March 29, 1960 W. V. GOODHUE ET AL 2,930,543

WINDING MACHINE

Original Filed April 26, 1951

2 Sheets-Sheet 1

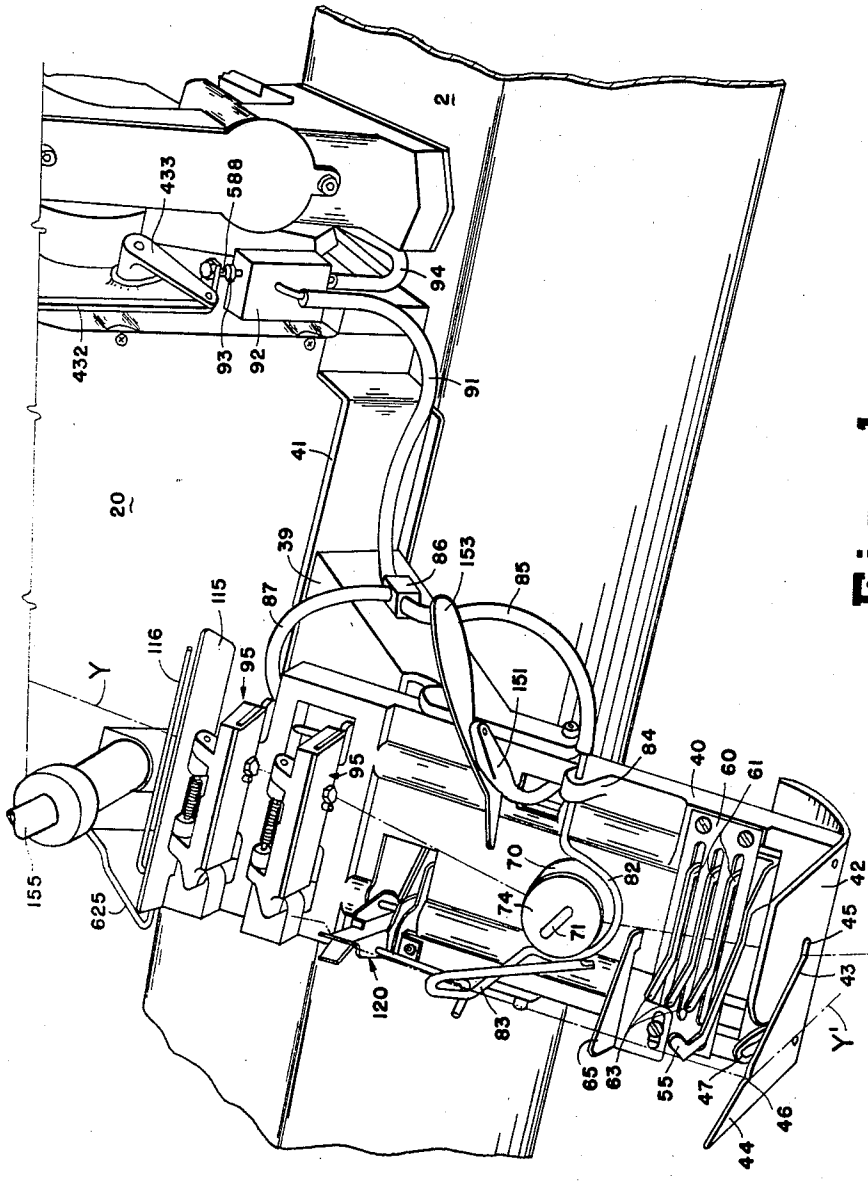


Fig - 1

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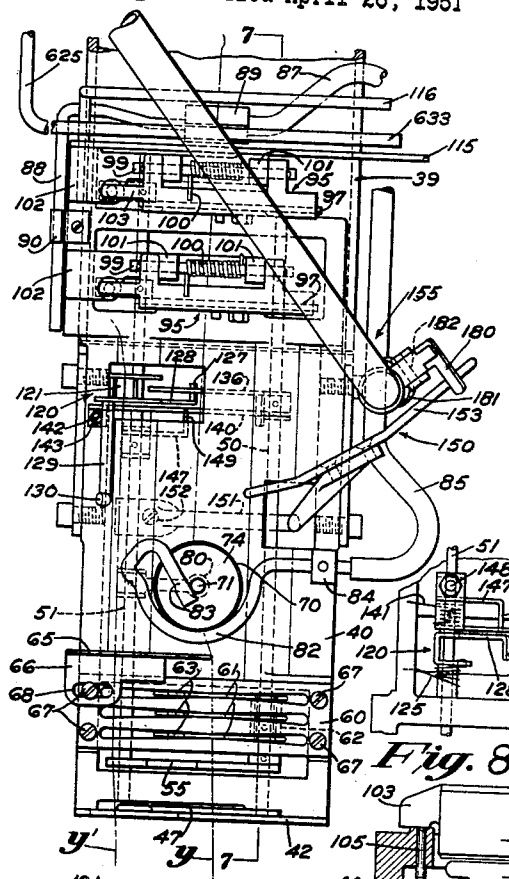


Fig. 2.

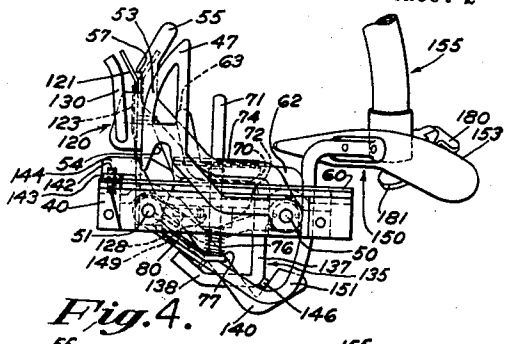


Fig. 4.

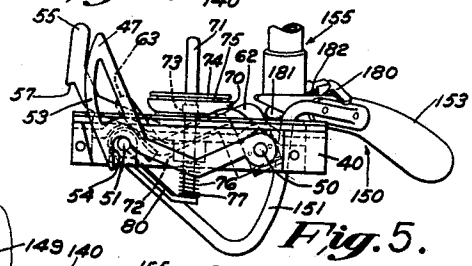


Fig. 5.

Fig. 8.

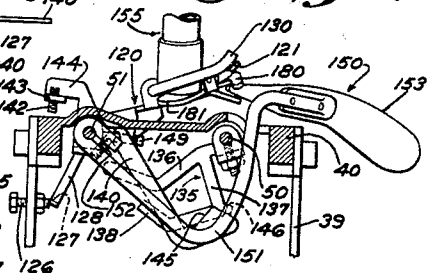


Fig. 6

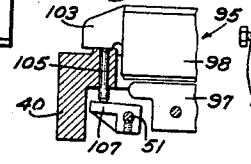


Fig. 9.

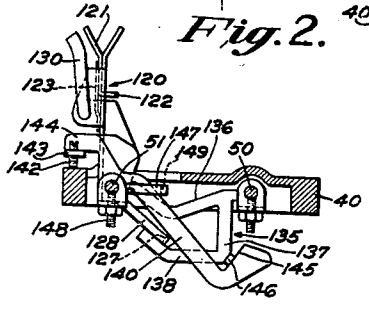


Fig. 7.

Fig. 3.

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2,930,543

WINDING MACHINE

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Original application April 26, 1951, Serial No. 223,022, now Patent No. 2,764,362, dated September 25, 1956. Divided and this application April 27, 1956, Serial No. 581,145

5 Claims. (Cl. 242—150)

This invention relates to winding machines for winding yarn or like strandular materials into cops, cones and other forms of packages and is a division of our copending application Serial No. 223,022, filed April 26, 1951, now Patent No. 2,764,362.

In the present specification and claims the term "yarn" is used in a general sense to designate all types of attenuated materials and the term "package" is employed for convenience of description to apply to any usual form of wound mass.

One object is to provide in a machine of the type indicated means for opening the tension-device to receive the new end and means for opening the slub-catchers.

Another object is to provide in a machine of the type indicated means for applying jets of air to the tension-device and slub-catchers as they are opened whereby to remove the lint, fluff or other foreign particles therefrom and valve-means for automatically operating the jets.

Further objects of the invention are set forth in the following specification which describes a preferred form of construction of the present invention by way of example as illustrated by the accompanying drawings. In the drawings:

Fig. 1 is a perspective view illustrating the tension assembly of the present invention mounted in its operating position on the frame of a winding machine of the type disclosed in United States Patent No. 2,764,362;

Fig. 2 is a plan view of the tension-assembly including the pair of slub-catchers and the means for cleaning the elements with air-jets;

Fig. 3 is a part-sectional side elevational view of the tension-assembly taken on line 7—7 of Fig. 2;

Figs. 4 and 5 are detailed views of the tension-device and the means for shifting the reserve supply yarn into position to be picked up by the tension-nozzle;

Figs. 6 and 7 are part-sectional detailed views of the same;

Fig. 8 is a fragmentary bottom plan view of one of the operating shafts of the tension-assembly; and

Fig. 9 is a part-sectional view in elevation showing the means for opening the slub-catchers.

In a winding machine of the type disclosed in said Patent No. 2,764,362 means for retaining spare yarn end in reserve; means for threading the spare yarn between tension-disks; and the other instrumentalities cooperating therewith are mounted in a group, called the "tension-assembly," which is carried by a bracket 39 projecting forwardly from the frame 20 which in turn is mounted on bed 2. The tension-assembly mounting consists in a relatively flat panel 40 supported in inclined relationship by the bracket 39 that is bolted to a U-shaped yoke 41 fastened to the sides of the frame 20 of a winding machine. Fastened to the forward end of the panel 40 is a yarn-guide in the form of a plate 42 having its lower portion curved inwardly and rearwardly. The upper portion of the guide-plate 42 is formed with a slot 43 having a re-entrant opening at the top and extending downwardly at an angle with a relatively short horizontal portion 45 at

the bottom. The right-hand edge of the slot 43 recedes arcuately toward the top of the plate 42 while to the left of the re-entrant opening of the slot is an upstanding finger 44 tapered to a rounded point at the top. The running yarn *y* is guided in the lateral extension 45 at the lower end of the slot 43 in the plate 42 as it feeds to the tension-device and thence to the winding package; while the spare end *y'* is normally held in reserve on a rest 46 formed by a shoulder on the edge of the slot 43 at the side of the tapered finger 44, being retained in this reserve position by the arcuate edge of a detention lever 47.

The detention lever 47 is mounted fast on the forward flatted portion of a rod or rock-shaft 50 which extends longitudinally beneath the panel 40 with its terminal portions rotatable in suitable bearings at the ends thereof. A second rock-shaft 51 is similarly mounted in bearings on the under side of the panel 40 in parallel spaced relation to the shaft 50. These two shafts 50 and 51 carry the several elements which function cooperatively for threading the spare end *y'* down into the guiding slot 45 of the plate 42 and also into the tension-device during the operation of retrieving the spare end and transferring it to the knotter for uniting it to the end on the winding package as fully described in United States Patent No. 2,764,362. The lever 47 consists in an elbow-shaped arm, see Fig. 4, extending laterally from a hub-portion 52 fast on the rock-shaft 50 and rising upwardly in a skeleton head having a vertical arm and a curved portion 53 forming its arcuate edge. With the lever 47 in normal position as illustrated in Fig. 4 the arcuate edge of its curved portion 53 cooperates with the edge of the tapered finger 44 to form a sort of crotch for retaining the spare yarn *y'* resting on the shoulder 46. The lower portion of the head of the lever 47 is shaped as a hook 54 adapted to engage around the rock-shaft 51 to limit the downward rocking movement of the lever and thereby the turning of the shaft 50.

Beyond the detention-lever 47 is a slack-yarn take-up lever 55, also mounted fast on the rock-shaft 50. The lever 55 consists in an arm of angular contour having its bifurcated hub fast on the shaft 50 and extending in an upright portion formed with a notched shoulder 57 for engaging the spare yarn *y'* as it rests on the shoulder 46 of the plate 42, this lever being operative to take up slack in the yarn in the manner later explained.

Beyond the two levers 47 and 55 is a sheet-metal plate 60 slotted to form a grid which is fastened to the top of the panel 40 overlying an opening therein. Cooperating with the bars of the grid 60 are a series of elbow-shaped detector-fingers 61, three in number as herein shown, extending from a single hub-portion 62 fastened to the rock-shaft 50, see Figs. 1, 2 and 3. The horizontal arms of the fingers 61 are normally supported slightly above the yarn *y* feeding across the bars of the grid 60, being sustained in this relationship by latching means, as described in United States Patent No. 2,764,362, which act to prevent the shaft 50 from rocking. The detector-fingers 61 have angular extensions 63 projecting upwardly at their ends to assist in guiding the yarn under their horizontal arms and across the bars of the grid 60. The fingers 61 act like drop-wires to permit release of the latching means for the shaft 51 after the yarn *y* from the first supply has been exhausted. Beyond the grid 60 is a yarn-guiding member 65, see Figs. 1, 2 and 3, having a foot 66 adjustably fastened in place by one of the screws 67 which attach the grid 60 to the panel 40. The foot 66 is formed with a slot 68 through which the screw 67 extends. The guide-member 65 comprises an upright blade with an inclined upper edge which assists in causing the yarn *y* to slide down into position across its ver-

tical edge, thereby serving to retain it in the tension-device.

The tension-device may comprise the usual concavo-convex disks **70** rotatably mounted on a pin **71** which is slidable through the bore of a boss **72** on the under side of the panel **40**. The pin **71** has a shouldered enlargement **73**, see Fig. 5, located in position to engage with and lift one or more weights **74** which apply pressure to the upper disk **70**, whereby to relieve the pressure thereon as the yarn is threaded into the tension-device. The weight **74** normally bears against a felt washer **75** to press the upper tension-disk towards the lower disk and apply resistance to the passage of the yarn therebetween. A helical spring **76** encircling the pin **71** between a split ring **77** and the bearing boss **72** acts to normally draw the pin downwardly.

Mounted fast on the opposite rock-shaft **51** is a lever **80** arranged with its end engaging under the end of the pin **71** to adapt it to slide the pin upwardly against the tension of the spring **76**, whereby to remove the pressure of the weight **74** on the upper tension-disk **70** and thereby open the tension-device for threading the yarn between the disks. Means are provided for cleaning the tension-disks when they are thus opened by blowing lint or any other foreign particles therefrom. The tension-disks **70** are cleaned by air-jets projected from a tube **82** having a semicircular portion partially surrounding the periphery of the disks and provided with small orifices (not shown) on its side for emission of the air forced through the tube. The semicircular portion of the tube **82** serves as a guide for directing the yarn into place between the tension-disks **70** and has an extension **83** projecting upwardly at one end and terminating in a loop at the top. This extension **83** of the tube **82** serves as a guard to direct the yarn down under its semi-circular portion. The upper end of the tube extension **83** is also provided with an orifice for projecting an air-jet across the detector-fingers **61** to remove the lint accumulation therefrom. A straight length of the tube **82** is supported in a lug **84** rising from the side of the panel **40** with the end of the tube projecting therefrom and connected to a flexible hose **85** through which the air is supplied. The air-hose **85** is connected to a pipe-T **86** on the side of the bracket **39**, see Fig. 1, and thence to a valve **92** in the supply line from a suitable source of compressed air, not herein shown.

A branch hose **87** from the T **86** extends across the underside of the panel **40** for connection to another tube **88** employed for cleaning the slub-catchers mounted at the rearward end of the panel **40**. The slub-catcher cleaning tube **88** overlies the side of the panel **40** with a length bent downwardly and fastened at its end to a union **89** mounted on the bracket **39**. The tube **88** may be fastened to the panel **40** by a clamp **90**. The branch hose **87** which extends from the three-way pipe-T **86** is connected to the union **89**. From the pipe-T **86** a hose **91** leads to the air-valve **92** shown in Fig. 1. The air-valve **92** may be of any suitable construction, preferably of the plunger-operated type as illustrated in Fig. 1, with its plunger **93** adapted to be forced downwardly by lever **433** through link **432** to open the valve through the operation of certain instrumentalities as described in United States Patent No. 2,764,362.

Mounted at the rearward or upper end of the panel **40** is a pair of slub-catchers **95**, see Figs. 1, 2 and 3, for cleaning the yarn before it feeds to the winding package. The slub-catchers **95** are of usual construction, each comprising a lower fixed blade **97** and an upper hinged blade **98** pivoted on a rod **99** with a spring **100** for rocking the upper blade to maintain its lower edge in spaced relation to the edge of the lower blade. The rods **99** are supported in bearings **101** on standards **102** formed as a part of the panel **40**. The upper blade **98** of each slub-catcher has an arm **103** projecting at the left as viewed in Figs. 2 and 9 and overlying the end of a

plunger-pin **105** which is slidable in the bore of a bearing forming part of the standard **102**. The lower end of the plunger-pin **105** is engaged by the end of a lever **107**, see detailed view Fig. 9, secured fast on the rock-shaft **51** so that when the latter is rocked the lever **107** will slide the pin upwardly and thereby rock the upper blade **98** of the slub-catcher **95** to open the latter as shown in Fig. 3 for threading the yarn thereinto. When opened the slub-catchers are cleaned by air-jets emitted from the tube **88**, previously referred to as connected through the union **89** and pipe-T **86** to the hose **91** from the valve **92**, see Fig. 2. The tube **88** has jet orifices on its side directed toward the openings between the blades of the slub-catchers **95**. Another orifice at the bend in the tube **88** causes an air-jet to be ejected therefrom along the crossbar **633** of the breakage-lever **625** to remove any length of yarn tending to cling thereto when the yarn is broken.

Supported rearwardly beyond the slub-catchers **95** is a plate-like guard **115** fastened to the rearward standard **102** with its lower rounded edge in position to adapt the yarn to feed thereunder. Beyond the edge of the guard **115** is a wire bail **116** arranged parallel therewith and under which the yarn feeds, the wire having a right-angular bent portion fastened in a bore at the end of the panel **40**.

It has been stated that the end of the spare yarn *y'* is held in reserve resting on the shoulder **46** in the guide-plate **42**, see Fig. 1, and retained in place by the lever **47**. A transfer lever **120**, see Fig. 7, mounted to turn on the rock-shaft **51**, extends upwardly therefrom through an opening in the panel **40**, being provided with a clip **121** at its upper end for seizing the end of the reserve yarn *y'*. The lower end of the lever **120** has a bifurcated hub-portion with bores in its bifurcations that serve as bearings for pivotally supporting the lever on the rock-shaft **51**. The upper terminal portion of the lever **120** is bent outwardly at an angle to adapt it to cooperate with a reversely-bent angular extension of the clip **121**, thus forming a crotch therebetween into which the end of the yarn *y'* may be inserted and carried down between the main arm of the lever and the parallel portion of the clip to grip it therein. The clip **121** is rockably mounted on the upright arm of the lever **120** by means of its laterally-projecting finger **122** engaging loosely through a slot in the arm. A leaf-spring **123** fastened to the rearward side of the lever **120** with its offset portion bearing against the back of the clip **121** tends to hold the latter pressed against the yarn *y'* to bind it to the lever. The clip-lever **120** is normally held cocked in upright relationship as shown in Fig. 11 by latching means arranged below the panel **40** and mounted on the opposite rock-shaft **50**.

A helical spring **125**, see Fig. 8, is coiled around the rock-shaft **51** and has one end engaged across a portion of the panel **40** with its other end hooked through a hole in one of the bifurcations of the hub of the lever **120**. The spring **125** acts to rock the clip-lever **120** downwardly toward the top of the panel **40** to draw the end of the reserve yarn *y'* into place to thread it between the tension-disks **70**. Movement of the lever **120** in this direction is limited by the end of a stud **126** in the side of the bracket **39**, see Fig. 6, engaging with the bent end **127** of a downwardly-extending latching arm **128** on the lever **120**. The upright portion of the clip-lever **120** carries a laterally-extending wire rod **129** terminating in a right-angular extension **130**, this rod being used for rocking the clip-lever upwardly and rearwardly to latch it in its upright position in the manner later explained.

Referring to Figs. 6 and 7, a latching lever **135** has its bifurcated hub-portion secured fast on the rockshaft **50**. The upper arm **136** of the latching lever **135** is inclined downward and then upwardly near its end in a sort of crook, the terminal portion of which is adapted

to be engaged by the right-angular bent end 127 of the latching arm 128 on the clip-lever 120 when the latter is swung back into upright position to cock it in this relationship. Projecting downwardly from the upper arm 136 of the latching lever 135 is a vertical extension 137 carrying a bent or crooked arm 138 shaped like the end of the upper arm but somewhat shorter. The bent end 127 of the latching arm 128 on the clip-lever 120 is adapted to engage with the under edge of the bent end of the upper arm 136 of the latching lever 135 to raise the latter and permit the end of the latching arm to enter between the two arms 136 and 138 of the latching lever and be held by the crook in its lower arm, see Fig. 7, against the force of the coiled spring 125 on the shaft 51. The latching lever 135 is maintained raised in engagement with the latching arm 128 on the clip-lever 120 by means of a hooked lever 140 having a bifurcated hub-portion rotatably mounted on the rock-shaft 51 and normally held in the position shown in Fig. 7 under the tension of a spring 141 coiled around the shaft 51, see Fig. 8. A stud 142 supported in an ear 143 on the upper arm 144 of the lever 140 with its end adapted to engage against the top of the panel 40 acts to limit the rocking motion of said lever 140 under the tension of the spring 141. The hooked end of the lever 140 terminates in an inclined cam-edge 145 adapted to slidably engage with a finger 146 projecting laterally from the lower portion of the latching lever 135 and thereby cause said finger to enter into locking engagement with the hooked end of said lever 140, see Fig. 7, to maintain the clip-lever 120 latched in upright position. A lever 147 has its bifurcated hub-portion secured fast on the rock-shaft 51 by a screw 148 and terminates in a right-angular bent arm 149, see Fig. 8. The arm 149 overlies the upper portion of the lever 140 to rock it downwardly so as to cause the finger 146 to be released from the cam-edge 145 of the lever 140.

The release of the latching means for the yarn-clip lever 120 is effected by the operation of a cam-lever 150 mounted fast on the shaft 51 and employed for rocking the latter. As shown most clearly in Fig. 6, the cam-lever 150 consists of a U-shaped wire arm 151 having one terminal portion bent around the rock-shaft 51 and secured fixedly thereto by means of a binder-screw 152. The opposite end of the U-shaped lever 150 has fastened thereto a cam-plate 153 of substantially ovate shape in outline. The upper edge of the cam-plate 153 is of arcuate contour extending inwardly towards the center of the panel 40 with its under edge of reversely-curved contour and joining the upper edge in a circular end. The cam-lever 150 is actuated to oscillate the rock-shaft 51 through the engagement therewith of means at the end of a suction-nozzle 155, termed for convenience the "tension-nozzle." The construction and operation of said tension nozzle is fully explained in United States Patent No. 2,764,362 and only so much of its operation as is necessary to a complete understanding of the present invention is included here. A finger 180 on the end of the tension-nozzle 155 rides along the upper curved edge of the cam-plate 153 to rock the lever 150 downwardly during the movement of the nozzle for picking up the reserve yarn end y' held by the clip 121 on the lever 120 when the latter is in its depressed relationship shown in Fig. 6. The end of the tension-nozzle 155 continues its movement from the cam-plate 153 to engage the laterally-extending rod 129 on the clip-lever 120 and rock the latter into upright position, thereby cocking it to be held by its latching means described above. On the return motion of the tension-nozzle 155 the finger 180 rides under the cam-plate 153 along its curved edge to lift the lever 150 and oscillate the lever 80 on the rock-shaft 51 to slide the pin 71 upwardly for raising the weight 74 from the upper tension-disk 70 in the manner and for the purpose more fully explained in United States Patent No. 2,764,362.

The foregoing mechanism operates in the following described manner:

The yarn y from a bobbin or other suitable source of supply, supported therebelow but not herein illustrated, is drawn up and entered in the guide slot 45 of the end-plate 42 on the tension-assembly, see Fig. 1, then led under the slack-lever 55 and the detector-fingers 61 to lie across the bars of the grid 60. The yarn y is then carried down along the vertical extension 83 of the tubular guide 82 to cause it to draw under the circular portion of the guide and enter between the contacting faces of the tension-disks 70. From the tension-disks 70 the yarn is entered between the blades of the dual slub-catchers 95, and under the lower edge of the guide-plate 115, thence above the crossbar 633 of the breakage lever 625 and under the horizontal portion of the wire guide 116. From the tension-assembly the yarn is led upwardly to a winding machine preferably of the type disclosed in United States Patent No. 2,764,362.

A spare or reserve yarn y' supplied from another bobbin arranged below is led upwardly therefrom and carried across the shoulder 46 on the guide plate 42, thence across the slack-lever 55 in its notch 57 and finally to the clip-lever 120 where its end is engaged in the spring-clip 121, see Fig. 7, to hold the strand under tension.

During the interval that the slub-catcher blades 98 are held open by the levers 107 and while the tension-disks 70 are separated slightly the pneumatic means are operated to release jets of air from the supply pipes 82 and 88, see Fig. 2, for cleaning these parts. This is accomplished by opening the valve 92 on the side of the frame 20, see Fig. 1, during the downward rocking motion of the lever 433, previously referred to, to cause the stud 588 to depress the plunger 93 and open the valve 92. A suitable source of compressed air is supplied to the valve 92 through the pipe 94, shown in Fig. 1, so that jets are emitted from the side of the pipe 88 and sprayed between the edges of the blades of the slub-catchers 95; and a series of jets from the circular portion of the pipe 82 are sprayed across the opposed faces of the tension-disks 70 to clean the lint and other foreign matter from their surfaces. An air jet is also emitted from an orifice in the end of the loop on the upright extension 83 of the pipe 82 to spray it across the grid 60 and fingers 63 to clean these elements. When the nozzle 155 swings away from the tension-assembly during its return movement the levers 107 and the lever 80 which have opened the slub-catchers and tension-device are both returned to first position as the cam-lever 150 drops back to its normal relationship. The pivoted blades 98 of the slub-catchers 95 will thus be released and returned to operative relationship as indicated in Fig. 9 and the pin 71 will be lowered to release the weights 74 so as to return the upper disk 70 into position to apply tension to the yarn.

When yarn from the initially-delivering supply bobbin is exhausted the automatic end-finding means is actuated to retrieve the end of the spare supply yarn y' to carry it to a knotter for uniting it with the end from a winding package not shown. As the yarn y runs out its end from the supply bobbin is drawn from beneath the detector-fingers 63 to permit release of the latching means for the clip-lever 120 after the cam-lever 150 has been depressed. As the mouth of the nozzle 155 swings toward the center of the tension-assembly the finger 180 on its cap 181 rides along the cam 153 and depresses the lever 150 so that the shaft 51 is rocked in clockwise direction as viewed in Figs. 5 and 6. The operation of said knotter and nozzle 155 are fully explained in United States Patent No. 2,764,362. During the rocking of the shaft 51 in this direction the bent end 149 of the lever 147 will engage the edge of the hooked lever 140, see

Fig. 7, and rock the latter downwardly to release its cam-edge 145 from the finger 146 on the latching lever 135. As the latching lever 135 is released in this manner gravity causes it to swing downwardly into the position shown in Fig. 6, thereby rocking the shaft 50 in contraclockwise direction. The detector-fingers 63 will then be swung down through the slots in the grid 60, since no yarn remains thereunder to sustain them. As the shaft 50 is rocked contraclockwise the detention-lever 47 will likewise swing downwardly, see Fig. 5, to cause its end to pass under the yarn y' for releasing it to enter the slot 43 in the guide-plate 42 shown in Fig. 1. At this point the notched shoulder 57 on the slack-lever 55 applies a drag on the yarn and as the lever swings downwardly it takes up any slack in the yarn. Meanwhile, the lower arm 138 of the latching lever 135, see Fig. 7, has released the latching arm 128 to cause the latter to swing into the position shown in Fig. 6 and engage against the limiting stud 126. The clip-lever 120 is thus released to cause its spring 125 to rock it downwardly and carry the end of the yarn y' held in the clip 121 into position to be sucked into the mouth of the nozzle 155 as the latter continues its movement along the cam 153 on the lever 150. As the clip-lever 120 is swung downwardly in this manner it will draw the yarn y' laterally against the upright extension 83 of the guide 82 at the side of the tension-disks 70. Continued movement of the suction-nozzle 155 while its cap 181 is still open will cause the yarn to be sucked into the nozzle and as soon as the finger 180 on the cap rides off from the end of the cam 153 the cap will be closed by the suction to seize the yarn y' against the mouth of the nozzle.

As before explained, the tension-nozzle 155 continues its movement across the tension-assembly to engage it with the rod 129 on the clip-lever 120 and swing said lever back slightly beyond its vertical position to cause it to be cocked by the latching means. When the clip-lever 120 is rocked in contraclockwise direction against the tension of its spring 125 its latching arm 128 is swung upwardly and as the finger 180 on the cap 181 rides off from the end of the cam 153 the spring 141, see Fig. 8, rocks the hooked lever 140 and shaft 51 contraclockwise to engage the lever with the bent end 149 of the lever 147. The hooked lever 140 is thus swung upwardly to cause the end of its hooked portion to contact the finger 146 on the lever 145, see Fig. 6. Continued movement of the nozzle 155 against the rod 129 on the clip-lever 120 will swing the bent end 127 of the latching arm 128 against the upper arm 136 of the latching lever 135 to rock it in clockwise direction and cause the finger 146 to slide off from the end of the hooked lever 140 and engage the cam-edge 145, see Fig. 7, to retain the shaft 50 in its initial position. As the shaft 50 is rocked clockwise the detention-lever 47, the slack-yarn take-up lever 55, and the detector-fingers 63 will also be rocked clockwise to restore them to initial position. At this juncture the clip-lever 120 will have rocked to its extreme rearward position and the nozzle 155 will have completed its movement across the tension-assembly. Then as the nozzle 155 starts to swing back in the opposite direction the clip-lever 120 is released so that the latching arm 128 will be rocked downwardly to engage its bent end 127 across the lower arm 138 of the latching lever 135 as shown in Fig. 7 to hold the clip-lever cocked in vertical position. During the movement of the nozzle 155 back towards the knotter the spare yarn y' will be drawn under the circular portion of the guide-tube 82 to thread it between the tension-disks 70, and as the yarn slides along the upper edge of the guide-member 65 and down across its vertical edge it will be drawn in under the detector-fingers 63 to the delivering position shown in Fig. 2.

With the tension-assembly elements restored to initial position a fresh bobbin is supplied, the yarn therefrom threaded through the guiding means and its end fastened in the clip 121 on the lever 120 to make it ready for retrieving and joining to the end on the package when the previously-joined end is exhausted from the supply bobbin.

While the machine is herein shown and described as embodied in a preferred form of construction, modifications may be made in the structure and arrangement of its mechanisms within the scope of the invention as expressed in the following claims. Therefore, without limiting ourselves in this respect, we claim:

1. In a winding machine having means for rotating a package to wind yarn thereon, a tension-device for applying tension to the yarn feeding to the package, a tube disposed adjacent the tension-device and having jet-orifices on its side, means connecting said tube with a source of compressed air, a valve for controlling the admission of air to the tube, and means operable in the absence of yarn to be wound to open the valve to cause jets of air to be emitted from the tube to remove lint and other foreign particles from the tension-device.

2. In a winding machine having means for rotating a package to wind yarn thereon, a tension-device comprising associated members for engaging the yarn feeding to the package to apply tension thereto, means to separate said members to open the tension-device, to tube disposed adjacent said tension-members and provided with orifices on its side, and means to supply compressed air to said tube to cause jets of air to be emitted through the orifices in the tube to remove lint and other foreign particles from the tension-members while they are separated.

3. In a winding machine having means for rotatably supporting a package to wind yarn thereon, a tension-device having associated disks between which the yarn feeds to apply tension thereto, means for rotatably supporting the tension-disks, a weight for applying pressure to one of the disks, means for lifting the weight to release the pressure on said disk, a tubular member disposed circumferentially of said disks and formed with orifices on its side, and means to supply compressed air to the tubular member to cause jets of air to be emitted therefrom between the tension-disks to remove lint and other foreign particles therefrom while said one disk is free of pressure.

4. In a winding machine having means for rotatably supporting a package to wind yarn thereon, the combination therewith of a tension-assembly comprising a pair of tension-disks between which the yarn feeds to the package, a grid comprising spaced bars across which the yarn draws in feeding to the tension-device mounted in close proximity to said tension assembly, feeler-fingers arranged above said grid, a tube including an arcuate portion surrounding the tension-device and an upstanding extension, said tube having at least one orifice in said arcuate portion directed towards said assembly and at least one orifice in said extension directed towards said grid, and means for supplying air to the tube to cause jets to be emitted through said orifices to remove lint and other particles from both the tension-device and grid.

5. In a winding machine having means for rotating a package to wind yarn thereon, the combination therewith of a tension-assembly including a pair of tension-disks, means for opening said disks a slub-catcher for cleaning the yarn as it feeds from the tension-device to the package, means for opening the slub-catcher, a source of compressed air, a tube extending adjacent the tension-device and formed with orifices in its wall directed towards said tension assembly, a tube located adjacent the slub-catcher and having orifices directed towards said slub-catcher, means for connecting said tubes with a source of compressed air, a valve, and means for opening the valve to admit the air to both the tubes simultaneously and causes jets to be emitted from said orifices

for cleaning the tension-device and slub-catcher while the same are open.

References Cited in the file of this patent

UNITED STATES PATENTS

1,443,875	Glazier et al.	Jan. 30, 1923
1,498,252	Vickers	June 17, 1924
1,882,539	Anderson	Oct. 11, 1932
2,273,241	Winslow	Feb. 17, 1942
2,438,034	Brugger	Mar. 16, 1948
2,450,074	Bartholomew	Sept. 28, 1948
2,622,305	Swanson	Dec. 23, 1952
2,661,913	Heizer et al.	Dec. 8, 1953
2,738,141	Klein	Mar. 13, 1956

FOREIGN PATENTS

1,034,281	France	Apr. 8, 1953