

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. 6,936, 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. Hill Rice, and Charles E. Pratt, for complainants.*

*Chauncey 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, Tufts 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-lumière* 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 formulae 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 supercedes the unreliable formulae 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 filing 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, Centerville, 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.