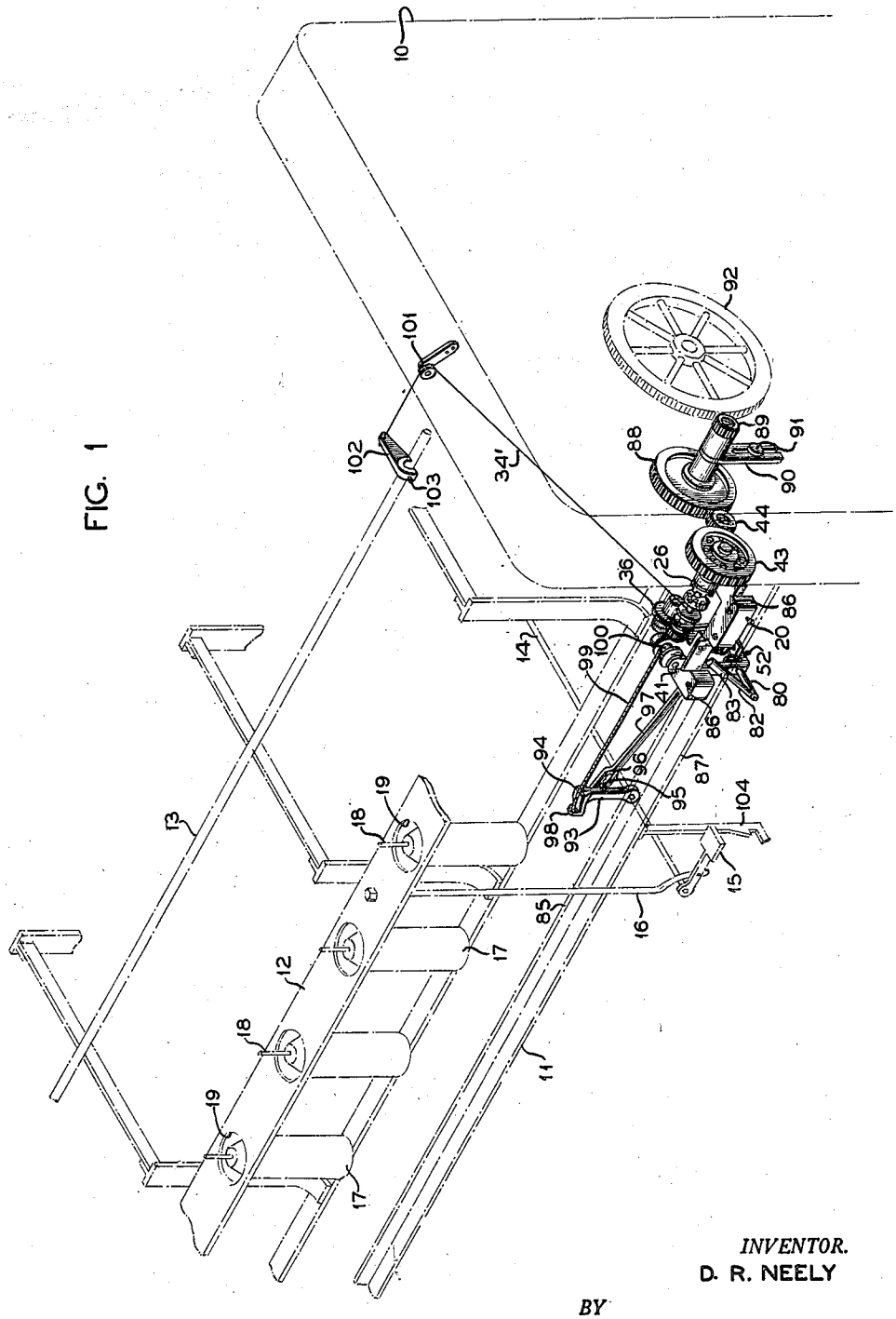
Feb. 13, 1951 D. R. NEELY 2,541,885

SPINNING FRAME CONTROL

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FIG. 1



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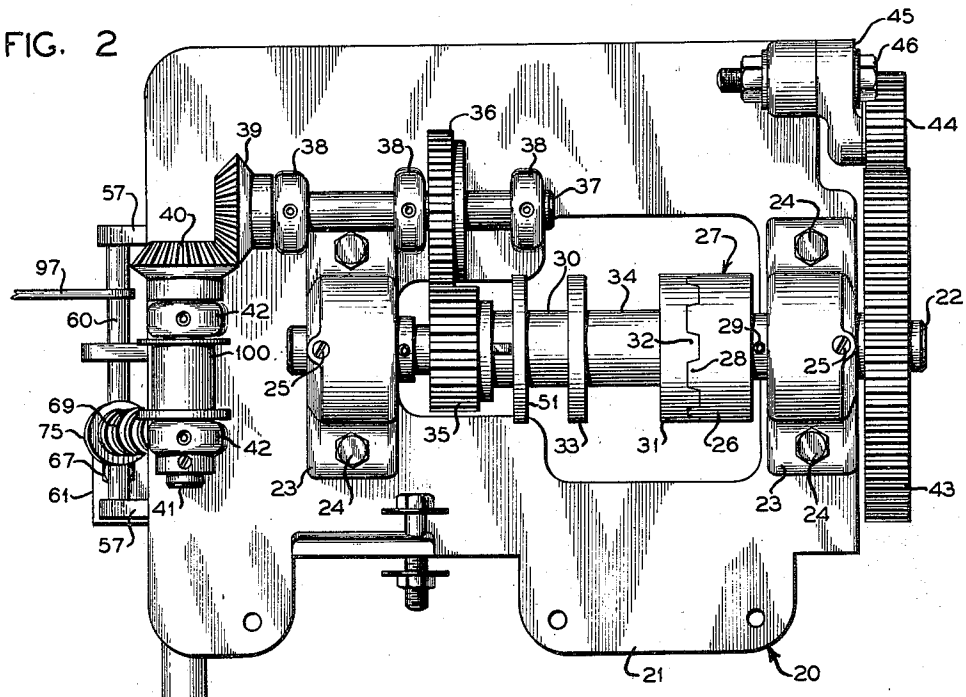
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SPINNING FRAME CONTROL

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FIG. 2



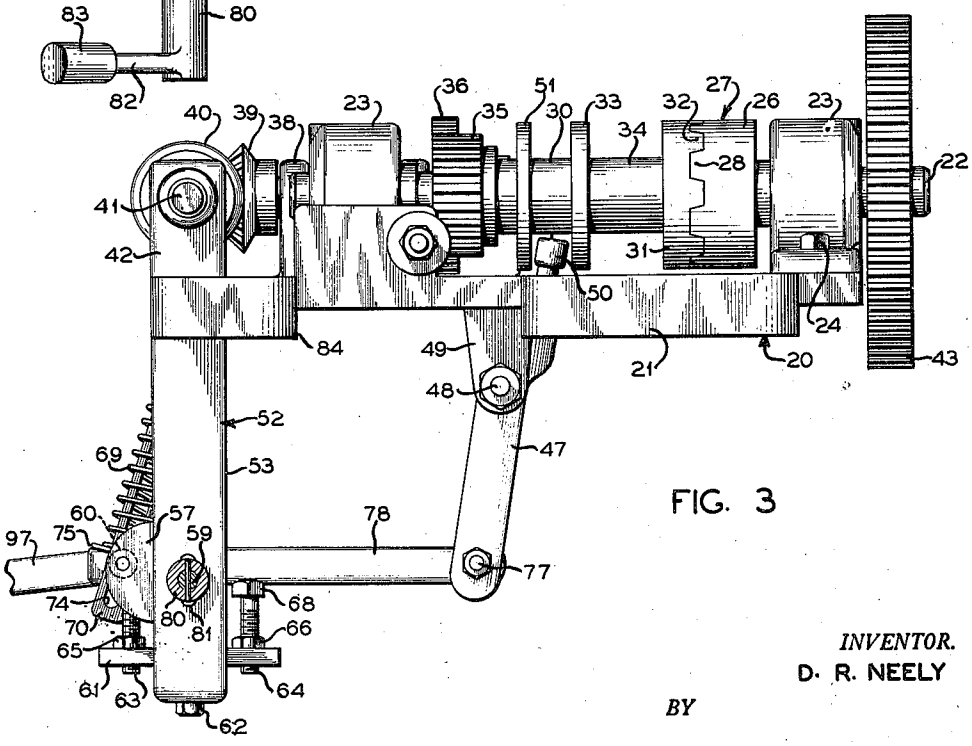


FIG. 3

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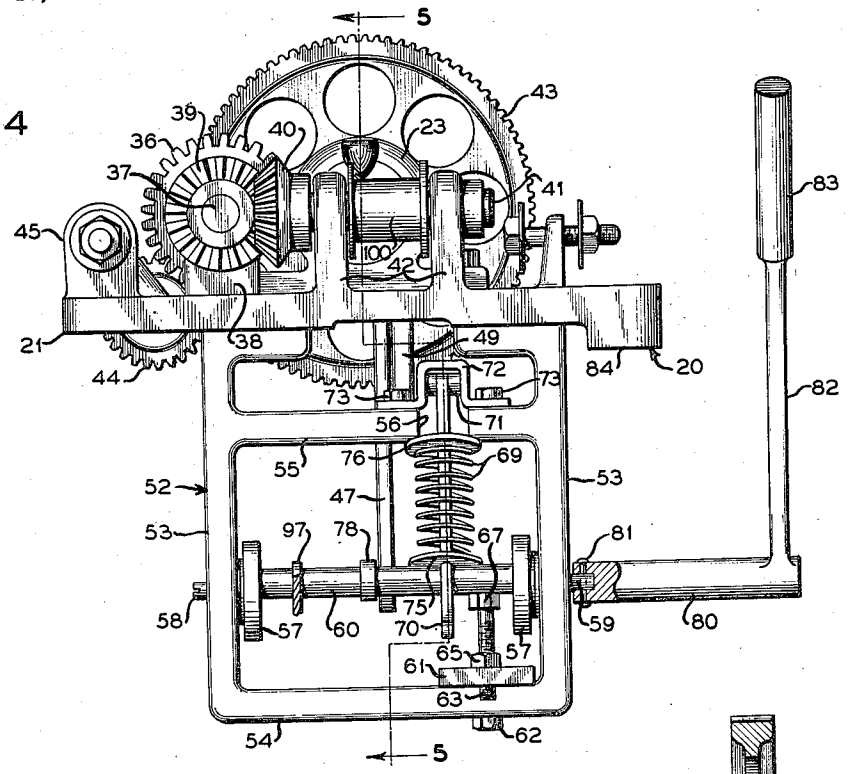
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FIG. 4



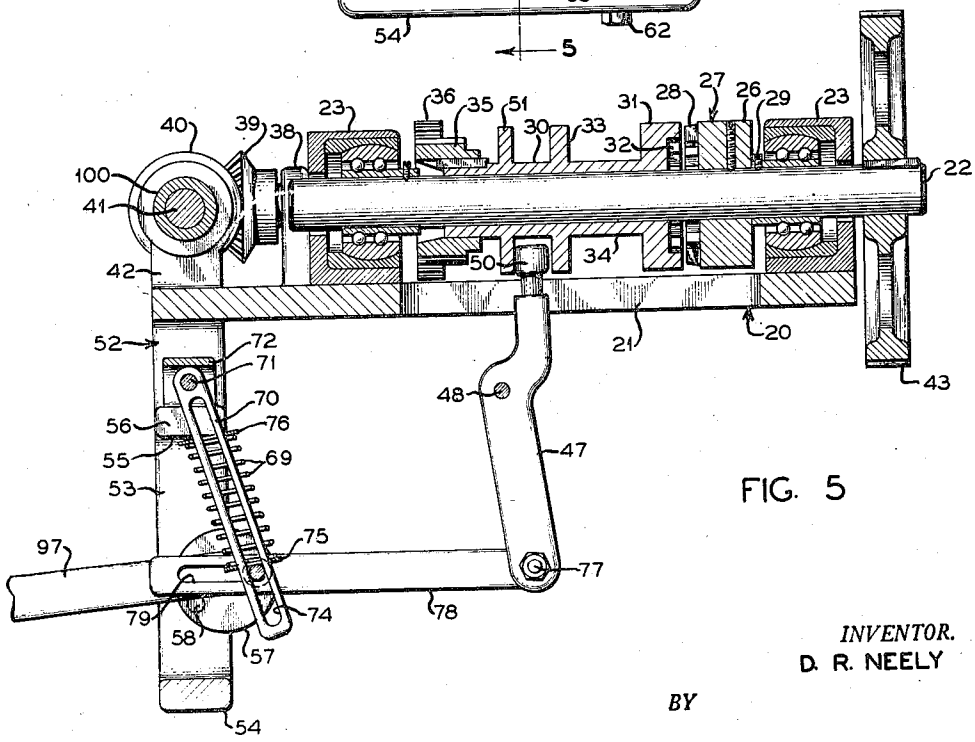


FIG. 5

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UNITED STATES PATENT OFFICE

2,541,885

SPINNING FRAME CONTROL

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Application January 18, 1949, Serial No. 71,420

10 Claims. (Cl. 57—79)

1

This invention relates to textile machinery and more particularly to control mechanisms for spinning frames and is an improvement of the mechanism disclosed and claimed in my prior Patent 2,445,687.

The commercial spinning of thread or yarn involves the use of frames containing a large number of spindles with bobbins mounted therein to receive the thread. Prior to the invention disclosed in my above identified patent it had been customary for the spinner to watch the operation of the spinning frame and upon completion of the winding to stop the machine and lower the ring rail to starting position. Such operation requires constant attention on the part of the spinner and it very often happens that while attending to other duties the bobbins are overwound and necessitate removal of a portion of the yarn which is lost. This results in a very material loss in profits since all of the bobbins on one machine would be overwound which necessitates removal of a very appreciable amount of yarn.

It is therefore an object of the invention to provide a control for spinning frames in which the ring rail is automatically lowered to starting position and the frame stopped upon completion of the winding operation.

A further object of the invention is to provide a control for spinning frames which is completely automatic in operation and incorporating safety means which may be utilized to shut the spinning frame down and lower the ring rail at any desired time.

A further object of the invention is to provide a control for spinning frames which is purely mechanical in operation, which is substantially a self-contained unit and which may be applied to all standard spinning frames with substantially no alteration thereof.

It is a further object of the invention to provide a control for spinning frames which is composed of relatively few parts, which is simple in operation, which will eliminate the loss of yarn due to overwinding and which will reduce the manual labor necessary in operating spinning frames, thus reducing costs and increasing profits.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a perspective view with parts in phantom for greater clarity and showing the spinning frame control in condition to start operating;

Fig. 2, a top plan view of the spinning frame control unit;

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Fig. 3, a side elevation of the unit shown in Fig. 2;

Fig. 4, an end elevation of the unit; and,

Fig. 5, a vertical section taken on the line 5—5 of Fig. 4.

With continued reference to the drawing, there is shown in Fig. 1 a portion of a spinning frame comprising a housing 10 which houses the driving pulleys and gears for operation of the frame. Extending at right angles to the housing 10 are bottom rails 11 and ring rails 12, it being understood that only one side of the frame is shown in the drawing and that the parts shown are duplicated on the opposite side of the spinning frame.

There is also provided a control rod 13 extending longitudinally of the frame and throughout the length thereof this control rod being provided with belt shifting means not shown, which is constructed and arranged to shift the drive belt for the spinning frame from a tight to a loose pulley when it is desired to shut down the machine. Rod 13 is mounted for limited longitudinal sliding movement and is normally operated by handles not shown, mounted on the frame in a position convenient to the operator.

There is also provided in the conventional spinning frame a cross shaft 14 extending laterally of the frame and mounted for rotation thereon. A pedal 15 is fixed to the end of the shaft 14 and a rod 16 extends upwardly from the pedal 15 and has its upper end secured to the ring rail 12.

In the normal operation of a spinning frame bobbins 17 are mounted on rotatable bobbin spindles 18 and at the beginning of the spinning and winding operation the ring rail 12 occupies a position adjacent the lower end of the bobbins. The thread or yarn is spun, and as the spinning progresses is wound on bobbins 17 starting from the lower end thereof and winding on progressively toward the upper end. The ring rail 12 having openings 19 receiving each bobbin moves upward during the winding operation until such time as the bobbins are filled. At this time the ring rail occupies a position adjacent the upper ends of the bobbins as shown in Fig. 1. At this point the operator must manually shut down the machine and depress the pedal 15 which by means of rod 16 will move the ring rail 12 to the initial starting position adjacent the lower ends of the bobbins. Filled bobbins are then removed from the spindles 18 and empty bobbins placed thereon whereupon the operation described above is repeated.

In order to avoid the necessity of carefully observing the winding operation so that the

frame may be stopped at precisely the proper moment, applicant has provided means whereby the frame will automatically be stopped upon completion of the winding operation and the ring rail will automatically be moved to its lowermost starting position.

The control unit 20 is shown in Fig. 1 installed on the spinning frame and in detail in Figs. 2 to 5. Referring particularly to the latter figures, the unit comprises a base 21 which may be conveniently formed as a casting and upon which the majority of the parts comprising the control unit are mounted.

Extending longitudinally of the base on substantially the center line thereof is a shaft 22 mounted for rotation in anti-friction bearings or the like 23 secured to the base 21 by fastening means 24. These bearings may be provided with screw threaded plugs or the like 25 to permit proper lubrication of the bearings. Fixed on the shaft 22 for rotation therewith is the driving member 26 of a jaw clutch 27. The driving member 26 is provided with teeth 28 and may be secured to the shaft 22 by a screw threaded set screw or the like 29.

Rotatably and slidably mounted on shaft 22 is a sleeve 30 provided at one end thereof with a driven clutch member 31 having teeth 32 complementary and adapted to mesh with teeth 28 in clutch driving member 26. Sleeve 30 is also provided with a flange 33 spaced longitudinally from the driven clutch member 31 and forming therewith a winding drum 34 adapted to receive a cable 34' for a purpose to be presently described. At the opposite end of sleeve 30 from driven clutch member 31 there is fixed thereto a spur gear 35 meshing with a spur gear 36 fixed on a shaft 37 extending substantially parallel to shaft 22 and being rotatably supported on the base 21 by bearings 38. On one end of shaft 37 there is mounted a bevel gear 39 meshing with bevel gear 40 mounted on one end of shaft 41 which in turn is rotatably mounted on base 21 by bearings 42. Shaft 41 extends at right angles to shaft 37 and as will be seen from an inspection of Figs. 2, 3 and 4 occupies a position across the inner end of shaft 22.

The control unit is driven by a gear 43 fixed to the outer end of shaft 22 and meshing with an idler gear 44 rotatably mounted on a stub shaft carried by bracket 45 which is pivotally mounted on base 21 by screw threaded fastening means or the like 46.

The operation of clutch 27 is controlled by a lever 47 pivotally mounted at 48 on an ear 49 depending from the lower surface of base 21. The upper end of lever 47 is provided with a roller 50 engaging between flange 33 and a second flange 51 longitudinally spaced therefrom on sleeve 30. It will therefore be seen that movement of lever 47 on pivot 48 will result in engagement of roller 50 with either flange 33 or flange 51 with consequent engagement or disengagement of the clutch teeth 28 and 32.

Clutch 27 is retained in engagement or disengagement by a novel mechanism supported on a frame 52 depending from the lower surface of base 21 adjacent the inner end thereof. Frame 52 is provided with side bars 53, lower cross bar 54 and an intermediate cross bar 55 having a portion thereof 56 removed to divide bar 55 into two sections with a passageway therebetween the purpose of which will presently appear. Pivotally mounted within the frame 52 and on side bars 53 are a pair of eccentric discs 57 which are rotatably held in position by pivot pins or the like 58 and 59. Eccentric discs 57 are connected by a rod 60 secured thereto radially of pins 58 and 59, the rod 60 and discs 57 serving to operate as a crank through a portion of one revolution. In order to limit the rotative movement of discs 57 and rod 60 the lower cross bar 54 of frame 53 is provided with a plate 61 secured to the upper side thereof by screw threaded fastening means or the like 62, plate 61 being provided with upwardly extending bolts 63 and 64 which may be locked in adjusted position by lock nuts 65 and 66 respectively. Rod 60 is adapted to engage the bolt heads 67 and 68 which prevent further angular rotative movement thereof in either direction the extent of this movement of course being adjustable by adjustment of bolts 63 and 64.

In order to resiliently hold rod 60 in engagement with either bolt head 67 or 68 there is provided a coil compression spring 69 received around a bar 70 pivotally mounted at 71 on a bracket 72 secured to the ends of intermediate cross bar 55 by screw threaded fastening means or the like 73. Rod 60 is slidably received in a slot 74 in bar 70, spring 69 being provided at the lower end thereof with a washer 75 engaging the upper surface of rod 60 and at the upper end thereof with a washer 76 engaging the lower surfaces of the two ends of intermediate cross bar 55. It will thus be seen that as eccentric discs 57 and rod 60 are rotated that the spring 69 will be progressively compressed until reaching dead center position, whereupon it will progressively expand until rod 60 engages the opposite bolt head where it will be resiliently held in position by spring 69 until moved in the opposite direction to engage with the opposite bolt head. This mechanism functions as a snap action in providing relatively fast and positive movement of the eccentric disc and rod 60 and also serves to resiliently hold this rod in either extreme position of movement.

Pivotally secured to lever 47 adjacent the lower end thereof at 77 is link 78 provided with a slot 79 slidably received on rod 60. This results in a lost motion connection between rod 60 and link 78 which permits rod 60 to travel beyond dead center before contacting the end of slot 79. Upon contacting such end clutch 27 will be engaged or disengaged as the case may be and due to the action of spring 69 this will be accomplished with substantially no overrun and no delay in engagement. The above described structure also operates to disengage the clutch 27 after the spinning frame stops since as soon as rod 60 passes dead center position further movement thereof to actuate the clutch is accomplished by spring 69 and further operating power from the cross shaft 14 is not required.

In order that the clutch 27 may be manually engaged or disengaged at will, pivot pin 59 is provided with an extension 80 fixed thereto by a pin 81 or the like, a lever 82 projecting from extension 80 at substantially right angles thereto and being provided adjacent the end thereof with a hand engaging portion 83 by which means the operator may grasp the same and either engage or disengage the clutch 27 at will.

In order to securely maintain the control unit 20 on the spinning frame, base 21 is provided with downwardly extending lugs or bosses 84 along one edge thereof, these bosses being adapted to engage over the vertical flange 85 of bottom rail 11, the unit being held in position by

bolts or the like 86 extending through the horizontal flange 87 of the rail 11.

The control unit is driven by a gear 88 meshing with idler gear 44, gear 88 being carried by a shaft to the opposite end of which is fixed a gear 89. Gears 88 and 89 together with their supporting shaft are carried by a bracket 90 which may be adjustably secured on the spinning frame by screw threaded fastening means or the like 91. Gear 89 meshes with gear 92 which is a part of the driving mechanism of the spinning frame and consequently serves to operate and drive the control unit 20 in timed relation to the operation of the spinning frame.

In order to control the operation of the spinning frame by the control unit described above, cross shaft 14 of the spinning frame is provided with an arm 93 fixed thereto, this arm terminating in a segment 94 and being also provided with a laterally extending pin 95. Pin 95 is slidably received in a slot 96 adjacent one end of a link 97 the opposite end of which is rotatably received on rod 60. Slot 96 provides a lost motion connection between link 97 and arm 93, thus permitting movement of arm 93 through a relatively large arc thereby causing pin 95 to contact the end of slot 96 and move 97 as arm 93 approaches the end of its angular movement in either direction.

Arm 93 is provided at one end of the segment 94 with an upstanding ear 98 to which is secured a chain 99, the opposite end of this chain being fixed to winding drum 100 mounted on shaft 41 for rotation therewith. It will thus be seen that with ring rail 12 in raised position at which time bobbins 17 are filled with yarn, the arm 93 will be in its extreme counterclockwise position as viewed in Fig. 1 and in this position will through pin 95, slot 96, link 97, rod 60, link 78 and lever 47 cause the engagement of clutch 27 which in turn will result in the rotation of winding drum 100, thus winding chain 99 thereon and moving arm 93 in a clockwise direction as viewed in Fig. 1 to lower ring rail 12 to its starting position. When ring rail 12 reaches its lowermost position arm 93 will be in its extreme clockwise position as viewed in Fig. 1 and at this time will operate through the linkage above enumerated to disengage clutch 27 thus stopping operation of the control unit 20. Since this operation disengages the clutch 27 winding drum 100 will be free to rotate, thus permitting unwinding of the chain 99 and consequent counterclockwise movement of the arm 93 during subsequent upward movement of the ring rail 12.

The control unit 20 also serves to stop the spinning frame upon movement of ring rail 12 to its lowermost position and for this purpose cable 34' which is attached to winding drum 34 is trained around suitable pulleys or guides 101 attached to the spinning frame cable 34' terminating in a clamp 102 adjustably secured to control rod 13 by a set screw or the like 103. It will thus be seen that upon operation of the control unit by engagement of the clutch 27 that winding drum 34 will also rotate to wind cable 34' thereon and the speed of rotation and size of the winding drum is such as to move control rod 13 the proper amount to disengage the driving belt from the driving pulley at the same time that ring rail 12 reaches its lowermost position, thus stopping the spinning frame to permit the removal of the filled bobbins and their replacement by empty bobbins. Upon completion of the downward movement of ring rail 12 the same is locked in its lowermost position by engagement of pedal 15 with pivoted latch 104 and after the filled bobbins have been replaced by empty bobbins the spinning frame is started by merely releasing latch 104 and moving contol rod 13 to reengage the driving belt with the driving pulley.

It will be seen that by this invention there has been provided a substantially self-contained control unit which may be applied to a conventional spinning frame by merely mounting the unit on one of the lower side rails thereof and by mounting the unit on one of the lower side rails thereof and by mounting bracket 90 in a proper position to cause meshing engagement of gear 89 with gear 92 and to mount arm 93 on cross shaft 14. In order to place the unit in operation it only remains necessary to connect chain 99 to ear 98 and clamp 102 to control rod 13. It will also be obvious that the control unit may be placed in operation at any time by manual operation of the handle 83 to thus lower the ring rail 12 and stop the spinning frame or the operation of the control unit may be interrupted at any time during its cycle of operation by movement of the handle 83 to disengage clutch 27. The control unit of this invention is entirely automatic in operation and will serve to control the operation of the spinning frame without attention from the operator, thus leaving him free to perform other duties in connection with other spinning frames and to prevent overwinding of the bobbins with consequent loss of yarn.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. An automatic control unit for spinning frames provided with a drive belt, tight and loose pulleys, a belt shifter rod, drive gears, a rotatably mounted cross shaft, bobbin spindles, a ring rail and means connecting said ring rail and cross shaft for upward and downward movement of said ring rail upon rotation of said cross shaft, said control unit comprising a base, means for mounting said base on said frame, a first shaft rotatably mounted on said base, gearing for rotating said first shaft, a second shaft rotatably mounted on said base at right angles to said first shaft, a first winding drum rotatably and slidably received on said first shaft, a second winding drum fixed to said second shaft, means for driving said second shaft from said first winding drum, clutch teeth on said first winding drum, a clutch driving member fixed to said first shaft, cooperating clutch teeth on said clutch driving member, clutch operating means including spring actuated eccentric mechanism movable to one side or the other of dead center for engaging or disengaging said clutch, and for resiliently maintaining said clutch engaged or disengaged, a segment mounted on said cross shaft and having a pin extending therefrom, a slotted link engaging said pin and said eccentric mechanism for providing a lost motion connection therebetween, whereby said clutch will be operated by angular motion of said cross shaft in either direction, flexible means connecting said first winding drum and said belt shifter rod, flexible means connecting said second winding drum and said segment, whereby upon engagement of said clutch and rotation of said winding drums, said cross shaft will be rotated, thus moving said ring rail

to lowermost position and said belt shifter rod will be operated to stop said spinning frame and said clutch will be disengaged upon said ring rail reaching its lowermost position, and means comprising a handle operatively associated with said eccentric mechanism whereby the operation of said control unit may be manually controlled.

2. An automatic control unit for spinning frames provided with a drive belt, tight and loose pulleys, a belt shifter rod, drive gears, a rotatably mounted cross shaft, bobbin spindles, a ring rail and means connecting said ring rail and cross shaft for upward and downward movement of said ring rail upon rotation of said cross shaft, said control unit comprising a base, means for mounting said base on said frame, a first shaft rotatably mounted on said base, gearing for rotating said first shaft, a second shaft rotatably mounted on said base at right angles to said first shaft, a first winding drum rotatably and slidably received on said first shaft, a second winding drum fixed to said second shaft, means for driving said second shaft from said first winding drum, clutch teeth on said first winding drum, a clutch driving member fixed to said first shaft, cooperating clutch teeth on said clutch driving member, clutch operating means including spring actuated eccentric mechanism movable to one side or the other of dead center for engaging or disengaging said clutch, and for resiliently maintaining said clutch engaged or disengaged, a segment mounted on said cross shaft and having a pin extending therefrom, a slotted link engaging said pin and said eccentric mechanism for providing a lost motion connection therebetween, whereby said clutch will be operated by angular motion of said cross shaft in either direction, flexible means connecting said first winding drum and said belt shifter rod, flexible means connecting said second winding drum and said segment, whereby upon engagement of said clutch and rotation of said winding drums, said cross shaft will be rotated, thus moving said ring rail to lowermost position and said belt shifter rod will be operated to stop said spinning frame and said clutch will be disengaged upon said ring rail reaching its lower-most position.

3. An automatic control unit as defined in claim 1, in which a lost motion connection is provided between said clutch and said eccentric mechanism, whereby said eccentric mechanism constitutes a snap action for rapidly engaging or disengaging said clutch.

4. An automatic control unit as defined in claim 1, in which said clutch is engaged or disengaged by said eccentric mechanism after passing dead center.

5. An automatic control unit for spinning frames provided with a drive belt, tight and loose pulleys, a belt shifter rod, driving gears, a rotatably mounted cross shaft, bobbin spindles, a ring rail and means connecting said ring rail and said cross shaft for upward and downward movement of said ring rail upon rotation of said cross shaft, said control unit comprising a base, means for mounting said base on said frame, a first shaft rotatably mounted on said base, gearing for rotating said first shaft, a second shaft rotatably mounted on said base, a first winding drum rotatably and slidably received on said first shaft, a second winding drum fixed to said second shaft, means driving said second shaft from said first winding drum, clutch means connecting said first shaft and said first winding drum, clutch

operating means including spring actuated eccentric mechanism movable to one side or the other of dead center for engaging or disengaging said clutch and for resiliently maintaining said clutch engaged or disengaged, a segment mounted on said cross shaft and having a pin extending therefrom, a slotted link engaging said pin and said eccentric mechanism for providing a lost motion connection therebetween, whereby said clutch will be operated by angular movement of said cross shaft in either direction, flexible means connecting said first winding drum and said belt shifter rod, flexible means connecting said second winding drum and said segment, whereby upon engagement of said clutch and rotation of said winding drums, said cross shaft will be rotated, thus moving said ring rail to its lowermost position and said belt shifter rod will be operated to stop said spinning frame and said clutch will be disengaged upon said ring rail reaching its lowermost position.

6. An automatic control unit for spinning frames having drive control means, and a rotatably mounted cross shaft adapted upon rotation thereof to raise or lower a ring rail, said control unit comprising a base, means for mounting said base on said frame, a first shaft rotatably mounted on said base, means for driving said first shaft, a second shaft rotatably mounted on said base, a first winding drum rotatably received on said first shaft, a second drum fixed to said second shaft, means driving said second shaft from said first winding drum, clutch means connecting said first winding drum and said first shaft, resilient clutch operating means for engaging and disengaging said clutch and for resiliently maintaining said clutch engaged or disengaged, a segment mounted on said cross shaft, and having a pin extending therefrom, a slotted link engaging said pin and said clutch operating means for providing a lost motion connection therebetween, whereby said clutch will be operated by angular movement of said cross shaft in either direction, flexible means connecting said first winding drum and said drive control means, flexible means connecting said second winding drum and said segment, whereby upon engagement of said clutch and rotation of said winding drums, said cross shaft will be rotated, thus moving said ring rail to lowermost position and said drive control means will be operated to stop said spinning frame and said clutch will be disengaged upon said ring rail reaching its lowermost position.

7. An automatic control unit for spnnning frames having drive control means and a rotatably mounted cross shaft adapted upon rotation thereof to raise or lower a ring rail, said control unit comprising a base, means for mounting said base on said frame, first and second winding drums, means for driving said second winding drum from said first winding drum and means for driving said first winding drum including a clutch, resilient clutch operating means for engaging or disengaging said clutch and for resiliently maintaining said clutch engaged or disengaged, an arm mounted on said cross shaft, a lost motion connection between said arm and said clutch operating means whereby said clutch will be operated by angular movement of said cross shaft in either direction, flexible means connecting said first winding drum and said drive control means, flexible means connecting said second winding drum and said arm whereby upon engagement of said clutch and ro-

tation of said winding drums said cross shaft will be rotated thus moving said ring rail to lowermost position and said drive control means will be operated to stop said spinning frame and said clutch will be disengaged upon said ring rail reaching its lowermost position.

8. An automatic control unit as defined in claim 7 in which means comprising a handle is operatively associated with said clutch operating means whereby the operation of said control unit may be manually controlled.

9. For use with a spinning frame having drive control means and a rotatably mounted cross shaft adapted upon rotation thereof to raise or lower a ring rail, an automatic control mechanism comprising winding drums, means to rotate said winding drums, control means for said rotating means constructed and arranged to start or stop said winding drums, means connecting one of said drums to said drive control means, means connecting another of said winding drums to said cross shaft whereby upon rotation of said winding drums said cross shaft will be rotated to lower said ring rail and said drive control means will be activated, a connection including lost motion mechanism between said cross shaft and said rotating control means whereby said rotating control means may be actuated by rotation of said cross shaft.

10. A control mechanism as defined in claim 9 in which said rotating control means operates with a snap action thereby preventing overrunning of the parts and consequent operation of said rotating control means after said spinning frame has stopped.

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No references cited.