Next in order comes the matcher. This has undoubtedly been made in a greater variety of forms to accomplish the same result than any other woodcutting machine in use. There seems to be nothing like a standard for any one of its parts in existence; each builder designs his machine seemingly with no other purpose than to make it as much unlike that of his predecessor in the business as possible. At least such is the opinion one would naturally form from an examination of the different patterns which are offered for sale in this country. They are built with two, four, six, and eight feed rolls, from four to fourteen inches in diameter, as extremes, the large ones sometimes fluted and the small ones with smooth surfaces, and *vice versa*. We find cylinders varying from four to ten inches in diameter, some with two, some with three, and some with four knives, which are attached in divers ways. In one style they are inserted in the cylinder with their cutting edges projecting past its turned surface; in another they are keyed to the cylinder, and in a third bolted upon it. Again in some machines the cylinder is round, as its name would indicate, and in others rectangular and triangular. The cylinders, too, are made of various materials, the most common of which are wrought iron, cast iron, and brass. In matcher side cutter heads, we find that the same dissimilarity prevails. They are made to carry from two to five cutters. These are in some cases solid, and in others in sections; in one machine placed with the beveled side of the cutter out, or next to the work, and in another in the opposite positions; sometimes straight, and frequently with an edge forming a quarter of a circle, and all these different classes are at work on the same kind of wood and under like conditions.

From all this diversity it would naturally be inferred that the manner of constructing a planing machine was of minor importance, or had not received the attention it deserved; but there are, notwithstanding, machines built which are very nearly perfect, and if an operator understands what is demanded for different kinds of work, and under different circumstances, he will have no difficulty in procuring a flooring machine that will almost exactly meet his requirements.

DECISIONS OF THE COURTS.

United States Circuit Court—District of Massachusetts.

PATENT BOBBIN AND SPINDLE.—OLIVER PEARL *et al. vs.* THE OCEAN MILLS *et al.*

[In Equity.—Before Shepley, J.: Decided January 2, 1877.]

Reissued Letters Patent, No. 6,036, were granted to the complainants September 1, 1874, for an "improvement in bobbins and spindles for spinning machines." The bill in this case is brought for an alleged infringement of the reissued letters patent.

Held by the Court:

Prior to the invention of Pearl unsuccessful attempts had been made to reduce the weight of the ring spindle and bobbin in general use, and thus diminish the amount of power required to run them. The patentee effected this desideratum by making the blade shorter than the bobbin, which was provided with a bearing therefor in the center. The bobbin was made light and a plug or bushing inserted in the upper end to strengthen it. The upper bushing forms no function in the combination of the bobbin and spindle, and the words "the described bobbin," occurring in the claims, must be construed not solely with reference to the words in the specification, but with reference also to the limitations in the context of the claims.

When, in the specification of the original patent, the inventor describes a new and useful combination of a number of ingredients, performing, in combination, certain functions less than he has claimed, he may in the reissue claim such combination of the less number which he has described, suggested, or substantially indicated as his invention, but failed to include in his claims.

A reissue need not describe the invention in the exact language of the original, but may contain a more full and exact description of what was there imperfectly described.

Mere change of form or location in a mechanical structure is not the subject of a patent without showing that some new or materially improved result is obtained.

The greatly improved result attending a change in the form or location of parts, when viewed in connection with the failure of the many experiments previously made to accomplish similar results by mere structural changes, has a great tendency to prove that they involve some functional difference beyond mere mechanical perfection and adjustment.

[*Benjamin F. Thurston, D. Hall Rice, and Charles E. Pratt*, for complainants.

Charuncy Smith, James J. Storrow, and William W. Swan, for defendants.]

NEW BOOKS AND PUBLICATIONS.

THE ART OF PROJECTING. A Manual of Experimentation in Physics, Chemistry, and Natural History, with the *Porte-Lumière* and Magic Lantern. By Professor A. E. Dolbear, Tuft's College. Illustrated. Boston, Mass.: Lee & Shepard.

The book whose title we give above is one which has long been called for, and which well supplies a want which has been felt for many years. During the last fifteen years the magic lantern and solar microscope have been gradually developing from what might be very appropriately called their infancy, when they were found almost only in the nursery as toys for children or elsewhere as means of mere amusement. During those years these instruments have been occupying an ever wider and wider field in the school room, the lecture room of the college, and the public lecture hall, and a mutual influence has reacted between these means of illustration and the methods of instruction for which they were best fitted; by which the character of such oral instruction has been modified and developed, and its enlarged requirements have called for and obtained a constant enlargement in the capacities of these instruments, until to-day we find in what the author of the above work calls "the standard lantern of the country," namely, the "College Lantern, manufactured by Messrs. George Wale & Co., of Hoboken," a complete outfit, by which an extended course of instruction in Science can be illustrated with a fulness and brilliancy that was not dreamed of a dozen years ago. The art of projection has thus come to be a matter involving much of detail in reference to the adjustment of apparatus and the management of experiments, and yet beyond the meager directions contained in the catalogues of manufacturers, nothing in a collected form has been published on this subject. Isolated papers have, it is true, appeared in various periodicals, and we among others have published many such; but such scattered information in no way fills the want which every experimenter and instructor feels of a handbook which shall give him full directions, systematically arranged, for every part of his work, and which shall supply him with suggestions for the subject as well as the method of his illustrations. All this the volume before us supplies in an admirable manner. It opens with clear and concise directions for making, at little cost, such a simple *porte-lumiere* as should answer the requirements of any one not able to procure a more perfect instrument. The darkening of the room and arrangement of the screen are then described. Next follows the description of artificial sources of light, including the electric light, the oxyhydrogen, the oxycalcium (so called), the magnesium, and finally oil and gas lights. Lanterns are then described, and next lenses, and then the subject of "projections" in general is extensively treated, including the ordinary projection of images of transparent objects or pictures with a lens, the projection of shadows from large pieces of apparatus, the projection with the megascope or by reflection from opaque objects, and the use of the vertical lantern of President Morton. What we have noticed so far occupies the first 43 pages of this book, the remaining 115 pages being devoted to the description of countless beautiful and instructive experiments to be performed with the instruments above described. These experiments are classified and made easy of reference by arrangement under the following heads: Physical experiments (that is, in molecular physics), acoustics, light, heat, magnetism, electricity, and chemistry. The fullness of this collection is very remarkable, and we are quite sure that an experimenter might occupy himself daily for a year if he only repeated once every experiment the details of which are here given. One of the merits of this collection is that it not only gives the author's own experiments, but embraces all that have been published on the subjects involved. As the author is not writing a history of the art, he is quite excusable for omitting all reference to the authorship of the various experiments which have been published by others: but any one interested in the subject will recognize many which have first appeared in this journal, and will thus recognize how much the "art of projection" owes to one of our frequent contributors.

THE NEW FORMULA FOR MEAN VELOCITY OF DISCHARGE OF RIVERS AND CANALS. By W. R. Kutter. Translated by L. D'A. Jackson, A.I.C.E. Price $5. New York city: E. & F. N. Spon, 446 Broome street.

Mr. Jackson is already well known to hydraulic engineers through his "Hydraulic Manual," a very excellent practical work which has already run through several editions. The new book, which he has translated from a series of papers by Herr Kutter, will, we think, also prove of much value to the profession. Mr. Jackson points out that all "the old velocity formulæ both for open channels and for pipes have been proved to have no claim to general application; and as a consequence of the dearth of hydraulic observations of modern date, the hydraulician is recommended to use variable coefficients of mean velocity of discharge, to be chosen in accordance with the circumstances of each special case." The new formula of Herr Kutter, however, is based on the experiments of D'Arcy, Bazin, Ganguillet, Humphrey, and Abbot, and on his own investigations, and hence is considered to be of great practical importance, inasmuch as it supersedes the unreliable formulæ above referred to. The text of Mr. Jackson's work, which bears the marks of careful editing, relates to flow in open channels generally, and flow in open channels in earth. The book contains numerous tables, besides plates.

Recent American and Foreign Patents.

NEW AGRICULTURAL INVENTIONS.

IMPROVED CULTIVATOR.

Thomas R. Landon, Sladesville, N. C.—This improved cultivating plow for cotton, corn, and other plants, is so constructed that it may be readily adjusted for use as a scraper, a sweep, and as a dirter, as may be required. The rear ends of standards are bent to the rearward, to form feet or have feet attached to them to strengthen them, to enable the plow to be more easily held, guided, and controlled. The rear ends of the feet are bolted to the lower ends of the rear standards. The upper parts of the standards are bent inward at right angles, are slotted longitudinally, and are secured to the beam by a bolt, so that, by loosening the bolt, the rear standards may be adjusted, as required, to correspond with the adjustment of the forward standards, and to cause the plows to throw more or less dirt, as may be desired. To adjust the plow as a double dirter, the standards and their attached plow plates are exchanged.

IMPROVED SULKY PLOW.

Charles Reed Conway, Midway, Wis., assignor to Jane Eliza Conway, of same place.—In this sulky plow, the draught is applied to the sulky, instead of being applied directly to the plow beam. The wheels are made large, and revolve upon the journals of the axle. To the middle part of the axle is attached the tongue, which is strengthened by the braces or hounds, and to which is attached the double tree. The standard is made higher than usual, so that the plow may not be liable to clog with rubbish. The plow beam passes through slots in hangers attached to the tongue in front and rear of the axle to keep the plow in line, and enable it to be guided by the sulky. The draught strain upon the plow is supported by a pin that passes through the beam in front of the forward hanger, and the sulky is kept from moving back upon the beam by a pin passed through the said beam in the rear of the said hanger. Rollers are placed upon the pins to bear against the hanger, to diminish the friction as the plow beam moves up and down within the slot of the said hanger.

IMPROVED TURF AND GRUBBING COLTER.

Samuel M. Lovell, Shady Grove, Va.—This invention furnishes an improved colter for cutting turf or sod, to enable it to be turned by the plow, and to cut off roots that may be in the ground and that would obstruct the plow, and which shall be simple in construction, easily kept in order, and of light draught.

IMPROVED FRUIT CRATE.

Roderick G. Ross and Francis A. L. Cassidy, Wilmington, N. C.—This invention is an improvement in the class of folding fruit and vegetable crates, and relates particularly to the mode of hinging the top and bottom of the crate to the bent portion of the rods by which the sides are pivoted together, and also to the means for both securing the cover and bottom closed, and holding the crate distended.

IMPROVED ANIMAL TRAP.

Zachariah J. Anderson, Dallas, Texas.—This invention consists in the combination of a hemispherical cage, a central standard, and a base piece, so arranged that the cage may slide on the standard, and may be held at the top of the standard by a trigger that engages with a ring at the top of the standard. The trigger is tripped by a chain to which bait is attached. The circular base piece of the trap may be made of any suitable material. It is rabbeted at its edge to receive the upper portion of the trap, and is bored centrally to receive a standard, which is secured thereon by nuts that are secured on the rod, and clamp the base piece. An eye is formed at the upper end of the rod, for convenience in handling, and also for receiving the trigger that supports the cover or cage. The hemispherical cover or cage is made of wire, and is provided with a cap or top piece of sheet metal, which consists of two concave pieces attached to the top of the cage, having their concave surfaces placed together, and each provided with a central aperture that fits loosely on the standard. A short section of tube attached to the lower piece forms an additional guide for the cage. A trigger is capable of hooking into the eye. The lower end of the trigger is bent to form nearly a right angle with the upper part, and is connected to a chain that is provided with a bait hook, and also with a guiding ring that slides on the standard. A dog is jointed to the top piece and is capable of clamping the standard, so that the cage cannot be raised without first turning the dog back. There is a handle for raising the cage. The trigger, when the trap is set, hooks into the eye. Any attempt to remove the bait from the hook trips the trigger, allowing the cage to fall upon the base piece. The dog prevents the imprisoned animal from raising the cage.

IMPROVED CORN PLANTER.

Thomas C. Young, St. Charles, Iowa.—The supporting frame of this corn marker is revolved by two horses and a driver. It rests on broad hind wheels and on curved furrowing pieces that are arranged in front of the seed boxes. The wheels are placed stationary on a square axle, and are coupled or uncoupled by a clutch mechanism that is moved along the axle by means of levers operated from the driver's seat. The seed boxes may be worked separately or jointly, according as one or both clutches are thrown into gear with the wheels. When one box only is required to drop, the opposite clutch mechanism is thrown out of gear, and when both are desired to be interrupted, for turning or otherwise, both clutches are thrown out of gear with the wheels. To the sliding sleeve, operated by the lever, are applied diametrically extended arms that curve at the outer ends. These arms revolve with the axle when the clutch is thrown into gear, and engage the rectangularly bent ends of the curved rods of a rock shaft, so as to raise and drop the same, and operate thereby, by fixed diametrical arms, the top and bottom slides of the seed-dropping tube. The slides are so arranged that when one opens the seed-dropping tube the other closes. the same, which produces alternately the filling and discharging of the tube. The planter is thrown in or out of gear with the wheels when the revolving arms are in nearly horizontal position, the marker rods being thereby also in a position so as not to interfere with the propelling of the planter.

IMPROVED GRAIN DRILL.

James R. Roe, Fairville, Mo.—This drill is so constructed that it will not clog with trash, will adjust itself to an uneven surface of ground, will sow the seed evenly and uniformly, and may be easily operated. It contains a number of new features in its mechanical construction.

IMPROVED THRASHING MACHINE.

George R. H. Miller, Oregon City, Oregon.—The novel feature in this machine is the feed table, which is placed upon the forward end of the frame and is secured in place adjustably by bolts, so that it may be moved forward or back, according as the stalks of the grain may be longer or shorter. To the table are pivoted two feed rollers, the lower one of which is ribbed or corrugated. The journals of the upper feed roller revolve in slots, so that it may rise to adjust itself to the thickness of the grain, and it is held down to its work by spiral springs. The feed table is also provided with an endless belt carrier for feeding purposes.

IMPROVED ROTARY STALK CUTTER.

Orson D. Johnson and John F. Bracket, Mount Pulaski, Ill., assignors to themselves and C. C. Mason, of same place.—This is a new machine for cutting stalks into pieces, so that they may be plowed under to fertilize the soil, and not impede the operation of plowing. A drum presses the stalks down and then knives arranged in slots in the periphery of the former are vibrated longitudinally to cut off the stalks. Attachments are provided for raising the drum when desired.

IMPROVED PEANUT CLEANER.

Daniel R. Rivers, Centreville, Tenn.—This consists of a hopper and cylindrical perforated sheet metal revolving screen, having longitudinal rows of large holes to let the stones and dirt out.

NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

IMPROVED SPRING BACK FOR WAGON SEATS.

John W. Wood, Owatonna, Minn., assignor to himself and C. Schoen, of same place.—This is an improvement in springs for connecting the back of a wagon seat with the arms. The back and arms have hitherto been connected by a curved plate spring, or the arm itself has been made in the shape of a coiled plate spring, or the arm has been made movable, being held by a surrounding coiled spring. These springs are found in practice to be often fractured in frosty weather by a sudden jar; and in order to avoid this, as well as to make a cheaper spring, the present inventor constructs this connection of rubber, making it flat at each end, so that it may be readily fastened between plates at the arm and back, and preferably make it stouter in the middle, to lessen its liability to break at that point.

IMPROVED AUTOMATIC SEWER TRAP.

John Peter Schmitz, San Francisco, Cal.—A vertical perforated partition divides the cesspool into two compartments. The street gutters discharge into one compartment, and the water passes through the perforations into the other, leaving the solid matters behind. A weighted valve closes the mouth of the sewer, but it is opened (to allow escape of water) by a float which is raised when the water accumulates in the second compartment.

IMPROVED SAW SET.

Christopher Heinen, Leavenworth, Kan.—This improves the construction of the saw set for which letters patent were granted to the same inventor August 8, 1876, to enable the upper die to be more firmly held in place, and the saw plate to be more easily and accurately guided to the dies. The general construction is such that the saw plates are securely and firmly held, and will be moved squarely across the dies, so that the teeth may be accurately and evenly set.

IMPROVED WAGON END GATE.

Theodore L. Block, Sidney, Ill.—A cross bar retains this gate rigidly in position until, by lifting and withdrawing the bar, the gate sections fold in the center, and are, on detaching the side hooks, readily taken off for dumping or removing the load. The pressure of the load on the inside of the end gate assists the taking off of the same, as it facilitates the swinging of the gate sections on their hinge connection. The gate may thus be easily locked to the wagon body and detached with great convenience, without requiring separate cross rods or other detachable fastening devices.

IMPROVED DOOR CHECK.

Hiram Shunk, Davenport, Iowa.—This is a stop for holding doors or shutters open or shut; and it consists of a spring formed from a ribbon of steel, the extremities of which are attached to the wall, and the center portion bent into a threefold loop forming a spring clamp, which engages with the outside of a loop or knob attached to the door, retaining it with sufficient force to prevent the door or shutter from closing by a pressure of wind or other slight cause. The clasp thus formed presents rounded ends, which readily slip over the loop attached to the door, and press the smaller part of it with a force which retains the door, but which may be overcome by pulling the door. The ends of the ribbon forming the clasp are formed into ears, through which screws pass for securing it to the wall. The stop not only answers the purpose of holding the door, but it also serves as a buffer which prevents the door from striking the wall as it is thrown open.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED HAT-BRIM-LURING MACHINE.

Ambrose Hill, Yonkers, N. Y.—This is an improved machine for luring the brims of hats, which shall be so constructed as to enable the work to be done well, and at the same time very quickly; and it consists in the combination of a hinged frame, spring, shaft, pulley, fly wheel, luring wheel, connecting rod, and treadle with each other, and with the frame for luring hat brims; and in the combination of the adjusting bar, the adjustable rest bar, and the detachable rest with each other, and with the frame for supporting hat brims while being lured.

IMPROVED MOTIVE POWER.

William W. Corey, Lisbon, N. H.—This is an improved mechanism for applying power to a hand car and to other mechanisms; and it consists in an improved motive power, formed by the combination of the four levers and the four connecting rods with each other and with the machinery to be driven. The form of the levers may be varied, as the particular use to which the power is to be applied may require.

IMPROVED RAILROAD SWITCH.

Ferdinando Luchini, Natchitoches, La.—In this switch the switch rail is operated by devices located upon the car. When the car is upon the main track and is going in the direction in which the switch rails point, the flange of the car wheels will push back the switch rail. When the car is passing from the main track to the side track, or from the side track to the main track, no movement of the switch rail is required.

IMPROVED DUST GUARD FOR SEWING MACHINES.

Albert A. Capeling, Rochester, N. Y.—This invention consists in an improved guard, cover, or case for the works of sewing machines, more especially for the Howe, Weed, and other machines having the stitch regulator located underneath the table. The guard completely encloses the works, and has a spring-closed door for permitting access to the regulator. The driving band runs through eyeleted openings.

IMPROVED VALVE SEAT.

Jacob F. Cock, Rockville Centre, N. Y.—This improvement consists in providing a valve seat of leather or other elastic or yielding material, placed in a channel cut in the bottom of the pump cylinder around the valve opening, or placed in a channel in an annular plate, which may also contain the packing for the lower end of the pump cylinder, and to which the valve may be attached. The object of this invention is to provide a valve seat which shall not readily wear, and which will permit the valve to close tightly, and which may be readily repaired. In applying this invention to new pumps, in the process of manufacture the valve seat or lower portion of the pump cylinder is grooved around the valve opening, and in it the rubber or leather valve seat is placed.

IMPROVED GRADING MACHINE.

Irven Coppock, Alba, Mo.—This is a machine to be employed for farming purposes, grading streets and roads, cutting ditches of all kinds, breaking ground for railroad cuttings, etc., and loading it at the same time directly on a wagon running in connection therewith; and it consists of an adjustable main frame supporting a plow that is raised and lowered thereon by suitable mechanism, and which throws, by a shovel or scoop-shaped mould board, the earth on an endless belt that is placed at suitable inclination, and driven by pulley and chain connection with the axle of the main wheels.

IMPROVED LOCOMOTIVE SPRING.

James Jenkins, Cortez, Nev.—In this invention the upper spring contacts with, and rests with its ends upon the ends of the lower. Median clips, employed to embrace the edges of springs, are connected by a spiral spring and internal flexible connection; while clips prevent lateral displacement between the middle and ends. Guide straps allow a free and independent movement to each of the springs upon the other, but not in a lateral direction.

IMPROVED LUBRICATOR.

George W. Gageby and William James, Johnstown, Pa.—This lubricator is for automatically lubricating the cylinders of engines; and it consists of two valves oppositely arranged upon the ends of a common stem, and provided with seats upon opposite ends of a chambered tubular conductor that connects the oil cup and steam chest, and is so arranged that steam pressure from within the steam chest closes the valve against the seat on the lower end of the tubular conductor, and a removal of the pressure from the steam chest allows the valve to drop and permits the lubricant to enter the steam chest.

IMPROVED KEY HOLE GUARD FOR LOCKS.

Calvin H. Covell, Stockton, Cal.—In this invention the casing of a door lock is applied to the door by recessing the same from the inside to the thickness of the lock, so as to leave the door strong enough, and without being weakened to the same extent as by the common mortise lock set in from the edge of the door. A face plate closes the lock from the inside, and is attached to the door by fastening-screws. The sliding latch bolt is guided in the casing and operated by turning the knob spindle in either direction, being engaged by extensions of the guide socket of the knob spindle, the extensions bearing against the lugs of the recessed interior part of the latch bolt. The latch bolt is acted upon by a spiral spring, that throws the same instantly forward when the knob is released. The outer section of the latch bolt is screwed into the wider interior section, and may thereby be readily detached for the purpose of reversing the external section of the latch bolt according to the side of the door to which the lock is to be applied. The external section of the latch bolt is guided in a suitable metal lined recess of the door, the guide recess connecting the edge of the door and the lock casing. The spiral spring is placed outside of casing, and around the exterior section of the latch bolt, between the casing and the enlarged end of the latch bolt, which arrangement of bolt section and spring reduces the width of the casing, and admits the carrying back of the lock from the edge of the door, leaving solid wood where it would otherwise have to be cut away. A pivoted guard plate swings at the inside of the casing adjoining the wood, and closes, when placed in position by its operating pin, the lock against the introduction of a key or instrument from the outside. The pin swings in curved slots of the casing and face plate. The guard plate forms an additional safeguard against the opening and picking of the lock from the outside. The lock is, therefore, of special advantage for outside doors, hotel, and such other rooms that are desired to be secured from the inside.

IMPROVED APPARATUS FOR INTRODUCING POWDERED FUEL INTO FURNACES.

George K. Stevenson, Valparaiso, Chili.—The object of this invention is to introduce powdered or granular fuel, such as coal, coke, or similar hydrocarbons, to furnaces adapted thereto in such a manner as to insure a more perfect combustion and more intense heat than heretofore; and the invention consists in connecting the fuel tube with furnace by a sleeve and tube, the latter of which is provided with a twisted plate that is made adjustable, as hereinafter described. The fan heretofore used exclusively in the attempts to introduce powdered fuels has not given satisfactory results, on account of the uncertainty of the blast of the fan, except at a given high velocity, which circumstance has been the cause of either their failure or of greatly diminished value.

IMPROVED ATMOSPHERIC GAS ENGINE.

Joseph Wertheim, Bornheim, Prussia.—This invention relates to an improved combined atmospheric gas engine, in which the explosive force of a suitable gas and air mixture and the atmosphere pressure are utilized as motive powers; and it consists, mainly, of a cylindrical explosion dome, connected by a siphon pipe with a reservoir. In this pipe, but at its lower part, is a paddle wheel, arranged in a casing with curved chutes, on which the power of the explosion in the dome and of the atmospheric pressure created by the vacuum therein is exerted by means of water or other liquid. The explosion may be produced by a suitable mixture of illuminating gas and air that is admitted into the explosion dome, and ignited by a slide valve with an igniting mechanism. The explosion forces the liquid, through a double valve arrangement of the siphon pipe, paddle wheel, casing, and connecting channels, into the liquid reservoir at the end of the siphon pipe, and back again by the vacuum formed in the dome and pipe, imparting, by the forward and return motion, a continuous rotary motion to the paddle wheel. The liquid valves control the escape of the gases from the explosion chamber, in connection with the return of the liquid, by means of a slide valve and interior pendent float valves, any mechanically escaping liquid being returned by a small collecting chamber and pipe to the liquid reservoir. The regulating device is operated in connection with the fly wheel of the paddle wheel shaft, interrupting temporarily the explosions in the dome when the speed is too fast.

IMPROVED COMBINATION TOOL.

Isham U. Malphurs, Gainesville, Fla.—This is an ingenious combination of monkey wrench, gimlet, screwdriver, and pipe tongs or nippers. The lower end of the wrench bar forms one jaw of the tongs, the opposite jaw being pivoted to said bar. The end of the pivoted jaw handle is fashioned out into a screwdriver, and the gimlet is attached to the back of the movable jaw of the wrench.

IMPROVED COTTON CHOPPER.

John H. Gilleland, Peak's Hill, Ala.—The new feature in this machine consists in two levers, which are pivoted, near their lower ends, to each other and to a cross bar of the frame, so as to work upon each other like the parts of a pair of scissors. In the adjacent faces of the lower ends of the levers are formed half-round notches, which, when the said ends are closed upon each other, form a bearing for the forward journal of the chopping shaft, which may consequently easily be detached.

IMPROVED FRICTION CLUTCH.

Samuel Peppard, Oskaloosa, Kan.—This is an improved device to take the place of cranks and pawls for transferring motion, which shall have no dead point, and will act at once when the power is applied. The side or face of the wheel or other object to be driven is made conical, to correspond with the faces of conical rollers, which revolve loosely upon the journals of an axle. The middle part of the axle is widened and has angles formed upon its opposite sides. The axle has a hole through its center, through which a shaft passes. The hub of a disk, to which power is applied, revolves upon the shaft. The face of the disk is made slightly conical, and has inclines formed upon it, so that when the disk is turned slightly in one direction it will be wedged by the rollers between the wheel and the ring, so as to carry the said wheel with it in its revolution.

IMPROVED CLAMP FOR HOLDING RATCHET DRILLS.

Louis Beland, North Springfield, Mo.—This is an improved apparatus for holding and feeding ratchet drills employed in drilling fish plates while in place on the rails. It consists of a clamp formed of two parallel bars of iron or steel, which serve as ways for a sliding nut, through which the clamping or feeding screw passes. The said bars are connected at each end with hooks of peculiar form, which are capable of engaging with the lower side of the rail. The nut carrying the feeding screw is capable of being adjusted to any number of holes within the limit of the length of the parallel bars.

IMPROVED CAR COUPLING.

Oliver Crum and Milton Crum, Monsey, N. Y.—This car coupling couples in reliable manner without danger to the attendant; and the drawhead has an inclined lateral locking piece. A swinging top hook is raised or lowered for uncoupling and coupling by a swinging bridge operated by a lever arm of the shaft of the coupling hook, so as to uncouple simultaneously the coupling. The interlocking hooks are readily detached in case one of the cars is thrown off the track. The drawhead also has considerable side play, and is capable of resisting more fully the concussions of the cars.

IMPROVED CHUCK FOR METAL-TURNING LATHES.

Jay H. Harris, Sacramento, Cal.—This chuck consists of a pair of jaws that may be made to project more or less beyond the lathe center, and which may be closed tightly on the shaft by a nut, which closes them by following their inclined sides. Dogs are placed eccentrically in the ends of the jaws, which prevent any slipping of the work. This device is quite simple, and is well calculated firmly to hold shafts and other objects to be turned.

IMPROVED DEVICE FOR DRAWING PULLEYS FROM SHAFTING.

Henry F. Casterline, Grand Detour, Ill.—In repairing shafting it is frequently necessary to remove the pulleys; but these after long usage often become set very tightly, so that to take them off involves the expenditure of considerable time and labor. The present invention suggests an ingenious device for the purpose, which consists of swinging hook levers that are forked and curved inwardly at the ends, which spring over the pulley. The levers are pivoted to at traveling screw head that serves to pull the pulley by a screw shaft. A loose pin is clamped into the socket end of the screw, and may be taken out and exchanged for others of different lengths, so as to bear on the shaft end and fit the lever hooks to the pulley, admitting the device also to be used as a jack screw by putting a plate at the center of the screw head.

IMPROVED COAL-HOISTING APPARATUS.

Guiseppe Paci, New York city.—The object here is to hoist coal, bricks, and other articles from vessels directly into the carts by utilizing the power of the horses pulling said carts. There is an inclined endless belt, with step-shaped parts, to be operated by the carthorse for rotating a drum, on which the hoisting rope is wound. The cord runs over guide pulleys of a supporting frame and of a bucket-conveying carriage, that locks and unlocks a fixed button in automatic manner to convey the load or lower bucket. The work of the endless stepping belt is stopped or interrupted by a lever actuating a double clutch and brake mechanism of the winding drum shaft. A weighted lever and swinging hub-locking standard secures the cart in stationary position while the horse is working.

IMPROVED TUBE SHEET AND FASTENING FOR TUBES OF STEAM BOILERS.

Daniel Hess, Greenville, Miss.—The object of this invention is to enable the defective fire tubes of steam boilers to be removed with convenience and dispatch, and without injuring the tube sheets. To this end, the patentee countersinks the holes or apertures in the tube sheets to receive screw nuts, which are applied to the ends of the fire tubes for securing or fastening them to the tube sheets.

IMPROVED SHACKLE.

Henry W. Dilg, Portland, Oregon.—This invention consists in constructing the shackle of two parts or curved bars having a loose jointed or detachable hinge connection at one end, and one of them made of angular form at the other end, whereby it is adapted to be locked to the companion bar.

IMPROVED MOUNTING FOR PORTABLE ENGINES.

Robert M. Beck, Westminster, Md.—This invention relates to an improved mounting for portable engines, designed with a view to simplicity, cheapness, and substantial construction; and it consists in the improved means of supporting the boiler and its engine upon wheels, and strengthening and bracing the same in its attachment.

IMPROVED CAR WHEEL CHILL.

William Wilmington, Toledo, O.—The object of this invention is to cast a wheel with such an arrangement of the chilled portion of the tread as would give the greatest wearing qualities, and at the same time preserve such form and amount of unchilled surface to the tread as will entirely, or to a necessary extent, relieve the tension which is the result of casting wheels with the entire face of the wheel chilled to a uniform depth. The improvement consists in constructing the chill with an inner recess at the outer edge of the portion forming the tread, and with a number of transverse grooves, running from said recess across the inner face of the chill, both of which grooves and recess are to be filled with sand or non-chilling material to conform to the face of the chill preparatory to casting the wheel.

IMPROVED WROUGHT IRON BRIDGE.

William H. Miller, Curwensville, Pa.—This consists of a truss made of six-sided frames of iron placed upright in a line and clamped together. The top and bottom chords are provided and the structure is stayed with plates and braces in a manner calculated to make a light and strong bridge, capable of sustaining great weight, and being very stiff against lateral vibration.

IMPROVED STUMP PULLER.

Joseph Richter, Jordan, Minn.—This invention consists in the combination of a shaft, ratchet wheels, two pairs of pawls, connecting rods, chains, and holding pawls with each other and with the frame; in the combination of the cords or chains and the hooks with the pawls, the connecting rods, and the levers. When the rear ends or handles of the levers are raised, the weight of the rear pawls will hold both pawls in gear with the ratchet wheel; and when the rear ends or handles of the said levers are lowered the weight of the rear pawls will hold both pawls in gear with the ratchet wheels. By operating the levers, the shaft will be turned, winding up the chain, and drawing the stump. The shaft is held from being turned back by the resistance of the stump when the levers are being raised to make another stroke by the pawls, which engage with the teeth of the ratchet wheels, and are pivoted to and slide upon a rod, attached to the rear posts of the side frames. The outer ends of the pawls project to serve as weights to hold their engaging ends against the teeth of the ratchet wheels, and as handles for sliding them away from the said wheels.

IMPROVED CAR COUPLING.

Charles G. Case and Daniel Gould, Davenport, Iowa.—This consists in a swinging and spring cushioned coupling hook, provided with an upwardly projecting shoulder connected with a top shoulder in the opposite drawbar by a swinging cam. When the cars approach each other the coupling hooks enter their corresponding cavities, and may then be locked by side levers. The uncoupling is also readily accomplished by swinging the cams down so as to release the hooks from the top shoulders of the drawbars.

IMPROVED COTTON PRESS.

Charles T. Mason, Sumter, S. C.—This consists in the arrangement, in a suitable frame, of two screws, each provided with a right and left hand thread, and two followers or platens, between which the cotton is pressed, supported upon, and moved in opposite directions by the said screws. The object is to throw the entire pressure of the followers on the compressing screws and thus obviate the necessity of making heavy and expensive press frames, and also to increase the rapidity with which the press may be operated.

IMPROVED AUTOMATIC BRAKE LOCK.

Garhard H. Roling, Bellevue, Iowa.—This wagon brake is operated automatically in going down hill by the neck yoke, and released by the strain on the whiffletrees when on level ground. The alternating application and release of the brakes by the automatic action of the horses, according to the nature of the ground, is thus produced in effective and reliable manner. The brake is also automatically released whenever the wagon has to be moved backward.

IMPROVED CRACKER MACHINE.

John Rannie and Alexander Rannie, Palmyra, N. J.—This machine is designed especially for use in the manufacture of what are known in the trade as "soft" goosd, such as ginger snaps, lemon snaps, bon-bons, fancy dessert biscuits, etc. It may, however, be used with advantage for the manufacture of any kind of crackers. The construction is such as to prevent the dough from adhering to and clogging the cutters, to indicate the exact thickness of dough that is passing from the feed rollers to the cutters, to stamp the dough with various devices before it passes to the cutters, to enable the scraps to be readily separated, and to prevent the cakes of dough from turning over as they pass from the feed apron to the pans upon the delivery apron.

NEW MISCELLANEOUS INVENTIONS.

IMPROVED TUNING PIPE.

William G. Cook, Jersey City, N. J., assignor to himself and D. M. Read, New York city.—The object of this invention is to furnish an improved reed instrument, which shall be so constructed that it may be adjusted to sound any note of the scale, and which may be used as a tuning pipe and as a toy musical instrument. The invention consists in the combination of the slotted sliding bar, having an index plate formed upon its outer end, the lever, and the pivoted fulcrum bar, with the slotted frame, the reed, and the case.

IMPROVED OIL STOVE.

Jacob M. Chamberlain, Albany, N. Y.—This stove, for burning kerosene and other oils, consists in the arrangement of an oil reservoir, provided with a space for water upon its upper surface, and an oven, and flues and dampers for controlling the direction of the smoke and utilizing the heat. It also consists in a vessel of peculiar construction for heating or cooking purposes.

IMPROVED BEVEL.

Albert Devoe, Oneonta, N. Y.—This is an improved extension brace rule, by which the bevels at both ends of a brace, and the mortises for a brace, may be readily laid out at any angle of the same, the brace rule being also conveniently used as a mitering and try square. It is composed of sliding and slotted main pieces, that are connected by a guide and clamp screw, and provided with graduated end rules, which are adjusted on the main pieces by additional clamp screws.

IMPROVED BALE TIE.

John L. Sheppard, Charleston, S. C.—The buckle is approximately hook shaped, and pivoted to the band. The free end of the band is looped around the bent free arm of the buckle. In effecting the lock, the buckle is turned on its pivot, so that the loop of the band will slide under the bent end of the buckle arm. The tie is simple, strong, easily manipulated, and cheap.

IMPROVED UMBRELLA.

Emerson Folsom, Toledo, O.—This improved folding or telescoping umbrella or parasol may be readily arranged into small and compact shape for being conveniently carried, packed, or stored, or drawn out for use as a common umbrella or parasol, the mechanism being of simple, yet strong and durable, construction; and it has a telescoping stick and ribs that are locked by spring catches when drawn out for use, in connection with the runner and tip holder.

IMPROVED TYPE WRITER.

William H. Snider, Angus, Ontario, Canada, assignor to himself and Jonas T. Bush, of same place.—The object of this invention is to so improve the key levers for type writers that either a considerable reduction in the number of keys may be made, or the application of the keys be enlarged to a considerable extent, so that the speed of the type writer may be increased and the working of the same facilitated. The invention consists of a compound key lever, obtained by attaching a steel spring, with a type at the movable end, to the rear end of the same, and arranging one or more letters on the key itself, so that by depressing the key either the letter of the spring or the combination of spring and key letters be formed.

IMPROVED PAPER BOX.

Richard H. Foster, Gloversville, N. Y.—This invention relates to packing boxes for that class of gauntlets that are provided with stiff wrists; and it consists of a square box provided with internal corner pieces or blocks, and with a central elevated table at the bottom of the box, and a removable piece that is received by notches in the inner corners of the blocks, the object being to provide a box in which gauntlets may be packed without injuring the stiff portion of the wrist. The box and the corner pieces may be made from pasteboard, wood, or other suitable material. The advantage claimed for the invention is that gauntlets having stiff wrists may be packed in boxes of this description without injury to their form.

IMPROVED FEED BAG FOR HORSES.

George C. Booth, New York city, assignor to himself and Robert Gibson, of same place.—The mouth of this feed bag is attached to a band or hoop of wood or iron, to which is hinged a cover for closing the bag, and which, when the bag is in use, acts as a stay or brace for holding the bag in the required position, being hooked into the hame or breast straps of the harness. There is a peculiar arrangement of cords for sustaining the bag, by which it is prevented from swinging, and is held steadily. It is claimed that the bag is always in the position required for feeding; it throws no impediment in the way of breathing; it can be readily attached and detached; and it folds compactly with or without the feed contained. The annoyance to the horse of inhaling the dust of the feed is entirely obviated, and the head is relieved of the weight of the bag, giving freedom of motion to the horse's head, avoiding the wasting of feed by the movement of the head.