

ENGINEERING INVENTIONS.

A car coupling has been patented by Mr. Frederick W. Kuehl, of Milwaukee, Wis. The buffer and draw springs are, by this invention, made in a novel form, to prevent the breakages liable to occur when ordinary steel springs are used, the construction being much cheaper than the ordinary form, and giving all the elasticity necessary.

MECHANICAL INVENTIONS.

A nut lock has been patented by Mr. Frank F. Stevens, of Slater, Mo. The invention consists in a washer shaped to form a nut lock, it being radially corrugated on its two faces, parted on one side, and spiral shaped, so that neither the nut nor nut seat requires any notches or unusual roughness for this lock to engage them.

AGRICULTURAL INVENTIONS.

A sulky corn stalk cutter has been patented by Mr. Alexis F. Gillet, of Burlington Junction, Mo. The object of this invention is to facilitate the cutting of corn stalks in the field, and to prepare the ground for plowing, and the machine may be made narrow to cut a single row of stalks, or wider to cut two or three rows at a time.

A check wire tension for corn planters has been patented by Mr. Albert P. Baker, of Thawville, Ill. Combined with a sliding rod having a cross head upon its forward end and an eye at its rear end is a spiral spring, adjustable stop pins, and other novel features, to give a uniform tension to check wires, so the pull of the planters will not draw the buttons of the check wire out of place, and the planting will be done in accurate check row.

MISCELLANEOUS INVENTIONS.

A running gear for vehicles has been patented by Mr. John B. Howell, of Allentown, N. J. This invention covers a novel construction and arrangement of parts, intended to promote elasticity, strength, and durability, and better adapt vehicles for use on rough and rocky roads.

A washing machine has been patented by Mr. Adam R. Herbel, of Fleetwood, Pa. This invention covers principally peculiar means for connecting the stirrers or rubbers to the vertical shaft, so the connection may be loose and not rigid, and hence less liable to tear the clothes.

A ventilating and adjustable rain proof has been patented by Mr. Samuel T. Atkin, of Georgetown, Texas. It is formed of a conical tube held on the roof, in the upper end of which conical tube the upper end of the stove pipe is held, a hood being held on the upper end of the stove pipe.

A meat tenderer has been patented by Mr. Virgil S. Brock, of Osceola, Ark. A bracket standard carrying a horizontal shaft is secured on a base, the shaft having a crank handle, and carrying a series of circular toothed knives or cutters, whereby meat may be rendered more tender and juicy by the cutting and bruising of its fibers.

A tricycle has been patented by Mr. Oliver U. Grinnard, of Kansas City, Mo. The invention covers improvements in the construction and arrangement of the frame and driving and steering gear, whereby it is designed to simplify and cheapen the cost of the machine, and at the same time improve its working qualities.

An improved door has been patented by Messrs. George E. Filer and Albert H. Neff, of Sheldon, Iowa. The object of this invention is to so construct a door that it may be used for a tight storm door, a glass panel door, or a screen or woven wire door, and it provides for detachable panels of wood, glass, or woven wire, with special forms of construction.

An ash sifter has been patented by Mr. William T. Adams, of Baltimore, Md. This invention relates to ash sifters inclosed within a case or box, to prevent dust from escaping, and is an improvement on a former patent issued to the same inventor, intended to better the form and increase the holding capacity within a given size of box space.

A tobacco pipe has been patented by Mr. John O. Kilroy, of Albany, N. Y. The stem has an internally screw threaded neck, on which are a saucer and bowl held in place by a hollow screw through the bottom of the bowl and saucer, and screwed into the threaded neck, so the bowl can be easily detached and replaced.

A child's carriage has been patented by Messrs. Uriah McClinchie and Jay F. Butler, of New York City. The body has side or wheel fenders with upright guards mounted on them and set out from the body, whereby a roomy interior is secured, with greater safety and convenience for the child, and the body generally is strengthened.

A carburetor has been patented by Mr. William C. Strong, of Readfield, Me. The air trap to the bell is of novel construction, to be opened self-actingly by the lifting of the bell; there is also a water jacketed arrangement of the gasoline vessel and carburetor in the main tank of the machine, with special contrivances for the inlet of air.

A combined ash sifter and coal box has been patented by Mr. Charles F. Goss, of Tappahannock, Va. The invention comprises an open top case, with a rocking sifter, an ash drawer supported by a hopper shaped partition, a coal chamber with inclined sides, an opening, and a hearth, with other novel features of construction and arrangement.

A weighing scale has been patented by Mr. Thomas H. Herndon, of West Point, Miss. This invention relates to weighing devices which register upon a scale the weight of any article placed on the scoop, and its object is to weigh accurately and quickly, and do away with movable weights, for which a novel construction and combination of parts is provided.

NEW BOOKS AND PUBLICATIONS.

How to TELL THE AGE OF A HORSE. M. T. Richardson, 7 Warren Street, N. Y. Price 30 cents.

This is a very small pocket manual, but it gives all the information needed for determining the age of horses.

Eureka Wheat Cleaning Machinery. Howes & Ewell, Silver Creek, N. Y.

The Straight Line Engine Co., Syracuse, N. Y.

Whittier Machine Co., 90 Liberty St., N. Y. Elevators, Engines, and Boilers.

Handsome illustrated catalogues from the above works have been received at the SCIENTIFIC AMERICAN office.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

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The invigorating rest of a smoke is lost if there is any suspicion of impurity in the tobacco. Drugged fragrance is poison. Nature's flavors are soothing and healthful. Every smoker has a guarantee of unadulterated quality when he fills a pipe with Blackwell's Durham Long Cut, or rolls it into a cigarette.

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"How to Keep Boilers Clean." Book sent free by James F. Hotchkiss, 86 John St., New York.

Stationary, Marine, Portable, and Locomotive Boilers a specialty. Lake Erie Boiler Works, Buffalo, N. Y.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

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Railway and Machine Shop Equipment. Send for Monthly Machinery List to the George Place Machinery Company, 121 Chambers and 103 Bead Streets, New York.

Steam Boilers, Rotary Bleachers, Wrought Iron Turn Tables, Plate Iron Work. Tippet & Wood, Easton, Pa.

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For Power & Economy, Alcott's Turbine, Mt. Holly, N. J.

If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN Patent agency, 361 Broadway, New York.

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Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y.

Electrical Alarms, Bells, Batteries. See Workshop Receipts, v. 3, \$2.00. E. & F. N. Spon, 35 Murray St., N. Y.

Curtis Pressure Regulator and Steam Trap. See p. 78.

We are sole manufacturers of the Fibrous Asbestos Removable Pipe and Boiler Coverings. We make pure asbestos goods of all kinds. The Chalmers-Spence Co., 419 East 8th Street, New York.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Barrel, Keg, Hogshead, Stave Mach'y. See adv. p. 78.

Gear Cutting. Grant, 66 Beverly St., Boston.

Hoisting Engines, Friction Clutch Pulleys, Cut-off Couplings. D. Frisbie & Co., Philadelphia, Pa.

Munson's Improved Portable Mills, Utica, N. Y.

U. S. Standard Thread Cutting Lathe Tool. Pratt & Whitney Co., Hartford, Conn.

For best low price Planer and Matcher, and latest improved Sash, Door, and Blind Machinery, Send for catalogue to Rowley & Hiernance, Williamsport, Pa. Woodwork'g Mach'y. Rollstone Mach. Co. Adv., p. 77.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 77.

The Porter-Allen High Speed Steam Engine. Southwark Foundry & Mach. Co., 430 Washington Ave., Phil. Pa.

Iron and steel wire of all kinds. Extra qualities straightened and cut to lengths a specialty. Trenton Iron Co., Trenton, N. J., and 17 Burling Slip, New York.

Split Pulleys at low prices, and of same strength and appearance as Whole Pulleys. Yocum & Son's Shafting Works, Drinker St., Philadelphia, Pa.



HINTS TO CORRESPONDENTS.

Name 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 due 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 mail, each must take his turn. Special Information requests on matters of personal rather than general interest, and requests for Prompt Answers by Letter, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Minerals sent for examination should be distinctly marked or labeled.

(1) J. F. P. asks: In an engine 12 inches diameter, 14 inches stroke, which will give the most power—to add one inch to stroke and take one from diameter, or add one to diameter and take one from stroke? A. You get the most power by adding one inch to the diameter and one inch less stroke.

(2) H. R. F. wants to know what chemical substance or compound will produce the greatest degree of cold. A. According to Ganot, the greatest artificial cold has been produced by a bath of bi-sulphide of carbon and liquid nitrous acid, viz. -140°C. 2. Also, if there is any process by which copper tools can be hardened and tempered? A. No; the so-called ancient copper tools were an alloy of copper and tin, about 4 ozs. tin to the pound.

(3) J. A. C. desires a receipt for making the composition used by printers and others, for fastening the sheets of letter heads, bills, and note heads in tablets or pads. A. The exact composition of the substance used is kept secret, but we believe it consists of glue and glycerine in proportions similar to roller composition, except that a less quantity of glue is used. The coloring matter is some soluble aniline dye.

(4) C. V. R. asks: Will an ordinary belt feedwater pump lift as well as force water, say from a well through a pipe 50 to 100 feet long? A. Yes, if the surface of the well is not more than 20 feet below the pump.

(5) C. M. E. asks the respective displacement of water in tons of the steamers Oregon and America. A. The displacement of the Oregon is 7,400 tons gross, and that of the America 6,500 tons gross. 2. Also the chief advantages of the compound engine over the ordinary high or low pressure marine engine? A. The principal advantages are less condensation in the cylinders and more uniform work on the crank pin and shaft.

(6) C. E. K., Jr.—How can I harden a piece of cast steel that is very soft? A. Good cast steel will harden by being plunged into cold water while red hot. If the steel is decarbonized steel it may be casehardened by heating red hot, covering it with powdered prussiate of potash, and plunging into cold water.

(7) P. J. D. asks: How can I harden steel runner castings for ice skates, the temper to extend along the edge from one-fourth to one-half an inch from the bottom? Experiments make them crack or spring. How can I blue the bottom of these skates? A. Heat and harden the entire iron if of cast steel; brighten and draw to color in red hot clamps. Straighten while still warm by pressure, by springing under and over bars, or by blows on the anvil. If the skates are to be blued, they will be only spring temper. "Skate runner castings" are cast iron cast in chills. "Steel runners" for skates are drop forged from steel.

(8) E. H. asks: Please tell how to temper steel screw gauges, both male and female, without altering the size. A. Heat in melted lead; harden in cold water or brine pickle; polish bright; draw to color (straw) in hot sand. If the steel is homogeneous, there will be no change in size.

(9) J. P. P.—The tensile strength of a cast steel bar is 140,000 pounds, wrought iron bar 50,000 pounds, malleable cast iron 25,000 pounds per square inch. Small steel castings can be annealed in the same manner as steel forgings by heating to a full red, covering with hot ashes, allowing 3 or 4 hours to cool. Your rule for determining pitch of rafters by laying off with a carpenter's square is good, and is in common use by framers of buildings.

(10) J. C. asks: If it takes 10 pounds of power to elevate a weight of straw 14 feet on a threshing machine, what power will it take to elevate it 28

feet in continuous elevation? A. If the straw is moving continuously with an apron, you will have about twice the weight to lift in carrying the straw twice the distance, and the friction of the additional apron. More than twice the power will be required.

(11) W. C. S. asks: Will a 1½ inch pipe conduct off or allow the steam to escape generated in a 55 horse power boiler, said boiler to be worked to its capacity? A. Yes, if the pipe is but a few feet in length.

(12) Inquirer.—The sun rises and sets north of due east and west about 47° at your place and date.

(13) F. E. L. asks: What should be the dimensions of valve, ports, and bridges of an engine 3x 4½ to run 350 revolutions per minute, also size of pipes? What power would it develop, and how large a boiler should I need? How large and heavy a flywheel would I need; throw of eccentric? A. Make your steam port ¾ inch by 2 inches; exhaust port ¼ inch by 2 inches; bridges ¼ to ⅜ inch; ¾ steam pipe; 1 inch exhaust; at 50 pounds mean pressure will equal 3 horse power; will require a boiler of 40 square feet heating surface; an 18 inch wheel weighing 50 pounds. Throw of eccentric equal to width of steam port and bridge.

(14) J. H. says: I wish to jacket a steam engine cylinder. I originally intended to use plaster of Paris for a non-conductor between the jacket and cylinder, but was told this was not good for that purpose, and so now I've come to you for advice. If plaster of Paris is suitable, shall I let it come in contact with the cylinder, or leave an air space of half an inch or so? If this is not a suitable filling, what is? A. Air is better to fill the space under the lagging than plaster of Paris. If you wish to use any filling, asbestos is the best. 2. I have store house with a single layer of boards for a roof. Over each joint I have a narrow piece of corrugated roofing iron, bent in a half circle and flanged out on each side and fastened with shingle nails. I have applied a coat of pitch over this, but it still leaks. What can I do to prevent it from leaking? A. The iron battens upon a board roof are not reliable. They are always upon the move by expansion and contraction from variations in temperature, thereby breaking the pitch joints. By adding a little lard oil to the pitch, just enough to keep it from cracking when cold—brush it on hot and saturate with sand—you may make your roof tight.

(15) G. H.—The breaking strain of iron varies from 40,000 to 50,000 pounds per square inch section, from which you may compute the value of your areas. The cost would depend on how you bought as well as quality. You had better consult a blacksmith about the many other calculations you ask.

(16) R. B. says: 1. Take a bolt in the flange of a cylinder, screw the nut down on the cover until you bring a tensile strain of 1,000 pounds upon the bolt, then give a pressure in the cylinder which will bring a strain of 1,000 pounds upon the same bolt, do you get a combining strain of 2,000 pounds on this bolt, or is the strain only 1,000 pounds? A. Under your statement the initial pressure will be 2,000 pounds, but if the bolt be small its threads will set, or the surfaces so unite under the pull, that the united pressure upon the threads will be diminished. 2. Also take the sides of a "water leg" on a boiler with a stay bolt holding them together, having 90 pounds pressure inside, would this stay bolt sustain a tensile strain of 90 pounds, or would the boiler pressure on both sides double the strain? A. In a water leg the strain of 90 pounds on one head of the stay bolt is balanced by the 90 pounds upon the other head, and the bolt is only under a tensile strain of 90 pounds—as a man may pull 90 pounds upon a rope attached to a post, and the strain will not be any different if another man take the place of the post and pulls just 90 pounds.

(17) W. F. V.—The arms of pulleys are curved to prevent cracking in casting from unequal shrinkage. The forms of curve are matters of fancy. It makes no difference as to which way they run, but looks shipshape to have all pulleys in a room or shop with their curved arms running the same way.

(18) H. S. asks: What material is used by architects and masons for cleaning Croton brick work of the marks and scratches made in the building? A. Hydrochloric acid (muriatic acid) is used for this purpose.

(19) H. Q. H. asks: 1. How many feet of compressed air can a tank 16x6x6 feet contain, tank made of one-sixteenth inch plate of iron? A. Tank will hold about 200 cubic feet, and will not be safe for more than 4 pounds pressure, which will enable you to utilize not more 20 cubic feet for your whistle, when the pressure will be reduced to 2 pounds. 2. How many feet of compressed air will a whistle 8 inches diameter use per minute? A. 3 to 6 cubic feet per minute, according to construction of whistle. 3. What distance do you think this whistle can be heard at? A. Possibly one-quarter of a mile.

(20) W. B. A. asks about making cement piping for conveying spring water? A. If you have but little pressure upon the cement pipe that you propose to make, you may make the pipe over a spindle of hard wood, slightly taper, just enough to allow it to be drawn out of the cement. Make a groove at the bottom of the ditch as nearly straight as possible, lay in the groove a course of cement of the thickness that you propose to make the tube; upon this lay the wooden spindle well oiled with linseed oil, then cover the spindle with cement. Proceed to make a second bed of cement, and draw the spindle forward nearly its length and cover with cement as before. The spindle may be from 3 to 5 ft. long; make the pipe from 1 to 2 in. thick, or for small pipe as thick as the diameter of the hole. Use pure Portland cement and water. Mix quickly and as thick as stiff mortar.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

D. M. S.—The specimens are limestone—calcium carbonate—colored red by the admixture of a little hematite or iron oxide.