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Vidler

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[54] **AUXILIARY RING RAIL POSITIONING MEANS FOR TEXTILE TWISTER OR LIKE MACHINE**

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[51] **Int. Cl.** **D01h 9/14,** B65h 54/28

[58] **Field of Search** ..... 57/34 R, 52–54; 242/26.1, 26.2, 26.3, 26.4

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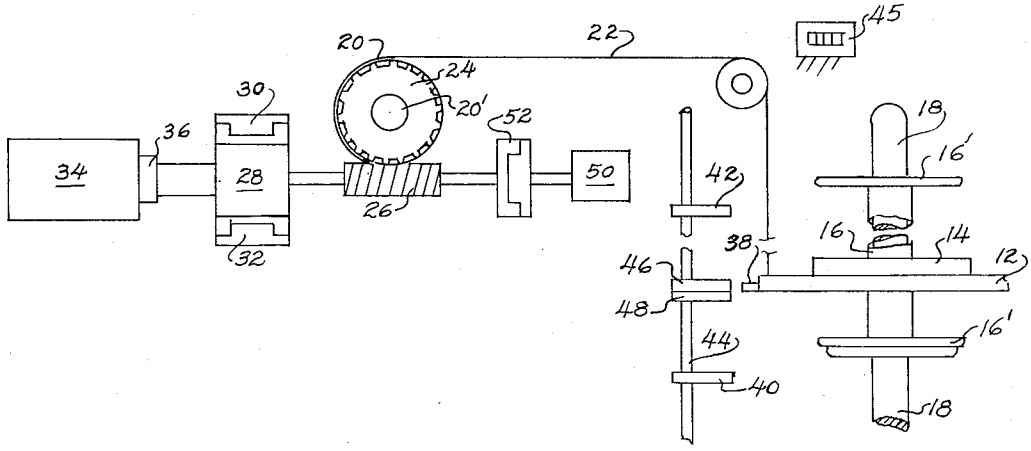
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[57] **ABSTRACT**

In immediate response to the detection by a yardage counter or the like of a full package condition at the textile machine, the auxiliary ring rail positioning means rapidly moves each ring rail of the machine directly and unidirectionally, from whatever random vertical position it might then occupy, to a preselected doffing position preferably located between and in spaced relation to the opposite ends of the normal path of reciprocatory movement of the ring rail. Upon each subsequently ensuing start-up of the machine, the auxiliary ring rail positioning means rapidly reciprocates each ring rail, between the aforesaid preselected doffing position and the lower limit of the rail's normal path of reciprocatory movement, for an adjustably variable time period sufficient to "tie-in" the yarn ends.

6 Claims, 2 Drawing Figures



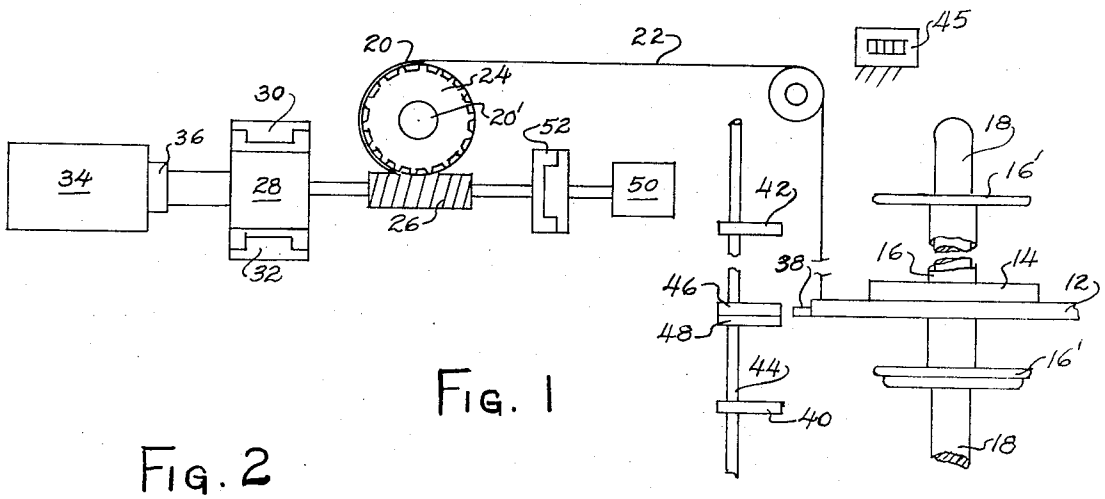
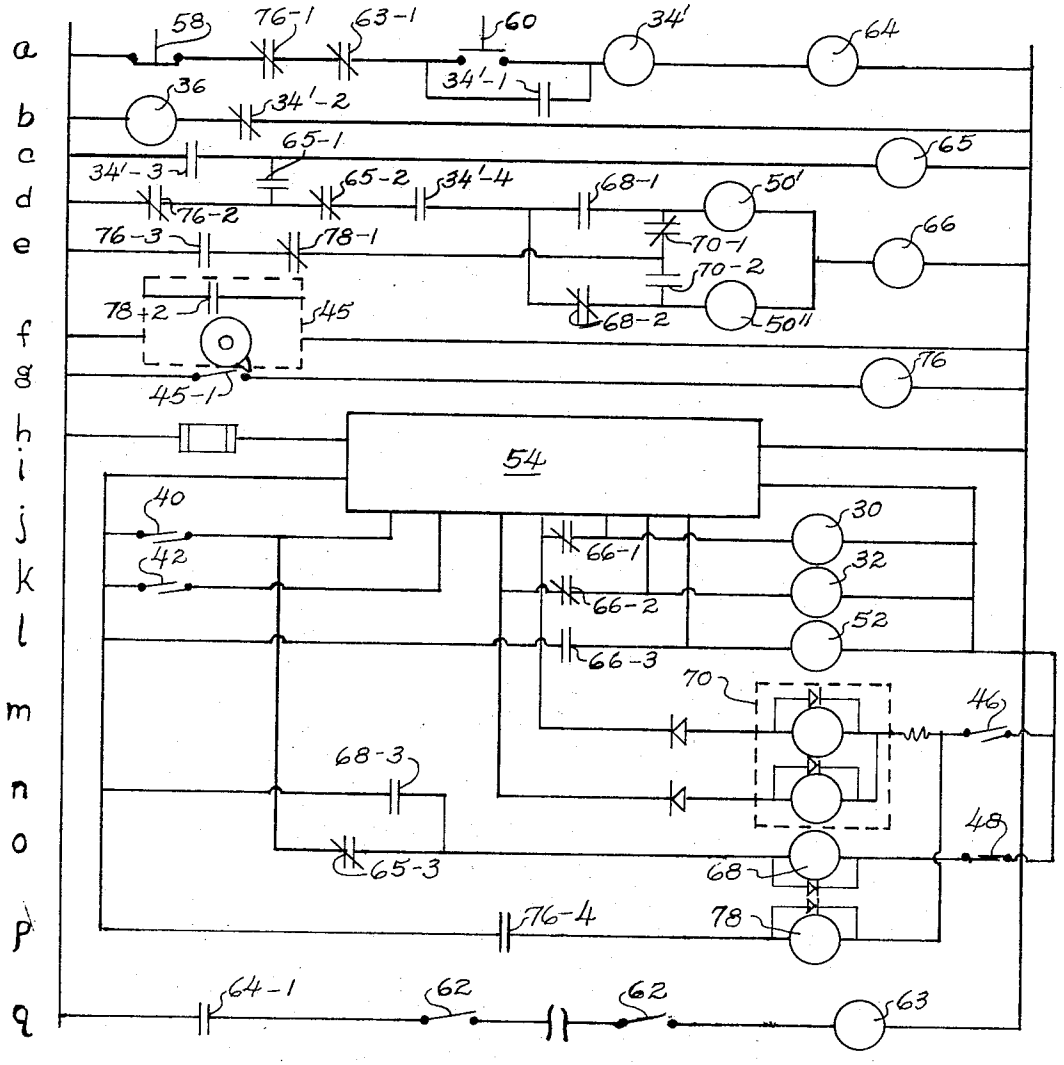

20
22
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24
30
20'
52
18
36
16'
34
28
50
42
26
16
14
38
12
46
48
44
16'
40
18
32

FIG. 1

FIG. 2


a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
q
58
76-1
63-1
60
34'
64
34'-1
36
34'-2
65-1
65
34'-3
65-2
34'-4
68-1
50'
76-2
70-1
66
76-3
78-1
70-2
78+2
45
68-2
50''
76
45-1
54
40
30
66-1
42
32
66-2
52
66-3
70
46
68-3
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65-3
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76-4
78
64-1
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62
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AUXILIARY RING RAIL POSITIONING MEANS FOR TEXTILE TWISTER OR LIKE MACHINE

BACKGROUND OF THE INVENTION

This invention relates to textile yarn twisters and like machines having ring rails which during normal operation of the machines are vertically reciprocated reciprocatorily by builder mechanisms, and more particularly relates to auxiliary means for positioning and moving the ring rails of such a machine in a manner facilitating its doffing and subsequent start-up.

Textile spinning machines have heretofore been provided with so-called automatic doff preparation systems effective to position the machines' ring rails at the extreme lower ends of their vertical reciprocatory paths of travel, preparatory to the substitution of empty yarn package members for the full packages upon the machines, and also effective during subsequent start-up of the machines to impart a "jogging motion" to the ring rails before again restoring control of ring rail movement to the machines' builder mechanisms. The automatic doff preparation systems used in association with textile spinning machines are not, however, readily adaptable in all respects to textile twisting machines. Textile twisting machines employ a yarn collection package member which is normally considerably larger than any employed upon spinning machines, and which usually has a relatively large diameter flange extending radially outwardly from at least the lower end thereof. Additionally, during the production of at least some particular types of yarns, such as that employed for tire cord, the ring rails of textile twisting machines are moved not only through a much longer reciprocatory path of travel than the ring rails of spinning machines, but also are moved at a relatively slow rate of speed.

If the ring rails of a textile twisting machine, as opposed to a textile spinning machine, were positioned during doffing closely adjacent the bottom of their reciprocatory paths of travel, the flanged yarn collection members employed in association with the twisting machines would significantly impede performance by the machine operator of certain required duties, such as traveler threading and/or replacement, attendant the doffing operation. It is therefore desirable for each ring rail of a textile twisting machine to be moved, preparatory to each doffing of the machine, to a doffing position located intermediate the length and spaced from the ends of the normal path of reciprocatory movement of the ring rail. It is also desirable for each ring rail of a twisting machine to be rapidly and directly moved to such a preselected doffing position, from whatever random vertical position the ring rail might then occupy, immediately upon the detection of a full package condition by the machine's yardage counter or the like. If a twisting machine of the type in question were permitted to continue in normal operation following detection of a full package condition by its yardage counter and until, say, its ring rails reached one or the other of the opposite ends of the path of reciprocatory movement thereof, the amount of yarn collected upon the packages produced by the machine could vary by as much as several hundred yards or more. This, in turn, would create a highly undesirable problem of varying "run-out" during subsequent processing of such yarn at other textile machines. On the other hand, if the twisting machine were immediately deactuated upon detection of a full package condition and the movement of its ring rails to a doffing position were accomplished so slowly or indirectly as to still be in progress long after all of the other machine's components had come to a complete halt, breakage of yarn and/or travelers would likely ensue.

OBJECTS OF THE INVENTION

With the foregoing in mind, the primary object of the invention is the provision of auxiliary ring rail positioning means, in association with a textile twister or like machine of the type described above, for rapidly and unidirectionally moving each ring rail of such machine to a preselected doffing position thereof, preferably located intermediate the length and in vertically spaced relationship to the opposite ends of the normal path of reciprocatory vertical movement of the ring rail, immediately upon the detection of a full package condition at the machine and irrespective of the random vertical position which the ring rail might occupy in relation to the preselected doffing position at the time when the full package condition is detected.

An additional object of the invention is the provision of auxiliary ring rail positioning means which, in addition to performing the aforesaid function, is effective upon start-up of the machine following the substitution of empty package members for the full packages thereon, to rapidly reciprocate each ring rail of the machine for a desired limited time period between the preselected doffing position of the ring rail and the bottom of its normal path of reciprocatory movement, or a portion thereof, for "tying in" the yarn ends upon the empty package members.

DESCRIPTION OF THE DRAWINGS

Still other objects and benefits of the invention will be in part apparent and in part pointed out specifically hereinafter in the following description of an illustrative embodiment thereof, which should be read in conjunction with the accompanying drawing in which:

FIG. **1** is a schematic rear elevational view of builder mechanism and related components of a textile twister or like machine equipped with auxiliary ring rail positioning means embodying the invention; and

FIG. **2** is a diagramatic representation of the electrical circuitry of the auxiliary ring rail positioning means and associated components of the builder mechanism of the machine of FIG. **1**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. **1** the numeral **10** designates a fragmentarily shown textile yarn twister or like machine having on each side thereof an elongate ring rail **12** and a plurality of yarn processing stations or "deliveries," at each of which a twisting ring **14** carried by ring rail **12** encircles a yarn collection package member **16** mounted for rotative movement upon an upright spindle **18** carried by a spindle rail (not shown) underlying ring rail **12**. During normal operation of machine **10**, yarn directed downwardly from the machine's creel and feed rolls (not shown) passes through a traveler (not shown) movable about twisting ring **14** and is collected upon package member **16** while the package is rotated by spindle **18** and while ring rail **12** is vertically reciprocated by the builder mechanism of machine **10**.

As schematically shown in FIG. 1, the builder mechanism of machine 10 includes a windlass 20 connected by one or more flexible tapes 22 and other components (not shown) to each ring rail 12 of machine 10. Windlass 20 is rotatable by a worm gear 24 affixed to its center shaft 20' and meshing with a worm 26 drivable at one end through a gear box 28 having a pair of electric clutches 30,32 associated therewith. Gear box 28 receives its input from the main drive motor 34 of machine 10, which motor also drives the yarn feed rolls (not shown) and spindles 18 of machine 10, and has a suitable electric brake 36 associated therewith. During normal operation of machine 10, drive motor 34 is continuously actuated and electric clutches 30,32 are alternately energized to produce the desired vertical reciprocatory movement of ring rail 12. When clutch 30 is energized, gear box 28 rotates worm 26 in a direction causing counterclockwise (as viewed in FIG. 1) rotation of worm gear 24 and windlass 20 and thus causing upward movement of ring rail 14. When the other clutch 32 is energized, gear box 28 reverses the direction of rotation of worm 26 and therefore of worm gear 24 and windlass 20, and ring rail 14 moves downwardly. Alternate energization of clutches 30,32 may be accomplished by switching means including a switch actuating element 38 and a pair of switch elements 40,42, the latter being respectively associated in a manner described more fully hereinafter with clutches 30,32. Switch element 38, which illustratively and preferably is of the magnetic type, is mounted for movement in unison with ring rail 12 along a path of travel correlated with that of the ring rail. Switch elements 40,42, which illustratively and preferably are of the magnetically-actuable reed switch type, are mounted adjacent the aforesaid path of travel of actuator element 38 for proximity actuation thereby and preferably for independent adjustive toward and away from one another. FIG. 1 shows actuator element 38 mounted upon one end of ring rail 12, and switches 40,42 mounted upon a rod 44 for manual adjustive movement toward and away from each other longitudinally of rod 44 and the adjacent path of travel of actuator element 38. Such showing is only illustrative, however, and elements 38,40,42 may be mounted in various other locations and ways, as upon shaft 20' and in the manner disclosed in commonly-assigned U.S. application Ser. No. 304,380, filed Nov. 7, 1972, now U.S. Pat. No. 3,811,628 and entitled CONTROL MEANS FOR THE BUILDER MECHANISM OF TEXTILE YARN TWISTER OR LIKE MACHINE.

The illustrated yarn collection package member 16 is of the conventional spool-like type, consisting of a relatively long central tube or core having end flanges 16' of relatively large diameter projecting radially outwardly from its opposite ends, commonly used upon textile twisters when a "regular" or cylindrical full-package shape is desired. To realize such a full package shape, switches 40,42 are positioned so as to be actuated by actuator element 38 whenever the twisting ring 14 carried by ring rail 12 is adjacent the elevation of end flanges 16' of package member 16. With switches 40,42 so positioned, ring rail 12 will be vertically reciprocated therebetween by the builder mechanism of machine 10, usually at a relatively slow speed, during normal operation of the machine and until a desired amount of yarn has been collected upon each package member 16. The collection of a desired amount of yarn is detected by full package detecting means, such as the yardage counter 45 schematically shown in FIG. 1, customarily provided in association with a machine of the type of twister 10. Upon detection by counter 45 of a full package condition, it is desirable for main drive motor 34 of machine 10 to be promptly deactuated and for ring rail 12 to be rapidly moved, from whatever random position it might then occupy and while the machine's yarn feed rolls (not shown) and spindles 18 are brought by brake 36 to a controlled halt, directly to a doffing position facilitating the performance by the machine operator of his duites attendant the substitution of empty package members 16 for the full packages upon machine 10. The large diameter flange 16' at the lower end of each package 16 would impede the performance of certain of the aforesaid operator duties, particularly traveler threading and/or replacement, if ring rail 12 were positioned during doffing adjacent the bottom of its normal reciprocatory path of travel. It is therefore desirable for the doffing position of ring rail 12 to be located intermediate the opposite ends, and preferably at least some 3 to 4 inches above the lower end or bottom, of the normal path of reciprocatory movement of ring rail 12.

The present invention provides auxiliary ring rail positioning means, independent of main drive motor 34 but correlated in operation therewith, for rapidly and unidirectionally moving ring rail 12 to a preselected doffing position, which may be at any desired location intermediate the opposite ends of the normal reciprocatory path of travel of ring rail 12, immediately upon detection of a full package condition at machine 10 by yardage counter 45. The auxiliary ring rail positioning means also is adapted to impart a "jogging" motion, i.e., rapid reciprocatory movement over a brief time period, to ring rail 12 upon start-up of machine 10 following substitution of empty package members 16 for the full packages upon the machine, for the purpose of "tying in" the yarn ends upon the empty package members.

Those components of the aforesaid auxiliary ring rail positioning means which are schematically shown in FIG. 1 include additional switch elements 46,48, an auxiliary reversible ring rail drive motor 50, and an associated electric clutch 52. Motor 50 is connectable through clutch 52 to worm 26 adjacent that end thereof opposite gear box 28 and main drive motor 34. When clutch 52 and the forward winding coils of auxilliary motor 50 are actuated, the motor rotates worm 26, worm gear 24 and windlass 20 in a direction causing upward movement of ring rail 12. When the reverse winding coils of motor 50 are actuated while clutch 52 is energized, the motor rotates worm 26, worm gear 24 and windlass 20 in an opposite direction and causes ring rail 12 to move downwardly. The speed of motor 50 is such that the ring rail movement which it produces is much more rapid than the ring rail movement produced by main drive motor 34 and gear box 28 during normal operation of machine 10. Switch elements 46,48 may be and illustratively are of the same reed switch type as switches 40,42, and illustratively are mounted in the same manner as switches 40,42 for unitary adjustive movement therebetween longitudinally of rod 44 and the adjacent vertical path of travel of actuator element 38. Switches 46,48 are vertically positioned, either by the manufacturer or by the operator of machine 10, so as to be actuated by magnetic ele-

ment **38** when ring rail **12** is at the reciprocatory position thereof which it is desired for the rail to occupy during doffing of machine **10.** In FIG. **1** ring rail **12** is shown in such a preselected doffing position which is located several inches above the bottom of the path of reciprocatory movement of ring rail **12** during normal operation of machine **10.** The preselected doffing position of ring rail **12** could be readily varied, either upwardly or downwardly, simply by repositioning switches **46,48** upwardly or downwardly upon rod **44.**

Various of the components discussed above in connection with FIG. **1** of the drawing are also shown in the FIG. **2** electrical diagram. As may be seen at lines *h–n* of FIG. **2,** reed switches **40,42,46,48** and electric clutches **30,32,52** are all operatively associated with a clutch power supply controller **54** of a conventional known type. A relay **34'** (line *a*) is effective when energized to, among other things, actuate main drive motor **34** (FIG. **1**) and deactuate brake **36** (FIG. **1** and line *b* of FIG. **2**). A pair of relays **50',50''** (line *d*) are similarly effective when energized to respectively actuate reversible auxiliary motor **50** (FIG. **1**) in forward (ring rail up) or reverse (ring rail down) driving directions. As is diagramatically indicated at line f of FIG. **2,** yardage counter **45** of machine **10** includes a cam operated switch **45-1** which closes upon detection by counter **45** of a full package condition at machine **10,** and which again opens upon resetting of counter **45.** The FIG. **2** electrical circuitry also includes such conventional components as manually operable switches **58,60** (line *a*) which when depressed respectively stop and start machine **10,** and a plurality of "end-down" detecting switches **62** (only an illustrative two of which are shown, at line *q*) each effective upon closure to also stop machine **10** by energizing a relay **63** having a normally closed contact **63-1** (line *a*) in series with main drive motor relay **34'.**

The remaining components of the FIG. **2** electrical circuitry will all be referred to as their function is described in the following explanation of the operation of machine **10.**

All components of the FIG. **2** electrical circuitry are shown in the conditions which they occupy immediately prior to start-up of machine **10,** at which time ring rail **12** is in its doffing position shown in FIG. **1.** Start-up of machine **10** is initiated by an operator momentarily depressing start switch **60** (line *a* of FIG. **2**), which energizes main motor relay **34'** and a time delay relay **64** having a single contact **64-1** (line *q*) in series with end-down detecting switches **62.** Contact **64-1** remains open until normal operation of machine **10** has been established, at which time relay **64** operates to close contact **64-1.** Energization of relay **34'** actuates main drive motor **34** (FIG. **1**) and simultaneously effects closing of relay contacts **34'-1** and **3** and opening of contacts **34'-2** and **4.** Closure of contact **34'-1** maintains relay **34'** energized notwithstanding release of start switch **60** by the machine operator. Opening of contact **34'-2** (line *b*) releases the brake **36** associated with main drive motor **34.** Closure of contact **34'-3** (line *c*) starts the timing cycle of an adjustable timing relay **65,** the various contacts of which do not operate until relay **65** times out. Closure of contact **34'-4** (line *d*) energizes the reverse or down relay **50''** of auxiliary motor **50** and simultaneously energizes a clutch relay **66** having a plurality of contacts **66-1,2** and **3** in the clutch-control part of the FIG. **2** circuitry. Opening of contacts **66-1** and **2** (lines **5** and **6**) maintains the clutches **30,32** associated with gear box **28** (FIG. **1**) in a released condition, and therefore prevents rotation of worm **26** and windlass **20** (FIG. **1**) by main drive motor **34** notwithstanding the latter's actuation. Closure of clutch relay contact **66-3** (line **1**) energizes the clutch **52** coupling auxiliary motor **50** to worm **26** (FIG. **1**). This, in conjunction with the previously-mentioned actuation of down relay **50''**, causes auxiliary motor **50** to rapidly move ring rail **12** (FIG. **1**) of machine **10** downwardly from its preselected doffing position (shown in FIG. **1**) toward the bottom of its normal reciprocatory path of travel. As ring rail **12** moves downwardly from its preselected doffing position, the movement therewith of magnetic actuator element **38** (FIG. **1**) from its prior position of proximity to reed switch **48** permits such reed switch to return to a normally closed condition. When its further downward movement brings ring rail **12** to the bottom of its normal reciprocatory path of travel, the then-proximity between actuator element **38** and reed switch **40** (FIG. **1** and line *j* of FIG. **2**) closes such reed switch and thereby operates a latching relay **68** (line *o*) in series with reed switches **40,48.** Operation of relay **68** causes closure of its contact **68-1** (line *d*), which is in series with up relay **50'** of auxiliary motor **50,** and opening of its contact **68-2** in series with down relay **50''** of motor **50.** This of course causes reversal of the direction of rotation of worm **26,** worm gear **24** and windlass **20,** and thereby causes reversal of the direction of movement of ring rail **12** from downwardly to upwardly. When ring rail **12** again reaches its preselected doffing position shown in FIG. **1,** the then proximity of actuator element **38** to normally closed reed switch **48** again opens switch **48.** Opening of reed switch **48** releases latching relay **68** to its original condition, illustrated in the drawing and wherein its contacts **68-1** and **2** are respectively opened and closed, causing another reversal of the operating condition of auxiliary motor **50** and ensuing reversal of the direction of movement of ring rail **12** from upwardly to downardly. The foregoing cyclic operation, and the resulting "jogging motion" or rapid reciprocatory movement of ring rail **12** between its preselected doffing position and the bottom of its normal reciprocatory path of travel, is continued for a brief period of time, which may be varied by adjustment of timing relay **65** (line *c*) and illustratively is approximately 10 seconds, until relay **65** times out.

Timing out of relay **65** causes closure of its holding contact **65-1** (between lines *c* and *d*) and opening of its contacts **65-2** and **3.** Opening of contact **65-3** (line *o*) disassociates latching relay **68** from reed switch **40.** Opening of contact **65-2** (line *d*) deactuates one and inhibits both auxiliary motor relays **50',50''**, and simultaneously deenergizes clutch relay **66.** Opening of the latter's contact **66-3** (line **1**) deenergizes auxiliary motor clutch **52,** thereby uncoupling the deactuated auxiliary motor **50** from worm **26** (FIG. **1**). Closure of contacts **66-1** and **2** of relay **66** restores control of clutches **30,32** to the respective reed switches **40,42.** Since reed switch **40** was last closed by actuator element **38** (FIG. **1**), clutch **30** is immediately actuated. This causes rotation of worm **26** (FIG. **1**) by gear box **28** (FIG. **1**) in a direction continuing or producing upward movement of ring rail **12.** When ring rail **12** reaches the top of its normal reciprocatory path of travel, the then proximity of actuator element **38** (FIG.

1) to upper reed switch 42 closes the switch, thereby causing release of clutch 30 and engagement of clutch 32. This reverses the direction of rotation of the output of gear box 28 (FIG. 1), and thereby causes reversal of the direction of movement of ring rail 12 from upwardly to downwardly. When ring rail 12 reaches the bottom of its normal reciprocatory path of travel, reed switch 40 is actuated by actuator element 38 and the direction of movement of ring rail 12 is again reversed, this time from downwardly to upwardly. Further reversals of the direction of movement of ring rail 12 then occur, in like manner and at opposite ends of its reciprocatory path of travel, for so long as machine 10 remains in operation and until the desired amount of yarn has been collected upon package members 16.

During its aforesaid reciprocatory movement, ring rail 12 of course passes repeatedly through its illustrated preselected doffing position, since such position is intermediate the length of the rail's normal reciprocatory path of travel. Each time ring rail passes through such preselected doffing position, normally open reed switch 46 (FIG. 1, and line *m* of FIG. 2) is momentarily closed by its then proximity to magnetic actuator element 38. Each closure of reed switch 46 changes the condition of a bistable latching relay device 70 (lines *m* and *n*) connected to clutch controller 54 and having a pair of contacts 70-1 and 70-2 (line *e*) respectively in series with up relay 50′ and down relay 50″ of auxiliary motor 50. When reed switch 46 is closed during upward movement of ring rail 12, the input which device 70 then receives from controller 54 places device 70 in a set condition, wherein its contacts 70-1 and 2 are respectively open and closed. When reed switch 46 is closed during downward movement of ring rail 12, the input which device 70 then receives from controller places device 70 in a reset condition, wherein its contacts 70-1 and 2 are respectively closed and open.

When the desired amount of yarn has been collected upon package members 16, the full package condition thereof is detected by yardage counter 45, and its cam switch 45-1 (line *g* of FIG. 2) closes, causing energization of a relay 76 having normally open contacts 76-3 and 4 and normally closed contacts 76-1 and 2. Opening of contact 76-1 (line *a*) deenergizes relays 34′ and 64, which causes deactuation of main drive motor 34, controlled application of brake 36, and inhibition of the end-down detecting switches 62 (line *r*). Contact 76-4 (line *p*) of relay 76 is in series with a latching relay 78 and with normally open reed switch 46. If by chance ring rail 12 should be in its preselected doffing position shown in FIG. 1 when yardage counter cam switch 45-1 is opened, closure of contact 76-4 would immediately energize relay 78. It will be appreciated, however, that the foregoing situation would rarely occur, and usually ring rail 12 would be above or below its preselected doffing position upon the detection of a full package condition by yardage counter 45. In this more usual case, relay 78 would not be energized until ring rail 12 had been moved to its preselected doffing position from whatever random position it might occupy thereabove or therebelow. Direct movement of ring rail 12 to its preselected doffing position rapidly transpires, irrespective of whether the ring rail is located thereabove or therebelow, due to closure of contact 76-3 (line *e*) of relay 76. Closing of contact 76-3 actuates either up relay 50′ or down relay 50″ of auxiliary drive motor 50, depending upon whether ring rail 12 is below or above its preselected doffing position, and simultaneously energizes clutch relay 66, the various contacts of which cause release of clutches 30,32 and engagement of clutch 52. Up relay 50′ of auxiliary motor 50 is actuated when ring rail 12 is below its preselected doffing position, in which event contacts 70-1 and 2 of bistable device 70 are respectively closed and open. Down relay 50″ of auxiliary motor 50 is actuated when ring rail 12 is above its preselected doffing position, in which event contacts 70-1 and 2 of bistable device 70 are respectively opened and closed. Irrespective of whether ring rail 12 is above or below its preselected doffing position when yardage counter 45 of machine 10 detects a full package condition thereat, ring rail 12 is therefore moved rapidly and unidirectionally to its preselected doffing position. When ring rail 12 reaches such preselected position, actuator 38 (FIG. 1) closes reed switch 46, energizing relay 78 (line *p* of FIG. 2) and thereby causing its contacts 78-1 and 2 to respectively open and close. Opening of contact 78-1 (line *e*) deactuates auxiliary drive motor 50 and simultaneously deenergizes clutch relay 66. Closing of contact 78-2 effects resetting of yardage counter 45, during which resetting its cam switch 45-1 (line *g*) opens. Opening of switch 45-1 deenergizes relay 76, which completes the restoration of the circuitry of FIG. 2 to its illustrated condition.

It should be noted that if the normal operation of machine 10 is at any time interrupted by closure of either stop switch 58 (line *a*) or one of the end-down detecting switches 62 (line *r*), auxiliary motor 50 should not and will not be actuated, either upon shut-down or subsequent start-up of the machine. Since relay 76 will not in such a case have been energized, its contact 76-3 in line *e* of FIG. 2 will remain open, and its contact 76-2 in line *d* of FIG. 2 sill remain closed. Relay 65 will be maintained in an energized condition through its then-closed holding contact 65-1 (between lines *c* and *d*), and its contact 65-2 (line *d*) will therefore remain open.

While a preferred embodiment of the invention has been specifically shown and described, this was for purposes of illustration only, and not for purposes of limitation, the scope of the invention being in accordance with the following claims.

That which is claimed is:

1. In a textile yarn twister or like machine adapted during normal operation to collect yarn for packages and during doffing to have empty package members substituted for full packages thereon, said machine having a builder mechanism, a ring rail reciprocatorily movable by said builder mechanism along a vertical path of travel during normal operation of said machine and adapted to be positioned preparatory to doffing of said machine at a preselected doffing position along said path of travel, and full package detecting means for detecting a full package condition at said machine, the improvement comprising:

auxiliary ring rail positioning means for, in automatic response to each detection by said detecting means of a full package condition, rapidly and unidirectionally moving said ring rail to said preselected doffing position from the particular random position occupied by said ring rail upon said detection of said full package condition by said detecting means, said auxiliary means moving said ring rail downwardly to said preselected doffing position when said random ring rail position is thereabove

and moving said ring rail upwardly to said preselected doffing position when said random ring rail position is therebelow.

2. Apparatus as in claim **1,** wherein said auxiliary ring rail positioning means includes reversible auxiliary ring rail drive means for when actuated in a first operating condition thereof moving said ring rail rapidly upwardly and for when actuated in a second operating condition thereof moving said ring rail rapidly downwardly, and control means for monitoring during operating of said machine the vertical position of said ring rail relative to said preselected doffing position thereof and for, upon the detection of a full package condition by said detecting means, actuating said auxiliary drive means in the appropriate one of said operating conditions thereof to move said ring rail unidirectionally to said preselected doffing position.

3. Apparatus as in claim **2** wherein said builder mechanism includes builder drive means, a windlass having a center shaft, a worm gear mounted upon said windlass shaft, a worm shaft for driving said worm gear, and first clutch means for when actuated operatively connecting said builder drive means to one end of said worm shaft, said auxiliary ring rail positioning means including second clutch means for when actuated operatively connecting said auxiliary drive means to the other end of said worm shaft, and said control circuit means including switching means for simultaneously deactuating said first clutch means and actuating said second clutch means upon each detection of a full package condition by said full package detecting means.

4. Apparatus as in claim **1,** wherein said auxiliary ring rail positioning means includes reversible auxiliary ring rail drive means operatively connected to said ring rail during doffing of said machine, control means operatively connected to said auxiliary ring rail drive means for causing the same, upon start-up of said machine following the substitution of empty package members for full packages thereon, to rapidly reciprocate said ring rail for a preselected adjustable time period between said preselected doffing position of said ring rail and the bottom of said vertical path of travel thereof.

5. Apparatus as in claim **1,** wherein said auxiliary ring rail positioning means includes switching means actuable upon movement of said ring rail to said doffing position thereof, said switching means including a switch element and a cooperating switch actuating element, one of said elements being mounted for movement in unison with said ring rail along a path of travel correlated with said path of travel of said ring rail, and means mounting the other of said elements adjacent said path of travel of said one element for switch-actuating cooperating between said elements when said ring rail is in said doffing position.

6. Apparatus as in claim **5,** wherein said mounting means mounts said other of said elements for adjustive movement parallel to said path of travel of said one of said elements.

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