

Spica, in the Virgin, from the sun at the time of the autumnal equinox. Hipparchus also measured this distance and found it to be greater than Timocharis had made it. The difference between the two measurements was too large to lead him to suppose that Timocharis had made a mistake, and he was thus forced to the conclusion that the sun and Spica were really further apart than they were a hundred and seventy years before. And he found further that by dividing this difference by the number of years which had passed since the first measurement was made, the annual precession was 49 minutes—which was only a very little wrong. Now, in the days of Hipparchus the sun really was just entering the Ram at the spring equinox, which was then, therefore, the first point of Aries. In the 2,000 years since this point has gone westward nearly 28 degrees, which brings it into the constellation of The Fishes; but the old name has not been changed.

"Hipparchus was a very clever astronomer," says the writer. "It would take too much room to tell all about him, but I may mention one other good thing he did: he made a catalogue of the principal stars—the first of its kind—and calculated their positions. This passed three hundred years later into the hands of another old astronomer named Ptolemy, who made a better catalogue, which has been very valuable in enabling modern astronomers to find out the changes which have taken place in the apparent places of the stars during the past two thousand years."

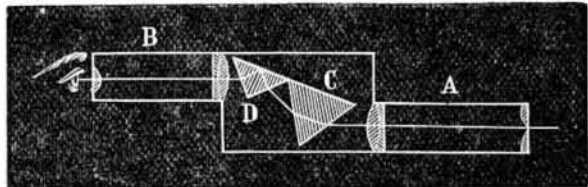
The first point of Aries is important, because it is the point from which the right ascensions of all the heavenly bodies are reckoned. To mark places on the earth we speak of their longitude and latitude. The position of a star is expressed by its right ascension and declination. Declination means distance north or south of the equator. Right ascension is the distance from the first point of Aries measured on the equator, always to the east, and is usually stated in time, one hour being equal to 15 degrees of arc. In consequence of this going backward of the equinoxes, the right ascensions of all the stars are constantly increasing, and will of course go on increasing till the first point gets back to Aries, or right ascensions are reckoned from a fixed point.

Orion is still the most conspicuous constellation, and may be found in the southwest soon after dark, with Sirius in the Great Dog nearly south. Other prominent stars visible on fine evenings are Mirfak in *Perseus*, Alcyone in the *Pleiades*, Aldebaran in the Bull, Capella in the Wagoner, Procyon in the Little Dog, Castor and Pollux in the Twins, Regulus in the Lion, Arcturus in the Hunter, and Spica in the Virgin. The moon is in conjunction with Jupiter and Mars on the 7th, and will occult one or two of the smaller stars in the *Pleiades* a little after 9 o'clock (Washington time) on the evening of the 19th.

[For the Scientific American.]

#### NEW SPECTROSCOPE FOR DIRECT VISION. BY PROFESSOR A. RICCO.

This instrument consists of the following parts: A is a collimator, in which the distance of the slot for the admission of light to the achromatic lens is equal to the focal distance of the latter. C is a prism of dispersive flint glass, which decomposes the light of the beam made parallel by the colli-



mator. D is a prism for total reflection, which sends the decomposed light into the telescope, B, parallel to the collimator, A. If the field of view of the telescope will not hold the whole of the spectrum, the prism, D, is made to turn about an axis passing through the middle of the hypotenuse of its base by means of an external lever. By this means the different parts of the spectrum will be successively reflected into the telescope.

On account of its simplicity, this spectroscope is very easily constructed; and by reason of the shortness of the path which the light passes over in the glass, the loss of light is less than that which takes place in a five-prism Amici spectroscope for direct vision.

Modena, Italy.

#### Metallotherapy—Another Deception.

When the blue glass believers become tired of their hobby, as many of them doubtless already have of mesmerism and "movement," "grape," "will," and other "cures," which from time to time have furnished sensations for the gullible or held out vain hope to the afflicted, they will find a new field for their credulity in the metal cure lately invented in France, and which, according to one of our best French contemporaries, is working miracles. Here are some examples: A young woman was totally paralyzed over her right side. Her body was utterly devoid of feeling; and a sharp needle thrust in her body attracted no notice. Dr. Burg simply gave her a cylinder of gold to hold in the hand, she being blindfolded. In fifteen minutes, she felt a pin prick, then recognized the touch of a plurality of objects, and regained perfect sensibility. Another patient had her left side paralyzed. This called for a copper cylinder, whereupon she too was cured. Then a venerable lady, whose jaw was in a similar unfortunate condition, was cured by a lump of iron under her tongue and a bandage of iron plates on her

head. It should be observed that interchanging metals upon these people did not produce good results. Their "systems" required the metals named, and no others.

Cause, of course, electricity, it being the fashion to use that much-misused word to explain anything which is not readily comprehended, from blue glass radiations to love. "Electric homoeopathy" our contemporary calls this latest deception, while devoting several columns to its grave consideration.

#### The Obnoxious Franking Privilege Again.

The Sundry Civil Appropriation bill, which was hurried through Congress during the closing hours of the late session, has been made the means of putting through a measure, tacked on as an amendment, which is meeting with the wholesale reprobation that it deserves. It is a resurrection of about the worst feature in the hitherto defunct franking privilege—namely, that of allowing members of Congress to send public documents free through the mails. Luckily the period fixed by law wherein the postal service of the country can thus be turned into an express agency for Congressmen expires on January 1 next; so that, even if the measure be not repealed before that date, public opinion concerning it is sufficiently strong to prevent its subsequent renewal.

We have frequently pointed out how great an imposition on the government any such privilege as this is. The mere sending of Congressmen's letters is in itself no particular burden to the mails; but when it comes to forwarding tons of electioneering documents already printed, and now distributed at the cost of the people, or private packages, or even wash clothes (as used to be the case), and the brunt of all to be borne by a service already working under a deficit, the practice degenerates into an abuse, and there is no reason for its existence. Now, we suppose, the average member will flood his constituents with Patent Office reports and copies of his speeches in lavish profusion, and in marked contrast to his careful distribution of such favors when he had to pay the postage. Government presses will accordingly be kept running, and the people will lose, not only the member's small contribution to post office expenses, but will pay for the production and transportation of some thousands more useless books, which will follow their usual short circuit from the press to the paper maker.

And that is not all; pension agents, land agents, patent agents, and others doing business in Washington, will probably avail themselves of some friendly member's stamp or signature in mailing broadcast their circulars, etc. This was done before, and human nature has not changed.

#### Blue Glass in a Nut Shell.

General Pleasonton's blue glass theory is assailed by the SCIENTIFIC AMERICAN. His idea that electricity is generated by the passage of light through the glass is declared to be absurd. Nor have colored rays any beneficial effect on life, the reverse rather being the truth, as a pure, white light is best. The only good that can possibly come of blue glass is in its use as a shade for decreasing the intensity of solar light.—*New York Sun.*

#### PUBLISHERS' NOTICE.

New subscriptions to the SCIENTIFIC AMERICAN and the SCIENTIFIC AMERICAN SUPPLEMENT will, for the present, be entered upon our books to commence with the year, and the back numbers will be sent to each new subscriber unless a request to the contrary accompanies the order.

Instead of a notice being printed on the wrapper, announcing that a subscription is about to end, the time of expiration is now denoted in the printed address each week.

In the article on the oleo-margarin industry in our last issue, the statement that "mixed fat of all kinds" is used should read "mixed beef fat"—this being the only variety employed at the factory described.

#### Inventions Patented in England by Americans.

From February 3 to February 19, 1877, inclusive.

ARTILLERY GAME.—W. Rose, New York city.  
CIGAR MACHINERY.—J. F. Fygh, Philadelphia, Pa.  
CIGAR-MAKING MACHINE.—J. S. Winsor, Providence, R. I.  
CUTTING PIPES, ETC.—A. C. Wood, Syracuse, N. Y.  
DRESSING MILLSTONES.—W. Griscom, Pottsville, Pa.  
FIRE ARM, ETC.—E. T. Starr, New York city.  
FRICTION COUPLING, ETC.—A. K. Rider, Walton, N. Y.  
GAS STOVE, ETC.—E. B. Cox, Brooklyn, N. Y.  
LOCK STITCH SEWING MACHINE.—C. F. Hollis, Boston, Mass.  
MAKING SAWS, ETC.—G. F. Simonds, Fitchburg, Mass.  
PADDLE WHEEL.—W. C. Thompson, Tipton, Tenn.  
PAPER PULP BOX, ETC.—S. Wheeler et al., Albany, N. Y.  
PARING APPLES, ETC.—G. Bergner, Washington, Mo.  
REFRIGERATOR, ETC.—C. L. Riker et al., New York city.  
ROTARY ENGINE.—J. C. Thomas, Carlinville, Ill.  
SCHOOL SLATE, ETC.—J. W. Hyatt et al., Newark, N. J.  
SEWING MACHINE.—C. H. Wilcox, New York city.  
SHUTTLE.—W. Beatty et al., Gray, Me.  
SPINNING FRAME.—G. Draper et al., Hopedale, Mass.  
YARN-WINDING REGULATOR.—S. Jackson, Lawrence, Mass.

#### Recent American and Foreign Patents.

##### NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

##### IMPROVED VEHICLE GEARING.

David G. Wyeth, New Way, O.—The object of this invention is to provide a vehicle gearing in which a reach, fifth wheel, and ordinary form of bolster are dispensed with. The springs are coupled in pairs, and arranged in a triangular relation to the rear axle. The rear clips and front bearings of the springs are also constructed in a peculiar manner. For particulars, see patent.

##### IMPROVED MACHINE FOR JOINTING STAVES.

Edmund W. Gillman, Long Island City, N. Y.—In this device two rotary concave cutter disks are arranged facing each other, upon a single shaft, each disk being provided with knives arranged tangential to a circle of small diameter described from the center of the disk. A casing surrounds each disk, which is connected with an exhaust fan for removing the shavings. Adjustable guide plates are attached to the side of the casing for supporting the stave, and there is a pivoted frame for carrying the stave centering and clamping apparatus. The machine includes a device for centering the staves, and for clamping them while being jointed; and also an adjusting device, by means of which the ends of the staves may be narrowed more proportionately in wide staves than in narrower ones; and means for inclining the stave in opposite direction to give its edges the proper bevel.

##### IMPROVED FLOOR CLAMP.

William H. Tarrant, Eau Claire, Wis.—This clamp may be used for laying single or double flooring. It consists of an eccentric cam and lever that operate jointly a sliding bar for pushing the flooring board and spring-actuated and serrated cam levers that bind on the joists for securing the clamp frame rigidly in position during work.

##### IMPROVED SNOW GUARD FOR ROOFS.

George F. Folsom, Boston Highlands, Mass.—This consists of a wire bent at right angles at one end and sharpened, so as to be readily driven into the roof boards. At the other end it is bent in the opposite direction, and formed into a loop of peculiar shape, which projects upward from the roof, and is provided with a tongue which is capable of retaining a plate of metal, which will retain the snow until it melts, thereby preventing the sliding of large quantities of snow in a mass from the roof.

##### IMPROVED GANG SAW MILL.

Dudley J. Marston, Amesbury, Mass.—This relates to that class of gang saw mills that employ a series of vertically reciprocating saws for cutting a number of boards simultaneously from a log. The advantages claimed are, that long and slender logs may be sawed without difficulty, as the force is exerted equally from above and below. The gates, having oppositely arranged cranks, counterbalance each other, so that jarring is avoided, and the speed may be increased, and the strain on the frame being lessened, it may be made lighter than the frames of ordinary mills.

##### IMPROVED MACHINE FOR JOINTING STAVES.

Joseph S. Milton, Bardstown, Ky.—This consists of a swinging stave-supporting or bed frame, with ratchet shaped guides, operated by a hand lever, and swinging in guide grooves of the main frame. The stave is pressed against curved adjustable seats and held in bulged shape by a cam lever and spring ratchet, for being jointed by a planeguided along the table of the machine.

##### NEW TEXTILE INVENTION.

##### SOFTENING AND CLEANSING ANIMAL AND VEGETABLE FIBRE.

William Maynard, New York city.—This invention relates to the use of detergents previous to bleaching, by which cotton, silk, wool, and grasses (such as hemp, flax, etc.) may be softened, decolorized, and cleansed, without boiling and with greater economy of time, labor, and materials. The process consists in the use of sulphuric acid, hydrated, mixed with a centralizing proportion of an alkali, but principally sal soda, which mixture is used instead of a solution of the crystallized sulphite salt, and possesses peculiar advantages over the use of the latter in that it obviates the time, labor, and expense of crystallization, is much more effective in its actions, does not injuriously affect the fiber, and is not subject to the deterioration incident to the use of the crystallized sulphites, which, when kept, rapidly oxidize and pass into the sulphates.

##### NEW MISCELLANEOUS INVENTIONS.

##### PREVENTING ACCUMULATION OF CARBON IN RETORTS.

Watson Karr, Frostburg, Md.—The process consists in using a small quantity of semi-bituminous coal with the ordinary bituminous or soft coal in the retort. The hydrogen gas produced from the semi-bituminous coal combines with the carbon from the bituminous coal which would otherwise be deposited upon the roof of the retort. The process saves the labor and time required for removing the carbon formations from the retort in the usual way, and likewise avoids the consequent injury to the retort itself, so that its durability is greatly increased.

##### IMPROVED BALE BAND TIGHTENER.

John L. Sheppard, Charleston, S. C.—The object of this invention is to provide an improved device or apparatus for bringing together the ends of cotton bale bands and taking up the slack while the bales are in the press. The same consists in vertical sliding bars, attracted respectively to the front side of the platen and bed of the press, and provided with slots, or otherwise so constructed as to enable them to clutch the ends of the band, so that when they are slid towards each other the band will be tightened and the slack taken up.

##### IMPROVED STOCKING SUPPORTER.

E. Louise Demorest and Thomas W. G. Cook, New York city, assignors to W. Jennings Demorest, of same place.—This consists in the combination of a clasp pin attached to the ends of an elastic strap by means of clips, and a combined clasp pin and buckle that receives the elastic strap, which is double. The clasp pins at the lower ends of the elastic strap are fastened into the stocking, and the clasp pin that is attached to the buckle is fastened to the under garments.

##### IMPROVED TOY WHIRLIGIG.

Charles E. Steller, Milwaukee, Wis.—This toy is so constructed as to give a rapid rotary motion, first in one direction and then in the other, to objects placed upon the revolving table or disks, to cause said objects to represent various beautiful and fanciful forms.

##### IMPROVED VETERINARY SURGICAL INSTRUMENT.

Lewis Woods Hamilton, Pendleton, Oregon.—This instrument is specially adapted for use in castrating animals. It consists of nippers having curved shaped jaws, and cutting blades which are formed on the outer end of the same levers. Said levers are pivoted together intermediate of the nippers and shears, and the shanks of the latter are provided with a finger-loop and guard.

##### IMPROVED SAFETY GUARD OR DOCKING FOR HARNESS.

Fayette W. Knapp and Christopher Schlimm, Fiddletown, Cal.—This consists in a peculiar construction of the cockeye which connects the trace with the single-tree. The eye which embraces the single-tree is swiveled to the yoke, which is attached to the trace, and is provided with a spring-actuated follower, between the end of the eye the hook which is upon the end of the single-tree is embraced. The invention was described and illustrated on p. 118, vol. 36.

##### IMPROVED FLY BRUSH.

Daniel H. Mowen, Greencastle, Pa.—This consists in the arrangement of a vertical shaft carrying a horizontal brush arm, a lever for moving the same, and a clamp for attaching it to a table or chair. The said shaft is provided with a spring for returning it to its normal position after it is moved by the lever. There is also a new adjusting device, by which the brush arm may be readily adjusted to any height on the vertical shaft, and by which the said arm may be made to project more or less from the vertical shaft.

IMPROVED GAS TORCH.

Albert R. Weiss, Brooklyn, N. Y.—This consists of a gas-lighting torch worked by a fulminate ribbon, whose pellets are fed and ignited by a suitable mechanism. The latter consists of a sliding sectional piston rod, operated from a trigger of the handle guided in a curved tube, and reset by a spring of the feeding device.

IMPROVED REIN SUPPORT.

Joseph L. Ryder, Islesborough, Me.—This device is made of a single piece of metal bent to form a central guide piece, eyes, and guard tongues. It prevents the reins getting entangled under the whiffletree, or under the horse's tail.

IMPROVED MIDDINGS SEPARATOR.

Peter Muller, St. Charles, Mo.—This consists in suspending the frame of a middings purifier by straps, and providing it with a cam wheel, pawl, shaft, and springs, arranged to reciprocate and jar the frame transversely to the flow of the material.

IMPROVED ELECTRIC LIGHTING APPARATUS FOR LAMPS.

Prof. William H. Zimmerman, Chestertown, Md.—This is a novel construction of self-lighting lamp, based upon the general principle of the employment of a hydrogen gas generator, together with a galvanic battery, in which the battery current heats a platinum wire red hot to ignite the jet of hydrogen, the flame of which latter impinges against and ignites the wick of the lamp. The invention consists, mainly, in locating the gas generator and the battery in twin supporting sockets attached to the brachial slide carrying the lamp, and in rendering the various vessels to be filled capable of independent support in upright position while being filled; in addition to which, the invention further consists in novel means for simultaneously bringing into operation both the gas generating apparatus and the battery, and instantly effecting the generation of gas, the flow of the electric current, and the lighting of the lamp. The self-lighting devices may be applied with slight modifications to all forms of lamps as well as to gas brackets.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED HORSESHOE MACHINE.

John W. Chewing, Jr., Shadwell Depot, Va.—The present invention is an improvement upon that for which letters patent of the United States were granted to the same party August 26, 1876 (No. 181,641). The improvement relates to the construction of the contact surfaces of the swaging die and the combined former and ejector; also to the mechanism for reciprocating the swaging die.

IMPROVED CHAIN PROPELLER FOR VESSELS.

William B. Whiting, Milwaukee, Wis.—This invention is an improvement in that class of chain propellers in which the boat is bisected by a central longitudinal opening in which the chain propeller is arranged. The novelty consists partly in the improved construction of the propeller, designed with a view to strength and smoothness of operation; and also in arranging the endless chain propeller about an inclined compartment connecting the two portions of the boat upon opposite sides of the central channel, which compartment rises toward the stern so as to secure the double result of facilitating the return of the paddles to the forward end of the boat upon the inclined deck railway, as well as the withdrawal of the paddles vertically from the water, which obviates the carrying of "dead water."

IMPROVED QUILTING ATTACHMENT FOR SEWING MACHINES.

John Douglass, Millport, Mo.—The quilting frame is attached to and pendant from a traveling carriage, which is supported upon an extensible horizontal beam or frame, in such manner as adapts it to be used in connection with a sewing machine. The quilting frame is moved back and forth to carry the quilt under the needle and return, and may be hung up out of the way when not required for use. The beam on which the carriage runs may be easily taken down when required.

IMPROVED APPARATUS FOR CONVERTING MOTION.

Peter Gregersen, Wauzeka, Wis.—This is an apparatus for converting reciprocating motion to continuous rotary motion; and it consists in the combination of movable racks with a sliding frame that is attached to the piston rod of an engine. The device also consists in a mutilated pinion that meshes with the movable racks, and is provided with a double cam, by which the motion of the shaft rotated by the said racks is reversed.

IMPROVED MACHINE FOR SHEARING SHEET METAL.

George Summers, Niles, O.—Threaded rods are provided upon which the feet are formed. These feet are fastened to the fixed jaw of the shears by means of bolts, and project therefrom at right angles. Guide plates are fitted loosely to the rods, and are held in place by means of nuts. Several sets of guide plates may be provided, that increase in height as they are placed farther from the blade of the shears, so that a number of widths may be cut without readjusting the gage.

IMPROVED EARTH AUGER.

James McCullough, Pensacola, Fla.—By turning the center shaft in one direction, the auger is opened for work, taking in the sand, earth, and water, and retaining the same, by turning the shaft in opposite direction and closing the openings of the auger by a valve. The auger is then raised for being emptied, the center shaft being attached to the auger, to prevent displacement of the valve in vertical direction by a collar, keyed to the shaft below the yoke.

IMPROVED EARTH AUGER.

Edward Cox and Henry Cox, East St. Louis, Ill.—This consists of a box auger attached, by a yoke, to a vertical shaft, at the upper end of which another yoke is attached that is made to revolve by bevel gearing. The upper yoke is provided with a horizontal shaft, having at its outer end a pinion that travels upon a series of cogs formed at the edge of the circular openings in which the yoke is suspended. An endless chain, carrying buckets, passes over a pulley on the horizontal shaft and around a pulley in the yoke that supports the auger. The whole is supported by a derrick, which is provided with a windlass for raising and lowering.

IMPROVED COTTON CLEANER.

James A. Bowers and Milton Adair, Princeton, Ark.—This consists of a slotted and ribbed stationary concave and a revolving cylinder with beaters, combined with a feeding and discharging case, in which the cotton feeds from a hopper at the top and escapes at the side, while the dirt and trash which are beaten out of the cotton by the beater cylinder and ribbed concave fall through the spaces and escape.

IMPROVED WATER ELEVATOR.

John F. Long, Bridgewater, Va.—This consists in the arrangement of two pulleys, one placed in a curb over a well, and the other at the bottom of the well, over which runs an endless belt carrying buckets that dip up water and deliver it to the spout in the curb.

IMPROVED WATER ELEVATOR.

Thomas J. Reid, Lexington, Ind., assignor to himself and John Malick, of same place.—This relates to that class of elevators that employ a windlass and bucket for raising water. The windlass has two drums, of different diameter, journaled in the upper portion of the curb. Upon the larger drum a rope is wound, by which the bucket is raised or lowered, and upon the smaller drum a strap is wound in a contrary direction, which is attached to a curved lever, by which the elevator is operated. There is also an arrangement of wire guides for the buckets, that extend from the top to

the bottom of the well. A slide runs upon the said wires, to which the bucket is hinged, and a catch receives and retains the slide when the water is emptied from the bucket.

IMPROVED STEAM GAGE.

Frederick H. McIntosh, Atlantic, Iowa.—This invention consists of a steam gage, whose pressure-indicating spring rod is guided in a screw sleeve at the top, which screw adjusts the tension of the spring until indicating the correct pressure. A link is screwed on to the threaded end of the pressure rod to apply the scales to the gage.

IMPROVED WATER WHEEL.

Elisha B. Shattuck and Isaac Stahlman, Mount Pleasant, Mich.—In this device it is claimed that increased power is obtained, the water freely discharged, and a larger percentage of the water power utilized. The invention consists of a double wheel, in which the buckets of the upper wheel connect with an inner tube and spiral buckets around the shaft, while the lower wheel connects with an outer cylinder or tube. The wheel is concave or dishing, and provided with vent holes at the top to accelerate the discharge of the water.

IMPROVED PILE DRIVER.

John Gregg, Riverton, Iowa, assignor to himself and James Miller, of same place.—When this device is used as a pile driver, guy-ropes are fixed in eyes attached to the ends of the bolt, on which the pulley sheave works, and the derrick is inclined, so that its top is directly over the place when the pile is to be driven. A clamp is then loosened, and guides are allowed to swing into a vertical position, where they are secured by the clamp engaging braces. The weight is raised by turning the windlass by means of a lever, a rope being attached to it, and running over the sheave, and attached to the hammer moving in the guides.

IMPROVED METHOD OF PROPELLING BOATS.

Albert Belz, Appleton, Wis.—The paddle wheel shaft is provided with ordinary paddle wheels. A spur wheel, which is keyed to the shaft and takes its power from a similar wheel, which is fixed upon the shaft. Cranks are placed on opposite ends of the shaft, and are worked by hand levers. The whole apparatus may be easily detached from the boat when desired.

IMPROVED BALANCED VALVE FOR STEAM ENGINE.

William Jackson, Millerstown, Pa.—This consists of a valve the back of which is beveled, and whose central or exhaust space extends to the rear in a beveled cover placed at the back of the valve, between which and the valve seat the valve moves. The whole is inclosed in the steam chest, and all of the exposed sides of the valve are subjected to the same pressure, so that the valve is balanced, and little power is required to move it.

IMPROVED ROTARY ENGINE.

John C. Thomas, Carlinville, Ill.—The wheel or disk within the casing has deep transverse grooves in which radial pistons work, the rods of which pass through stuffing boxes in the wheel. The rods are attached to hollow boxes in which are springs which act upon bars. Said bars pass through slots in the boxes and through slots in the radial bars or spokes of the wheel and connect.

IMPROVED HEMMER FOR SEWING MACHINE.

Charles L. Goethals, Los Angeles, Cal.—This is an improved adjustable hemmer for sewing machines, by which folds of different widths may be hemmed and the fabric fed in regular manner to the needle after being started. The invention consists of a base part, with sliding folding part, that folds and feeds the fabric to the needle, and a pivoted guide piece, that regulates the folding of the fabric.

IMPROVED PUMP.

Swan Petersen, Knoxville, Ill.—The lower and the upper pump stock are coupled together by a tube joint. A rim extends around the tube immediately between the ends of the pump stocks, which are tightly seated against the rim by packing rims. The strong and rigid connection of the pump stocks is obtained by projecting metallic lugs, secured by bands extending around the ends of the pump stocks. The lower pump stock is secured to the walls of the well by a brace, which is rigidly wedged in place. The convenience of releasing the brace and taking out the lower pump stock for repairs, as well as the reliable and effective working of the pump when properly coupled at the tube joint, furnishes a pump of substantial, durable, and convenient construction.

IMPROVED ROTARY ENGINE.

Hodgen I. Willson, Harrisville, Tex., assignor to himself and L. J. Russell, of same place.—The operation of this rotary engine is as follows: Steam passes through a passage in a rocking valve on the upper side of the cylinder, and through one or two passages in said cylinder into the steam chest; thence through a port in a side valve, and through a passage in a guide, and into the cylinder by way of a passage in the abutment. When the piston has moved through a half revolution, a cam quickly shifts the rocking valve, so that steam is admitted to the other of the two passages. The steam acts upon the piston, shifting the abutment, and admitting steam to the cylinder, forcing the piston through the remainder of the stroke. While this takes place the steam from the first passage is allowed to pass into the exhaust.

IMPROVED WATER WHEEL.

Nelson L. Greene, Edmeston, N. Y.—By new devices in this wheel, a body of water of varying cross section may be thrown without obstruction or diminution of power on the wheel. The escape of water at the top of the casing is also prevented, and a full utilization of the reaction of the water at the lower part of the wheel is claimed to be obtained.

IMPROVED TRUSS BRIDGE.

Lyman W. Densmore, St. Joseph, Mo.—The principal novel features of this bridge are: First, forming the truss chord of metallic rods having their ends extended past each other and through the girders or couplings, and fastening them upon the opposite sides of said girders or couplings by means of nuts; the chord rods being increased in number toward the center, but always arranged about a common center of tension; and secondly, the fastening of one of the tension rods in each panel, whose strut carries a cumulative horizontal thrust to an independent angle block carrying said strut; and thirdly, the particular arrangement of a detachable girder beneath the couplings.

NEW AGRICULTURAL INVENTIONS.

IMPROVED CORN HARVESTER.

James Pienkharp, Columbus, O.—The corn stalks are severed close to the ground and carried back on to a platform by means of a rotating-arm shaft, and a vibrating carrier provided with hooks or curved arms. The platform is made in two parts, of elliptical form, each of which turns horizontally, and tilts to discharge the "shock" upon the ground. The platform is tilted by a suitable device under the control of the driver.

IMPROVED SEED PLANTER.

James H. Sale, Boydsville, Ky.—This invention belongs to that class of seed planters in which a given quantity of seed are lifted from the hopper by means of a pivoted reciprocating seed cup, and are dumped into a pipe or chute leading to the furrow. The improvements consist, mainly, in the particular construction and arrangement of the feed bars, hollowed out at their upper ends to form seed cups, which bars are pivoted below to the cranks of the main driving axle and extend upwardly through openings in the bottom of the seed box, in which openings they loosely slide, and about which point the feed bars also oscillate as a fulcrum from the revolution of the

cranks carrying the bars below, so that the upper ends of the bars, provided with the feed cups, have a compound motion which causes them alternately to rise and move forward to dump the seed, and then recede toward the center of the box and descend to be filled again.

IMPROVED RECIPROCATING CHURN.

John Henry Sheffer, Cairo, Ky.—This relates to gearing for converting the rotary motion of a hand crank into the reciprocating motion required for driving the dasher. It consists in a crank disk that is attached to a shaft that is journaled in a standard attached to the churn cover, and driven by spur gearing turned by hand power. There is also a slotted cross head that is driven by the crank, and is connected with a jointed dasher rod.

IMPROVED HARROW.

Charles Keehner, Roseville Junction, Cal.—The new feature here is a harrow section formed of converging rods connected by cross rods, the other rods having their nearer ends hooked, and the inner having their farther ends hooked. The middle rod is provided with a hook at one end and an eye at the other end, so that by alternately reversing the sections they may be connected at the sides as well as in alignment.

IMPROVED CORN PLANTER.

August J. Hintz, Lemont, Ill.—In using this planter, the jaws are thrust into the soil up to a stop attached to a stationary jaw. The upper end of the planter is then carried forward, which swings the stationary jaw backward, allowing the seed to drop into the soil, and, at the same time, loosening the soil, so that it will fall into the hole formed by the jaws as the same are withdrawn. As the jaws are withdrawn from the soil a spring closes the said jaws, ready to be again thrust into the soil, and, at the same time, draws forward an arm, bringing the dropping hole within the body, to be again filled with seed.

IMPROVED CORN PLANTER.

Jesse G. Stokesbary and John H. Stokesbary, Millersburg, Iowa.—This corn planter is so constructed as to drop the seed automatically as the machine is drawn forward. It is easily controlled, and enables the hills to be planted in accurate check row.

IMPROVED HAY GATHERER.

Harlin Butner and James J. Ray, Clarence, Mo.—This is a rake for collecting the hay and drawing it to the stack. It is so constructed that the weight of the load will raise the points of the teeth from the ground, so that they will not catch, and so that it may be readily withdrawn from the load when desired.

IMPROVED SHOVEL PLOW.

Thomas H. C. Dow, Tampico, Ill.—This implement is so constructed that it may be adjusted for use as an ordinary shovel plow, or turned toward either side to form a right or left hand plow, as the particular work to be done may require.

IMPROVED COTTON PLANTER AND FERTILIZER DISTRIBUTER.

Joseph A. Shine, Mount Olive, N. C.—This machine is so constructed as to open a furrow, distribute cotton seed and guano into it, and cover the seed. It includes a new construction of the hopper and attached mechanism.

IMPROVED FARM FENCE.

Charles Cremor, Red Bluff, Cal.—This fence is made without posts or nails, and is so constructed that it may be used as a stock fence, as a protector for young hedges, and as a sheep shed. It is not liable to be pushed or blown over. To the notched outer edges of the supporters the side boards are attached. Said boards are beveled at their ends to overlap each other edgewise in said notches, and are secured to each other and to said supporters by wires.

NEW HOUSEHOLD INVENTIONS.

IMPROVED FOLDING CHAIR.

John A. Ware, Morris, Ill.—It consists of a chair having the rear legs and back made in one piece with a seat hinged to the same at the rear and free to fold upwardly at its front; in connection with which elements are arranged a set of front legs with tenons at their upper ends which enter mortises in the chair seat, the said front legs being connected with the seat and back by means of side braces pivoted to the front legs, the middle part of the seat, and the back of the chair, and provided with an upwardly folding toggle joint whereby the parts of the chair may be folded compactly, and in such manner as to stand alone upon its four legs.

IMPROVED FRUIT JAR.

Adam Dicker, Middletown, O.—This is a fruit jar composed of black opaque glass, which excludes light from its interior. It combines all of the advantages of transparent glass, metal, and earthenware, with none of their disadvantages—i. e., it prevents the fading and deleterious effect of light upon the fruit incident to transparent jars, obviates the corrosive action and metallic taste produced by the acids of the fruit upon metal cans, is free from the clumsiness of earthenware jars, and the objectionable action of the acids upon the glaze on the one hand, or the difficulty of removing the germs of ferment on the other when left porous.

IMPROVED BUTTER DISH.

Westel E. Hawkins, Wallingford, Conn., assignor to Simpson, Hall, Miller & Co., of same place.—In this butter dish the cover of metal is made in two parts, pivoted at their angles to the opposite sides of the body of said dish, so that they may be turned down upon the outside of said body. Segmental gear wheels at the angles of the parts of the cover cause said parts to move together upon their pivots. Suitable devices are provided for fastening the cover in desired position.

IMPROVED BLANKET.

Nathaniel Wickliffe, Waterproof, La.—This consists of a couple of light blankets of wool with a lining between or outside of them of paper, laid on a sheet of gauze adapted to strengthen the paper, to prevent it from tearing by the handling of the blankets. The paper and the cloth layers are suitably fastened together detachably by buttons, to take them apart to remove the paper for washing the cloth. The paper, being of such close texture as to prevent the passage of air, makes the blanket much warmer for a given weight of material.

IMPROVED WASHBOARD.

Westly Todd, Wauseon, O., assignor to himself and H. H. Williams, of same place.—The object here is to improve the construction of the washboard for which letters patent were granted to same inventor July 18, 1876, so as to make it stronger and more durable without increasing the cost of manufacture. The improvement consists in short parallel corrugations formed along the side edges of the zinc facing, between or within them in corrugations.

IMPROVED ROCKING CHAIR.

William Shaub, Nashville, Tenn.—This consists of a rocking swing, made of round rockers secured centrally to the posts of the seats, and at the ends to the extended foot and seat rests. The seat rests are braced by interior strengthening pieces. The swing cannot upset, and is readily portable from place to place.

IMPROVED WASHING MACHINE.

John W. Modlin, Albion, Iowa, assignor to himself and Simon C. Gillespie, of same place.—By means of a lever, a corrugated rubber is caused to work over a concave bed of rollers. By suitable construction the rubber accommodates itself to the thickness of clothes beneath it.