Texas. The body has inward projecting tubes, with protecting caps on their inner ends, the outer faces of the caps being convex and having apertures of greater diameter than the bore of the inner end of the tube, making a simple and efficient ant trap or exterminator.

A fence has been patented by Messrs. John and Anton E. Reif, of Branch, Wis. It is a portable fence, made in sections, the invention consisting principally of the foot pieces, in apertures of which fit the lower ends of the posts, making a fence which is very stable and not liable to be blown over, and which is very simple in construction.

A marine boat slide has been patented by Mr. Harry H. Schaefer, of Point du Chene, N. B., Canada. It is a novel construction of inclined frame or roadway, with its lower end extending beneath the surface of the water, the keel of the boat sliding in runners, and the edges of the boat having guards to prevent the water from splashing upon the passengers.

A washing machine has been patented by Mr. Charles W. Turner, of Meriden, Kansas. The construction is cheap and simple, and the machine is adapted for use with any tub, clamps or fastenings being unnecessary, as the operator in bearing down upon the handle in working holds the machine and imparts pressure to the clothes, water being continuously forced through them.

A two wheeled vehicle has been patented by Mr. Emery W. Baxter, of Burr Oak, Mich. The construction is such that the body may be adjusted to vary its leverage action upon the springs to adapt the springs to the weight of the rider, and this adjustment can be effected without removing nuts and bolts, and the body is so supported that horse motion is in a large measure neutralized.

A stone and ore crusher has been patented by Mr. Daniel Brennan, Jr., of Salterville, N. J. In a suitable supporting frame is a fixed die and a movable die, a reciprocating ram and suitable mechanism for driving it, whereby the ram is made to strike suddenly against the movable die and with great force, the invention being designed to make the crushing and discharging action more effective.

A machine for forming sheet metal has been patented by Mr. Michael T. Durkin, of Brooklyn, N. Y. This invention provides a machine for forming straight or curved mouldings in sheet metal by means of dies adapted to an ordinary drawing or foot press, by which the flat edges of the guiding dies are presented to the curved surfaces of the work, so that the work is not indented by the corners of the dies.

A machine for grinding hand cards has been patented by Mr. William S. Burton, of Maryville, Tenn. In connection with an emery grinding cylinder which is automatically vibrated in the direction of its

length, are means for conveniently holding the hand cards so that their wires will be held at the desired angle to the grinding surface, the machine being adapted for cards of variable length and width.

An extractor for headless shells has been patented by Mr. Charles H. Keenan, of Fort Helleck, Nevada. It is a cylinder with the general form of a cartridge and having a head fitted to the recess in the breech of the gun bored axially, with a rod extending its entire length, the cylinder having a notch in one side, in which is loosely placed a dog retained by the rod extending through the bore of the cylinder.

A lamp trimmer and extinguisher has been patented by Mr. William W. Haviland, of Plainfield, Mich. The trimmer is mounted on the wick chamber, and consists of an upwardly extending jaw, formed with clamps that partially encircle the wick chamber, a thumb wheel operating jaws to remove the charred remains from the top of the wick, while the raising of the jaws makes them act as an extinguisher.

A diffraction camera has been patented by Mr. John Vansant, of St. Louis, Mo. The diffraction diaphragm is formed of two very thin strips of suitable material secured together and having slits at right angles to each other, forming a rectangular aperture, whose diameter must in no case exceed seventeen one-thousandths of an inch, with other novel features, calculated to give clear cut and well defined photographic pictures.

A machine for testing the friction of metals has been patented by Mr. Ezra L. Post, of New York City. It has a non-conductive frame supporting independent boxes carrying separate metals, a shaft keyed centrally thereto, independent weighted levers pivoted upon each box, and incased thermometer entered through the boxes and metals to a bearing on the shaft, for ascertaining the relative frictional resistance of metals.

A cotton picking machine has been patented by Mr. John C. Johnston, of Douglasville, Ga. The box or frame of the machine is in two parts, between which the rows of cotton plants pass, and barbed fingers which rotate horizontally project into the plants from each side and pick the cotton, which is then stripped off and delivered into a suitable receptacle, the mechanism for operating the fingers constituting the chief feature of the invention.

A heel for boots or shoes has been patented by Mr. John T. Gray, of Gray, Dakota Territory. The main body of the heel is cut away to form a recess at its lower back portion, with a bottom lift or projection left at the forward part, and in the part cut away is fitted an annular metal plate, within which is fitted a leather lift or disk, preventing uneven wear of the heel, without the heel making the sharp metallic click in wear.

A telegraph sounder has been patented by Mr. Reuben C. Rutherford, of Quincy, Ill. It has an armature lever carrying two hammers, combined with a casing containing the sounder and having an adjustable resonant cover for receiving the blows of the hammer, the device being portable, and adapted for receiving messages direct from the line, or through a relay and local circuit, or to produce signals audible at a distance or very light ones.

A spring bed bottom has been patented by Mr. George Steinson, of Guttenberg, N. J. Combined with a network of coiled wire springs connected to a suitable frame are shackles for the springs, to prevent their being too far distended by heavy weight upon the bed, the springs having loops or hooks at each end to connect with chain shackles, and there being a metal coupling with headed arms to connect the chains to form the network and to connect the network to the frame.

A fare box forms the subject of two patents issued to Mr. Timothy L. Beaman, of Knoxville, Tenn. The inventions relate to an arrangement of a sinuous pay chute and a hopper which receives the fares therefrom, both situated in the upper part of the fare box, which is of a kind to be used in street railroad cars, omnibuses, etc.; the box is so constructed that it may be repaired conveniently should the glass be broken, and has more effective safeguards against the abstraction of fares than other similar boxes.

NEW BOOKS AND PUBLICATIONS.

THE PRINCIPLES AND PRACTICE OF CANAL AND RIVER ENGINEERING. By David Stevenson, F.R.S.E., M.I.C.E., author of a "Sketch of Civil Engineering in North America," etc. Edited and revised by his sons David A. and Charles A. Stevenson. Third edition. New York: Scribner & Welford. Pp. 406, large octavo, 18 plates.

The first edition of this valuable work was published in 1853, being revised and enlarged from the article "Inland Navigation" in the eighth edition of the Encyclopædia Britannica. The second edition, with much new matter, appeared in 1872. This edition is out of print, and the inquiry for the work has grown into such a demand as to necessitate a third edition. The first two chapters are devoted to a brief sketch of the early history of barge canals, giving a general description of some of the famous ship canals of the world, without entering into the technical details of their construction. The second and larger part of the work contains a general and technical review of river engineering, presented in a clear and interesting manner. Among the topics treated of we note the following as being of timely interest: The compartments of rivers defined; the tides of rivers, their variations; the general rules for taking soundings, with applications; American methods of taking elevations along a tidal river without leveling. The discharge of rivers, undercurrents, velocities of flow, floods, methods of studying currents. The water-sheds of rivers, and methods of rendering small rivers navigable. Tidal propagation and currents of rivers.

Removal of obstructions to tidal flow; the dredging of navigable streams, the discussion of "jettying," the improvement of rivers. Docks, tide basins, harbor bars and barless rivers. The reclamation of land, and the crossing of navigation highways by bridges. The plates illustrate plans and sections of the Caledonian, Amsterdam, and Suez Canals, charts of Dornoch Firth, the Dee, the Lune, the rivers Tay, Ribble, estuaries of the Clyde and the Foyle. Diagrams of tidal lines of the river Dee, during flood of a spring and an ebb tide, and diagrams of tidal waves in the Firth of Forth and in the Clyde. The work is marginally annotated for ready reference, in addition to having a well classified index. American engineering practice is largely drawn upon throughout the work, and many valuable records of fact are herein embodied in permanent form. The vast amount of money paid out by the United States Government annually for river and harbor improvements has made the reappearance of this standard work of timely importance to all American engineers.

DIE SCHIFFSMASCHINE, Busley. Ship machinery, its construction and manipulation; a hand and reference book for marine engineers, officers of men-of-war and merchant steamers, machinists, students, ship builders, and others interested in marine engineering. There are two volumes of text and one volume containing 170 lithographic plates, comprising 1,300 colored figures taken from the working drawings. The publishers are Lipsius & Tischer, of Kiel, Germany. This exhaustive work appears now in an enlarged second edition, and comprises every machine used on board of men-of-war and merchant steamers, and, in point of completeness, outdoes any work of like nature ever published. It is not a dry compilation of statistical results, nor a history of ship machines; but it gives in concise language the physical laws governing the construction of machines, the mathematical formulæ derived from these laws, and a full and complete description of the construction and arrangement, with the resultant operation and details, of every machine on board of a steamer. It is needless to say that the author has selected, from every type of ship machine, the most advanced, standard styles. The various tables contain comparisons of the use of coal and steam, strength of parts, the relative proportions of French, German, and English men-of-war, etc. The plates, which are bound in a separate volume, are magnificently executed, the sections being colored according to the colors of the respective materials, and every figure is drawn to a scale. The work is handsomely bound, and the publishers deserve great credit for the manner and style in which they have presented the work to the public. The author, C. Busley, Professor in the Imperial Marine Academy in Kiel, has again proved that German savants deserve the reputation which they enjoy for thoroughness, deep study, and completeness of thought, and last, but not least, for being thoroughly wide awake to the requirements of modern times.

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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. **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.

(1) T. D. McC. asks: 1. For what kinds of work is the diamond carbon battery suitable? A. For intermittent or open circuit work only. 2. Can electriclight carbons be used in its construction? A. Yes.

(2) P. J. McC. asks the reasoning by which the following algebraic expression is reached. The age of a father is represented by a , the age of his son by b . The problem is to deduce a formula for determining the space of time (in years) in which the age of the father will be n times that of the son. The solution is $\frac{a-nb}{n-1}$ years. How is it deduced? A. Start-

ing with the father, aged a years, and the son, aged b years, as time advances the same increment is added to each age. Call this increment x . The ratio of age to age, or the quantity n , depends upon this factor. After the expiration of any given time x , the ratio of the ages will be denoted by $\frac{a+x}{b+x}$. This by the conditions of the problem is equal to n , giving us the equation
$$n = \frac{a+x}{b+x}$$
 which reduces to
$$a+x = nb + nx$$
 and solved with respect to x gives
$$x = \frac{a-nb}{n-1}$$

(3) G. A. B. asks: Would not cypress be a far better wood to use for stringers and ties for street car tracks than either white or yellow pine? A. No. Cypress is more durable in damp places than pine and is stronger, but it has the serious disadvantage of springing in its length, which renders it unfit for car track stringers, although some varieties are free from this objection, and could be used for the purpose. The cost of cypress is about one-third higher than pine, which is in itself a drawback to its use.

(4) H. A. asks (1) what process there is of fixing a billiard ball which has a small piece chipped out. A. Use white mastic 30 parts, shellac 90 parts, turpentine 6 parts, and spirit of wine 90 per cent strong 350 parts. Use as a cement. 2. Also of changing white to a dark red. A. Soak in a solution of aniline red, which should be very slowly heated to near the boiling point. 3. How far does a rivet on the circumference of a wheel, whose diameter is six feet, travel in $\frac{1}{4}$ of a mile long? A. The cycloid path followed by the rivet measures 6,722 $\frac{1}{2}$ feet, about.

(5) C. E. K.—The 20 ohm sounder with three cells should give slightly better results, as regards sound.

(6) J. F. H. asks (1) how far the Panama Canal is completed. A. No portion of the canal is fully completed. 2. What chemicals are used for coating dry plates? A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 541, for full particulars.

(7) W. K. D. asks if fish are ever frozen up in ice and transported alive in that condition by the Government Fish Commissioners or by any one? A. The Fish Commission have never used this method of transportation of live fish; freezing kills them. Commissioner Blackford says the assertion that this has