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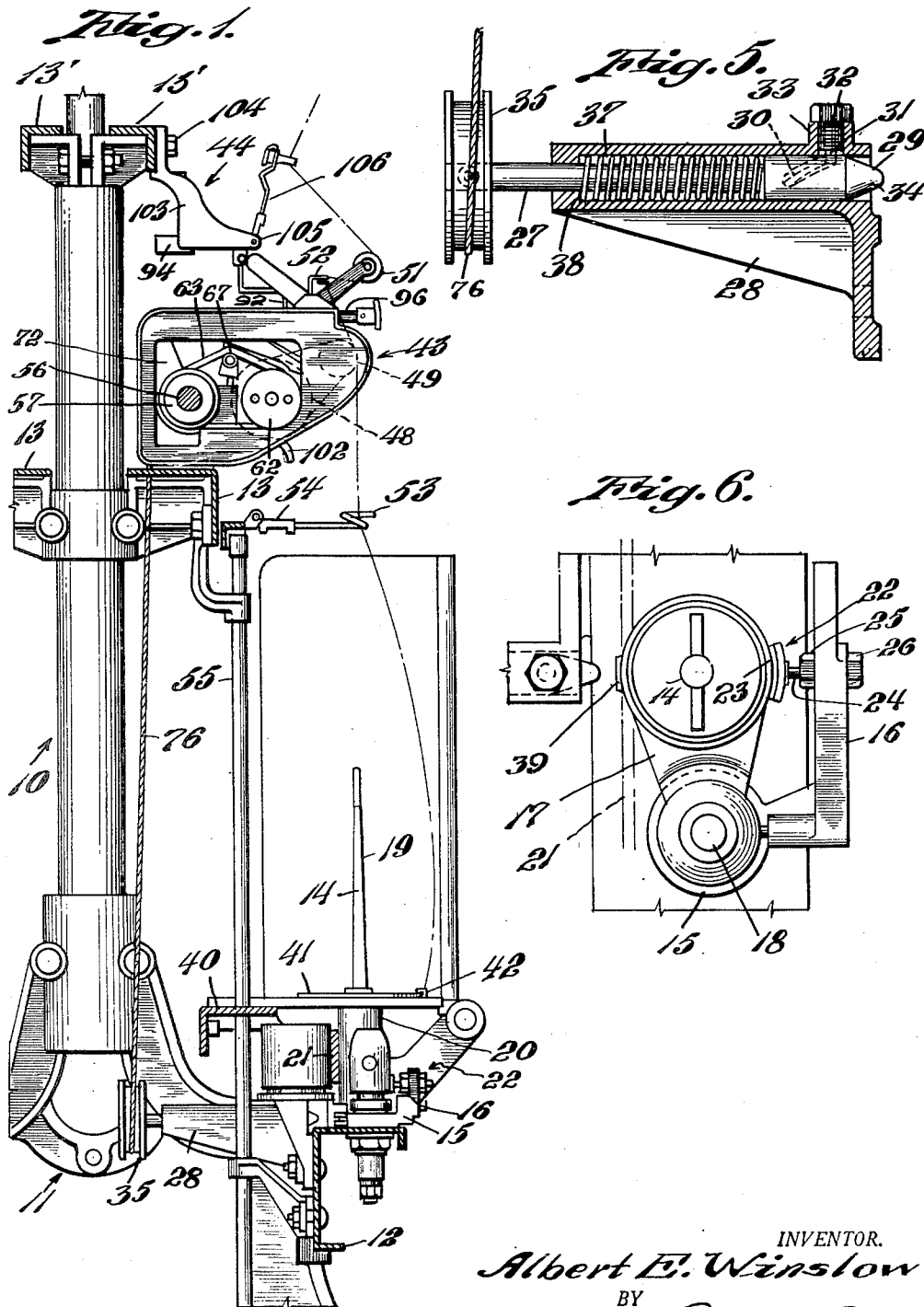
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**2,481,185**

# FEED ROLL UNIT FOR TEXTILE MACHINES

Filed March 19, 1948

3 Sheets-Sheet 1



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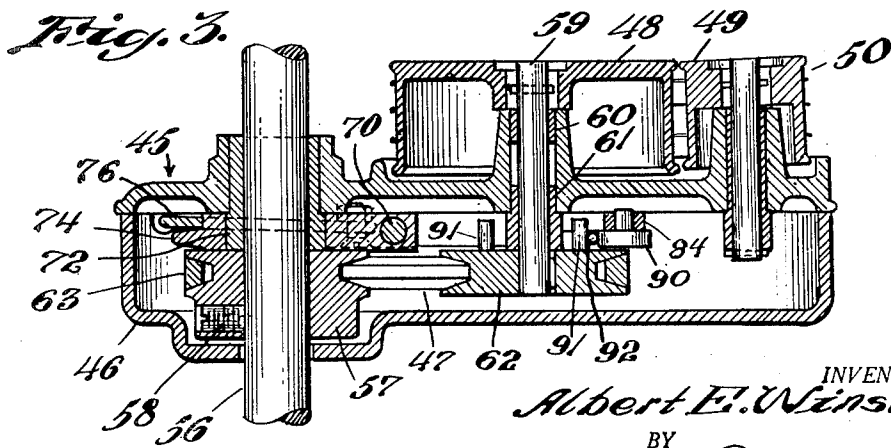
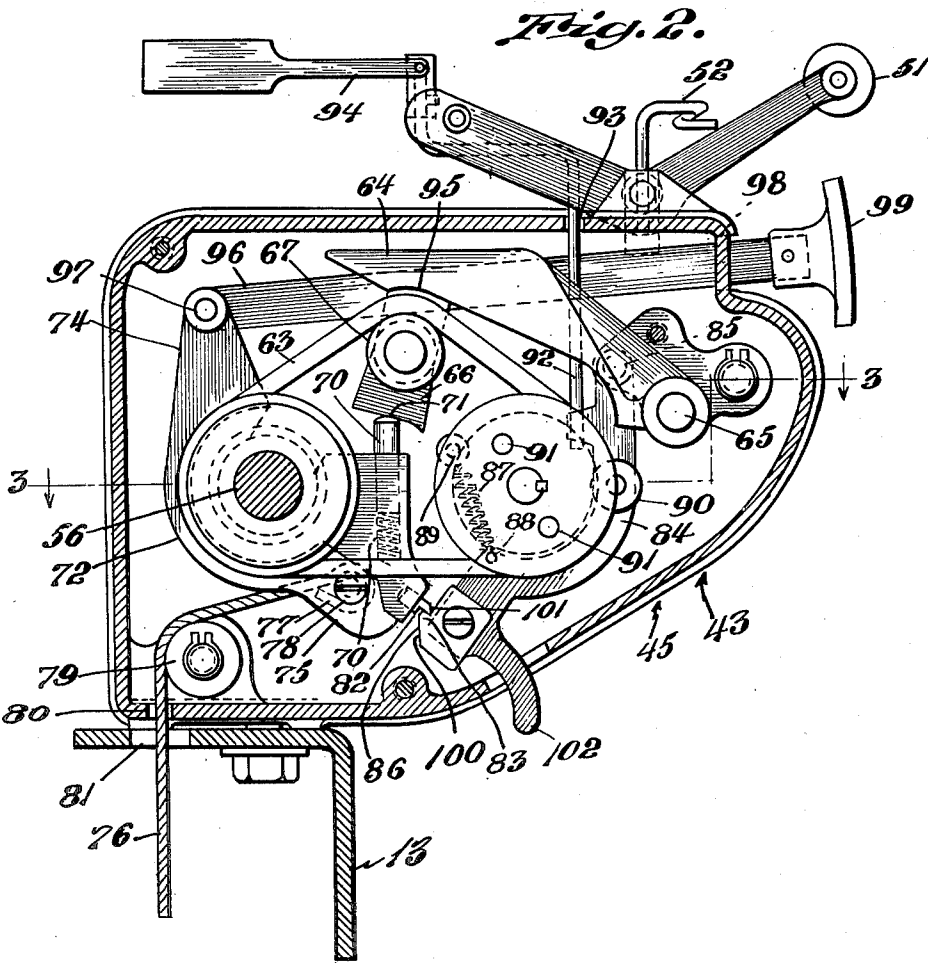
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3 Sheets-Sheet 2



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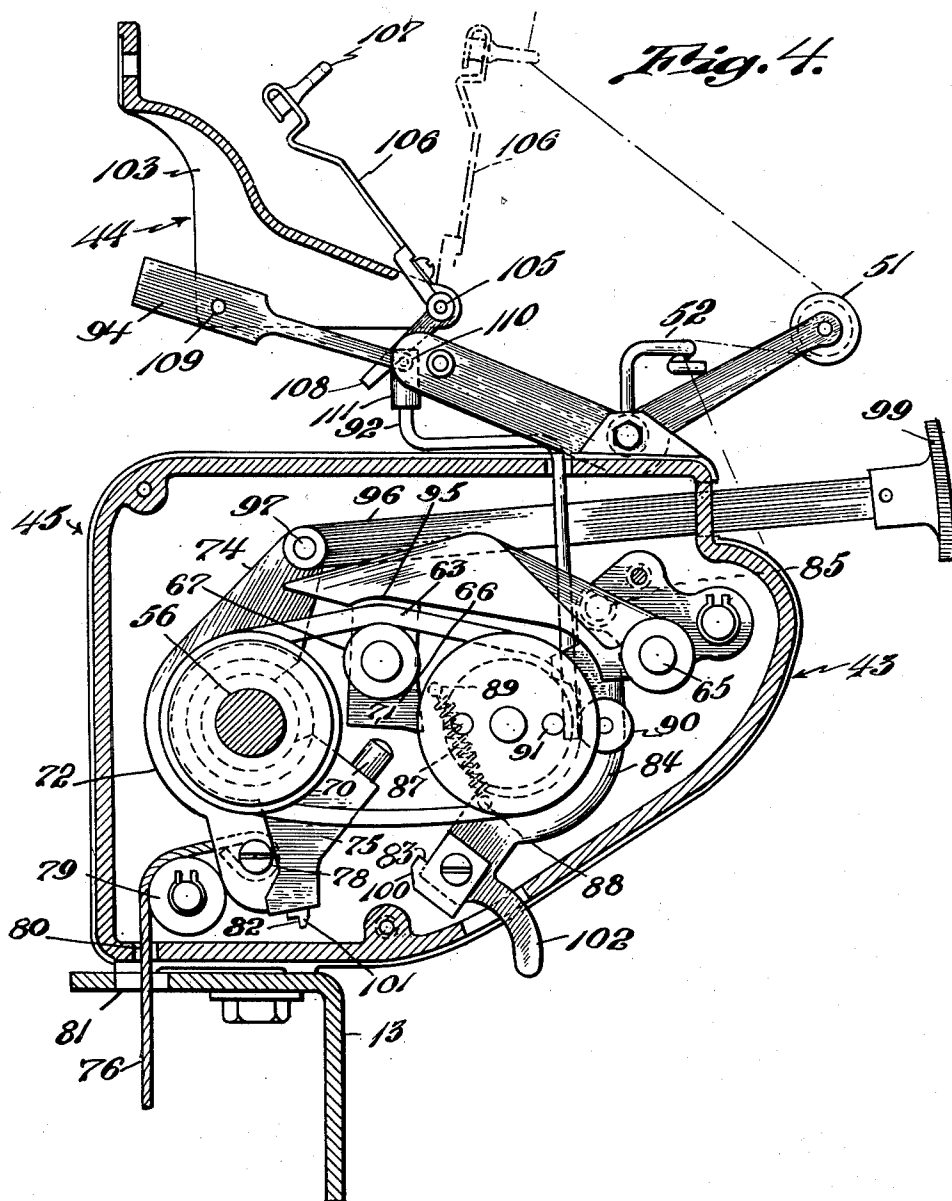
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# FEED ROLL UNIT FOR TEXTILE MACHINES

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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,481,185

## FEED ROLL UNIT FOR TEXTILE MACHINES

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14 Claims. (Cl. 57—83)

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This invention relates to a textile machine and has particular reference to a feed unit for advancing yarn in a textile apparatus. It is particularly designed for use on a twisting machine.

A usual mechanism employed in textile machines such as twisting machines for advancing a yarn or a group of yarn ends to be twisted together into a single strand comprises in general a feeding unit having spaced feed rollers therein to which the yarns are led and frictionally held by being wrapped thereabout several turns and from there led to the point of twisting. It has been usual to stop the action of the feed rollers by lifting one of the rollers out of driving engagement with the drive means therefor upon the breaking of a yarn. In many instances such movement of the roller causes additional yarns of the group to break. In some cases slack appears in the yarn which is undesirable.

An object of this invention is the provision of means for rotating the feed rollers of a feeding unit of the above character which may be moved in or out of driving relation with the feed rollers without changing the spacing between the feed rollers or the distance between the feed rollers and the take-up package.

A more specific object of the invention is the provision of a belt drive for the feed rollers which may be manipulated into or from driving relation with the feed rollers upon the breaking of a yarn advanced by the rollers.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is an elevational view of a fragmental portion of a twisting machine embodying my invention;

Figure 2 is a sectional view of the feed unit on an enlarged scale;

Figure 3 is a section taken along line 3—3 of Figure 2;

Figure 4 is a sectional view similar to that shown in Figure 2, but showing the non-driving relationship of the parts;

Figure 5 is a sectional view of a fragmental portion of the means for disconnecting the drive of the take-up spindle from its driving belt; and

Figure 6 is a plan view of a take-up spindle and mounting thereof.

In proceeding with this invention, I provide a feed unit for groups of yarns to be twisted together into a single strand. Each unit is similar and comprises in general a pair of feed rollers

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positioned in spaced relation to each other to which the yarns are led and wrapped several turns about the rollers which, upon the rotation thereof, will advance the yarn to be twisted and packaged on a suitable core or bobbin in a manner usual in machines of this kind. I drive one of the rollers from a main drive shaft by means of a V-belt drive. This belt is supported in a manner to be moved from driving relation in response to the breaking of a yarn fed by the feed unit. The belt is held in operative position by means of a latch which is tripped upon the breaking of any one of the yarns to permit the movement of the belt out of driving relation. Secured to this mechanism by means of a flexible member is a means for disengaging the take-up spindle for the group of twisted yarns from its drive belt. By this arrangement, both the motion of the feed rollers and the spindle are arrested substantially simultaneously upon the breaking of a yarn end. The spacing between the feed rollers is not disturbed and no slack in the yarn is had.

Referring to the drawings for a more detailed description of the invention, 10 designates generally a twisting frame or the like textile machine, only so much of which is illustrated as is believed necessary for a clear understanding of the invention. The machine has a plurality of intermediate uprights supporting frames 11 on either side of which are several longitudinally extending girts or rails 12, 13, and 13'. These rails support in back-to-back relation a plurality of duplicate units or assemblies in a manner usual in machines of this kind.

The spindles 14 of the machine are attached to the lower rail 12 at spaced intervals along the rail. Each spindle unit (see Figures 1 and 6) includes a fixed support 15 having a stationary arm 16 and an arm 17 mounted for swinging movement about a stationary post 18 extending vertically from the support 15. The blade 19 of the spindle is mounted in the arm 17 to be moved therewith and is rotated by means of a whorl 20 attached to the blade. A torsion spring (not shown) is arranged in any approved manner for biasing the whorl against an endless belt 21 by which the whorl is rotated. The blade 19 receives a take-up core or a bobbin (not shown), on which the yarn is wound. In order to arrest the rotation of the whorl 20, a brake device designated generally 22 is provided. This device includes a brake shoe 23 mounted thereon by means of a threaded stud 24 fastened to the brake shoe and 55 extending through the arm 16 and there secured

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by means of nuts 25, 26. The brake shoe 23 is positioned at a location to be engaged by the whorl 20 when moved out of contact with the belt 21. To this end a plunger 27 is mounted for axial and rotational movement in a bearing bracket 28 carried by the rail 12. (See Figures 1 and 5.) The plunger has an enlarged end portion or head 29 which is provided with a cam slot 30 in which is received the reduced end 31 of a screw 32. This screw is threadedly received in a boss 33 on the bracket 28. (See Figure 5.) The forward or head end of the plunger is tapered as at 34 and carries at the opposite end a pulley 35. A compression spring 37 encircles the plunger and one end abuts against the inner shoulder of the head 29, and the other end abuts against a shoulder 38 formed by a difference in the diameter of the bearing openings in which the plunger is mounted. The rotation of the pulley 35 clockwise, as viewed from the head end of the plunger, will permit the plunger to be moved by the spring 37 towards the spindle to engage some portion of the arm 17, such as at 39, to move the arm 17 and the whorl carried thereby into engagement with the brake shoe 23 to arrest the motion of the spindle.

Moving the plunger axially away from the spindle by rotation of the pulley in an opposite direction will charge the compression spring 37 to position the same in condition to again move the plunger toward the spindle upon opposite rotation of the pulley as previously stated.

In order to properly lay and wind the yarn on the core of the bobbin, a traverse or ring rail 40 is provided (see Figure 1), which is mounted for vertical reciprocal movement and is actuated by a usual mechanism or so-called builder motion, not shown. The ring rail has secured thereon a traveler ring 41 which surrounds the spindle blade 14. A weight or traveler 42 is mounted for movement about the circumference of the ring, and the yarn is led therethrough to the core or bobbin on the blade 14. As the spindle is rotated, the yarns will be twisted and wound in proper layers along the length of the bobbin in a well-known manner.

The rail 13 supports a feed unit designated generally 43 which is shown in section in Figures 2, 3, and 4, while the rail 13' supports a yarn actuated trip mechanism 44. (See Figures 1 and 4.) The feed unit includes a casing 45 (see Figures 2, 3, and 4.) Having a removable closure 46 providing a chamber 47 which houses the mechanism for controlling the drive of feed rollers 48 and 49 mounted on the outer side of the casing. These rollers are of different diameters with the smaller rollers 49 rotating about an axis which is positioned to be slightly out of parallelism with the axis of rotation of the roller 48. The yarn is led from the tripping mechanism 44 to the feed rollers 49 and 48 and wrapped thereabouts several turns from the outer edge of the rollers as at 50 to the inner edge thereof which are a greater distance apart, thereby applying a tension to the yarn as it is travelled along the axis of the rollers. Guides 51, 52, and 53 are provided for leading the yarns to and from the feed rollers. (See Figure 1.) The guides 51 and 52 are fixed to the casing 45, while the guide 53 is carried by a thread guide board 54 hingedly secured to the upper end of a rod 55.

The feed roller 48 is rotated by means of a drive shaft 56 which extends through the casing and has a grooved pulley 57 within the chamber 47 attached to the shaft by means of a set screw

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58. The feed roller 48 is secured to a stud shaft 59 which is mounted in bearings 60 and 61 in the casing 45. This shaft extends within the chamber 47 and has mounted thereon a grooved pulley 62. An endless V-belt 63 extends about the pulleys 57 and 62 to transmit motion from the drive shaft to the feed roller 48. The belt extends about the pulleys in slack relation and means are provided for tensioning the same to provide proper frictional driving relation with the pulleys. The rotation of the feed roller 48 will, by means of the wrappings of the yarn thereabout, rotate the smaller pulley 49 in unison and advance the yarn from a supply source (not shown) to the point of twisting and packaging, as previously described.

The yarns to be twisted into a single strand are led from the supply source to the feed rollers in untwisted relation to each other. In order to arrest the advance of the group of yarns upon breakage of any one of the group, I provide for arresting the rotation of the feed rollers, as well as arresting the rotation of the spindle blade 14. To this end I provide 18 a mechanism to move the belt in and out of driving relation with the pulleys 57, 62. The mechanism comprises an arm 64 pivotally mounted to the casing as at 65. A bracket 66 depends from this arm at the free end portion thereof and has mounted thereon an idler pulley 67. The belt 63 is of a length to provide considerable slack therein and extend over this idler pulley and is maintained taut in driving relation with the pulleys 57 and 62 by means of a spring-pressed pin 70 which engages the lower edge 71 of the bracket 66 to move the arm 64 in a direction so as to apply a tension on the belt 63. The pin 70 is carried by a lever 72 which is rockably mounted about the hub portion 73 of the pulley 57 and provides opposite arms 74 and 75. The pin is mounted on the arm 75 and has a compression spring 76 acting thereon in a manner providing a cushioning therefor. The arm 75 has a flexible cable 76 attached thereto by means of a loop 77 formed at one end portion of the cable and through which the shank of a screw 78 extends and is threadedly received in the arm 75. The cable is guided over a roller 79 and passes out of the casing through an opening 80. The rail 13 is also provided with an opening 81 in line with the opening 80 and through which the cable 76 also extends. The other end of the cable is attached in any convenient manner to the pulley 35. This arm 75 is also provided with a catch 82 which is engaged by a latch 83 to maintain the lever 72 in a position whereby the pin 70 will maintain the arm 64 in tension-applying position.

The latch 83 is in the form of an arm 84 which is mounted for swinging movement about a pivot 85. (See Figures 2 and 4.) This arm is curved to extend partially about the axis of rotation of the pulley 62 and carries an abutment 86 which engages with the catch 82. A pull spring 87 is attached at one end thereof to the latch 83 as at 88 and the other end to a stationary support 89 and biases the latch into engagement with the catch 82.

In order to disengage the latch from the catch, so as to permit the belt 63 to be slackened from driving engagement, a roller 90 is mounted on the latch arm 84 and pins or the like projections 91 are mounted on the pulley 62 to rotate therewith about the axis of the pulley. The roller 90 is mounted on the arm so as to be at a position adjacent to but spaced from the path of move-

ment of the pins 91 when the latch and the catch are in locking engagement with each other. A wire or the like member 92, having a diameter greater than the distance of the normal spacing between the pins 91 and the roller 90 when adjacent to each other, is guided into the chamber 47 through an opening 93 in the casing to be positioned adjacent the roller 90 in the path of movement of the projections 91. This wire 92 is suspended from a weight lever 84 which is part of the trip mechanism 44 and which upon the breaking of a yarn will be moved in a direction to permit the wire to drop or be moved to the position between the rollers and the path of movement of the pins. With the wire 92 in this position, the engagement thereof with either of the projections 91, will swing the arm 84 about the pivot 85 to disengage the latch 83 from the catch 82. The cable 76 under tension of the charge spring 37 will rock the lever 72 to move the arm 75 and the spring-pressed pin carried thereby away from the edge 71 of the tensioning roll carrier so as to permit the arm 64 to drop by gravity and carry the belt 62 therewith to remove the same from driving engagement with the pulleys 57 and 62. The arm 64 has a shoulder 95 thereon projecting over the upper surface of the belt 63 to engage and carry the belt inwardly to loosen the same from the pulleys. The charged spring 37 will also exert a force on the plunger to move the same, as previously stated, to disengage the whorl from the belt 21 and move it into engagement with the brake shoe 23 thereby also arresting the rotation of the blade.

In order to move the belt into driving relation, a bar 96 is movably attached to the arm 74 as at 97. The bar extends through the casing as at 98 and has a handle 99 thereon to be manually engaged to rock the lever 74 in the opposite direction, whereby to again move the pin 70 into engagement with the edge 71 of the bracket 66 so as to apply tension upon the belt 63. The abutment 86 is provided with a tapered surface 100 to engage with a similar surface 101 on the catch 82 to permit passing of the catch by the abutment 86 when resetting the lever 72. A finger 102 is provided on the arm 83 whereby the belt may be manually slackened, if desired.

The tripping mechanism 44 (see Figures 1 and 4) comprising a supporting frame 103 which is fastened to the rail 14 such as by screws 104. A plurality of fingers 106 are pivotally mounted at 105 on the frame 103 for a swinging movement thereabout, one for each separate yarn to be led to the feed rollers, and each arm has a guide 107 through which the yarn extends. These fingers are weighted as at 108 so as to swing the arm counter-clockwise when free of the yarn. The weighted lever 94 is pivotally mounted on the frame 44 as at 109 and one end carries a pin 110 extending therefrom axially of the pivot 109. This pin 110 also carries a socket 111 in which is received and attached the wire 92. The fingers 106 are maintained in the forward position, as shown in Figure 1, by means of the tension of the yarn thereon. Upon the breaking of the yarn, the weighted portion 108 will engage the pin 110 and overbalance the lever 94 to swing the same about the pivot 109 in a direction to move the wire 92 inwardly adjacent to the roller 90 to set in motion the forces heretofore described.

I claim:

1. A textile machine comprising a spindle for a take-up package, a feed unit for advancing

yarn to the take-up package, a rotatable feed roller in said unit, a drive shaft, a pulley on said shaft, a pulley connected to said feed roller, a flexible member extending about said pulley for transmitting motion from said drive shaft to said feed roller, a mechanism for moving said member to and from driving engagement with said pulleys, and a trip mechanism operable upon the breaking of a yarn for actuating said mechanism.

2. A textile machine comprising a spindle for a take-up package, a drive belt for said spindle, said spindle being mounted for movement to and from said drive belt, rotatable means for moving said spindle from said belt, resilient means for moving said rotatable means to disengage said spindle from said belt; a feed unit for advancing yarn to the take-up package, a rotatable feed roller in said unit, a drive shaft, a pulley on said drive shaft, a pulley connected to said feed roller, a flexible member extending about said pulleys for transmitting motion from said drive shaft to said feed roller, a mechanism for moving said member to and from driving engagement with said pulley, and a flexible means connected to said mechanism and to said rotatable means whereby said rotatable means is held in an inoperative position when said flexible member is in the driving engagement with said pulleys.

3. A textile machine comprising a spindle for a take-up package, a feed unit for advancing yarn to the take-up package, a rotatable feed roller in said unit, a drive shaft, a pulley on said drive shaft, a pulley connected to said feed roller, a flexible member extending about said pulleys for transmitting motion from said drive shaft to said feed roller and movable in and out of driving engagement with said pulleys, a mechanism for moving said flexible member to and from driving engagement with said pulleys, said mechanism including a catch and a latch, a member mounted to revolve in an annular path, an abutment on said latch at a position adjacent this path of movement of said revoluble member, and means for disengaging said latch from said catch upon the breaking of a yarn comprising a trip mechanism engaged by the yarn as being advanced to the take-up package, a member suspended from said trip mechanism and moved thereby to be positioned between said abutment and the path of movement of said revoluble member whereby to be engaged by said member to move said abutment and disengage said latch from said catch upon the breaking of a yarn.

4. A textile machine comprising a spindle for a take-up package, a rotatably mounted roller for advancing the yarn to the take-up package, a drive shaft, a pulley on said drive shaft, a pulley connected to said roller, a flexible member extending over said pulleys in slack relation thereto, and means for tensioning said member into driving relation with said pulleys for transmitting motion from said drive shaft to said roller, comprising an arm, an idler pulley carried by said arm and over which said member extends, a lever pivotally mounted and having a pin therein movable into engagement with said arm to move said idler to tension said member into driving relation with said pulleys, a catch carried by said lever, a latch pivotally mounted and movable into engagement with said catch to retain said idler in tension-applying relation with said member, a pin mounted to revolve in an annular path, an abutment carried by said latch at a location adjacent to, but spaced from,

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the path of movement of said pin, and a suspended member operable upon the breaking of a yarn to be moved adjacent said abutment and the path of movement of said pin to be engaged by said pin and moved against said abutment to cause disengagement of said latch from said catch, and a spring for moving said latch towards said catch.

5. A yarn feeding unit for a textile machine, comprising a pair of feed rollers rotatably mounted and about which the yarn is wrapped to be advanced by the feed rollers, and by means of which wrappings of yarn motion is transmitted from one roller to the other, a drive shaft, a pulley secured to said shaft, a pulley connected to one of said feed rollers, a flexible member extending over said pulleys in slack relation therewith, an arm pivotally mounted and having an idler pulley thereon movable therewith and engaging said member, a pivoted lever having means thereon positioned to engage and move said arm upon moving of said lever to tension member into driving relation with said pulleys for transmitting motion from said drive shaft to said one of said feed rollers, and means for moving said lever.

6. A yarn feeding unit for a textile machine, comprising a pair of feed rollers rotatably mounted and about which the yarn is wrapped to be advanced by the feed rollers and by means of which wrappings of yarn, motion is transmitted from one roller to the other, a drive shaft, a pulley secured to said drive shaft, a pulley connected to one of said feed rollers, a flexible member extending over said pulleys in slack relation therewith, an arm pivotally mounted and having an idler pulley thereon movable therewith and engaging said member, a pivoted lever having means thereon positioned to engage and move said arm upon moving of said lever to tension said member into driving relation with said pulleys for transmitting motion from said drive shaft to said one of said feed rollers and an extension on said lever manually engageable for swinging said lever about its mounting.

7. A yarn feeding unit as set forth in claim 5 wherein said lever means is a spring-pressed pin.

8. A yarn feeding unit as set forth in claim 5 wherein said lever is mounted to swing about the axis of the drive shaft.

9. A yarn feeding unit as set forth in claim 5 wherein said flexible member is a V-belt.

10. A yarn feeding unit for a textile machine, comprising a pair of feed rollers rotatably mounted and about which the yarn is wrapped to be advanced by the feed rollers and by means of which wrappings of yarn, motion is transmitted from one feed roller to the other, a drive shaft, a pulley secured to said drive shaft, a pulley connected to one of said feed rollers, a flexible member extending over said pulleys in slack relation therewith, an arm pivotally mounted and having an idler pulley thereon movable therewith and engaging said member, a pivoted lever having means thereon positioned to engage and move said arm upon movement of said lever to tension said member into driving relation with said

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pulleys for transmitting motion from said drive shaft to said one of said feed rollers, means for moving said lever about its mounting, and means for holding said lever in position to maintain said idler pulley in tensioning relation with said arm, comprising a catch on said lever and a latch engaging said catch.

11. A yarn feeding unit as set forth in claim 10 wherein said latch is pivotally mounted and resilient means are provided for biasing said latch into engagement with said catch.

12. A yarn feeding unit as set forth in claim 11 wherein said latch is provided with a manually operable finger engaging extension for disengaging said latch with said catch.

13. A yarn feeding unit for a textile machine, comprising a pair of rotatably mounted feed rollers, a drive shaft, a pulley on said drive shaft, a pulley connected to one of said feed rollers, a flexible member extending over said pulleys in slack relation therewith, a pivoted arm, an idler pulley mounted on said arm and movable therewith to engage said member for tensioning said member into driving relation with said pulleys for transmitting motion from said drive shaft to said one of said feed rollers, means for moving said arm to move said idler pulley into tensioning relation with said member comprising a pivoted lever, a spring-pressed pin carried by said arm and movable with said lever into engagement with said arm to swing the arm about its pivotal mounting, a catch on said lever, a pivoted latch for engaging said catch for holding said pin in engagement with said arm, a projection on one of said pulleys and rotatable therewith, an abutment on said latch at a location thereon to be adjacent the path of travel of said projection and spaced therefrom, and a member adapted to be positioned between the path of travel of said projection and said abutment to be engaged by said projection to move said abutment to disengage the latch from the catch to permit said arm and the idler thereon to be moved out of tensioning relation with said member.

14. A yarn feeding unit for a textile machine comprising a pair of feed rolls, a drive shaft, a pulley on said drive shaft, a pulley connected to one of said feed rollers, a flexible member extending about said pulleys in slack relation thereto, means for tensioning said member including an idler pulley movable into engagement with said member, means for holding said idler pulley into tensioning relation with said member comprising a catch part and a latch part and means for disengaging said catch and latch to permit movement of said idler in a direction to provide a slack in said member.

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