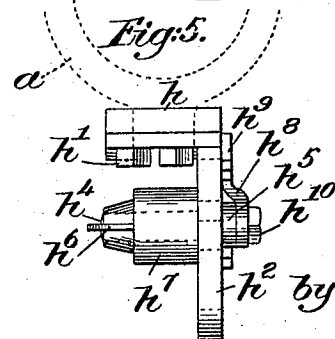
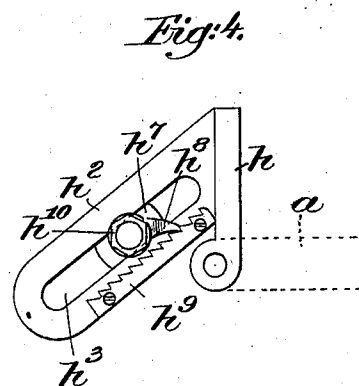
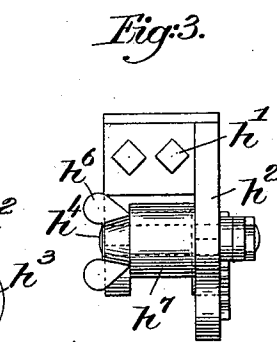
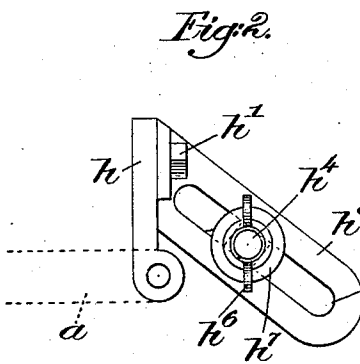
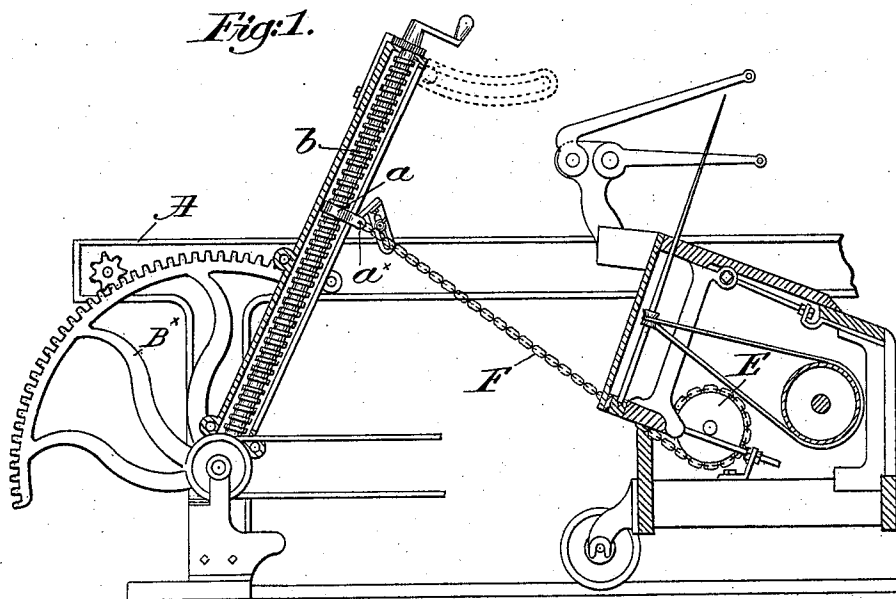


(No Model.)

S. JACKSON.  
SPINNING MULE.

No. 576,730.

Patented Feb. 9, 1897.



witnesses.  
Thomas J. Hammond,  
Fred S. Greenleaf.

Inventor.  
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attys.

# UNITED STATES PATENT OFFICE.

SAMUEL JACKSON, OF PAWTUCKET, RHODE ISLAND.

## SPINNING-MULE.

SPECIFICATION forming part of Letters Patent No. 576,730, dated February 9, 1897.

Application filed September 3, 1895. Serial No. 561,234. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL JACKSON, of Pawtucket, county of Providence, State of Rhode Island, have invented an Improvement in Spinning-Mules, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to mules for spinning cotton, wool, and the like.

In spinning mules as now constructed the spindles are carried upon a movable carriage, said carriage being provided with a drum called the "chain-drum," which at times is connected with and rotates the spindles for winding the spun thread or yarn thereupon, this chain-drum being connected by a chain with what is called a "quadrant," pivoted to the frame of the machine and toward and from which the carriage, with its chain-drum, moves.

As the carriage is moved away from the quadrant the chain is unwound from and thereby rotates the drum to rotate the spindles and wind the thread thereupon, and during the return movement of the carriage toward the quadrant for a second stretch of the thread the chain is again wound upon the drum from the quadrant.

As the carriage is moved away from the quadrant the latter is rocked about its pivot to carry the point of attachment of the chain a greater or less distance toward and in the direction of the retreating carriage to thereby unwind the chain from and to rotate the drum less than would be the case were the chain attached to a fixed support.

As the cops are built up and thereby increase in diameter they must be rotated a less number of times at each stretch for the winding thereupon of the previously-twisted fixed lengths of thread, for the larger the diameter of the cop the fewer turns necessary to wind the said lengths of thread thereupon. To compensate for this changing diameter of the cops and to impart a variable rotative movement to the drum and spindles driven thereby, the chain is attached to the quadrant through the medium of a nut or holder usually mounted upon a radial screw on the quadrant, which, as the cop is built up, is gradually rotated to cause the nut at successive movements of the

quadrant to be moved farther and farther from the axis of rotation of the quadrant and toward the retreating carriage, to thereby give out more and more of the chain and rotate the drum and spindles less and less to compensate for the increasing diameters of the cop. In practice, however, it has been found that this movement of the quadrant, with the varying position of the nut thereupon, does not always give the required movements or rotations to the drum and the spindles rotated thereby, it having been found necessary to provide the quadrant at its free end with a nosing peg or finger, which, when thrown into action, will, just prior to completion of the movement of the quadrant, strike the chain and bend the latter to in effect shorten the chain and cause it to rotate the drum momentarily to a greater extent in order that the yarn may be more tightly wound upon and at the noses of the cops. Prior to my invention these nosing pegs or fingers have, so far as I am aware, uniformly been mounted on the free ends of the quadrants or quadrant-arms and by reason of the long sweep of the latter contact with the chain only at the latter part of the movements of the quadrant and impart to the chain a short jerky movement. To overcome this objection and to more gradually bend and thereby in effect shorten the chain, my present invention comprehends the mounting of the chain-bending device or nosing-peg upon the nut or member to which the chain is attached and which is moved gradually out and in upon the quadrant. By thus placing the bending device or peg the chain is acted upon earlier in the movement of the quadrant, and the bending of the chain is more gradual than heretofore, and, further than this, the construction is lighter and much more simple.

In the drawings illustrating one embodiment of my invention, Figure 1 is a side view of a sufficient portion of a mule and its quadrant to enable the invention to be understood; Fig. 2, an enlarged detail showing the bending device in side elevation; Fig. 3, a right-hand edge view of Fig. 2; Fig. 4, a rear side view of Fig. 2, and Fig. 5 a top or plan view of Fig. 3.

In the embodiment of my invention selected for illustration and shown in the draw-

ings the frame A, the carriage B, the chain-drum E, mounted thereupon, the chain F, the quadrant B<sup>x</sup>, its quadrant-screw b, and the holding member or nut a, to which the chain F is attached, are and may be of usual or desired construction and such as common to spinning-mules now in existence.

In accordance with one embodiment of my invention I have connected with the holding member or nut a, preferably by the same pin a<sup>x</sup> by which the chain is connected thereto, a swinging plate h, to which is secured, as by screws or bolts h', a nose or bender plate h<sup>2</sup>, slotted at h<sup>3</sup> to receive the shank h<sup>4</sup> of a stud, the head h<sup>5</sup> of which is at the back of the slotted plate h<sup>2</sup>, said shank receiving a thumb-nut h<sup>6</sup>, between which and the said slotted plate is interposed a collar or roller h<sup>7</sup>. (See Figs. 3 and 5.)

The stud is shown prolonged beyond its head h<sup>5</sup> to receive loosely the locking device h<sup>8</sup>, shown as a pawl adapted to engage one or another of the teeth of the rack h<sup>9</sup> at the back of and secured to the plate h<sup>2</sup>, a nut h<sup>10</sup> holding the locking device in position upon the extended end of the stud.

Referring now to Fig. 1, the slotted plate h<sup>2</sup> and the carrier-plate h hang by gravity in position with the collar or roller h<sup>7</sup> resting upon the chain, but without bending the latter.

As the quadrant moves forward or to the right, Fig. 1, in the direction of the retreating carriage to give up more or less of the chain it will turn down toward a horizontal position, and as the roller h<sup>7</sup> is supported by the chain there will come a time before the quadrant completes its downward movement when the plate h will be turned by the chain back against the quadrant-arm, further movement of the quadrant-arm toward its horizontal position pushing the plate before it and acting through the roller h<sup>7</sup> will bend the chain downwardly to in effect shorten it and momentarily increase the unwinding of the same from and the rotative movement of the drum E and its connected spindles.

On the return movement of the quadrant the chain is first permitted to straighten by the rising of the quadrant-arm, and afterward during the remainder of the return movement of the quadrant to the left the carriage moving toward the quadrant causes the chain to be wound upon the drum, all as usual in mules as at present constructed.

By varying the position of the stud h<sup>4</sup> in the slot of the plate h<sup>2</sup> the commencement of the bending of the chain may be varied as desired and the extent of bend also varied.

In adjusting the stud the locking device h<sup>8</sup> drops into one or another of the notches at the back of the slotted plate h<sup>2</sup> and prevents the stud from moving toward the quad-

rant-arm under the pressure of the chain which it is bending, this being an improvement over present constructions wherein the stud is held by friction only, and consequently under the stress or pull upon the chain is sometimes moved toward the quadrant, thereby changing the adjustment.

It will be seen that my improved device acts upon the chain earlier in the movement of the quadrant and bends the chain more gradually than the devices at present employed upon the outer end of the quadrant, and that my improved device is also more simple in its construction and also much lighter.

In the claims I have denominated the nut a as a "holding member."

I have described my invention as embodied in the best form now known to me, but my invention is not necessarily limited to this particular embodiment, for it is evident the same may be varied without departing from the spirit and scope of the invention.

Having described my invention, and without limiting myself as to details, what I claim as new, and desire to secure by Letters Patent, is—

1. In a spinning-mule, the combination with a chain-drum, its chain, and the quadrant, of the quadrant-screw, the quadrant-nut thereon and adapted to move from one to the other end of said screw, a chain-bending stud and a carrier therefor permanently and pivotally mounted on said nut, and means to adjust said stud on said carrier, substantially as described.

2. In a spinning-mule, the combination with a drum, the carriage, the chain-drum and its chain, of the quadrant, the movable holding member thereon to which the chain is connected, the slotted plate h<sup>2</sup> pivotally connected with said holding member, and the chain-bending stud made adjustable in said slot, substantially as described.

3. In a spinning-mule, the combination with a drum, the carriage, a chain-drum and its chain, of the quadrant, the movable holding member thereon to which the chain is attached, the slotted plate hinged to said holding member, the chain-bending stud adjustable in said slotted plate, a locking device on the said stud, and a series of teeth on the said plate, to be engaged by said locking device, all operating substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL JACKSON.

Witnesses:

FREDERICK L. EMERY,  
ALEX. C. PROUDFIT.