

Feb. 9, 1926.

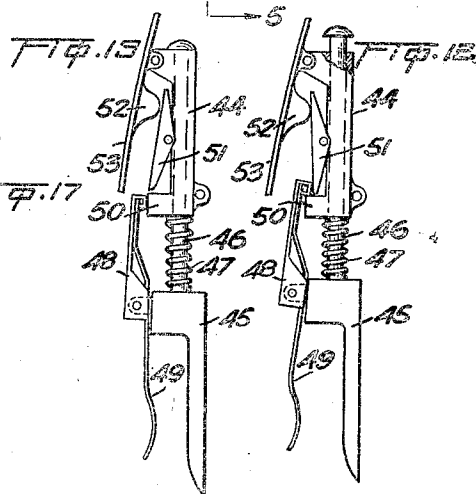
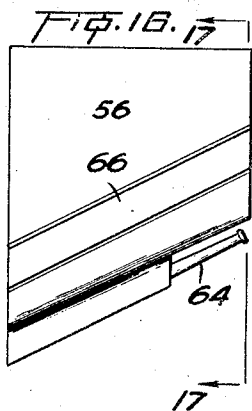
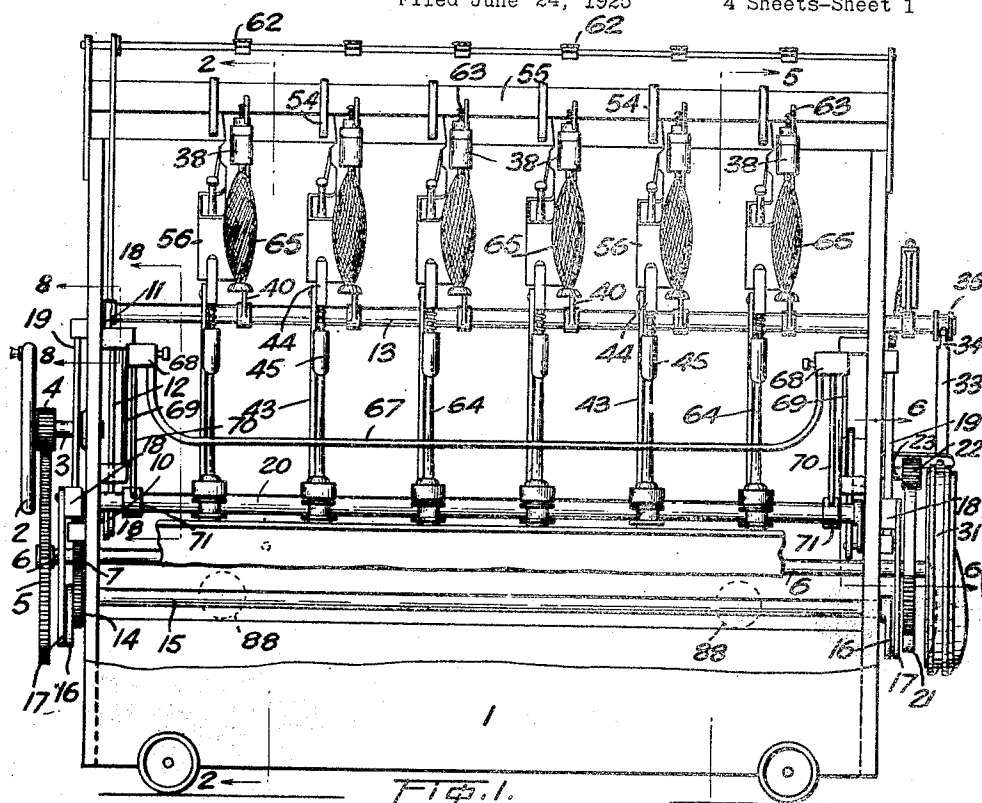
1,572,103

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DOFFING APPARATUS FOR SPINNING FRAMES

Filed June 24, 1925

4 Sheets-Sheet 1



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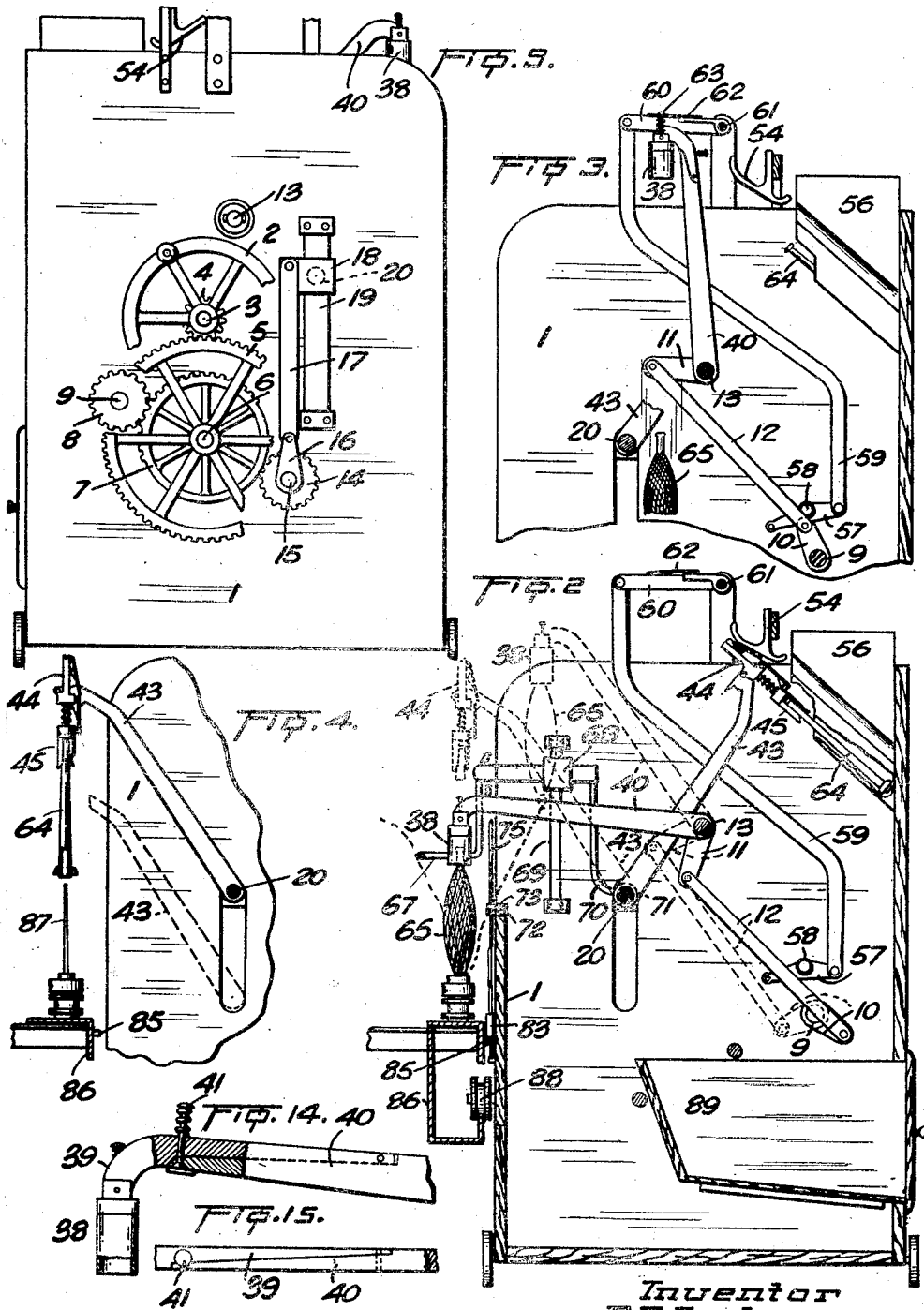
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1,572,103

DOFFING APPARATUS FOR SPINNING FRAMES

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4 Sheets-Sheet 2



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1,572,103

DOFFING APPARATUS FOR SPINNING FRAMES

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4 Sheets-Sheet 3

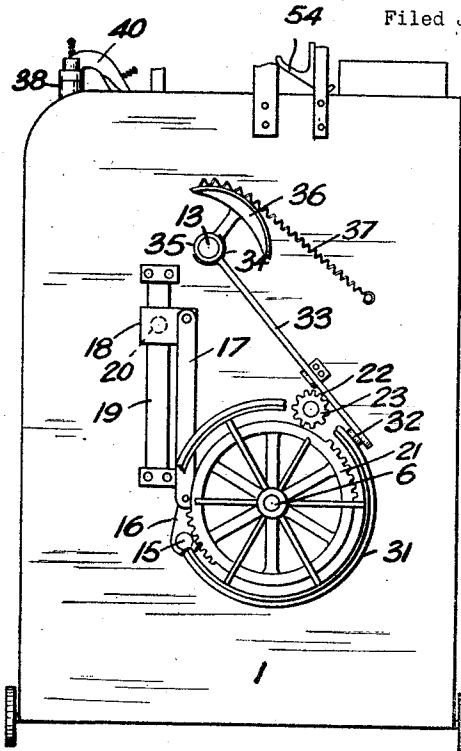


FIG. 10.

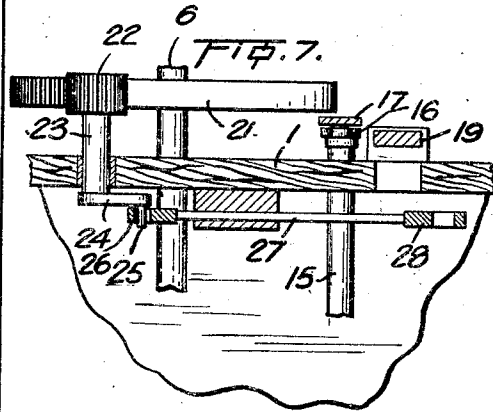


FIG. 7.

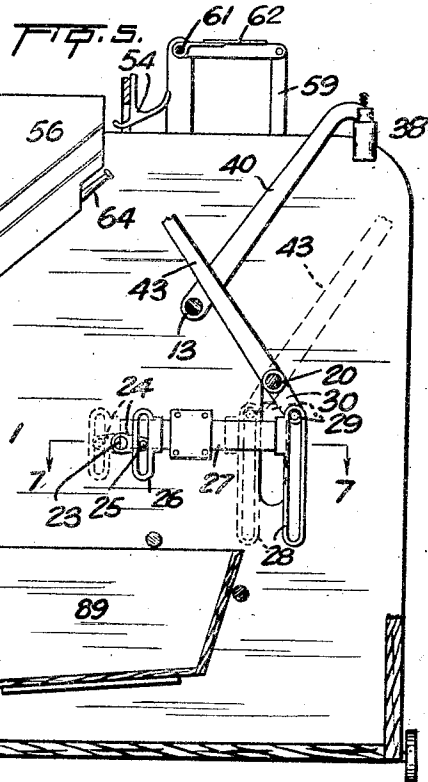


FIG. 5.

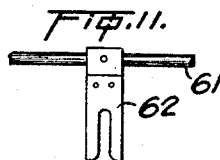


FIG. 11.

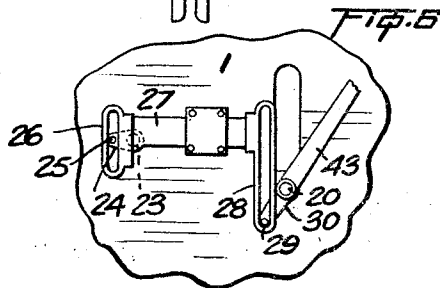


FIG. 6.

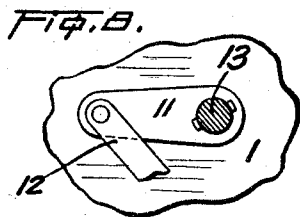


FIG. 8.

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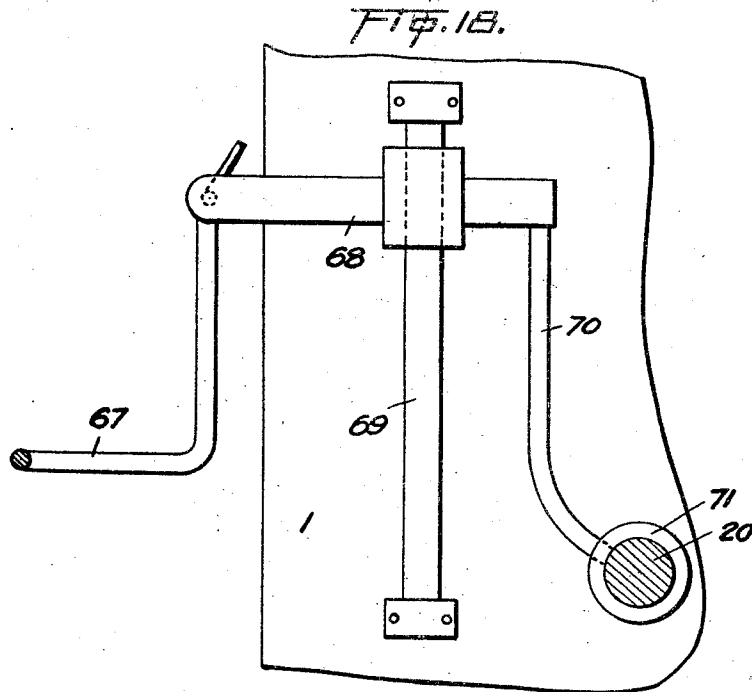
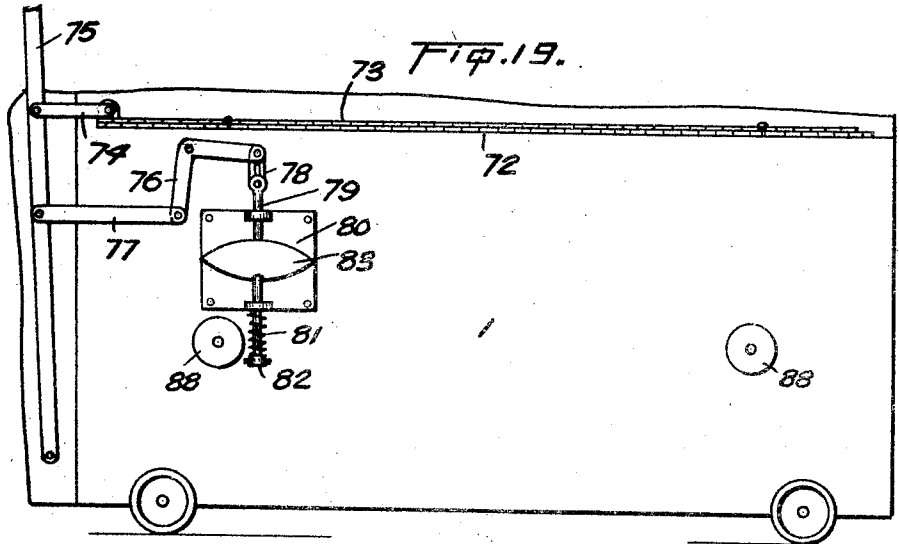
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1,572,103

DOFFING APPARATUS FOR SPINNING FRAMES

Filed June 24, 1925

4 Sheets-Sheet 4



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Patented Feb. 9, 1926.

UNITED STATES PATENT OFFICE.

ROBERT BURNETT BUCHANAN, OF HAMILTON, ONTARIO, CANADA.

DOFFING APPARATUS FOR SPINNING FRAMES.

Application filed June 24, 1925. Serial No. 39,378.

To all whom it may concern:

Be it known that I, ROBERT BURNETT BUCHANAN, a subject of the King of Great Britain, and a resident of the city of Hamilton, in the county of Wentworth, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Doffing Apparatus for Spinning Frames, of which the following is the specification.

My invention relates to improvements in doffing apparatus for spinning frames of the kind designed to travel along the sides of the spinning frame to remove the full bobbins from the spinning spindles and replace them by empty bobbins and the object of the invention is to devise means for removing a predetermined number of the full bobbins at a time and replace them by the same number of empty bobbins.

Another object is to devise means for shifting the full bobbin chuck arms out of alignment with the spinning spindles in order to permit the empty bobbin chuck arms to come down in alignment with the spindles, thus enabling the device to remain stationary during the complete operation on a section of bobbins.

A still further object is to devise means for preventing the breaking of the yarn between the spindle and the rolls and to shear the yarn between the spindle and the removed bobbins at the requisite moment.

And a further object is to devise an improved means for supplying the empty bobbins to their chucks whereby any separate handling of the empty bobbins is eliminated.

My invention consists of a doffing apparatus constructed and arranged, all as hereinafter more particularly described and illustrated in the accompanying drawings in which:

Fig. 1 represents a front view of my apparatus with a section of frame and spindles showing the operation of placing the empty bobbins on such spindle.

Fig. 2 is a vertical cross section through the line 2—2 (Figure 1) showing a chuck about to remove a full bobbin and also showing the empty bobbin chuck about to receive an empty bobbin.

Fig. 3 is a similar view to Figure 2 showing the full bobbin released from the full bobbin chuck.

Fig. 4 is a similar fragmentary view to Figures 2 and 3 showing the empty bobbin

on its chuck about to be lowered onto a spindle.

Fig. 5 is a vertical cross section through the line 5—5 (Figure 1) showing the traversing action on the empty bobbin arm shaft.

Fig. 6 is a fragmentary section through the line 6—6 (Figure 1) showing an empty bobbin arm in the position illustrated in Figure 1.

Fig. 7 is a horizontal section through the line 7—7 (Figure 5).

Fig. 8 is a fragmentary section through the line 8—8 (Figure 1).

Fig. 9 is an end elevation of the apparatus from the operating end showing the means for actuating the full and empty bobbin arm shafts.

Fig. 10 is an end elevation of the opposite end of the apparatus showing the cam motion for shifting the full bobbin shaft and the traversing and lowering means for the empty bobbin shaft.

Fig. 11 is a detail in plan of one of the full bobbin chuck trips.

Fig. 12 is an enlarged elevational detail of one of my empty bobbin chucks showing the same in the open position.

Fig. 13 is a similar view to Figure 12 showing the chuck in the bobbin gripping position.

Fig. 14 is an elevational detail partly in section of a full bobbin chuck and showing the means for taking care of bobbins of varying lengths.

Fig. 15 is a plan view of the arm shown in Figure 14.

Fig. 16 is a side elevation of an empty bobbin hopper.

Fig. 17 is a sectional view through the line 17—17 (Figure 16).

Fig. 18 is a cross sectional detail through the line 18—18 Figure 1, and

Fig. 19 is a front elevation of the casing showing the shears for cutting the yarn and the means for positioning the apparatus at the frame side.

Like characters of reference indicate corresponding parts in the different views.

1 is the rectangular casing of the apparatus, 2 is a hand wheel by means of which the device is operated, said hand wheel being secured to the stub shaft 3 journaled on the casing end. 4 is a pinion secured to the shaft 3, and meshing with the main drive

gear 5 secured to the main drive shaft 6 which is journaled in the casing ends. 7 is an intermittent drive gear secured to the shaft 6 and meshing with the pinion 8 on the doffing drive shaft 9 which is provided with a crank 10 connected to a crank 11 by the connecting rod 12, said crank 11 being secured to the full bobbin arm shaft 13 which is slidably journaled in the casing 1. The connection is so arranged that the crank 11 will be rocked while the crank 10 revolves.

The intermittent gear 7 also meshes with a pinion 14 on the elevating shaft 15 which carries at its ends the cranks 16 connected by the connecting rods 17 with the slides 18 in the guides 19 which are secured to the casing ends. 20 is an empty bobbin arm shaft journaled at its ends in the slides 18. The opposite end of the main drive shaft 6 to that provided with the main drive gear 5 is provided with an intermittent gear 21 which meshes with a pinion 22 on a stub shaft 23 provided at its opposite end with a crank 24 which is connected through a pin 25 sliding in vertical slot 26 in a transverse slide 27. The opposite end of the slide 27 is provided with a long vertical slot 28 into which extends the pin 29 on the empty bobbin operating arm 30 which is secured to the empty bobbin arm shaft 20.

The main drive shaft 6 also carries the cylindrical cam 31 in which extends the roller 32 journaled on the lower end of the lever 33 which is fulcrumed intermediately of its length on the casing 1. The upper end of the lever 33 is provided with a fork 34 extending around the spool 35 on the end of the full bobbin arm shaft 13. 36 is a balancing quadrant secured to the shaft 13 and 37 is a spiral spring secured at one end thereto and to the casing 1 at the other end.

38 are the full bobbin receiving chucks which may be of any suitable construction to grip the uncovered portion of the bobbins such as that described in my co-pending application for chucks, filed October 15th, 1924 under Serial Number 743,808. Each of these chucks 38 is pivoted to a portion 39 of the full bobbin arm 40 to which such portion is pivoted, and resiliently held in place by means of the spring 41 extending around the headed pin 42 which extends freely through the portion 39, being secured in the arm 40.

The empty bobbin arm shaft 20 carries the arms 43 to the extremities of which are pivoted the empty bobbin chucks 44, each of which consists of a shoe 45 secured to a stem 46 which extends freely through the body of the chuck 44.

47 is a spring interposed between the body 44 and the shoe 45. 48 is a latch pivoted on the shoe 45 and carrying the tension spring

49 which is designed to coact with the shoe to hold the bobbin. 50 is a latching lug on the body 44 adapted to coact with the free end of the latch 48. 51 is a releasing shoe pivoted on the body 44 and adapted to be actuated by the lug 52 on the trip 53 which is pivoted on such body 44.

54 are tripping shoes secured to the longitudinal bar 55 which is secured to the casing 1, said tripping shoes being so disposed as to engage the trips 53 upon the arms 43 being swung upwardly to the hopper 56.

57 is a lever fulcrumed on the casing 1 and carrying a roller 58 which is engaged by the crank 10 as it revolves, thus lifting the lever, to the free end of which is connected the rod 59 which is in turn connected at its upper end to the lever 60 secured to the shaft 61 which extends longitudinally of the apparatus and is journaled on the casing ends. 62 are forked full bobbin chuck releasing trips which are adapted to coact with the headed stems 63 of the chucks 38.

64 are the empty bobbins and 65 are the full bobbins. The bobbins 64 are loaded into the hopper 56 which is so constructed that the bottom is inclined to the horizontal so that the bobbins lie with their tops elevated above their lower ends.

66 are offsets disposed intermediately of the hopper walls in order to prevent the weight of the bobbin in the offsets being put onto the lower bobbin about to be received into the chuck 44. One side wall of the hopper is cut away so as to permit the chuck 44 gripping the end of the bobbin 64.

67 is a yarn rail curved rearwardly at its ends which are secured to the slide brackets 68 adapted to slide on the guides 69. 70 are rods connected at their upper ends to the slide brackets and at their lower ends to the collars 71 freely mounted on the shaft 20.

72 is a stationary toothed shearing plate secured to the front of the casing 1, and upon which is slidably mounted the toothed shearing plate 73 which is attached by the link 74 to the operating lever 75 which is pivoted on the casing 1. 76 is a bell crank lever fulcrumed on the casing 1 and connected by the link 77 with the lever 75. The other end is connected to a link 78 which is slidably connected to the spindle 79 of the latching device, said spindle being slidably mounted in the double bracket 80.

81 is a spring interposed between the collar 82 on the lower end of the spindle 79 and the lower of the double brackets 80. 83 is a double latching cam secured to the spindle 79 and provided with a pin receiving notch 84 in its lower face, said notch being adapted to receive one of the pins 85 on the spindle carrying rail 86 of the spinning frame. 87 are bobbin receiving spindles thereon. The apparatus is slid along the lower flange of

the rail 86 through the medium of the wheels 88 rotatably mounted on the front of the casing 1.

In using my apparatus the frame is doffed by sections and I will now describe the complete operation of doffing one section of bobbins. The apparatus is moved to the desired position and the wheels 88 straddle the lower flange of the rail 86. It is then moved longitudinally until the latch cam 83 latches onto a pin 85. The hand wheel 2 is now turned in the required direction which turns the shaft 3 and attached pinion 4 which turns the drive gear 5 on the main shaft 6 thus turning the intermittent gear 7, bringing its toothed section into mesh with the pinion 8 which turns the shaft 9 and crank 10, causing it to make one complete revolution. The connected crank 11 is thus rocked from the position illustrated in dotted lines in Figure 2 to the position illustrated in full lines wherein the chuck 38 grips the full bobbin 65, and subsequently is swung with the full bobbin back in the dotted line position.

During the movement of the bobbin 65 from its position on the spindle 87 to the dotted line position in Figure 2 the yarn is unbroken and lies across the shear plates 72, and 73 to its turn around the spindles 87.

While the chuck arms 40 are returning from the spindles 87 to the stopping position the cam 31 is functioning with respect to the lever 33 and swinging the upper end of the lever outward thus sliding the shaft 13 longitudinally so that the arms 40 and chucks 38 are out of alignment with the spindles 87 and the arms 43.

One toothed section of the intermittent gear 21 on the shaft 6 now comes into mesh with the pinion 22 on the shaft 23, thus turning the crank 24 a half revolution and sliding forward the slide 27 with the result that the crank 30 is swung in a clock-wise direction through the medium of the pin 29 engaging the wall of the slot 28. The swinging of the crank 30 turns the shaft 20 and thus swings the arms 43 from the position illustrated in full lines in Figure 2 to the position illustrated in dotted lines in that figure.

The toothed section of the gear 7 now meshes with the pinion 14 and thus rotates the shaft 15. Thus the slides 18 and shaft 20 journaled therein are lowered through the medium of the cranks 16 and connecting rods 17, thus depositing the empty bobbins 64 onto the spindles 87 wherein the yarn is locked in the spindle cup, and returning to the uppermost position wherein the arms 43 are again in the position illustrated in dotted lines in Figure 2.

The second toothed section of the gear 21 now meshes with the pinion 22 turning the shaft 23 another half revolution with

the result that the reciprocation of the slide 27 is complete and the shaft 20 is turned in the opposite direction so that the arms 43 are swung back from the dotted position (Figure 2) to the full line position.

When the arms 43 complete their upward traverse movement the chuck 44 is pressed over the empty bobbins 64 in the hopper 56.

The apparatus is now ready to be moved to the next section of bobbins. The lever 75 is actuated, which through the link 74 pushes the shearing plate 73 along, shearing the yarn between its teeth and the teeth of the stationary shearing plate 72. Simultaneously the bell crank 76 is swung through the link 77 drawing up the link 78 and the spindle 79 and attached latching cam 83 which is now disengaged from the pin 85. The apparatus is now moved to the next section of bobbins and the above operation repeated.

The first portion of the reciprocation of the arms 40 swings such arms which have already received in their chucks 38 full bobbins from the previous operation, upwardly into the position illustrated in Figure 3, wherein the forked trips 62 engage the chuck stems 63 and release the full bobbins 65 which drop into the box 89 in the apparatus.

When the apparatus is moved along to the next section of bobbins the yarn rail 67 is just above the top of the full bobbins 65 on the spindles 87 and as such yarn rail is disposed forwardly of the front of the apparatus it engages the yarns between the spindles and the rolls, thrusting them back of the spindles. When the shaft 20 is lowered to the bobbin depositing position the collars 71 and rods 70 pull down the slide brackets 68, thus pushing the yarns and travellers (not shown) to the back of the rings preventing the yarns fouling the empty bobbins when they are deposited on the spindles 87.

I will now describe the operation of the individual chucks 44 which receive the empty bobbins 64 from the hopper 56. In Figure 13 the respective parts are in the position in which they are pressed over the exposed ends of the bobbins 64 in the hopper 56. In this position the free end of the latch 48 has ridden up onto the lug 50 so that the tension spring 49 is pressing the bobbin against the shoe 45. While it is in this position the trip 53 is against the bracket 54 which holds down the rocker shoe 51 by means of the lug 52, thus preventing the latch 48 from functioning while the arms 43 are in such position.

When the arms 43 are traversed to the position illustrated in dotted lines in Figure 2, the weight of the bobbins and chucks 44 cause them to remain in the perpendicular position and thus be finally suspended above

the spindles. When the arms 43 are lowered their full extent the suspended bobbins 64 are pressed against the bottoms of the spindles, thus causing a thrust on the shoes 45 which are pressed upwardly against the spring 47. When this is done the tension of the springs 49 cause the latches 48 to function into the latched open position illustrated in Figure 12 which releases the grip on the bobbins 64.

When the chucks 44 on the arms 43 are returned again to the position adjacent the brackets 54 the trips 53 first engage the brackets 54 which causes them to tip until the trips 53 come in contact with the bracket 54. The lug 52 then presses down the rocking releasing shoe 51, lifting the latch 48 before the shoe 45 comes in contact with the empty bobbin in the hopper 56.

From the above description it will be apparent that I have devised a simple and effective apparatus that will doff the bobbin of ring spinning frames mechanically, thus replacing the present method of doing the doffing by hand.

What I claim as my invention is:

1. In a doffing machine for spinning frames, the combination with the spinning frame bobbin spindles, of a movable casing including a full bobbin receiving receptacle, an empty bobbin hopper, an oscillatable shaft longitudinally slidable in the casing, arms thereon, full bobbin gripping chucks on the arms, a second oscillatable shaft, arms thereon, empty bobbin gripping chucks on the arms, means for successively swinging the shafts to bring the respective full and empty bobbin chucks into their bobbin gripping position and into the chuck releasing positions, and means for sliding the full bobbin arm shaft longitudinally to escape the arms of the empty bobbin arm shaft.

2. In a doffing machine for spinning frames, the combination with the spinning frame bobbin spindles, of a movable casing including a full bobbin receiving receptacle, an empty bobbin hopper, an oscillatable shaft longitudinally slidable in the casing, arms thereon, full bobbin gripping chucks on the arms, a second oscillatable shaft, arms thereon, empty bobbin gripping chucks on the arms, means for successively swinging the shafts to bring the respective full and empty bobbin chucks into their bobbin gripping positions and into the chuck releasing positions, means for successively lowering and raising the empty bobbin arm shaft whereby the chucks are moved down and up perpendicularly over the spinning frame spindles, and means for sliding the full bobbin arm shaft longitudinally to escape the arms of the empty bobbin arm shaft.

3. In a doffing machine for spinning frames, the combination with the spinning

frame bobbin spindles, of a movable casing including a full bobbin receiving receptacle, an empty bobbin hopper, an oscillatable shaft longitudinally slidable in the casing, arms thereon, full bobbin gripping chucks on the arms, a second oscillatable shaft, arms thereon, empty bobbin gripping chucks on the arms, means for successively swinging the shafts to bring the respective full and empty bobbin chucks into their bobbin gripping positions, and into the chuck releasing positions, means for successively lowering and raising the empty bobbin arm shafts whereby the chucks are moved down and up perpendicularly over the spinning frame spindles, and means for sliding the full bobbin arm shaft longitudinally to escape the arms of the empty bobbin arm shaft, and means for positioning the movable casing so that the respective arms are in alignment with the spinning frame bobbin spindles.

4. In a doffing machine for spinning frames, the combination with the bobbin spindles on the spinning frame, a movable casing, an oscillatable empty bobbin chuck arm shaft, means for mounting the shaft in the casing so that it is capable of up and down movement, arms on the shaft, empty bobbin engaging chucks on the arms, means on the casing for latching the chucks, means for oscillating the arms, and means for moving the shaft down and subsequently up so that the chucks will travel perpendicularly over the spindle to place the empty bobbins thereon, and withdraw the chucks from the empty bobbins.

5. In a doffing machine for spinning frames, the combination with the bobbin spindles on the spinning frame, a movable casing, an oscillatable empty bobbin chuck arm shaft, means for mounting the shaft in the casing so that it is capable of up and down movement, arms on the shaft, empty bobbin engaging chucks on the arms, means on the casing for latching the chucks, means for oscillating the arms, and means for moving the shaft down and subsequently up so that the chucks will travel perpendicularly over the spindle to place the empty bobbins thereon, and withdraw the chucks from the empty bobbins, said means including an intermittent driven gear, and an operative connection between the intermittent driven gear and the empty bobbin arm shaft for successively oscillating it and moving it down and up.

6. In a doffing machine for spinning frames, the combination with the bobbin spindles on the spinning frame, a movable casing, an oscillatable empty bobbin chuck arm shaft, means for mounting the shaft in the casing so that it is capable of up and down movement, arms on the shaft, empty bobbin engaging chucks on the arms, means

on the casing for latching the chucks, means for oscillating the arms, and means for moving the shaft down and subsequently up so that the chucks will travel perpendicularly over the spindle to place the empty bobbins thereon, and withdraw the chucks from the empty bobbins, said means including an intermittent driven gear, a transversely operable slide for oscillating the shaft, a vertically operable slide for moving the shaft down and up and operable connections between the respective slides for actuating them.

7. In a doffing machine for spinning frames, an empty bobbin chuck arm shaft, chuck carrying arms thereon, means for oscillating the empty bobbin chuck arm shaft, a full bobbin chuck arm shaft, chuck carrying arms thereon, means for oscillating the full bobbin chuck arm shaft, and means for moving the full bobbin chuck arm shaft longitudinally so that the arms thereon escape contact with the arms on the empty bobbin chuck arm shaft.

8. In a doffing machine for spinning frames, a full bobbin chuck arm shaft, a main drive shaft, means for driving the main drive shaft, a crank connection between the main drive shaft and the full bobbin chuck arm shaft whereby the latter is oscillated on the rotation of the former, and means on the main drive shaft co-operating with means on the full bobbin chuck arm shaft whereby the latter is moved longitudinally.

9. In a doffing machine for spinning frames, a full bobbin chuck arm shaft, a main drive shaft, an intermittent gear for driving the main drive shaft, a crank connection between the main drive shaft and the full bobbin chuck arm shaft whereby the latter is oscillated on the rotation of the former, a cam on the main drive shaft, a swingable lever having one end operatively connected to the cam, and its other end operatively connected to the full bobbin chuck arm shaft.

10. In a doffing machine for spinning frames, a movable casing, an empty bobbin chuck arm oscillatable shaft mounted in the casing, an arm thereon, a latching chuck swingably mounted on the arm, an empty bobbin hopper, means on the casing for unlatching the chuck upon its being moved into the empty bobbin engaging position.

11. In a doffing machine for spinning frames, the combination with the spinning frame bobbin spindles, and full bobbins thereon, of means for removing the full bobbins from the spindles, an oscillatable empty bobbin chuck arm shaft movable up and down, and means engaging the yarns between the full bobbins and the rolls for pressing them back from the spindles, said means connected to and moving up and

down with the vertical movement of the empty bobbin chuck arm shaft.

12. In a doffing machine for spinning frames, the combination with the spinning frame bobbin spindles, and full bobbins thereon, of means for removing the full bobbins from the spindles, an oscillatable empty bobbin chuck arm shaft movable up and down, a casing in which the shaft is mounted, slide guides on the casing ends, slides thereon, forwardly extending brackets on the slides, a yarn rail extending between the brackets, and operative connections between brackets and shaft.

13. In a doffing machine for spinning frames, the combination with the spinning frame bobbin spindles, and full bobbins thereon, of means for removing the full bobbins from the spindles, an oscillatable empty bobbin chuck arm shaft movable up and down, a casing in which the shaft is mounted, slide guides on the casing ends, slides thereon, forwardly extending brackets on the slides, a yarn rail extending between the brackets, collars loosely mounted on the shaft and rods each connected at one end to a collar and at its other end to a slide.

14. In a doffing machine for spinning frames, the combination with the spinning frame bobbin spindles, of a movable casing including a full bobbin receiving receptacle, an empty bobbin hopper, means for transferring an empty bobbin from the hopper to a spindle, means for transferring a full bobbin from a spindle to the receptacle, and means for positioning the movable casing vertically with respect to the spinning frame.

15. In a doffing machine for spinning frames, the combination with the spinning frame bobbin spindles, of a movable casing including a full bobbin receiving receptacle, an empty bobbin hopper, means for transferring an empty bobbin from the hopper to a spindle, means for transferring a full bobbin from a spindle to the receptacle, and means for positioning the movable casing vertically with respect to the spinning frame, said means permitting longitudinal movement of the casing with respect to the frame.

16. In a doffing machine for spinning frames, the combination with a movable casing, of a longitudinal rail on the spinning frame, a plurality of spaced apart pins on the rail, a vertically movable spring latch on the forward face of the casing adapted to coact with a pin, manually operable means for releasing the latch from the pin, and yarn cutting shears on the forward face of the casing operated by the manually operated latch releasing means.

17. In a doffing machine for spinning frames, the combination with a movable casing, of a spring-held casing positioning latch on the front of the casing, yarn cut-

ting shears on the front of the casing, and means for releasing the latch, said means synchronously actuating the cutting shears.

18. In a doffing machine for spinning frames, an empty bobbin chuck comprising a body, a bobbin engaging shoe, a headed shoe stem extending freely into the body, a spring on the stem for normally holding the shoe in its spaced apart position with respect to the body, and latch actuated means for gripping the bobbin between it and the shoe.

19. In a doffing machine for spinning frames, an empty bobbin chuck comprising a body, a bobbin engaging shoe, a headed shoe stem extending freely into the body, a spring on the stem for normally holding the shoe in its spaced apart position with respect to the body, latch actuated means for gripping the bobbin between it and the shoe, and a trip for the latch actuated means.

20. In a doffing machine for spinning frames, an empty bobbin hopper having an inclined bottom and open top and so constructed that empty bobbins introduced into the hopper through the open top will lie therein with their longitudinal axes substantially parallel to the inclined bottom.

21. In a doffing machine for spinning frames, an empty bobbin hopper having an inclined bottom and open top and so constructed that empty bobbins introduced into the hopper through the open top will lie therein with their longitudinal axes substantially parallel to the inclined bottom, the bottom portion of the hopper being cut away

to expose the head portion of the lowermost empty bobbin in the hopper.

22. In a doffing machine for spinning frames, an empty bobbin hopper, its side walls being correspondingly bellied intermediately of their height, the belly on one side wall extending partially across the interior of the hopper whereby the weight of the upper empty bobbins is taken on such belly instead of on the lowermost bobbin.

23. In a doffing machine, an empty bobbin hopper and means disposed intermediately of the height thereof for taking the weight of the upper bobbins off the lower bobbins.

24. In a doffing machine, an empty bobbin hopper, empty bobbins therein, a portion of the hopper being cut away to expose the head portion of each bobbin on the hopper successively upon the one next below it being removed, and movable means adapted to grip the exposed head portion of each successive bobbin and pick it out of the hopper.

25. In a doffing machine for spinning frames, the combination with spinning frame bobbin spindles, an empty bobbin hopper and a full bobbin receptacle, of independent movable means adapted to grip the head portions of the empty and full bobbins respectively, means for removing the gripped full bobbins from the spindles and depositing them into the receptacle, and means for picking the gripped empty bobbins out of the hopper, carrying them to and placing them on the spindles.

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