

## ENGINEERING INVENTIONS.

Mr. Thomas V. Tucker, of Henderson, Ia., has patented a car coupling of novel construction. The draw head of the car has on its top a vertical sleeve in which the coupling pin works, and a lever, having suitable connections, raises the pin from either the top or side of the car. A sliding spring latch holds the pin up. The link is provided with lateral projections that engage with the spring catch to release the pin.

Mr. Cornelius Kunkel, of Oregon, Mo., has patented improvements in windmills, in which the feathering of the wings of the windmill, to prevent too great velocity, is controlled by mechanisms connected with weighted levers, moved out and in by centrifugal force. The hub of the wind wheel is countersunk from its rear end, whereby the weight of the wheel is brought over the main bearing, and overhanging of the wheel is prevented. Suitable devices for starting and stopping the wheel are also provided.

The object of an invention that has been patented by Mr. Cornelius Gorham, of De Soto, Mo., is to economize labor in handling coal in coaling locomotives. It consists in a portable coal chute, mounted on a truck of peculiar construction, and adapted to be tilted to discharge its load, enabling the fireman to coal the locomotive without other assistance. Tracks and storage platforms are also provided by which the loading and unloading of the chute are facilitated.

Improvements in the class of dredging buckets, called clam shell buckets, has been patented by William A. T. Sargent, of Wilmington, Del. The ordinary bucket is constructed of two partially cylindrical shells, and is often extremely difficult to hoist out of the material in which it has been embedded on account of the suction produced. The improved bucket is composed of four buckets instead of two, the upper buckets cutting a larger circle than the center ones, and displace sufficient material at the sides to allow the water to pour in and prevent the formation of a vacuum when the bucket is hoisted.

Mr. John J. Carrier, of Waseca, Minn., has patented an automatic car coupling. A plate that has at its inner end a pocket for receiving the end of a car link rests flat in the bottom of the opening in the drawhead, and is raised more or less to elevate the link for coupling by a crank. A sliding plate on top of the drawhead supports the coupling pin above the opening, and by a rod at the end of the drawhead is moved back when the cars are run together to couple. When the plate moves back the coupling pin drops, and the cars are coupled.

## MECHANICAL INVENTIONS.

A machine for welding plowshares and landsides has been patented by Messrs. Joseph Myers and Thomas B. Simonon, of Superior, Neb. To a bed plate are secured a fixed and a movable jaw of proper shape and thickness to grasp and press the land side and plowshare at the point to be welded. A lever for working the movable jaw is pivoted to the bed plate, and has an eccentric head that presses the jaw up with great force. The parts to be welded, when sufficiently heated, are placed between the jaws, which are quickly forced together by the lever, thus performing the work perfectly and quickly.

A reversible mechanism for counter shafts has been patented by Mr. Christian E. L. Moebius, of New York city. The driving pulley runs loose upon a counter shaft revolving in suitable hangers, but is prevented from longitudinal movement on the shaft. The pulley carries the shaft with it by means of a clutch, that slides upon the shaft and engages with clutch teeth formed upon the pulley. Upon the inner surface of the rim of the pulley is attached a gear wheel, and by suitably arranged intermediate gear wheels and a clutch the motion of the pulley is changed as desired.

An improved cutter for leather whitening machines has been patented by Mr. John E. Clement, of Peabody, Mass. The cutter head is a cylinder of slightly greater length than its diameter, and in grooves formed in the head are secured cutters made of thin blades of metal bent in V form, each wing being formed as a spiral on a pitch equal to the length of the cylinder. The angles of the cutters are at midlength of the cutter head, and the wings extend to the ends of the head. The cutters act on the leather with a shearing cut, from the center outward, the operation being similar to slicker whitening done by hand.

Mr. Johnathan B. Richards, of Wager, Ark., has patented an improved bench pin attachment that can be applied to the ordinary wood worker benches. The attachment is so constructed that it may be moved horizontally to be adapted to lumber of different lengths, and it may also be moved vertically to adapt it to be used with both high and low vises, and for holding lumber of different widths. The attachment is cheap and simple, and seems well adapted for the use intended.

Messrs. Thomas Donahue and William W. Cone, of Terryville, Ct., have patented improvements in hasp locks for trunks and chests. Such locks have heretofore been made of cast metal, making the locks expensive. This invention consists in hasp locks made in all its parts of punched and stamped sheet metal, the parts being stiffened by raised edges and by tongues folded on the inner surfaces of the plates. A lock made in this manner is light and strong, and cannot readily be broken by blows.

## AGRICULTURAL INVENTIONS.

An improved check row corn planter has been patented by Mr. Joseph Morava, of Castle Rock, Wis. The improvements consist in devices by which the upright tubular seed boxes can be raised and lowered to plant the seed at any desired depth in the ground, and may be turned into a horizontal position, so that the machine can be turned or taken from place to place. Suitable mechanisms operated by the wheels also control the planting of the hills, so that they are properly check-rowed in the field.

Messrs. Benjamin Stalcup and George W. Stewart, of Worthington, Ind., have patented improve-

ments in a band and feed cutter for which they received Letters Patent 247,427. The improvement consists in placing between the knife shaft and the revolving spreader a transversely moving shaker, for more thoroughly shaking out the bundles after the bands have been cut, and also in the construction and shape of the teeth on the web or belt that carries the bundles.

An improvement in plow handles has been patented by Mr. Friedrich Hacke, of De Soto, Mo. The handles of a plow are made in two parts, and are united by a suitably constructed adjusting splice, just below the curved parts of the handles. By this means the handles of plows are readily adjusted to suit short or tall plowmen, and the parts are more cheaply replaced when broken than when the handles are made in one piece.

## TEXTILE INVENTION.

Mr. Albert Winter has patented a machine for folding cloth into layers of equal length from a roll or pile. Standards fixed to the sides of one end of a table have slots in their inner edges in which rollers are journaled. Similar standards are placed on a traveling frame at the opposite end of the table. In folding the traveling frame is placed at a suitable distance from the fixed standards, and the cloth is passed around the rollers alternately and secured at each end. The traveling frame is then moved from the fixed standards, and the cloth is stretched into even folds, and the rollers are then removed.

## METALLURGICAL INVENTION.

Mr. William W. Waplington, of Halifax, Can., has patented improvements in gas furnaces for metallurgical purposes, and for melting glass in pots, etc., in which the gas producers, flues, valves, regulators, and working chamber are combined in one building, the object being to economize fuel and space, and to obtain an efficient furnace for the above named purposes, at a greatly reduced cost, consequent on the simplicity of construction.

## MISCELLANEOUS INVENTIONS.

An improved folding clothes rack has been patented by Mr. George Seymour, of Boone, Ia. Four posts are connected in pairs by hinges, in such a manner that the lower ends of the pairs can be swung from each other. The end bars are hinged to the outer side of each of the posts, and their outer ends are hinged in a similar manner to an upright bar, the upper ends of these being connected by a separable hinge. When these hinges are separated the racks stand out radially from the center, and when the hinges are united, the bottoms may be separated to form an A shape, the sides being held in position by jointed bars.

A window sash and window frame, in which the sash will be held at any point in the frame without weights or similar contrivances, has been patented by Mr. Casper Lowenstein, of Columbus, O. The side bars of the sash are wider at the top than the bottom, and the window frame is provided with recesses, in which bars are placed, that are pressed out by suitable springs against the diagonal edges of the side bars of the sash, the springs exerting the greatest pressure below the center of the bars, and holding the sash at any desired position.

A device for holding hats in church or other places has been patented by Mr. John H. Burns, of Springfield, Ill. A clip composed of two plates pivoted to each other, their lower ends being held together by a spring coiled around the pivot, is hinged to a bar that is pivoted to a plate adapted to be secured to the back of a chair or church pew. This device holds a hat or cap securely and out of the way of the wearer.

Mr. Henry E. Hayes, of Brooklyn, N. Y., has patented an adjustable map supporter. The supporter consists of two clamps connected at one end by a crossbar, having a hand screw for attaching it to a chair or other support, and having eyes at the other end to receive a hollow cylinder that is provided with map suspending rods and a locking device for holding the rods in any desired position.

A novel fire escape has been patented by Mr. Diedrich Schmidt, of New York city. It consists of a derrick, pivoted to the inner surface of a wall and formed in hinged sections, so that the end of the arm of the frame can be swung out of the window opening to the outer surface of the wall. From the end of the arm a box, containing a folding ladder, is suspended, which drops from the box when the bottom is opened, permitting persons to pass down in case of fire.

A device for regulating the flow of sap from the reservoir to the evaporating pan has been patented by Mr. Charles F. Mansur, of Weston, Vermont. The sap flows from the reservoir through a pipe in a box containing a valve, and from this box into the evaporating pan. As the liquid rises in the pan, a portion of it passes into an auxiliary vessel containing a float. The float is connected by a rod to the valve of the supply pipe, and as the float moves upward the valve is carried upward also until it is pressed on the end of the supply pipe, closing it and stopping the flow of sap. As the liquid in the pan is boiled away the float descends, permitting the sap to flow from the pipe again.

An improved waiter, or bracket stand, for receiving dishes or plates, has been patented by Mr. Joseph T. McFarlin, of Middleborough, Mass. The stand consists in a standard, to which removable bracket plates or rings are held by means of projections on the standard and tongues and apertures on the rings, and also in a pie dish holder formed of two rings placed edgewise on the surface of the supporting ring, having slots for receiving a lifting handle.

A starch drying chamber, so constructed that the starch can be dried in less time and with less labor than by the ordinary methods, has been patented by Mr. George E. Full, of Charlotetown, Prince Edward's Island. The chamber has a slotted or perforated upper receiving floor, upon which the starch is thrown as it comes from the tanks. The finer portions fall through the slots of the floor onto drying frames below. These frames are either hinged or pivoted, in such

a manner that when the starch is dry the frames may be tilted or dropped, to discharge the starch into bins below them.

A device for securing pocketbooks, watches, etc., in the pockets of the owners, has been patented by Mr. Thomas B. Deniston, of Peru, Ind. A snap hook is attached to the pocket book or other article to be secured, and to the inside of the pocket, at the bottom, a wire or loop is fastened, to which the snap hook is hooked. The pocket book cannot be removed from the pocket without attracting the attention of the owner.

A mechanical device for catching fish has been patented by Mr. Thomas Heaton, of Vancouver, W. T. The device consists of an endless chain passing over two skeleton wheels, the shaft of one of the wheels being journaled in suitable supports placed on two connected boats, the other wheel being submerged in the water and suspended from the boats by suitable devices. The endless chain that passes over the wheels is provided with suitable nets for catching and elevating the fish. The device may also be used for gathering oysters, clams, etc.

An invention by which revolving heels for boots and shoes are made more firm and secure has been patented by Mr. Henry J. Johnson, of Philadelphia, Pa. A circular plate is secured to the stationary heel, and has attached to it a spring latch pin that engages with a series of holes in a circular plate secured to the top of the revolving heel and holds the heel in any desired position. The plates are connected by suitable devices to hold them securely to each other.

Improvements in velocipedes have been patented by Mr. Cephas Shelburne, of Johnson City, Tenn. The velocipede may have three or four wheels as desired. The treadles are connected with rocking levers, by pivoted connecting bars. The rocking levers are provided with pawls that engage with ratchet wheels placed on the shaft of the driving wheels. By these means when the treadles are operated by the feet the wheels are revolved.

A universal tool handle has been patented by Mr. Thomas Bates, of Janesville, Wis. The handle is hollow, and has at one end a heavy metal ring. Two jaws are hinged at their inner end to a screw threaded bolt that enters a nut secured to and turning on the butt end of the handle. The hinged jaws are grooved on their inner surfaces, and have flanges on their outer sides by which the hinged parts are closed or released when the nut at the butt of the handle is turned.

Mr. William G. Harper, of Unionville, O., has patented improvements in the hind hounds of wagon running gear by which they are made more economical and durable than those of ordinary construction. The improvements consist mainly in such a combination and construction of the axle and bolster, and brace rods and hounds, that they are all properly united and strongly held without cutting or notching any of the parts.

## Notes &amp; Queries

## HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) W. A. P. writes: The following question has arisen and been discussed by a good many of the men in our town. We have found we cannot come to any conclusion, and have decided unanimously to leave the question to you, if you will be so kind as to answer it. Does the follower head in the cylinder of a locomotive run back and forth, or does it have any other than a forward motion? My idea is that when the crank pin on the drive wheel moves above the level of the axis of the drive wheel, the follower head runs over ground faster than the cylinder, and therefore gets to the forward end of it. But when the crank pin passes below the level of the axis, the follower head still has a forward motion, but it moves slower than the cylinder, and instead of the follower head moving back, the cylinder moves forward away from it until it is at the back end. A. The crank pin and piston of a locomotive never move backward relatively with the track, except when the wheels slip. The pin and piston in their upper and forward stroke, from dead point to dead point, move forward, a distance equal to one half the circumference of the wheel, plus the length of the stroke or twice the length of the crank, while in the lower and return stroke, from dead center to dead center, they also move forward relatively to the track a distance equal to one-half the circumference of the wheel, minus the length of the stroke or twice the length of the crank. This is true for all lengths of crank within the radius of the tread. If the crank pin should be placed exactly at the periphery the piston would stand still for an instant at the middle of the return stroke, and if it be placed beyond the periphery, the piston would have a reverse motion at the middle of the return stroke.

(2) E. R. D. asks (1) how to pulverize phosphorus. A. Triturate it with some chloroform in a mortar until dry. It will not remain in this condition long, and must be kept very cool to avoid its ignition. 2. How to make a solution to get a surface with paint. I wish to apply it to illuminating, such as is done on the illuminated match safes. A. Turpentine spirits is the best practical solvent for this purpose, or linseed oil. A mixture of this kind cannot replace luminous paint. 3. Also by what process do match makers get phosphorus to the proper consistency to dip matches in? A. Glue or gum, and the solvent action of the other ingredients, sulphur, etc.

(3) J. E. H. writes: I have a good stout boat, 24 feet long, 9 feet beam, with flat bottom. I wish to apply steam to it as a propelling power, and wish to know the most advisable manner in which to do it. I wish it only as a family and sporting boat, to be used in smooth water, and five or six miles an hour would be fast enough. What size engine shall I use and what size screw as propeller? A. Apply a screw propeller; engine about 4 inches or 4½ inches diameter of cylinder, by 5 or 6 inch stroke. 2. Would any of the small stationary engines do for it? A. Yes, if not too high or too heavy. Your boat will have a light draught of water, and the screw will be, say, one-third of its diameter out of water.

(4) B. T. writes: We are putting up two boilers, 36 inches in diameter, 26 feet long, with two 12-inch flues in each boiler. What should be the size and height of chimney? The boilers are second hand, and are badly scaled with rust on the inside. Will you please give us some plan for removing it? A. Twenty inches square, and 50 to 56 feet in height above boiler. As your boiler is second hand, it should have very careful examination outside and inside before putting it in use.

(5) "Subscriber" asks: 1. Does not a small boat have more water surface in comparison to its size than a large one? A. Yes. 2. Which gives the greatest speed, the side wheels or the screw propeller? A. For light draught steamers the wheel, and for deep draught ocean-going steamers the screw.

(6) A. B. F. writes: I desire to become an engineer on an ocean steamer. I have had experience in using stationary engines, and have made such things a study. How is the proper way to learn? A. You should first get a position as a junior assistant. 2. What pay do first class engineers get now? I am twenty-two years of age, and have had a good education, have graduated from one of the best academies in the State. A. Chief engineers of sea-going steamers get from \$100 to \$150 or \$200 per month, depending on the class of steamer and length of route.

(7) E. D. E. asks: Who built the first railroad, and in what year was it built, and between what cities? A. The first railroad was from Quincy, Mass., to a granite quarry, and was used for transporting stone, and was completed in 1827. The work of the Baltimore and Ohio Railroad was commenced in July, 1828, and the first steam locomotive run on it in summer of 1829.

(8) W. K. writes: I am running an upright tubular boiler, 58 inches inside diameter, 19 feet surface (grate), 179 two inch tubes, and have to run a 35 horse engine, cutting off half-inch stroke, 70 pounds boiler pressure. Boiler is about 38 or 40 horse nominally. What I want to know is, what is a fair amount of coal to burn in ten hours' work to run the above? Boiler holds her steam well, but has small steam room. By a careful calculation, for a day's run I have burned about 150 pounds coal per hour. Is that too much or not? A. We consider 150 pounds a fair consumption. It might run from 125 to 165 pounds, according to the style and condition of the engine.

(9) A. D. F. asks: 1. What speed should a twenty-four inch diameter grindstone be run to do the best and most work? A. A twenty-four inch stone for machine shop use should run about 100 revolutions per minute, or just fast enough to retain the water. "Professional grinders" doing special work sometimes run as high as 150 to 200 turns per minute, and accomplish the most and best work. At this speed protect yourself against the accident of a bursting stone and flying water. 2. What is meant by vertical "direct acting" as applied to steam engine? A. "Direct acting" engine has piston rod and crank, connected by a pitman or single rod, as distinguished from a "beam engine." 3. Why are the upright posts or pillars on the Brooklyn Bridge higher in the middle than on the edge? A. The truss work upon the bridge is made higher in the center to accommodate an elevated footpath. 4. Why do masons always leave the mortar out of the center of a stone window sill? A. Stone window sills are set hollow, or with mortar at the ends only, to prevent breaking by the compression of the piers, and are generally closed up, or pointed, before a building is finished.

(10) J. E. K. writes: I am desirous of starting a stationary steam saw mill (circular) at this place, and intend at no distant day to attach a grist mill thereto, to be run separately, unless business will justify me otherwise, and one person advises one style, another advises another style, and I therefore apply to you to solve the perplexing question. Would it or not, be more economical, better or cheaper, taking all things into consideration, to get an engine, say 24-inch stroke, stationary horizontal style, than to get one of a shorter stroke, and run it at a greater speed, and to put a pulley wheel upon each engine large enough to drive the saw the same number of revolutions (say 600 per minute), the longer stroke engine to have the larger pulley wheel, in proportion to the speed of the same necessary to run the saw the required velocity? Would 100 revolutions per minute for an engine, 8 or 9 by 24, be too fast for it to run? For such work would you advise me to get a vertical or horizontal engine? If a vertical, which style, with wheel at the top or bottom? A. We would advise a horizontal engine. If 24 inch stroke, 100 revolutions per minute is not too fast. Use pulleys for speeds required. 2. What is the lightest gauge, solid tooth circular saw that can be used with safety in a general lumbering business (or for sawing all kinds of logs), saw to be 56 inches? A. In regard to saws write manufacturers who advertise in our columns.