Japanese Process of Varnishing.

In 1873 Professor Rein, of Marburg, was sent by the Prussian Minister of Finance and Commerce to Japan, to study those branches of industry in which that people excel, and thoroughly examine processes of manufacture. Upon his return he gave a course of instruction in varnishing, or japanning, to an employee of Messrs. Beuttenmueller & Co., from whose report to the Baden Minister of Commerce we abstract the following:

The course of lessons given by Dr. Rein lasted 9 hours a day for 6 days. Dr. Rein filled up the intervals, while waiting for the work to dry, with theoretical instructions about the plants from which the varnishes are prepared, the method of preparing the different qualities, etc.

Japanese varnish is obtained from a tree, *rhus vernicifera*. This varnish tree, which is called *urishi naki* by the Japanese, reaches a height of 33 feet; and at the age of 40 years, the trunk is 40 inches in circumference, grows very slowly, about 13 inches per year in height. The wood is strong and heavy, has few branches, consequently very little foliage, and the tree is not very pleasing to the eye. The fruit resembles grapes, and grows in thick spikes on the branches. In October the fruit is ripe, and is collected in November to obtain from it a vegetable wax, known as Japanese wax. The tree is best propagated from the root shoots. It reaches its greatest perfection at its 18th year, and then produces the largest yield of lac or varnish. This is obtained by slitting the bark in a horizontal direction, and may be performed at any time between April and October; later in the year the lac is very thick and viscid, so that its collection is attended with much greater difficulty. The lac tapper carries his own peculiar bow-shaped knife, made for this purpose, with which he cuts a 2 millimeter ($\frac{8}{10}$ inch) cut in the trunk of the tree in a horizontal direction, and then draws the point of the knife through the cut again, to remove any chips formed by the first cut. This cut is made low down; on the opposite side of the trunk 15 or 20 cm. (6 or 8 inches) farther up, a second cut is made, then on this side again, and so on until the trunk has 6 or 10 such cuts. After he has cut 10 or 15 trees, he returns to the first tree and collects the sap oozing from the cuts, which sap is light gray, and thick; but by exposure to the air, it at once turns dark brown and afterwards quite black. The crude lac is called *ki-urushi*.

The tree is hacked in this way for 60 to 80 days, until it dies; it is then cut down, the wood chopped up and put in hot water, which extracts the last remnant of the sap. From the tree when cut down, ¼ liter at most of sap is obtained, and this forms the poorest kind of lac. The value of 100 lac trees is about $30 to $40.

The lac is purified in the following manner: It is first filtered through cotton stuff, ground on a paint stone like ordinary paints, mixed with water, and the water evaporated again by warming. The finer sorts are bleached in shallow dishes in the sun. The best kind is called *nashyi-urushi*, the poorer kind *henki-urushi*, the unbleached *jeshime-urushi*. The black varnish, *roiro-urushi*, is made from the crude lac, *ki-urushi*. There are about 20 different kinds in market, of which the above named are most used. The cost in Japan is: *Nashyi-urushi*, $4.77 per lb.; *jeshime-urushi*, $1.65 per lb.; *roiro-urushi*, $3.70 per lb. The Japanese varnishes are as often adulterated in trade as wine in Germany (or milk with us)?

The operation of varnishing is conducted totally different from what it is in Europe. The Japanese apply their varnishes mostly to woodwork, less frequently to copper and unglazed stoneware and porcelain. When applied directly to tinware, the japan does not stick. The varnishes, when applied, are generally brilliant black, dark colored, impure vermilion, or impure dark green, or dark gray. Pure light colors and white cannot be produced with Japan varnish.

The Japanese varnishers prepare their woodenware with the utmost care, the surfaces are smoothed and the chinks filled with cement. The ground coat is a mixture of jeshime-urushi with paste; upon this is laid Japanese paper, rubbed smooth with a brush, and dried. Afterwards several very thin coats of the same varnish, now and then well dried, and, after every coat, polished with Japanese carbon.

The drying is performed in a moist atmosphere. For this purpose they take a box that will shut tightly, put the articles to be dried in it, close the box and wet it on all sides with water. After 24 hours one coat is dried. If the articles are to be black, it is now given a coat of black varnish, roiro-urushi, but if it is to be gray or gray-brown, jeshime-urushi is used instead, and if it is to be red, the latter varnish is mixed with vermilion. The appearances of gold and pearl are obtained by mixing real gold dust, or mother of pearl dust, with the varnish, whereby a beautiful effect is produced. It is then dried, rubbed down, and polished; and if there are gold, tortoiseshell, or mother of pearl decorations, another coat of azure varnish, nashyi-urushi, is applied. Dr. Rein communicated other methods of japanning, the introduction, of which, in this place, would lead us too far.

In applying their varnishes, the Japanese use broad brushes, the bristles of which are very stiff, and inserted in wood, just as the graphite is in our lead pencils. After long use the bristles get worn short, and the wood is cut away as in sharpening a pencil, exposing more of the bristles. A very fine piece of work receives 18 coats; these never fade with time but rather improve, bear a high heat, and are totally unaffected by acids, spirits, and the like.

The Japanese method is not likely to be introduced into Europe or this country, because of the want of the natural material, which, when imported from there, becomes extremely costly; and the process is indirect and tedious, and, with the high price of wages, would be impracticable.

The Great Wall of China.

The Great Wall of China was measured in many places by Mr. Unthank, an American engineer, lately engaged on a survey for a Chinese railway. His measurements give the height at eighteen feet, and a width on top of fifteen feet. Every few hundred yards there is a tower twenty-four feet square, and from twenty to twenty-five feet high. The foundation of the wall is of solid granite. Mr. Unthank brought with him a brick from the wall, which is supposed to have been made two hundred years before the time of Christ. In building this immense stone fence to keep out the Tartars, the builders never attempted to avoid mountains or chasms to save expense. For 1,300 miles the wall goes over plain and mountain, and every foot of the foundation is in solid granite, and the rest of the structure solid masonry. In some places the wall is built smooth up against the bank, or canons, or precipices, where there is a sheer descent of 1,000 feet. Small streams are arched over, but on the larger streams the wall runs to the water's edge, and a tower is built on each side. On the top of the wall there are breastworks, or defences, facing in and out, so the defending forces can pass from one tower to another without being exposed to any enemy from either side. To calculate the time of building, or cost of this wall, is beyond human skill. So far as the magnitude of the work is concerned, it surpasses everything in ancient or modern times of which there is any trace. The Pyramids of Egypt are nothing compared to it.—*London News.*

Recent American and Foreign Patents.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED MILLER'S PAINT STAFF.

Jacob Austine, Huntsville, O.—This is an improved form of miller's paint staff, or device for applying a color in a true plane to the face of a millstone to detect and locate the high places when the stone is "in wind," or has uneven places, and then permit the same to be trued up. It consists in a staff made in the form of an equilateral triangle, the advantages being partly in the facility and accuracy of construction (the same measurement of bar serving for all three sides), but more especially in the corrections of its results, the equilateral triangle being best adapted to the circular area of a millstone.

IMPROVED CAR WHEEL.

William Y. Cruikshank, Shamokin, Pa., assignor to John Cruikshank, of same place.—This invention consists of an oil chamber arranged in the hub of the car wheel, and connected by radial holes to an annular recess in bore of wheel or groove of axle. Ribs or elevations of the oil chamber arrest the oil, and feed it to the supply holes to lubricate the bearings, and pass the surplus back again to the oil chamber. The centrifugal force distributes the oil during the running or revolving of the wheel by the aid of the outer elevations around the outer surface of the oil chamber, while the side elevations conduct the oil and cause it to flow through the holes to the axles. When the wheel ceases to revolve the oil above the axle is guided along the ribs to the holes, and along or around the axle or shaft in the recess or groove back to the holes below the axle, and thence into the oil chamber again, saving thus all the oil which is not used actually in lubricating the axle or shaft. Sufficient oil adheres to the axle to run the wheel in either direction and lubricate the bearings.

IMPROVED DRY WOOD GRINDER FOR PAPER-PULP.

Isaac W. Bowers and David A. Curtis, Petersburg, Mich.—This invention relates to an improved machine for making dry pulp from dry wood in a cheap and simple manner, which pulp has the advantage of being readily shipped, not liable to freeze, and being converted with less labor into paper. The invention consists of a machine for grinding up the wood by exposing it to the action of a cylinder covered with a grinding surface of glue, ground flint, quartz, and emery, and conveying the pulp by a hopper and an endless revolving belt to a reciprocating screen. The wood pulp produced by a dry process with this machine is, in many respects, superior to that obtained by the wet processes hitherto in use, as it does not mold or freeze, and may be more conveniently shipped. The machine is cheaper and simpler in construction than those used in wet processes, and may be run without skilled workmen. A number of machines may be arranged side by side, according to the quantities of pulp to be manufactured.

IMPROVED AUTOMATIC CYLINDER COCK.

Joseph M. Graham, Bloomfield, assignor to himself and George Elliott Bedford, Ind.—This invention relates to cocks for discharging the water of condensation from engine cylinders, and it consists in the arrangement at each end of the cylinder, of cups of sufficient capacity to contain water accumulating during one stroke, and in small valves placed in the said cups that open upward and are connected with a lever which is held by a spring, so that the valves are both open when the pressure is removed, but admits of the valves being alternately closed by the steam pressure as it acts in the cylinder. As steam is admitted to the cylinder it closes one of the valves while the other remains open, and when steam is admitted to the opposite end of the cylinder, the valve which before was open is closed by steam pressure, and by virtue of the connection of the two valves with the lever, the valve which was closed is now opened, permitting the escape of the water from the cavity. The valves are automatic in their action, and the water escapes when the pressure is removed, so that the noise of escaping steam common to other devices for relieving engine cylinders of water is by this improvement entirely avoided, and the valves need no attention.

IMPROVED TREADLE MOTION.

Henry B. Barber and Clark J. Barber, Scott, N. Y.—The object of this invention is to furnish an improved treadle motion for sewing machines, lathes, and other like machines, by which the working of the machines is facilitated and produced with less effort of the foot; and the invention consists of the combination of the swinging treadle with a pitman of inverted V-shape, which is pivoted to the toe of the treadle and the supporting rod of the same, and at the apex or upper end of the crank rod of the flywheel. The elbow formed between the pitman and crank transmits the power in more effective manner to the flywheel, requiring less effort to run the machine, and rendering thereby the working of the same less fatiguing and trying.

IMPROVED FREIGHT CHUTE.

William C. Crompton, New York city, James Nicol, Newark, and Richard Hawley, Jr., Jersey City, N.J.—The object of this invention is to furnish a chute for lowering cheese and other freight in loading vessels, in warehouses, and in other places, in such a way that it will not be injured, and which shall be simple in construction and convenient and reliable in use. To the sides of the chute are attached guide bars which project inward and incline downward. The guide bars are made elastic, or have spiral or other springs placed between them and the sides of the chute, so that they may yield to allow the articles to pass, while at the same time they offer sufficient resistance to said articles to check or retard their descent, and prevent their acquiring too great a velocity and momentum.

IMPROVED ACCOMMODATING PULLEY FOR CABLES USED IN PROPELLING CARS, ETC.

Orlando H. Jadwin, Brooklyn, N. Y.—The object of this invention is to provide on effective means for the propulsion of cars, boats, or other bodies, and it consists, first, in the manner of connecting and disconnecting the car from the travelling cable; and, second, in the manner of supporting the cable on accommodating pulleys which allow a knot, swivel, or other bulky obstruction to ride over with ease. The connection between the car and traveling cable is so made that the cable is not pinched, but simply has its tension increased, so that neither car nor cable receives any sudden jar, as the motion of the cable slipping through imparts the motion gradually until the car has attained nearly the same speed as the cable, at which time the tension is made sufficiently tight to prevent slipping between the friction and tension rollers.

IMPROVED APPARATUS FOR OPERATING PUMPS.

John A. Hurley and Daniel J. Hurley, Oil City, Pa.—This invention relates to an improved pumping apparatus for oil and artesian wells, and consists of a rock beam operated by the pitman of an engine, and connected by ball joints with the ends of a cable or rope, passing over guide pulleys, and being attached by an adjusting device on the pump rod. The rock beam is connected at the lower end with the pitman of a steam or other engine, by which oscillating motion is imparted to the rock beam, which, by the cable and adjuster, gives vertical reciprocating motion to the pump rod, so as to work the well by a simple and reliable apparatus.

NEW MISCELLANEOUS INVENTIONS.

IMPROVED PANTOGRAPH.

Elijah Ware, Omaha, Neb.—The object of this invention is to provide a simple and inexpensive pantograph which may be adapted to large or small work, as may be required; and it consists of a pantograph of rectangular form, made of four bars, so placed as to assume a parallelogram. To one end of this parallelogram are pivoted, or attached by means of screws, three supplementary bars, two of which continue the parallelogram form of the instrument, while the third bar makes the end piece. These last named bars are used for copying, enlarging, or reducing large work. The size of the copy is varied by shiftiag the last named end bar toward or away from the pivot of the instrument, and by moving the bar so as to change the position of the pencil or tracing point. When the instrument is used for smaller work the bars are disconnected, and it is used as a common pantograph.

IMPROVED POCKET RIFLE.

Marcus L. McCord, Nashville, Ill.—The object of this invention is to furnish an improved sight for pistols and other firearms, which shall be so constructed that it may be readily extended to the rearward to give a longer range to the sight and greater accuracy of aim. To the rear end of the barrel, or to a projection or support attached to the barrel, is hinged the end of a bar in such a way that the bar may be turned back into a position parallel with its former position. This bar, when turned back, rests upon a support attached to the stock, and which enters a guide socket formed in the bar. The bar is made of such a length that when turned down upon the barrel its forward end may abut against the forward sight, and may be secured in place by a spring catch attached to the bar, and which engages with the recessed rear side of the said sight. The rear sight, when the bar has been turned down upon the barrel, enters a transverse groove in the barrel. The bar may be pivoted to the rear end of the barrel, so that it may be swung around from one position to the other; or it may be slid into a dovetail groove in the upper side of the barrel.

IMPROVED COMPOSITION FOR DRESSING COTTON YARNS.

William H. Perkins, Fall River, Mass.—The dressing consists of unslacked lime, sal soda, soap, and water, and is prepared in the following manner and proportions: Two and one half pounds of unslacked lime, two and one half pounds of sal soda, one ounce of common soap, and one gallon of boiling water, which are thoroughly stirred together until the parts are mixed. Five gallons of salt water are then added, and the whole left standing for twenty-four hours, when the compound is ready for use. It is applied in the same manner as other dressing, but is considerably cheaper. It imparts a bright and glossy finish to the fabrics dressed therewith, and stands unchangeable in any weather or atmosphere.

IMPROVED HOSE COUPLING.

Frederick Stewart, St. Louis, Mo., assignor to himself and Oscar F. Scudder, of same place.—This invention relates to an improved hose coupling that is tightly connected with the hose ends, so as to resist a considerable pressure on the coupling parts with less liability to blow out or disconnect the hose ends, as the connection of coupling and hose will be drawn tighter the greater the pressure exerted thereon. The interior sleeve of the coupling is made with a slight taper. The hose end is placed in position on the same, and rigidly secured thereon by a diagonally split and tapering band, having a screw thread cut on the outside, and by an outer sleeve, with corresponding taper, having an interior screw thread. The screwing up of the outer sleeve on the split band closes the latter, and clamps the same and the hose tightly on the inner sleeve. The clamping or wedge connection of the inner sleeve, split band, and outer sleeve with the intermediate hose end produces a tight fastening of the hose, that gets tighter the greater the pressure, so as to remove any liability to blow out by the pressure of the water on the coupling.

IMPROVED BED PAN.

Clark S. Merriman, New York city.—In this invention the ordinary bed pan is used, to one side of which an air cushion is attached. The airspace in the annular part is separate from that in the cushion. When the device is used it is placed under the body, and one or both parts are inflated, as may be required. The cover is then placed in position with the pocket in the cavity of the bed pan. After use the cover may be removed and cleansed and replaced; or two may be used in alternation. The advantages claimed for this improvement are that the body is supported in an elevated position, so that the excrements, when ejected, will not flow down the back. It is more comfortable to use, and is easily cleaned.

IMPROVED COMBINED CANE AND UMBRELLA.

Thomas F. Darcy, New York city.—This invention consists in a combined umbrella and cane, formed of the ribs, the handle, the stretchers,

the runner, and the tubes and cap, constructed and arranged to operate in connnection with each other. When the umbrella is extended, and it is desired to adjust it for use as a cane, the handle is drawn down through the tube until the collar reaches, and is secured to, the lower end of the tube. As the handle is being drawn it slides down through the runner until the stationary ferrule strikes the said runner. The stretchers are then pressed upward by the end of the tube, which closes or folds the umbrella upward, and the whole umbrella passes downinto said tube. Another tube is then drawn upward and locked, and the cap is secured to its upper end, and the device is ready for use as a cane.

IMPROVED REMOVABLE TOP FOR SHOWCASES.

Thomas H. B. Parks, Arkadelphia, Ark.—This invention is a detachable front or cover designed for application to boxes containing goods. For example, when a grocer receives a box of crackers, raisins, or other articles whose contents he wishes to display, and at the same time to protect them from dust, also from thieves, and yet render them accessible for the purpose of removal of a portion to supply customers, the top of the box may be removed and the detachable front or cover applied to the same. In such case the box may be turned on its side, so as to better display the goods. By use of this improvement the dealer avoids the necessity of placing the goods in separate boxes for the purpose of exposing yet protecting the goods. In practice the dealer will keep on hand a number of the detachable box fronts or covers, and will transfer them from one set of boxes to another as occasion requires.

IMPROVED MEDICINAL COMPOUND.

Mary Catharine Peden, Caverna, Ky.—The object of this invention is to furnish an improved medical compound for purifying the blood and effectually curing scrofulous diseases. The inventor says: In preparing this compound I take burdock root, one and a half ounces; poke root, one and a half ounces; sarsaparilla root, one and a half ounces; and sulphur, one ounce. To these ingredients I add proof whisky, one pint, and allow it to stand twelve hours. I then add such a quantity of water that there will be one pint of the mixture when drawn off. The compound is then allowed to stand in a cool place for one week, when it is drawn off and bottled, and is ready for use and market.

IMPROVED STOPPER FASTENER.

John L. Stewart, Ellicott City, Md.—This is an improved form of bottle stopper, more particularly designed for bottles for holding aerated liquids, such as beer, ale, soda water, etc., but applicable to other uses. It belongs to that class of stoppers in which a yoke made of bent wire is screwed about the neck of the bottle to receive a swinging bail, which bail carries a rubber stopper that is forcibly pressed against or into the mouth of the bottle. The improvement consists of a tilting cam provided with a thumb piece and combined with the bail, the rubber stopper, and the support to which said cam is pivoted, whereby the fastening is made more secure, and the manipulation of the stopper is facilitated by permitting the same to be removed or applied with ease and rapidity.

IMPROVED STAKE HOLDER FOR PLATFORM CARS.

Owen Miner Avery, Pensacola, Fla.—This invention relates to an improved socket and stanchion for railway platform cars. The object of the invention is to obviate the difficulty usually encountered in removing the stanchion from the sockets when the car is to be unloaded. As ordinarily constructed, the stanchions have to be lifted vertically from their sockets, and when the car is loaded with lumber or other similar freight the lateral pressure exerted by the same against the stanchion jams the latter in the socket so that they can be removed only with difficulty. This invention consists in pivoting the stanchions in such a manner that they may be quickly turned laterally to a horizontal position and then down, or entirely detached if desired, and yet be locked in a rigid vertical position while upon the route.

IMPROVED COMBINED COFFEE ROASTER AND COOLER.

Joseph B. Underwood, Fayetteville, N. C.—This is an improved device for carrying out the method of roasting coffee for which letters patent were granted the same inventor May 16, 1876, by which method the volatile products that arise from the coffee being roasted are utilized by being conveyed to a closed communicating chamber for cooling the coffee, where said flavoring and aromatic exhalations, which are being given off from the roasting coffee, and restored to the hot roasted coffee as it is cooled, the method serving to preserve the roasted coffee and render it less susceptible to the managing influences of the atmosphere, and at the same time preserving the full strength of the flavor and obviating loss in weight. The means consist generally in a revolving roasting cylinder arranged in combination with a revolving cooling and condensing cylinder, and so connected as to admit of the transfer of the generated volatile products of the first to the latter without condensation in transit, and finally of the transfer of the entire charge of roasted coffee from the roasting chamber to the cooling chamber. The improvement also consists in other details of secondary importance.

IMPROVED ANIMAL TRAP.

John Crawford, Vanlue, O.—This invention covers certain improvements in animal traps of that form in which a cage or box is allowed to drop upon the animal enticed by a bait beneath the same. The improvement consists in a central axially-turning rod having notches formed in the same which are adapted to support a cage or box moving upon vertical guides until said central rod is turned axially by the animal in removing the bait from an arm attached to the same, when the notches will be removed from the catch on the cage and the latter allowed to drop bodily upon its guides over the animal.

IMPROVED VENTILATING BARREL FOR SHIPPING FRUITS, VEGETABLES, ETC.

William Crowell, Dennis, Mass.—The object of this invention is to provide, for the packing and shipment of fruits, vegetables, and other articles of perishable nature, an improved barrel or other package that is sufficiently ventilated at the center to prevent the decaying of the articles; and the invention consists of a barrel, box, or other package having a grooved center piece or partition for admitting air, and a sectional removable head, secured by a conical nut, binding on the head sections and turning on the threaded end of the center piece. As the decay of the articles commences generally in the center of the barrel, on account of the lack of air, this objectionable feature of the packing of fruits, vegetables, and other articles is prevented by the use of this ventilating center piece, post, or partition. By unscrewing the nut the head sections may be readily detached, and the contents of the barrel removed, and *vice versa*.

IMPROVED HORSESHOE ATTACHMENT.

George W. Price, Lakeland, assignor to himself and William H. Sanford, Hauppauge, N. Y.—The object of this invention is to provide calks for horseshoes that may be attached and detached at pleasure, and also to provide a device for preventing balling. An ordinary horseshoe is attached to the horse's hoof in the usual way. The calks, that are fitted to the horseshoe just in front of the usual heel calks, are each provided with an inwardly projecting arm, at the end of which a nut is formed. They are also provided with a lip that engages the edge of the horseshoe. The calks of the attachment, being longer and sharper than the calks of an ordinary horseshoe, prevent slipping, and by means of a plate balling is entirely prevented.

IMPROVED WEIGHING ATTACHMENT FOR HAND TRUCKS.

Daniel A. Beam, Newark, N. J.—This invention consists in the combination of scale levers and scale beam with an ordinary two-wheeled hand truck having an axle fitted in slotted bearings of the truck frame, so as to enable the latter to have a vertical motion relatively to the axle when weight is applied. The invention is mainly designed for use where an approximation to the weight of several packages is required, when it would be impossible to weigh each package accurately upon regular scales.

NEW AGRICULTURAL INVENTIONS.

IMPROVED MILK PAIL.

William Heuermann, Sedalia, Mo.—This invention has relation to strainers for buckets, and the nature of the invention consists in combining, with the pouring spout of a bucket, a removable strainer, a hinged retaining cap, and a hinged cover. From the hood of the pail springs a pouring spout, near the end of which is formed a ring, forming a seat for a strainer. This strainer is preferably composed of gauze wire, suitably secured to a ring, and when it is adjusted on its seat is retained in position by means of a shoulder formed on a hinged cap. This cap forms the nozzle of the pouring spout, and its reduced end has a cover hinged to it, which cover will automatically open when the bucket is tilted, and close when it is set upright. The strainer can be quickly removed when it is necessary to clean it, and it can be quickly replaced.

IMPROVED FENCE.

Nelson B. Gunn and Timothy Gunn, Elwood, Ind.—This invention relates to rail or worm fences, and the object is to afford greater strength and security to the fence at the angles thereof by rigidly tying the crossed ends of the rails together with wire or its equivalent, held under strong tension by means of a wedge. Instead of using posts or stakes at the points of the crossing of the ends of the rails, the rails of each section are firmly bound together by means of a strong wire loop, which may encompass all of the rails or only a few of them. A single band or loop will in all ordinary cases be found sufficient, although two loops may be used and arranged closed to the points where the rails cross each other.

IMPROVED STUMP PULLER.

Henry M. Stitzer, Cochranton, Pa.—This invention relates to an improved device for pulling stumps, rocks, and other bodies in simple and effective manner, by making use of another stump or fixed body, close to the one to be pulled; and it consists of a single or double beam, attached at one end by a chain to a stump or other object, and of a draft link, connected by a chain to another stump and pivoted to a hand lever, combined with pivoted pawls and wedge links, of peculiar construction, that work the link forward on the beam by the rocking of the lever. These links being loosely arranged, also, they turn upon their recessed seats in the pawls in their progression along the plain bars, so that in advancing alternately along the bar to take a new hold they slip freely over the same; but when strained in the opposite direction, in exercising the draft, they turn and cramp against and bind with the bars, and thus give a purchase for the draft strain.

IMPROVED CATTLE-WATERING DEVICE.

William H. Hayes, Salisbury, Mo.—This invention has reference to an improved device for watering stock in stock cars or yards, in a superior and automatic manner from a common tank, without waste; and the invention consists of a bucket hung to a fulcrumed and weighted lever, with curved end, that is pressed by the weight of the water in the bucket against the hose, connecting tank, and bucket, so as to cut off the water supply and re-establish the same when the bucket is getting empty. The raising of the bucket takes off the pressure from the hose, and re-establishes the supply of water from the tank, until the weight of the water in the bucket overcomes again the balance weight and cuts off the supply. In this manner a continuous and automatic water supply for stock in cars and yards is obtained.

IMPROVED SULKY AND GANG PLOW.

John H. Goodwin and David Woodard, Lamar Station, Mo.—This invention relates to improvements in gang plows, and consists mainly of an axle with swinging plow beams that are raised or lowered by a pulley frame, chains, and lever to the required depth. The pulley frame is jointed. to admit the raising of the plow beams into upright position after work, The plow beams are retained m position by curved metallic brace pieces, that are hinged to the axle in front of and above the turning points of the plow beams, and seated in notches of the same, according to the higher or lower position of the beams. The pulley frame is made of two sections, of which the lower stationary part is secured, at suitable inclination, to the axle, while the upper section is pivoted, by its fork-shaped ends, thereto, in such a manner as to rest on a supporting extension or bearing of the lower part when the plows are dropped for work. After use, the plows are raised and thrown, with the upper section of the pulley frame, into nearly vertical position on the axis, so that the gang plow may be carried to and from the field with great facility. The shape of the plow beams produces a light draft, and the ready adjustment or entire raising of the same a gang plow of convenient construction and use. The plow may also be used as a sulky plow by using one plow only, taking off the others, the plow being thus a gang or sulky plow, as desired.

IMPROVED GATE.

John W. Harvey, Farley, Iowa.—This invention relates to gates which, when opened, will close by their own gravity; and the nature of the invention consists mainly in a foot plate for a swinging gate post having a convex bottom and crossed slots through it, in combination with studs on a post driven into the ground, which studs enter the said slots and keep the gate in proper position. A lever is pivoted to the post and connected to the gate by a pin and slot, so that a person can raise the gate bodily with very little exertion. This allows the gate to be opened and shut over snow drifts.

IMPROVED BEEHIVE.

Isham B. Burroughs, Tuscaloosa, Ala.—The object of this invention is to furnish improved beehives, which shall be simple in construction and convenient in use, enabling all the operations necessary in taking care of bees to be easily and conveniently performed, and thoroughly protecting the bees from moth. A drawer in the lower part of this hive is divided into compartments, in which are formed holes to allow the millers to pass through. With this construction the moths enter a forward dark compartment of the drawer, see a little light entering through the holes in the partition, and pass through said holes into the inner compartment of said drawer, where they lay their eggs, and from which they cannot find their way out.

IMPROVED WHEEL PLOW.

Stephen M. Harris, Forest Grove, Oregon.—The object of this invention is to furnish an improved plow, which shall be so constructed that either wheel may be raised and lowered, as required; which will turn under and thoroughly cover stubble; which will clear itself of vines and weeds, and may be readily thrown out of the ground when desired. Upon the outer arms of the crank axles revolve the wheels, which are unequal in size, the furrow wheel being the larger. Spring pawls are placed in such positions as to engage with the teeth of ratchet wheels, and thus hold the wheels securely in any position into which they may be adjusted. The plowed land end of the cross bar has a slotted crosshead formed upon it, to receive a bolt which passes through the slot of a bar, so that the said bar can be inclined forward or rearward, to adjust the cutter to take or leave land, as may be required. To the furrow end of the roller is attached a flange, which projects over the edge of the furrow, so as to bend down the projecting weeds and stubble into said furrow, and thus insure their being fully covered.

IMPROVED CENTRIFUGAL MACHINE FOR CREAMING MILK.

Wilhelm C. L. Lefeldt and Carl G. O. Lentsch, Schoeningen, Germany.—This invention consists of a revolving cylinder or drum, provided with a fixed or detachable top flange or ring and with radial detachable partitions. The drum is inclosed by a guard casing or jacket, and revolved at uniform speed, being slowly started and stopped by means of a weighted idler bearing on the driving belt. The spindle revolves in a cushioned bearing of radial arms of the safety jacket and in a base step. The cream is separated from the milk by centrifugal force, and drawn off after the drum has been slowly brought to rest by taking off the idler from the driving belt. The apparatus is operated as follows: The milk is placed, in fresh state, in the drum, and the drum then gradually set in motion by pressing the idler first lightly against the driving belt until the maximum velocity is obtained. The milk is allowed to revolve with the drum for about twenty minutes, during which time the separation of the cream from the blue milk is obtained by the greater specific gravity of the latter, which is thrown up along the wall and against the top flange, while the lighter cream collects nearer to the center. The success of the operation depends now on the stopping of the machine in such a manner that this separation of the milk and cream is kept up, so that they may be separately drawn off. This is accomplished by stopping the drum slowly without jerks, which is obtained by raising the weighted arm of the elbow lever, so that the idler clears the belt and takes off the tension of the same. This causes the revolving the drum and spindle by their own *vis viva*, and the gradual decrease of the speed of the same until they assume a state of rest. After a few minutes of rest the cream may be skimmed off, the partition walls being first carefully taken out for facilitating taking out of the cream. The cream may be churned sweet or sour. The extraction of cream from the milk is best done just after milking, and excepting the want of the creamy matter, say the inventors, after the extraction the milk will not be discerned from fresh milk.

IMPROVED HORSE HAY RAKE.

Adolphus W. Stevenson, Xenia, O.—The teeth of this rake are curved in the usual way, the points being bent upward, so that they will slide along, but will not scratch or catch upon the ground. The bodies of the teeth are flattened a little just below they reach the axle to give them greater elasticity and render them less liable to break should their points strike an obstruction. A spring latch rests against the convex surface of a curved bar attached to the axle, so as, when the teeth are in working position, to engage with a notch, shoulder, or catch formed in the said bar to prevent the teeth from rising and passing over any of the hay. When a sufficient quantity of hay has been collected the driver presses the upper end of the lever forward with his foot. The first effect of this movement is to draw the spring latch back from the bar to allow the teeth to rise. The next effect is to push the clutch outward to engage with the clutch teeth of the wheel to cause the said wheel to turn the axle and raise the teeth, leaving the hay in a windrow.

NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

IMPROVED THILL COUPLING.

John W. Anderson, New York city.—This invention relates to certain improvements in thill couplings of that class in which the thill iron is made in the form of a hook, and is fastened to the pivot pin by being hooked over the same in a certain position and afterwards turned to the working position in which the parts cannot be separated. The improvements consist mainly in constructing the hooked or open slotted thill iron with a notch upon its rear side, and combining the same with a rubber block and a detent held between the ears of the clip, whereby the devices are prevented from being accidentally detached if the position of the thill iron should be changed from the falling of the horse or from other causes. The improvement also consists in forming the clip with a lip just above and outside of the edge of the ears, for the purpose of retaining and holding the rubber block and locking detent in place. The improvement also further consists in combining the hooked thill iron with an oblong tumbler located upon an eccentric pin or rivet, whereby the thill iron is made to bind against the spring and rubber block when in the working position, and thus increase the tension to prevent rattling, the eccentric location of the pin serving to better adapt the parts to each other.

IMPROVED SHUTTER FASTENER.

George M. Mudgett, Edgartown, Mass.—This invention relates to fasteners for shutters, doors, etc., and it consists of a button upon the opposite sides of which nibs or catches are formed, which engage automatically with a pin in the window stool when the shutter is closed, or with an L-shaped hook projecting from the wall when the shutter is open, there being also a sector-shaped portion. The operation is as follows: As the shutter is closed the plate strikes the pin and is moved so as to throw the nib over the said pin. When the shutter is open the nib is made to engage with a hook that projects from the side of the building in a similar way. The plate not only moves the button, but it also limits its motion as it strikes the sides of the screw.

NEW HOUSEHOLD INVENTIONS.

IMPROVED BED BOTTOM.

William M. Ward, Eureka, Ill.—This invention relates to that class of bed bottoms in which the bed bottom is connected with and supported on the posts and end rails of the bedstead, so as to dispense with the strips on the side rails, and take off all strain from the same. The bed fastenings are provided with hooks, cast therewith, on which are hung by end eyes longitudinal rods, which are lengthened or shortened, to be exactly adjusted to the bedstead by a swivel connection, that turns on the flanged head of one rod section and the threaded end of the other. By shortening the rods the bedstead is braced and made firmer. In this manner a three-fold spring action is obtained, namely, in the rods, in the slats, and in the springs at the ends of the cross pieces. The slats "give" just enough to make the bed easy to rest on, and settle all alike whatever weight is placed thereon. No strain is thereby thrown on the side rails of the bedstead, but all on the posts, which are stronger and better fitted to bear the same. The bed bottom may be readily taken out for cleaning the bed, and forms, when in position, a connecting part of the same, being cheap, durable, and strong, and readily applied to old and new bedsteads with little additional expense.

IMPROVED WATERPROOF CELLAR BOTTOM.

James R. Anthony, Cedar Rapids, Iowa.—This bottom is designed for wet or any springy ground and for quicksand. In constructing the bottom, the timbers are first laid and upon them tapering boards are placed, a small distance apart. Laths are nailed transversely to the said boards, and upon the laths a layer of waterproof mortar or cement is laid, into which the bricks are embedded. The spaces between the boards lead to the well, and the water that rises while the bottom is in process of construction escapes to the well, and may be removed in any convenient manner. The wall should be continued upward above high water line, and it may with advantage be carried to the same height as the outer wall.

IMPROVED WASHING MACHINE.

Oscar Jurden, Ackley, Iowa.—This invention consists in the arrangement, in a suitable frame, of two vertically reciprocating pounders and gearing for operating the same. The clothes to be washed are placed in the tub and the pounders are rapidly moved by turning the wheel by means of a crank attached to its shaft. The tub containing the cloths is turned, as occasion may require, either by hand or foot. If there should be a greater quantity of clothes in one side of the tub than in the other, the rubber springs yield, and prevent straining any part of the machine or injuring the clothes.