

Nov. 18, 1924.

1,516,354

J. D. SULLIVAN

STOP MOTION FOR SPINNING MULES

Filed March 4, 1924

4 Sheets-Sheet 1

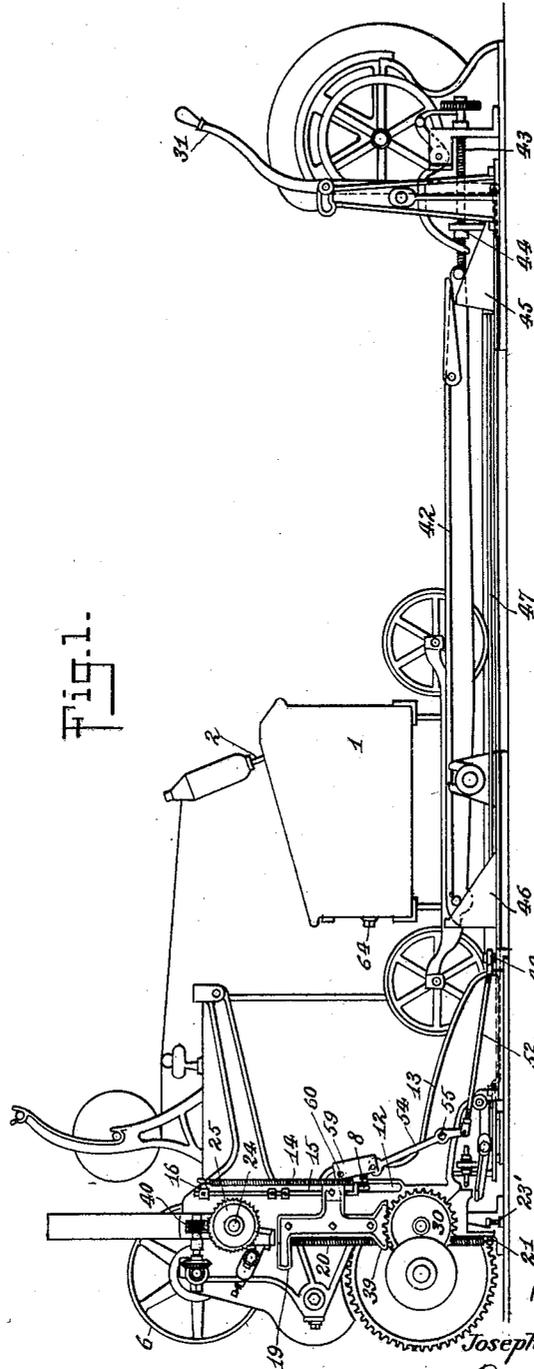


Fig. 1.

WITNESSES
William P. Goebel
A. L. Kitchen

INVENTOR
Joseph D. Sullivan
BY *Mumler*
ATTORNEYS

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Fig. 3.

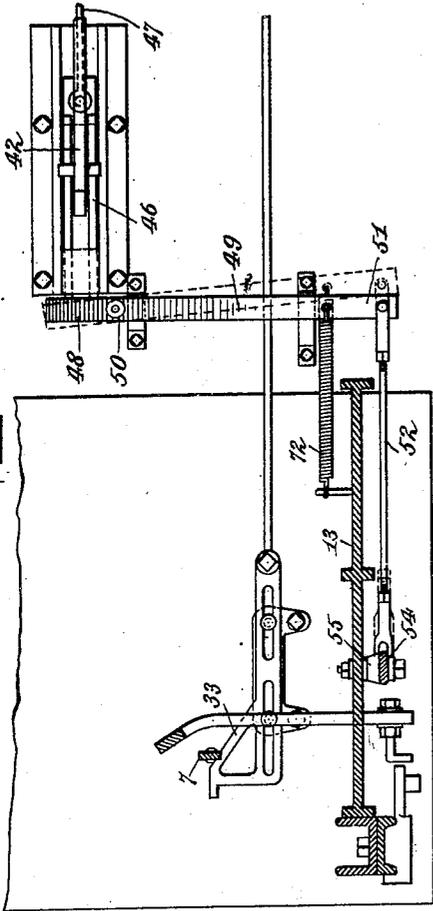
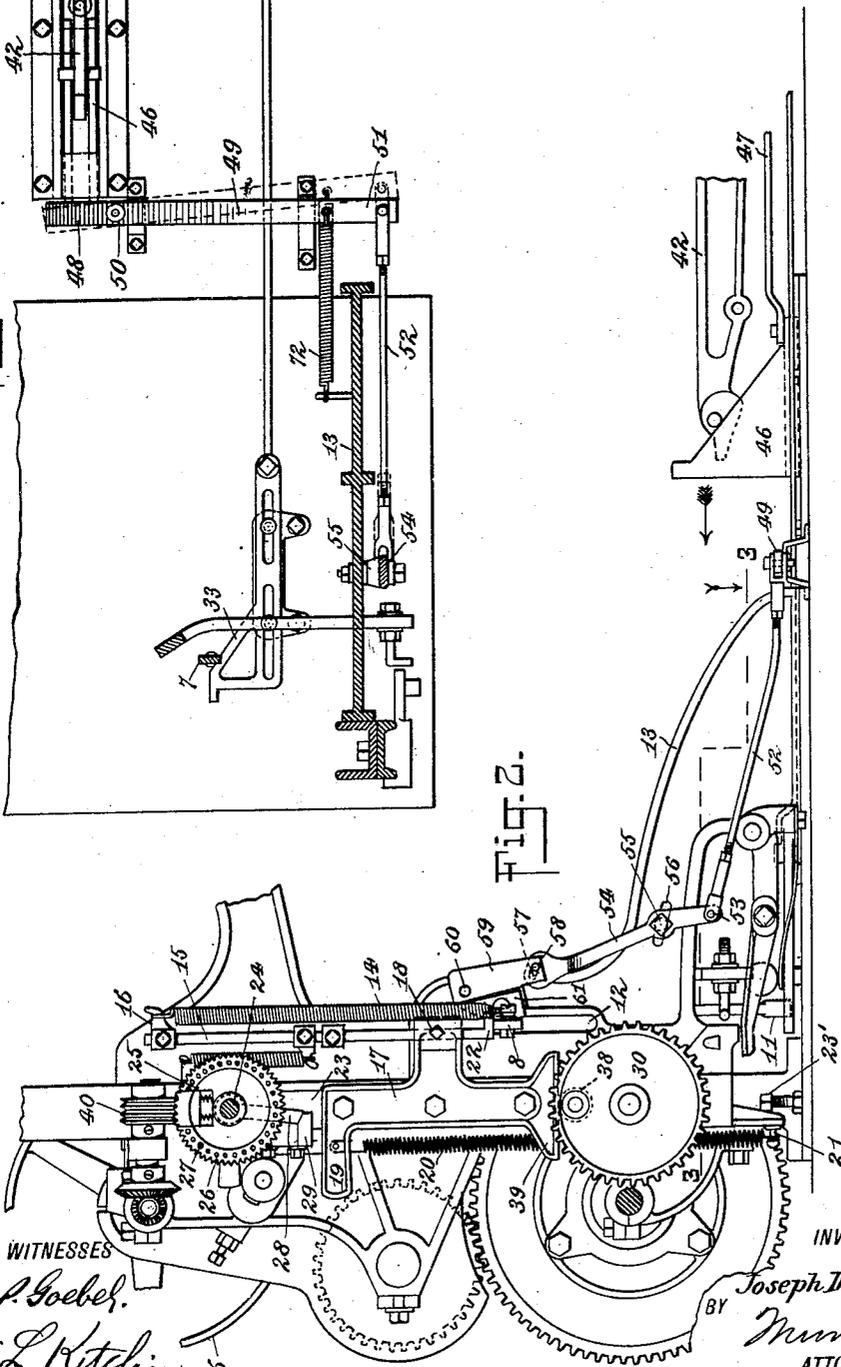


Fig. 2.



WITNESSES

Wm. P. Goebel.

A. L. Kitchin

INVENTOR

Joseph D. Sullivan

BY *Mumford*
ATTORNEYS

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J. D. SULLIVAN

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4 Sheets-Sheet 3

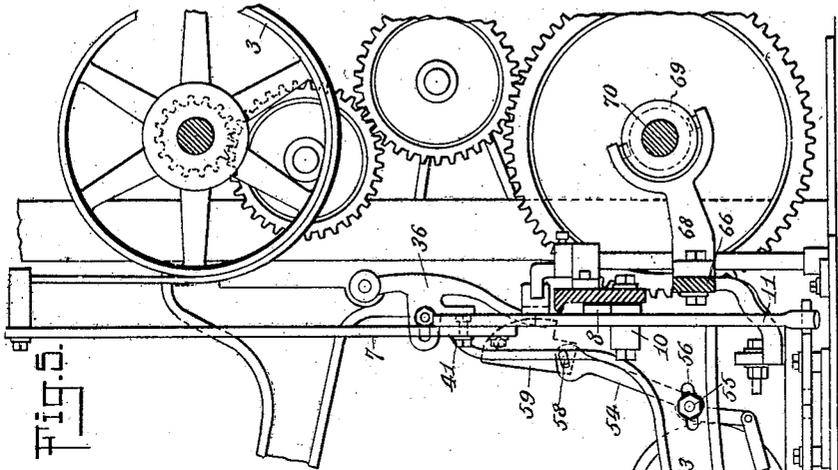


FIG. 5.

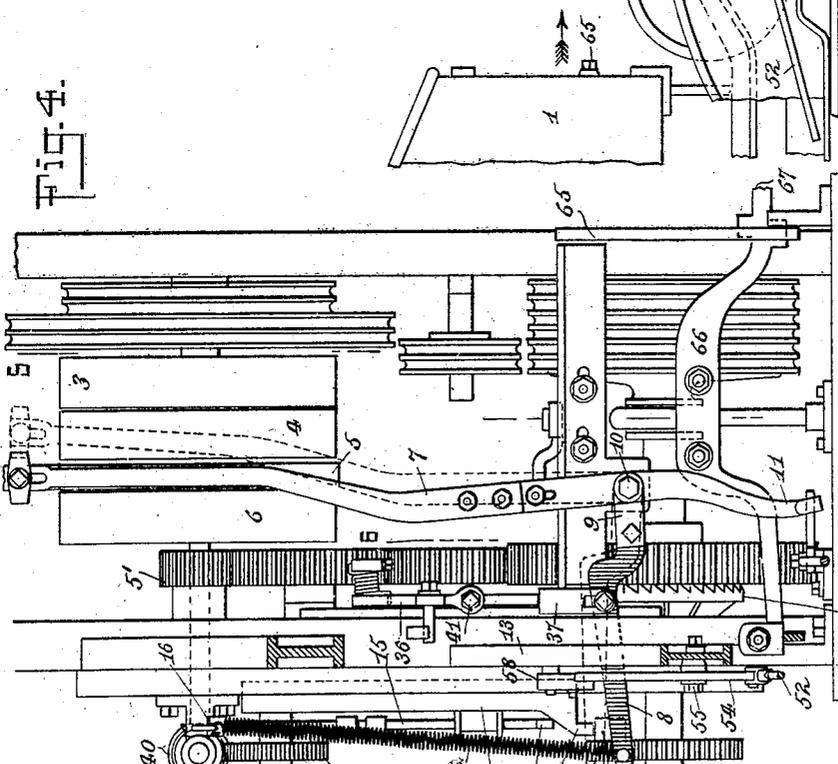


FIG. 4.

WITNESSES
William P. Goebel.
A. L. Kitchin.

INVENTOR
Joseph D. Sullivan

BY *Mumford*
ATTORNEYS

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Fig. 6.

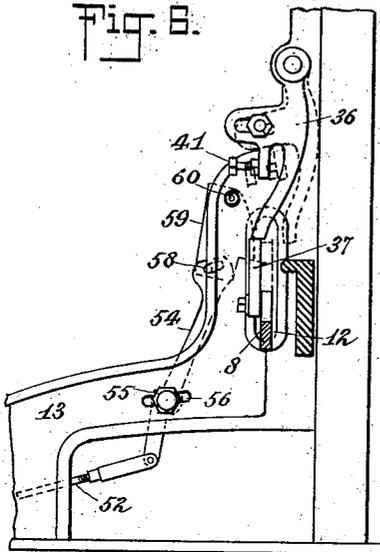


Fig. 7.

Fig. 8.

Fig. 9.

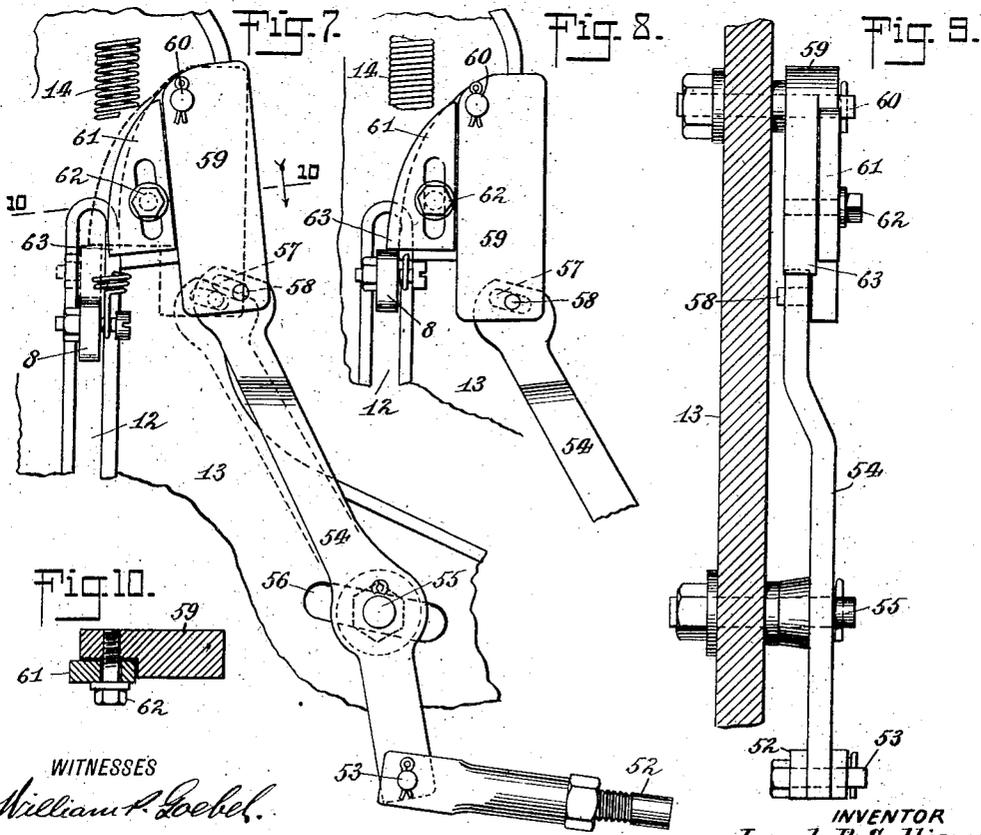
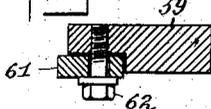


Fig. 10.



WITNESSES
William A. Goebel.
A. L. Kitchin.

INVENTOR
Joseph D. Sullivan.
 BY *Munn & Co.*
 ATTORNEYS

UNITED STATES PATENT OFFICE.

JOSEPH D. SULLIVAN, OF MAYNARD, MASSACHUSETTS.

STOP MOTION FOR SPINNING MULES.

Application filed March 4, 1924. Serial No. 696,874.

To all whom it may concern:

Be it known that I, JOSEPH D. SULLIVAN, a citizen of the United States, and a resident of Maynard, in the county of Middlesex and State of Massachusetts, have invented a new and Improved Stop Motion for Spinning Mules, of which the following is a full, clear, and exact description.

This invention relates to stop motions for what is known as spinning mules of the type manufactured by Davis & Furber, and has for an object to provide an improved construction wherein the parts may be set to automatically stop the action of the spinning mules at any time.

Another object of the invention is to provide stop motions for spinning mules which are intended primarily to stop the machine when the spindles have been filled and to not interfere with any part of the machine until the spindles have been completely filled.

A still further object of the invention is to provide a stop motion for spinning mules wherein the parts are so arranged as to contact with the parts of the mule without changing the parts of the mule so that the stop motion members may be readily applied to the machine and cause the usual mechanism of the machine to function at the proper time to throw off the power and thereby stop the entire operation.

In the accompanying drawings—

Figure 1 is a transverse central sectional view through a spinning mule of the Davis & Furber type, the same being shown conventionally and with an embodiment of the invention applied thereto.

Figure 2 is an enlarged detail view of one end of the structure shown in Figure 1, illustrating part of the mule head and how the invention is applied thereto so as to contact with the usual parts of the head.

Figure 3 is a fragmentary horizontal sectional view through Figure 2, approximately on line 3—3.

Figure 4 is a rear elevation of part of the head shown in Figure 2.

Figure 5 is a fragmentary sectional view through Figure 4, approximately on line 5—5.

Figure 6 is a detail fragmentary sectional

view through Figure 4, approximately on line 6—6.

Figure 7 is an enlarged fragmentary side elevation of part of the samson shown in Figure 1 together with the locking lever and certain other parts embodying certain features of the invention.

Figure 8 is a view similar to the upper part of Figure 7 but showing the parts in their locked position.

Figure 9 is an edge view of the structure shown in Figure 7.

Figure 10 is a fragmentary sectional view through Figure 7 on line 10—10.

Referring to the accompanying drawings by numerals, 1 indicates the carriage containing the various spindles 2, said carriage being mounted on a suitable track and operated by mechanism which forms no part of the present invention and, therefore, will not be described in detail. The showing in the drawing is a Davis & Furber spinning mule and all the parts of this machine shown, operate in the usual manner while a stop motion embodying this invention is so applied to the old structure as to be actuated by certain parts thereof for causing a stopping of the entire machine at the proper time. Therefore, a description of the stop motion structure embodying the invention will be given and only brief mention will be made of the other parts in order to clearly bring out how the stop motion functions.

The spinning mule is provided, as shown particularly in Figure 4, with pulleys 3, 4, 5 and 6. The pulley 3 is for high speed while the pulley 6 is a loose pulley and the pulley 4 is known as a drawing out pulley for causing the carriage 1 to move outwardly or to the right as shown in Figure 1 while the pulley 5 is the drawing in pulley for causing the carriage 1, as shown in Figure 1, to move to the left. These pulleys are connected with a suitable source of power in the usual manner and in order to change the speed of the carriage or to stop the machine, the shipper 7 is actuated for moving the driving belt onto any of these pulleys. The stop motion embodying the invention is designed to automatically hold the shipper 7 so as to cause the driving belt to be held on

the drawing in pulley. It will, of course, be understood that the shipper 7 might be moved manually at any time in the usual manner. In order that the shipper 7 might be held automatically by the stop motion mechanism, a shipper arm 8 is rigidly secured thereto at 9 (Figure 4) while the shipper arm itself is pivotally mounted on a suitable pin 10.

By reason of this construction, it will be noted that when the lower end 11 of the shipper is swung, a proper movement is provided for causing the upper end to shift the belt onto the respective pulleys above mentioned or if the shipper arm 8 is moved a proper distance, the belt will be similarly shifted. In order that the arm 8 may be swung the proper distance to cause the shipper 7 to move the belt onto the drawing in pulley for stopping the machine, a number of parts have been provided. The shipper arm 8 extends through a suitable slot 12 in the samson 13 and this arm moves up and down during the usual operation of the machine. A spring 14 is connected to the shipper arm 8 near its outer end as shown in Figure 4, said spring at its upper end being connected to the rod 15 through the hook bracket 16 (Figure 2.). The rod 15 is rigidly secured to the lifter casting 17 by any suitable means, as for instance, by one or more set screws 18. The lifter casting 17 is provided with a handle 19 to which one end of the spring 20 is secured, the opposite end being secured at 21 to some fixed part of the machine.

It will be noted that the lower end of the rod 15 is provided with an offset or shoulder 22 adapted to engage the shipper arm 8 and force the same down when the lifter casting 17 and the rod 15 are lowered. The lifter casting 17 is bolted or otherwise rigidly secured to the twist frame slide 23 which carries the stub shaft 24 on which is rotatably mounted the twist wheel 25. The twist wheel is provided with a number of apertures 26 designed to receive at any time the pin 27. Usually in spinning mules, each aperture indicates thirty revolutions of the spindle 2 and, therefore, the location of the pin 27 determines how many revolutions the spindle makes each time that it reaches its outer or front position. A swinging dog 28 is loosely mounted on the stub shaft 24 and normally rests against the lock or stationary part 29 as illustrated in Figure 2. When the various spindles 2 have made the desired number of revolutions, the wheel 25 will have rotated until the pin 27 strikes the swinging dog 28 and pushes the same off of the lock 29 whereupon the twist wheel 25, twist frame slide 23, lifter casing 17, rod 15 and associated parts will immediately move downwardly under the action of gravity and also under the action of the

spring 20 until the adjustable stop 23' is engaged. This downward movement, of course, moves the shipper arm 8 downwardly until the detent lever 36 (Figure 6) moves into the path of the detent 37 rigidly clamped to the shipper arm 8. This downward movement of the twist wheel 25 and other parts, including the downward movement of the arm 28 and the locking thereof, occurs immediately at the end of the twisting operation whereupon the drawing in pulley 5 will cause the carriage 1 to move inwardly. As it reaches a position about eighteen inches from its innermost position, the projection or cam 38 on the wheel 30 (Figure 4) will strike the overhanging projection 39 of the lifter casting 17 and raise the lifter casting 17 and all parts associated therewith until the twist wheel 25 has moved into engagement with the wheel 40. This upward movement, however, does not release the shipper arm 8, which is not released until the carriage 1 has reached its extreme inner position and as it reaches this position, it will strike the adjustable pin 41 (Figure 4) and swing the detent lever 36 away from the detent 37 whereupon the arm 8 is released and spring 14 will quickly raise the same for moving the shipper 7 so that the belt will be shifted to the drawing out pulley 4. This will cause the carriage to again move outwardly and draw out the yarn to the proper amount. The machine will continue to move back and forth in this manner and as it functions in this manner, the builder rail 42 will be gradually lowered as the carriage 1 operating through suitable mechanism not forming any part of the present invention, causes the actuation of the screw 43, which acting on the threaded projection 44, will force the front shoe 45 toward the rear and also will force the rear shoe 46 a similar distance toward the back of the machine, namely, to the left as viewed in Figure 1.

It will be noted that the shoes 45 and 46 are connected by a rod 47 whereby they move in unison. As these shoes move toward the back of the machine, the builder rail 42 naturally moves downwardly as it rests on the inclined surface of these shoes. This downward movement of the builder rail permits the twisted yarn to be wound higher and higher on the spindles 2 until they have been completely filled. By the time the spindles have been completely filled, the rear shoe 46 will have reached a certain position in its movement toward the back of the machine, namely, to the position shown in dotted lines in Figure 3. As it moves to this position, it will engage the end 48 of lever 49 and move the same so that the lever 49 will swing on its pivotal pin 50. This will cause the end 51 to swing a certain distance and, consequently, to pull on the rod 52,

which rod is pivotally connected at 53 (Figure 2) to the link 54. This link is pivotally connected on a bolt 55, which bolt is clamped to the samson 13 by a suitable nut, said bolt extending through the slot 56 whereby the proper adjustment may be provided. The upper end of the link 54 is provided with an arc-shaped slot 57 (Figures 7 and 8) whereby the pin 58 carried by the casting 59 may project therethrough. This casting is pivotally mounted at 60 on the samson 13 and carries an adjustable stop 61 which is held in different positions by a clamping screw 62. This stop presents a shoulder 63 adapted to be moved from the position shown in Figure 7 to the position shown in Figure 8 whereby it holds the shipper arm 8 in a lowered position.

At the time that the shoe 46 moves lever 49 and the various parts connected therewith, including the adjustable stop 61, the shipper arm 8 is in its lowered position and, consequently, will be held against rising so that when the carriage releases the detent lever 36 and detent 37 as shown in Figures 4 and 6, the shipper 7 cannot move, and consequently, the power belt will remain on the drawing in pulley 5. However, the projection 64 (Figure 1) on the carriage 1, will strike the lever 65 and release the member 66 (Figure 4) whereupon the spring 67 will swing this member and shift the arm 68 (Figure 5) whereupon the collar 69 will be moved longitudinally of the shaft 70 and the draw in clutch 71 will be thrown out. This will result in permitting the drawing in pulley to continue to rotate and to rotate the pinion 5' and the various gears associated therewith as illustrated in Figure 4. Though these gears will rotate, all other parts of the machine will immediately stop and the bobbins are to be doffed, which is done with the carriage out. In order to get the carriage out, it is necessary to wind up the builder by screw 43 and jar handle 31 (Figure 1), which will cause the inclined surface 33 (Figure 3) to move the shipper 7 slightly and lower the shipper arm 8 slightly, whereupon the spring 72 (Figure 3) will quickly move the lever 49 and associated parts back to their former position, including the movement of the adjustable stop 61 back to the position shown in Figure 7. When this occurs the spring 14 will immediately shift the shipper arm 8 so that the power belt will be moved to the drawing out pulley 4 and the operator is compelled to take the bobbins off owing to the fact that the builder has been disturbed. After this takes place, the machine functions in the usual manner. It will, of course, be understood that at the time the bobbins are removed, the builder rail 42 will be moved back to its former position and the other parts correspondingly set. As this is part of

an old structure, the details will not be set forth.

Upon moving the builder rail 42 back to its former position, the rear shoe 46 will also be moved back or away from lever 49 so that as soon as the pressure is relieved on the adjustable stop 61, (Figure 8), the spring 72 will function. It will, of course, be evident that the various parts embodying the invention must be properly proportioned and also properly set to be actuated at the right time, namely, when the spindles have been properly filled. It will be noted that the construction embodying the invention does not interfere with the usual operation of the various parts of the machine nor does it interfere with the usual manual stopping of the machine.

What I claim is:

1. A stop motion for spinning mules, comprising a shipper arm connected rigidly with the shipper of the spinning mules, and a stop adapted to move into the path of movement of said arm for locking the arm in a given position, and a lever actuated by one of the builder rail shoes for actuating said stop whereby the shipper of the spinning mule is held in a given position until the carriage of the spinning mule has actuated the usual power throw off clutch of the spinning mule.
2. A stop motion for spinning mules, comprising means for holding the driving belt on the draw in pulley until the carriage has operated the draw in clutch of the spinning mule, said means including a shipper arm rigidly connected to the shipper of the spinning mule, a spring for automatically shifting said arm in one direction, a swinging structure formed with a stop adapted to lock said arm in one position, means including a pivotally mounted lever for actuating said swinging structure, said lever being positioned to be actuated by the rear shoe of the builder rail of the spinning mule, and a spring for moving said lever and parts connected therewith back to their former position as soon as said rear shoe has been moved back to its starting point.
3. A stop motion for spinning mules, comprising a shipper arm rigidly secured to the shipper of the spinning mule, a spring acting to normally hold the shipper arm in a given position and to return the same to said position, a swinging structure including an adjustable stop adapted to be swung over said arm for locking the same in a given position, and means including a pivotally mounted lever for swinging said swinging structure, said lever being positioned to be swung by the rear builder rail shoe as the builder rail reaches its lowermost position.
4. In a stop motion for spinning mules, means for causing the power to be thrown off the spinning mule on the last trip of the carriage of the spinning mule after the bob-

bins have been filled, said means including a lever actuated by one of the shoes of the builder rail, an arm connected to the shipper of the spinning mule, and means operatively connecting the lever with the arm for locking the arm in a given position on the last travel of the carriage of the spinning mule. means operated through the action of one of the shoes of the builder rail of the spinning mule for locking the shipper of the spinning mule in such a position as to cause the power to be maintained on the drawing in pulley of the spinning mule.

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5. In a stop motion for spinning mules,

JOSEPH D. SULLIVAN.