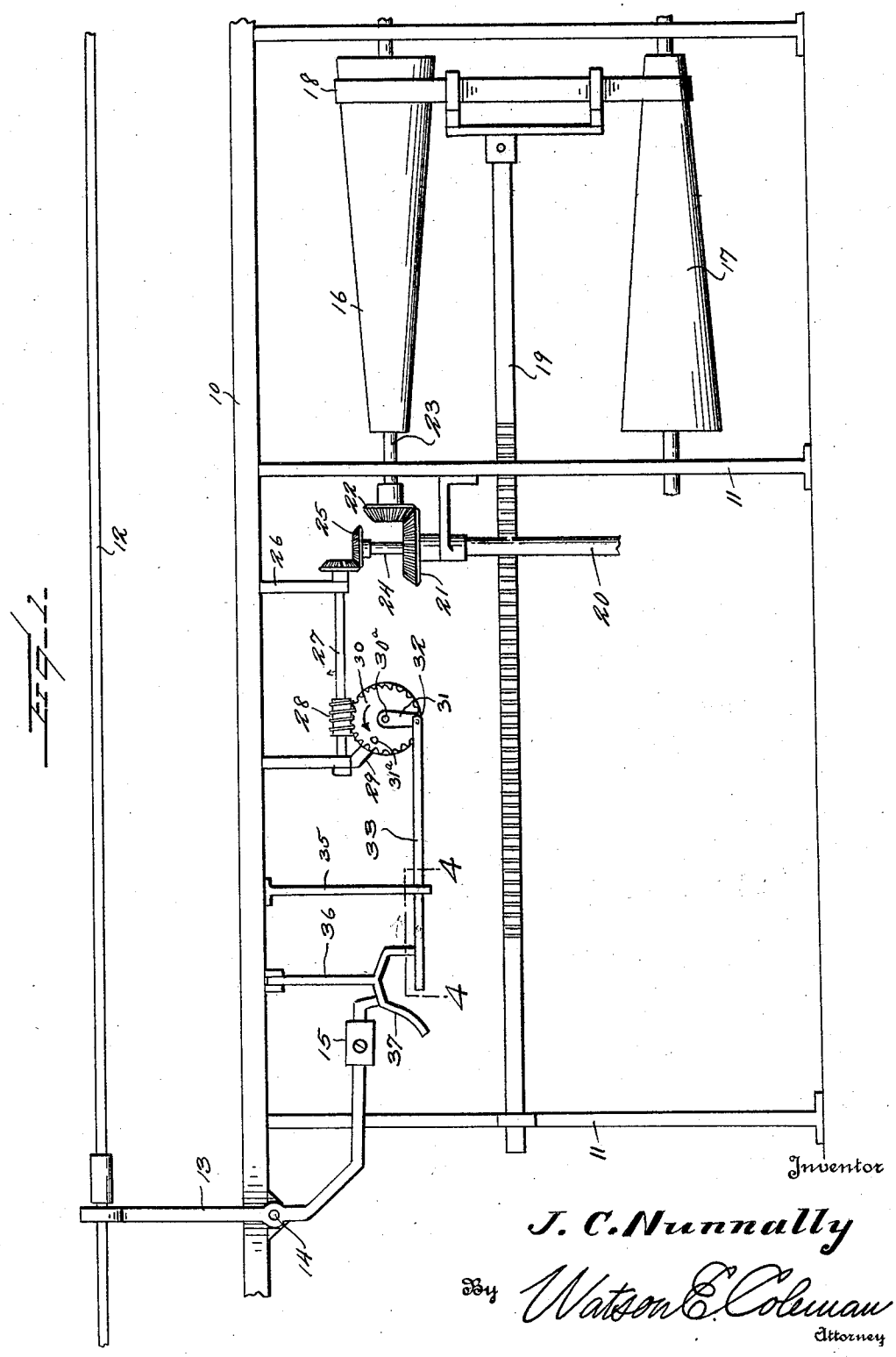
Sept. 20, 1932. J. C. NUNNALLY 1,878,533

KNOCK-OFF MECHANISM FOR SLUBBERS AND ROVING FRAMES

Filed Feb. 23, 1929 2 Sheets-Sheet 1



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Filed Feb. 23, 1929 2 Sheets-Sheet 2

Fig. 2.

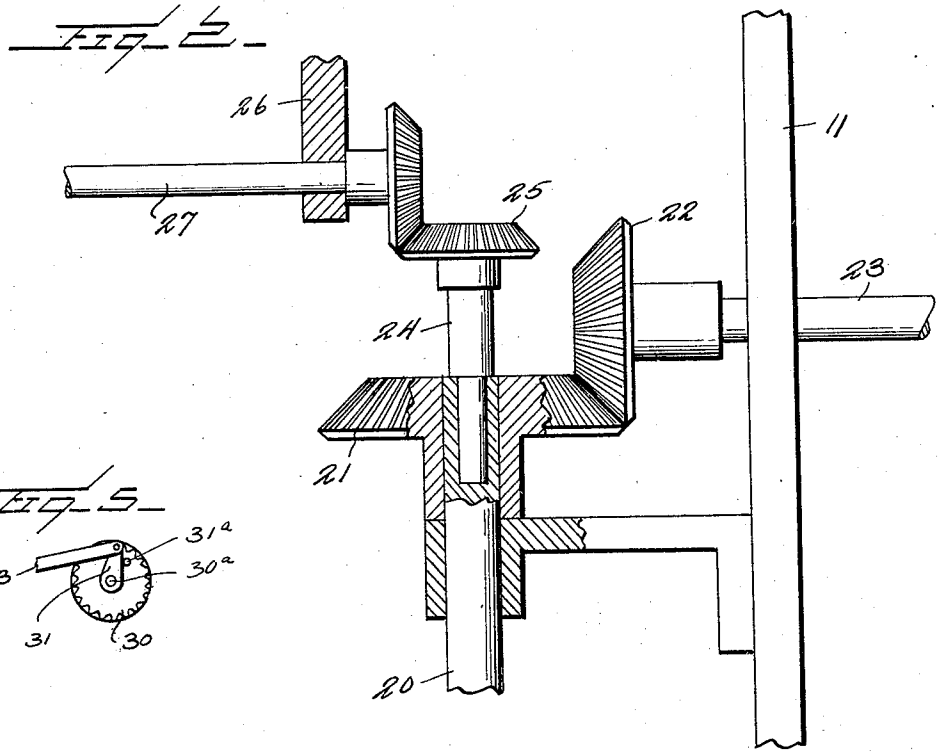


Fig. 5.

Fig. 3.

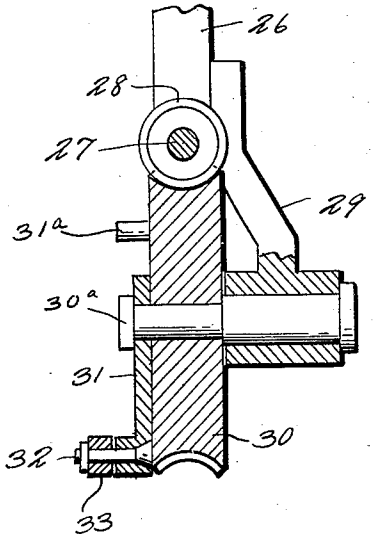
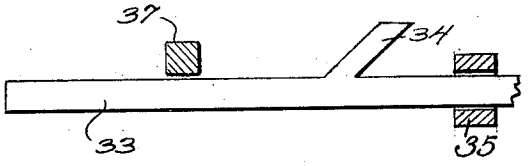


Fig. 4.



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UNITED STATES PATENT OFFICE

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KNOCK-OFF MECHANISM FOR SLUBBERS AND ROVING FRAMES

Application filed February 23, 1929. Serial No. 342,142.

This invention relates to the stop motions or knock-off motions of slubbers and kindred mechanisms as for instance roving frames, fly frames and the like.

At the present time, all roving frames known to me are doffed by the rack knock-off motion which is changed each time that the tension gear is changed. With this mechanism, when the yarn or roving gets slack in damp weather or tightens up in dry weather, the operative changes the tension and all these changes affect the yardage of stock on the bobbins, making it impossible to keep the creeling all run out together, thus causing a waste of stock at each creeling.

The general object of the present invention is to avoid the difficulties above referred to by causing the knock-off to occur by the use of means driven from the contact shaft which in all machines known to me is driven independently of the tension motion, this contact shaft getting its motion from the top cone shaft, thus getting an even yardage on each doff of the roving.

A further object is to provide means readily connected to the ordinary slubber or roving frame as commonly constructed whereby the belt shipper rod may be shifted automatically after a predetermined number of revolutions of the contact shaft.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of a portion of a spinning frame showing my knock-off mechanism applied thereto;

Figure 2 is an enlarged sectional view through the upper end of the contact shaft showing means for driving the knock-off mechanism;

Figure 3 is a sectional view through the worm and worm wheel showing the means for supporting the worm wheel;

Figure 4 is a section on the line 4—4 of Figure 1.

Figure 5 is a fragmentary elevation of the worm wheel and knock-off rod.

In these drawings, I have illustrated only so much of a roving frame, as for instance a slubber, as is necessary for an understanding of my invention. In the drawings, 10 designates the usual roll beam and 11 sampsons supporting the same. The belt shipper rod is designated 12, this being operatively connected to a knock-off arm or lever 13 pivoted at 14 and having the usual weight 15, this knock-off arm, under the action of the weight, shifting the belt shipper rod 12 to the right in Figure 1 and shifting the belt fast to the loose pulley (the belt and pulleys not being shown).

The top cone is designated 16 and the bottom cone 17, the top cone 16 being driven by the usual belt 18 and the belt 18 being shifted over the faces of the cones to change the speed by means of the usual rack 19 actuated in the usual manner by mechanism which it is not necessary to show as it is well known. The contact shaft 20 as usual carries the mutilated beveled gear wheel 21 engaging the beveled gear wheel 22 on the top cone shaft 23 so that thus the contact shaft receives its motion from the top cone shaft which in turn receives its motion from the lower cone 17 driven in the usual manner. So far I have described elements which are commonly found in all slubbers, roving machines and fly frames.

Mounted upon the contact shaft for rotation therewith is an extension 24 carrying at its upper end the beveled gear wheel 25 and mounted in brackets or supports 26 is a worm shaft 27 extending longitudinally of the machine and parallel to the roll beam 10. This carries upon it a worm 28. One of the supports 26 has a downward extension 29 upon which is mounted the shaft 30ª carrying a worm wheel 30. A crank arm 31 is loose upon the shaft 30ª and in order to cause a rotation of this crank arm with the worm wheel, the worm wheel is provided with a pin 31ª which as the worm travels engages the arm and turns the crank arm with the roll. The worm wheel travels in a counter-clockwise direction and the pin 31ª therefore, picks up the arm 31 when the latter is in a depending position and carries it around in a counter-clockwise direction to a point where the arm 31 will pass the vertical

plane cutting the axis 30ª. As soon as the arm 31 reaches this point, the arm 31 will swing downward by gravity and will remain in this position until it is again picked up by the pin 31ª.

Mounted upon the crank pin 32 of the arm 31 is the knock-off rod 33 which has projecting from it an inclined lug 34. This rod 33 is slidingly supported on a supporting member 35 depending from the usual roll beam 10 or otherwise supported for rectilinear motion. It will be obvious that as the wheel 30 rotates, the knock-off arm will be reciprocated.

Pivotally mounted upon the roll beam 10 or adjacent thereto is the depending trigger 36 which is forked at its lower end, one branch 37 of the fork extending beneath the free end of the knock-off arm 13 while the other branch extends down in the path of movement of the lug 34 on the rod 33.

It will be seen that with this construction, the shaft 27 which as before stated is driven from the contact shaft in turn driven from the top cone shaft will make a large number of revolutions before the worm gear 30 will have made one complete revolution. As the worm gear 30 starts its revolutions in a counter-clockwise direction at the beginning of the bobbin filling operation, the rod 33 will be retracted by the rotation of the arm 31 and when the worm wheel 30 has made a complete revolution, the rod 33 will be forced outward and the lug 34 will wedge the trigger from beneath the knock-off arm, whereupon the weight 15 will cause the knock-off arm to descend, shifting the shipper toward the right in Figure 1 and stopping the machine for doffing. It will be seen that this mechanism is very simple, that it may be easily applied to roving machines now on the market, and that it is not affected in any way by changes in tension.

Of course, it will be understood that the contact shaft 20 makes a predetermined number of half revolutions during the winding up of bobbins and before the doffing thereof as for instance seventy-two half revolutions or thirty-six full revolutions for $11 \times 5\frac{1}{2}$ slubbers while in intermediate frames $9 \times 4\frac{1}{2}$ contact shaft makes seventy-two half revolutions or thirty-six complete revolutions to one revolution of the worm gear 30. The top cone 16 is of course, driven in the usual manner from the main shaft through the twist gear train.

In the operation of this mechanism, the worm wheel travels in a counter-clockwise direction and when the pin 31ª has reached the position shown in Figure 5, the arm will under the action of gravity leave the pin 31ª and the rod 33 will descend by gravity and swing out of the way of the latch 36 or in other words will drop back sufficiently to let the latch 36 swing back under the weighted end of shipper lever 13. As soon as the disconnection has taken place between the driving mechanism and the winding machine the frame is ready to be doffed and to have a new series of bobbins placed thereon for winding. The mechanism which I have devised entirely eliminates the objectional features referred to in the first paragraph of this specification.

As before stated, one of the advantages of my invention resides in the fact that the knock-off mechanism is operated by means driven directly from the contact shaft 20 so that this knock-off mechanism is not changed when the tension mechanism is changed. Inasmuch as my mechanism is driven directly from the contact shaft itself, there is no possibility of any change in the tension making a change in the adjustment of the knock-off mechanism.

It is very simple, is readily applied and the action is very positive.

While I have illustrated certain details of construction and arrangement of parts, I do not wish to be limited to these details as obviously many minor changes might be made without departing from the spirit of the invention as defined in the appended claims.

I claim:—

1. A knock-off mechanism for winding machines having a contact shaft, the mechanism including a horizontal shaft directly driven from the contact shaft, a worm mounted upon said horizontal shaft, a worm gear engaged by the worm and having a crank arm, a weighted knock-off arm, a swingable trigger normally supporting the weighted arm in a raised position, and a reciprocatable member connected at one end to the crank arm and carrying a lug adapted to engage the trigger and push the trigger out of supporting engagement with the knock-off arm when the worm gear has made one complete revolution.

2. In a winding machine, a contact shaft, a knock-off arm having a weight at one end, a trigger for supporting the knock-off arm, an auxiliary shaft directly engaged with the contact shaft and driven thereby and carrying a beveled gear wheel, a longitudinally extending shaft having a beveled gear wheel engaging the last named beveled gear wheel, supports on the roll beam for supporting said longitudinal shaft, a worm on the longitudinal shaft, a worm wheel below the same with which the worm engages and having a crank arm and a member pivotally mounted on said crank arm and movable longitudinally toward and from the trigger, the member having a lug engageable with the trigger when the crank arm has reached a predetermined position to shift the trigger out of engagement with the knock-off arm and permit the knock-off arm to drop.

3. A knock-off mechanism for winding machines having a contact shaft, the mechanism

including a horizontal shaft operatively driven from the contact shaft, a worm mounted thereon, a worm gear engaged by the worm and having an outwardly projecting pin, a rotatable arm loosely mounted upon an axis concentric to that of the worm gear and with which arm the pin is adapted to engage, a weighted knock-off arm, a swingable trigger supporting the knock-off arm in a raised position, and a member connected at one end of the rotatable arm and reciprocated thereby and carrying a lug and adapted to engage the trigger and shift the trigger out of engagement with the knock-off arm and permit the knock-off arm to drop when the worm gear has made one complete revolution.

4. A knock-off mechanism for winding machines having a contact or tumbling shaft, the mechanism including a rotatable element operatively driven from the contact shaft at reduced speed, a knock-off arm, a trigger supporting the arm, a crank arm loosely mounted for rotation around the axis of rotation of said rotatable element, a pin carried by said rotatable element and radially spaced from the axis thereof, and adapted in the rotation of the rotatable element to engage with and pick up the crank arm and rotate this arm through approximately three-fourths of a revolution with the rotatable element, the arm then dropping by gravity to a depending position, a rod pivoted to said crank arm and rectilinearly movable thereby and adapted in its forward movement to release said trigger to allow the knock-off arm to drop when the crank arm associated with the rotatable element has moved through approximately three-fourths of a complete revolution.

In testimony whereof I hereunto affix my signature.

JAMES C. NUNNALLY.