No. 863,942. PATENTED AUG. 20, 1907.

J. H. RYALLS.

SELF ACTING SPINNING MULE.

APPLICATION FILED JUNE 5, 1906.

2 SHEETS—SHEET 1.

Fig. 4.

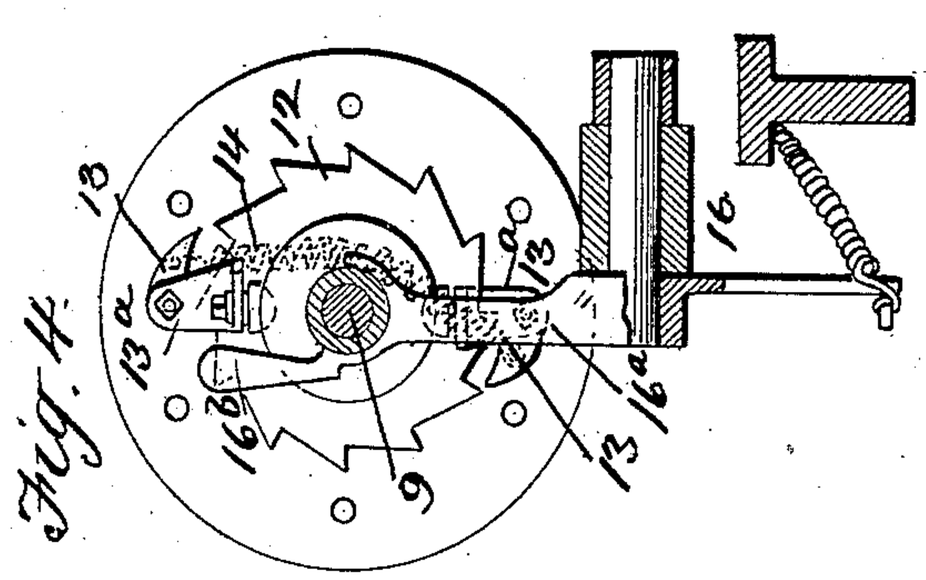


Fig. 1.

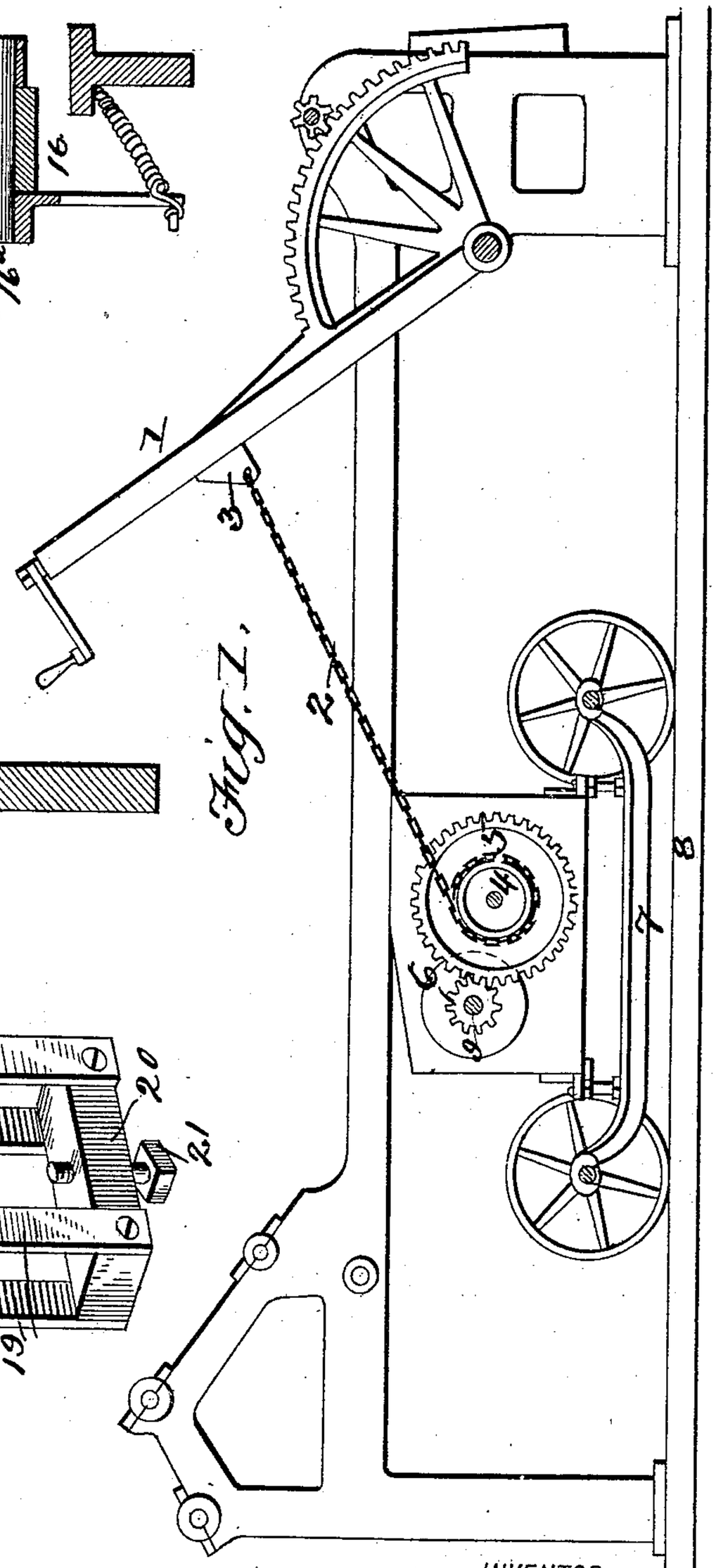


Fig. 3.

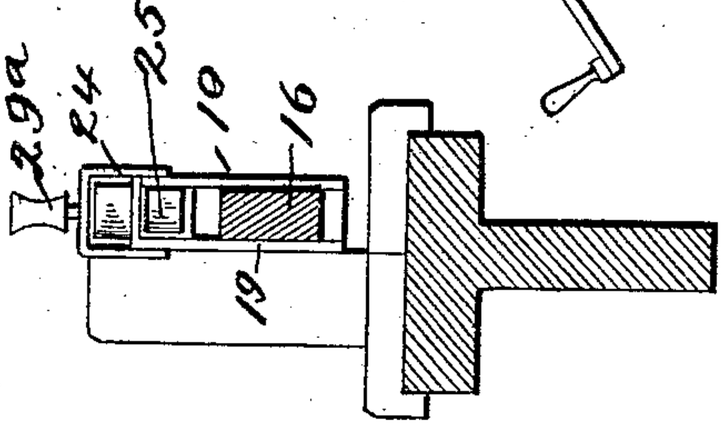
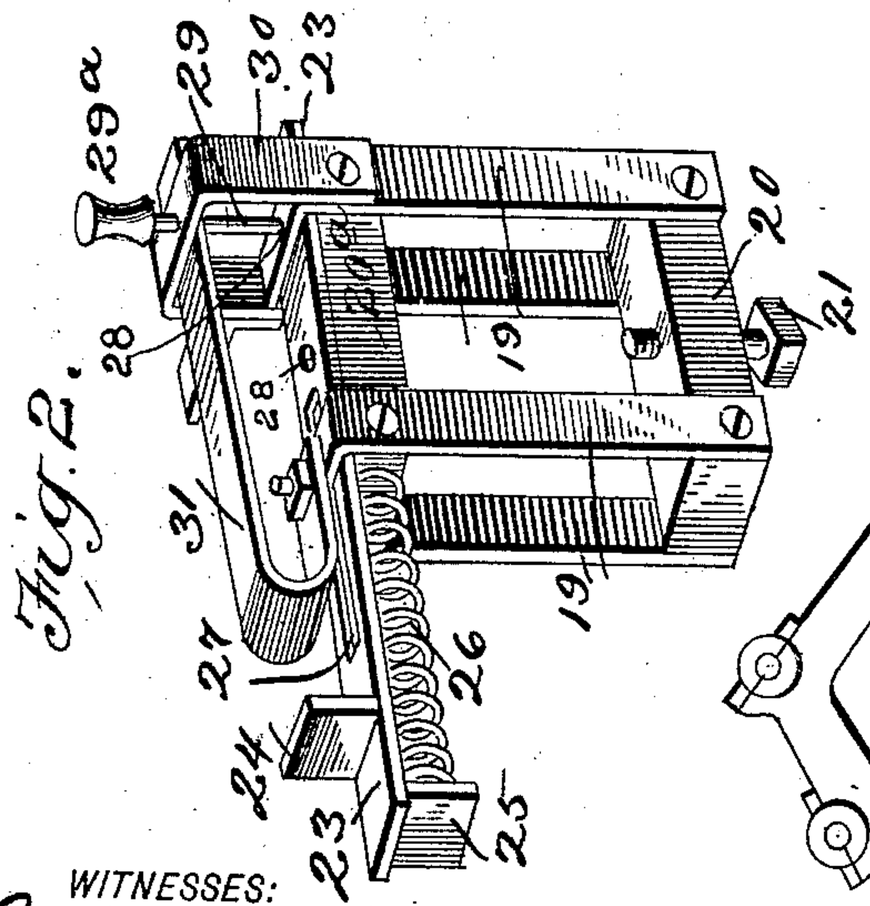


Fig. 2.



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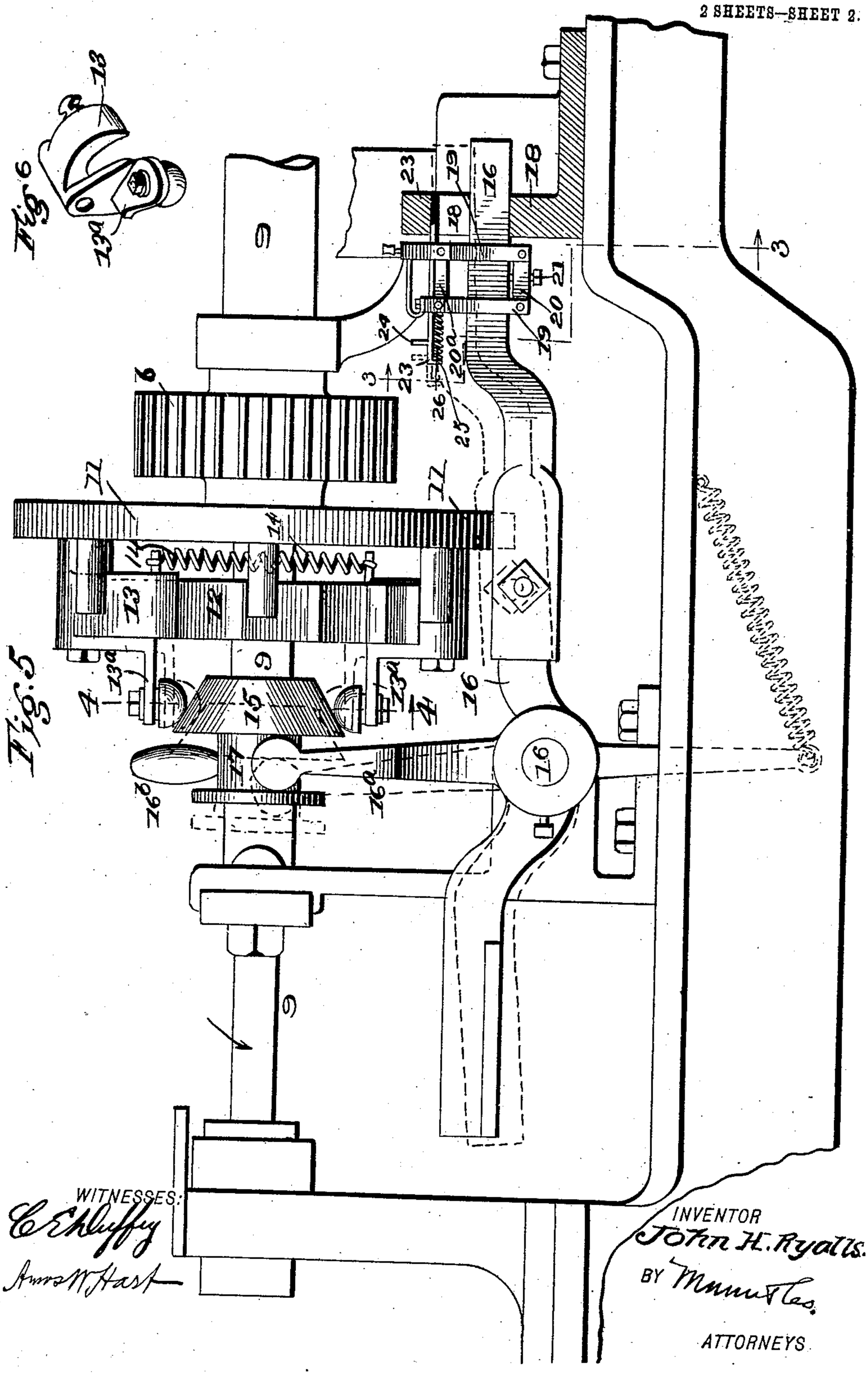
2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

JOHN HURBY RYALLS, OF CHARLOTTESVILLE, VIRGINIA.

SELF-ACTING SPINNING-MULE.

No. 863,942. Specification of Letters Patent. Patented Aug. 20, 1907.

Application filed June 5, 1906. Serial No. 320,363.

To all whom it may concern:

Be it known that I, JOHN HURBY RYALLS, a citizen of the United States, and a resident of Charlottesville, in the county of Albemarle and State of Virginia, have made certain new and useful Improvements in Self-Acting Spinning-Mules, of which the following is a specification.

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", or "quadrant lever", which is pivoted to the frame of the machine and toward and from which the carriage moves.

When the carriage moves 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.

The quadrant is usually provided with a screw-threaded shaft to which a nut is applied, and the aforesaid chain is connected with the nut which is caused to travel automatically further out on the shaft as the quadrant swings toward the carriage when the latter is moving away for winding on.

It is important that the chain shall not be allowed to become slack but be kept taut in any position of the carriage in order to prevent kinking of the spun threads and a sudden jerk of the chain when the slack is suddenly taken up, and consequent injury by breakage of gear teeth or loosening of nuts, bolts or other parts.

The chain unwinds from the drum as the carriage moves in, and thus the drum is rotated, and this being geared with another styled the "driving drum", the latter is rotated in turn and effects the winding of the yarn on the spindles. The gearing here referred to comprises a large spur gear on the chain drum and a small gear on the driving drum, the two being in mesh. A ratchet wheel and spring-pressed pawls are applied to the smaller gear, and the pawls require to be held off the ratchet when doffing the mule or when winding on the spindles.

My invention is embodied in improved means for locking the pawls when released from the ratchet wheel, leaving the gearing free.

The construction, arrangement, and combination of parts embodying my invention are as hereinafter described and claimed.

In the accompanying drawing—Figure 1 is in part a diagrammatic side view showing a quadrant lever and the carriage of a spinning mule. Fig. 2 is a perspective view of my improved means for locking the lever controlling the position of pawls with reference to the ratchet connected with the driving or winding-on drum. Fig. 3 is a vertical transverse section on line 3—3 of Fig. 5. Fig. 4 is a vertical cross section on the line 4—4 of Fig. 5. Fig. 5 is a side view showing the ratchet and pawl mechanism and the lever for operating the pawls with my improved locking device applied to it. Fig. 6 is a perspective view of one of the pawls that engages the ratchet.

So far as the general construction and operation of the mule is concerned, it is similar to other self-acting mules now in use such, for example the "Meyer", which is the subject of United States Patent No. 544,234, dated Aug. 6, 1895; also the "Furbush" and "Platt" mules; and hence I have not illustrated in the drawing many of the parts constituting the same. I have illustrated and shall describe only those parts which are necessary to an understanding of my particular improvement.

In Fig. 1, the numeral 1 indicates the quadrant lever which is constructed, arranged, and operates in a well known manner; 2 is a chain connecting with the adjustable nut 3 of said lever and wound on a drum 4 having a large spur gear 5 that meshes with a smaller one 6, mounted on the driving or winding-on drum. The two drums are mounted, with spindles and other necessary mechanism, upon a carrier 7 adapted to run on tracks 8 toward or from the quadrant lever 1 in the usual way.

As is well understood, when the carriage 7 moves out or away from the roving rollers, the chain 2 winds on the drum 4, when the spindles are rotated so as to draw and twist the roving for forming threads; and, when the carriage is reversed and runs inward, the spun threads are wound on the spindles by the quadrant chain. If, at the beginning of the inward movement of the carriage, any slack of the winding chain 2 occurs, the thread or yarn is liable to kink, because the spindles are not rotated the instant the carriage starts, and, in order to effect this the chain must pull on the drum the instant the carriage begins to move inward.

The shaft 9 and its attachments—see Figs. 4 and 5—are used, substantially, in the "Meyer" mule spinner before referred to. The attachments consist of a gear

6 (see Fig. 1) and an adjacent disk 11, both of which are fast on a long hub, or sleeve, which is loose, and hence adapted to rotate, on shaft 9. It is to be noted, however, that the said parts 6, 11, remain stationary while shaft 9 rotates, except when the carriage 7 is going in. Adjacent to disk 11, but fast on shaft 9, and hence always rotating with it, is a ratchet wheel 12, with which pivoted and weighted pawls 13 are held normally engaged by a spiral spring 14. The pawls are pivoted to disk 11 and a cone, or cone sleeve, 15, is adapted to slide on the shaft 9 toward and from the ratchet wheel. The pawls 13 are provided with lateral and inwardly-projecting arms 13^a having projections that work in frictional contact with the inclined side of the cone 15, so that when the cone 15 is moved inward, or to the right, Fig. 5, the pawls will be raised out of engagement with the ratchet wheel 12. Thus, the action of the cone in such case is opposed to the tension of the spring 14 by which the pawls are held in engagement with the ratchet wheel when the carriage is moving inward for winding on. When the carriage is moving in the pawls engage the ratchet wheel 12 automatically, and thus the disk 11 and gear 6 are set in motion with the said wheel and the shaft 9, to wind carriage 7 in and at the same time to wind spun yarn on bobbins. As soon as carriage goes in to its farthest limit of travel, the pawls 13 are disengaged from wheel 12, the disk 11 and gear 6 are hence also released and then remain stationary as carriage draws away from feed rollers, the roving being drawn and the yarn twisted. The action of the cone is effected through the medium of a weighted and counterbalanced lever 16 having an arm 16^a which is extended upward and is forked—see Fig. 4—to adapt it to engage a circumferential groove 17 in the hub of the cone 15. The said arm is further extended, as shown at 16^b, to form a handle by which the cone may be manually adjusted should occasion require. The free end of the said lever 16 projects through and is adapted to move vertically in a fixed slotted guide 18.

It will be understood that the slot is of sufficient length to allow vibration of the lever to the extent required to operate the cone 15 in the manner described.

It will be understood, that my invention has no reference to the shaft 9 and its described attachments *per se*, but my invention coacts therewith, it being directly connected with the lever 16, and serving to shift the same as indicated by dotted lines Fig. 5.

My invention is constructed and operates as follows, its sole purpose being to lock said lever 16 when required.

As shown in Fig. 2, four parallel side bars 19 are spaced apart and rigidly attached to upper and lower blocks 20, 20^a, which are also spaced apart. The lever 16 projects through this frame, see Figs. 2, 5, and the frame is clamped thereto by means of a screw 21 applied to the lower block 20, a wooden block being in practice inserted between the lever and the upper block 20^a for the purpose of preventing undue jar of the parts. The bars 19 are extended over the top block 20^a and spaced therefrom sufficiently to receive a slide, or slidable plate, 23, which is provided at its outer end with a lug 24, that projects upward and another 25 projecting downward. A spiral spring 26 is interposed between the pendent lug 25 and the adjacent end of the block 20^a, it being held in position by a guide pin. The upper lug 24 serves as a finger-contact device for use in pushing the slide or plate 23 inward against the tension of the spring 26. The slide 23 is provided with a slot 27 and also with a hole 28. It is shown in Fig. 2 in its normally retracted position and in Fig. 5 in its projected or working position where its right hand end engages the top of the fixed and slotted guide 18 so that it locks the lever 16 in the depressed position. The hole 28 in the slide 23 serves to receive a locking pin 29 having an enlarged head 29^a and working in a vertical guide 30, (Fig. 2). A plate spring 31 is attached to the frame of the appliance or device and its free end engages the pin 29 and serves to hold it normally depressed or in engagement with the slide 23.

When the machine, that is the mule, is working normally, or winding the yarn, the pawls 13 engage with the ratchet wheel 12 as the carriage moves in, and they do not engage with the ratchet wheel when the carriage is moving out, that is to say, when the twist is being put in the yarn. Such engagement of the pawls with the ratchet wheel when the carriage is going in, is for the purpose of winding the spun yarn on the bobbin. When the mule is being doffed, the pawls do not engage with the ratchet wheel at any stage of the operation. If any slack yarn requires to be wound on the spindle in order to start a new bobbin, this must be done by hand. The pawls are held out of engagement with the ratchet wheel when the lever 16 is depressed, and it is shown in that position in Fig. 5, and is locked down by my improved appliance, the cone 15 being thus necessarily adjusted inward or toward the ratchet 12. Such adjustment is effected by the operator pushing against the lug 24 of spring slide 23, whereby the slide is forced to the right under the guide 18 as shown in Fig. 5, the pin 29 in such case entering the hole 28 in the slide so that the latter is locked until tripped manually by the operator pulling up the pin so that it is freed from the slide, whereupon the slide will be automatically retracted by the spring 26. In most spinning mules it is necessary for the spinner to reach down to the locking lever and operate it and release the pawls from the ratchet and pull off the winding chain, an operation attended with labor, and, when the chain tightener is used, with danger of the operator's hand being caught in the winding drum gears. By my attachment, the spinner may easily lock the pawls by moving the slide 23 as described, and thus the lever 16 will be held down until its release is desired, when the slide is tripped and moved in the opposite direction. In other words, when the lever 16 is forced down and locked by my appliance the pawls 13 are out of engagement with the ratchet wheel, and when the locking device is tripped, the cone releases the pawls and thus leaves the connected gear free to rotate.

What I claim is—

1. In a spinning-mule, the combination, with winding-on mechanism and a lever for controlling such mechanism, of the improved appliance comprising a frame which is secured to said lever, the horizontal slide 23 arranged in said frame, a spring for retracting it, and a spring-actuated catch, or trip device, which is secured to the frame and locks said slide in the projected and engaging position, as shown and described.

2. In a spinning mule, the combination, with ratchet-

and-pawl mechanism forming part of winding-on mechanism, of a lever connected with the ratchet-and-pawl mechanism, and an appliance for locking said lever, comprising a frame and means for clamping it on the lever, a slide and a spring for actuating it, and a fixed object with which the slide is adapted to engage.

3. The improved appliance adapted to be secured to the lever controlling the winding-on mechanism of a spinning mule, the same comprising a frame, the horizontal slide 23 arranged in the upper portion of said frame, a spring for retracting said slide, and a spring-actuated catch, or trip device, which is secured to the frame and locks the slide in projected and engaging position, whereby the adjacent end of the lever is held depressed, substantially as described.

JOHN HURBY RYALLS.

Witnesses:
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N. C. MCGEE.