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(54) Textile machinery

(57) The invention concerns textile winding and like machinery and relates to a yarn feed mechanism sensitive to the tension in the yarn being fed, so that material deviations from a normal winding tension can be detected and, if necessary, used automatically to stop the machine.

The apparatus disclosed comprises two spaced parallel rollers (12, 13) of which one is mounted for movement relative to the other under the effect of the tension in the yarn (63) arranged in multiple wraps therearound and against the restraint of a resilient means (38, 39), movement of the movably mounted roller (13) in either direction in excess of a predetermined extent serving to operate an electrical switch means (15 not shown) whereby the machine is stopped.

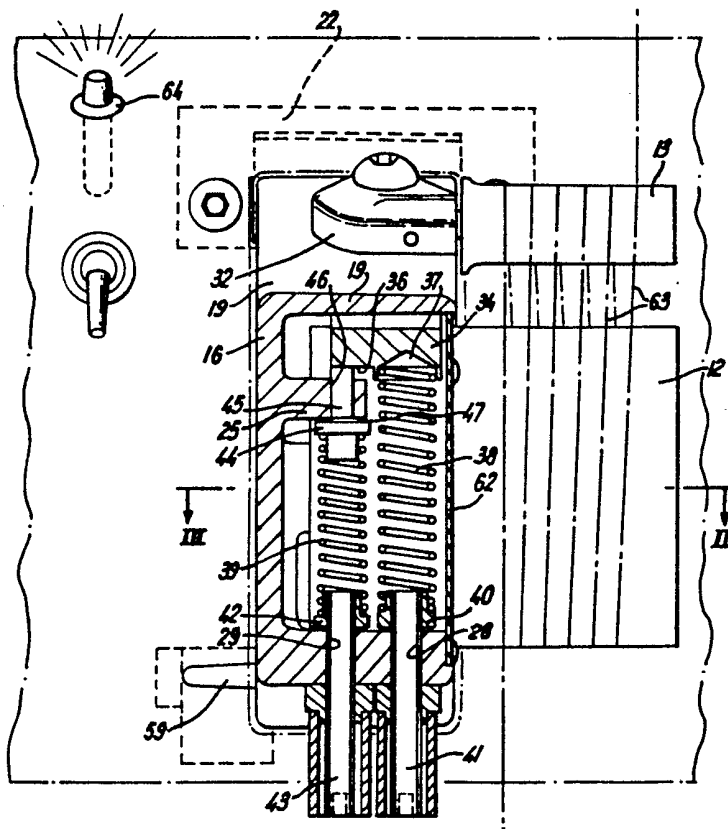
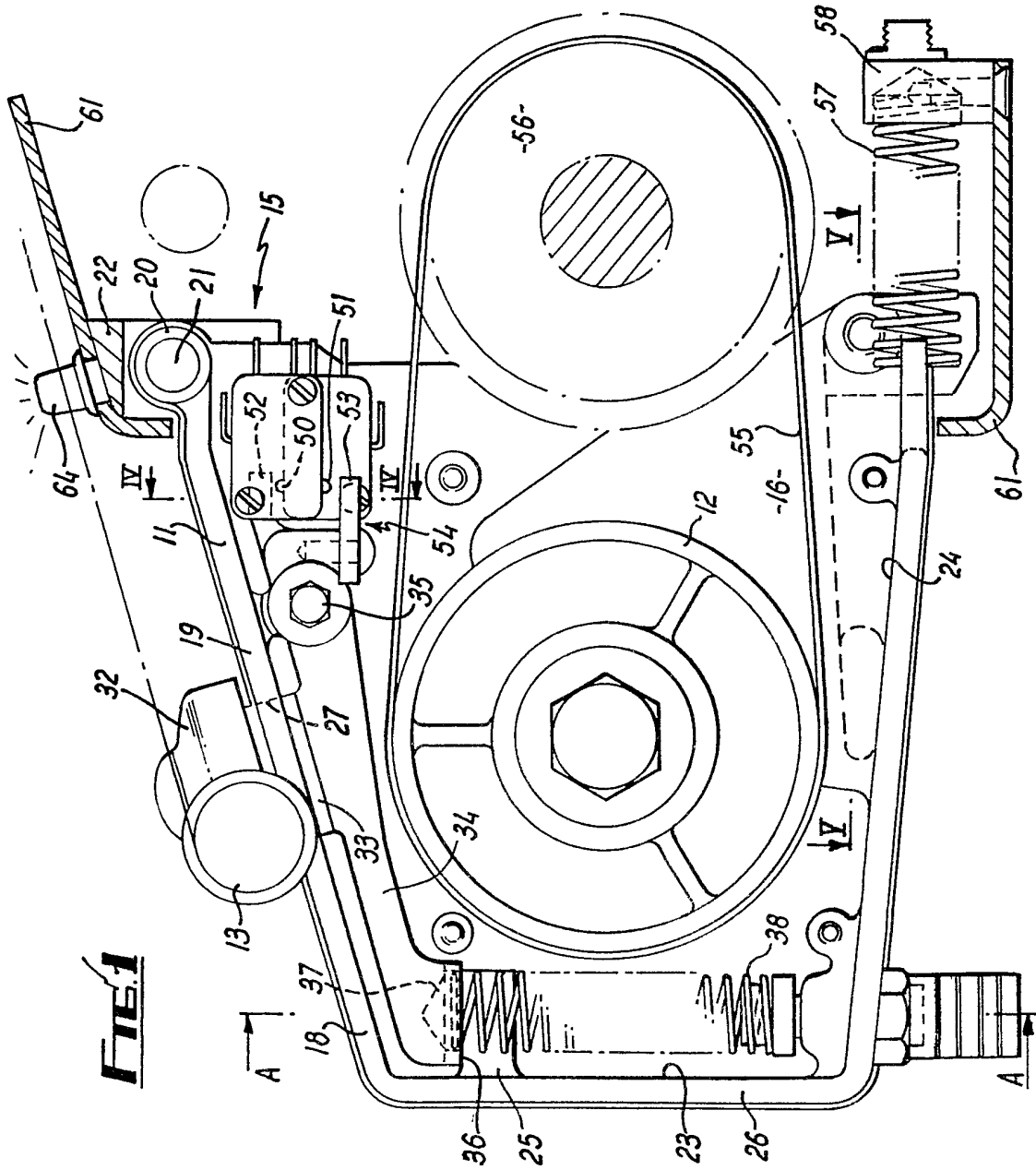


FIG. 2

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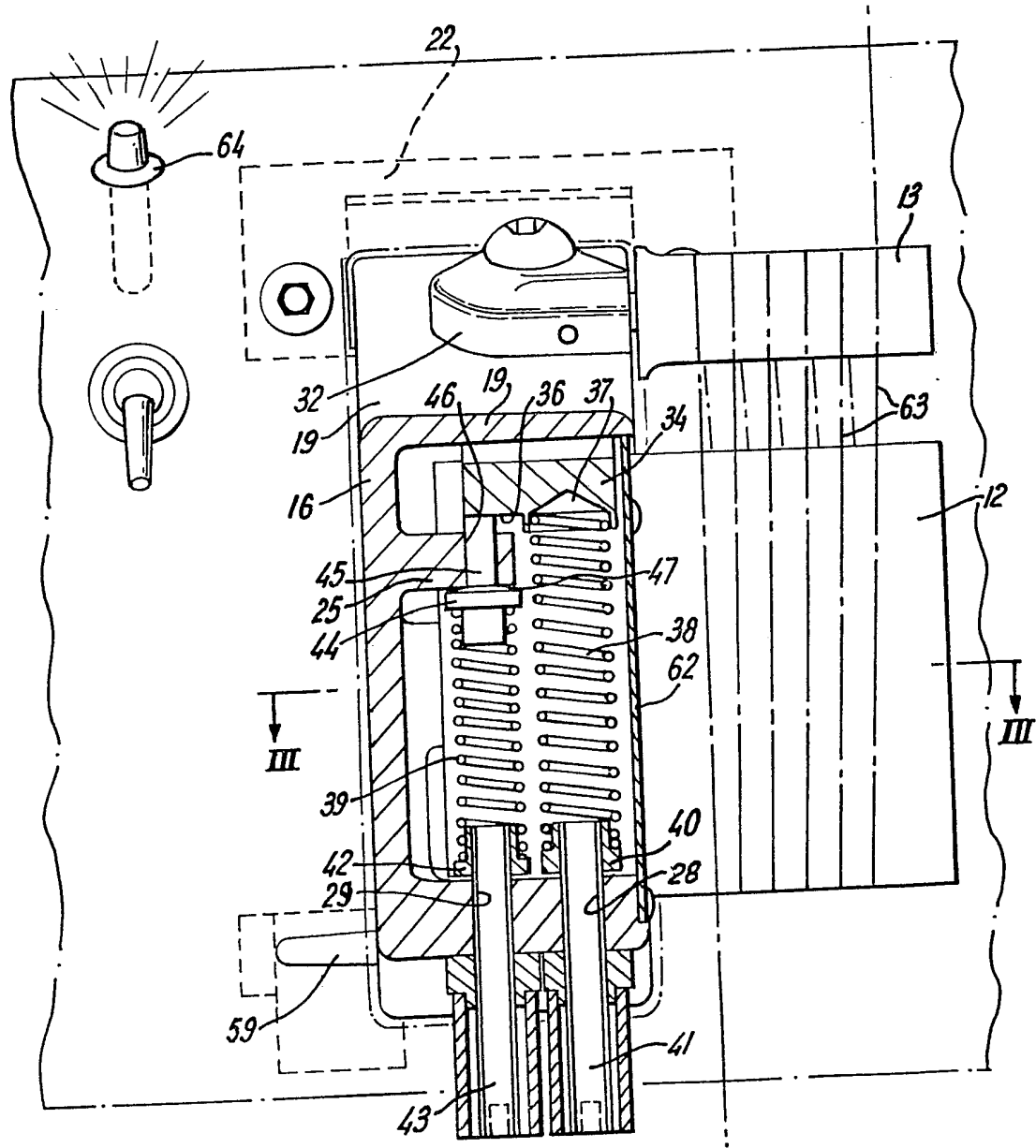


FIG. 2

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FIG. 3

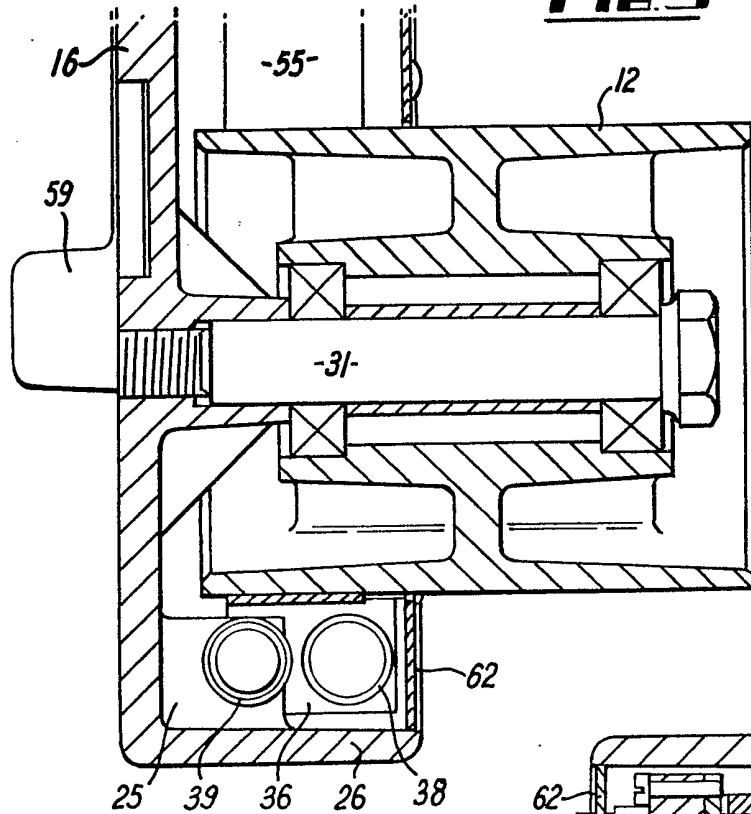


FIG. 4

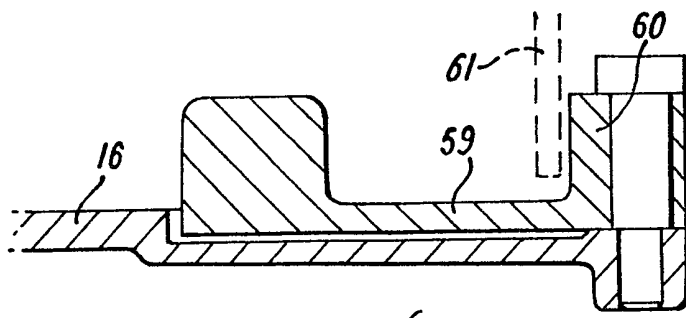
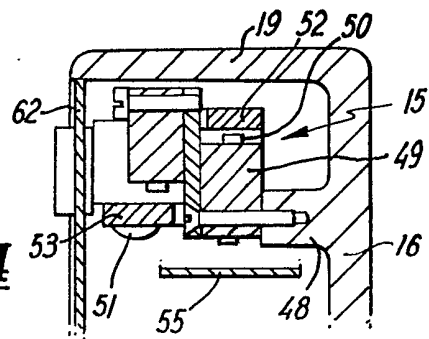


FIG. 5

SPECIFICATION

Textile machinery

5 The invention concerns textile machinery, and has more particular reference to a stop mechanism of application to, for example, twisting machines.

The primary object of the invention is to provide a stop mechanism for a twisting or winding machine (hereinafter, for convenience, referred to as "winding machines") which is sensitive to the tension in a yarn passing to the take-up package of such machine, and which will detect any material deviation from a predetermined winding tension and indicate such deviation.

In its broadest aspect the invention proposes a yarn feed mechanism for a textile winding machine which is sensitive to the tension in the yarn being fed and comprising spaced rollers collectively to receive the yarn thereabout and means sensitive to the loading applied to one at least of the said rollers by the yarn in engagement therewith in a direction towards the other roller.

More particularly, the invention contemplates a yarn feed mechanism comprising first and second rollers arranged in spaced, generally parallel disposition, mounting means supporting the first roller for movement towards and away from the second roller, resilient means resisting movement of said first roller towards the said second roller, under the effect of a yarn extending about said rollers as considered collectively and switch means sensitive to the position of the said first roller and actuable upon movement thereof relative to a datum position in excess of a predetermined extent.

According to a preferred feature, the first roller is supported on a pivoted lever and the resilient means operates on said lever to resist movement thereof towards the second roller.

According to a further preferred feature the resilient means comprises side-by-side helical springs of different respective strengths, the stronger spring being operable to restrain movement of the first roller on movement thereof in a direction towards the second roller and away from the said datum position.

The invention will now be described further, by way of example only, with reference to the accompanying drawings illustrating one embodiment thereof, and in which:

Fig. 1 is a vertical section through a capstan overfeed device for use in the context of a twisting machine;

Fig. 2 is a section taken on line A-A of Fig. 1;

Fig. 3 is a section on line III-III of Fig. 2;

Fig. 4 is a section on line IV-IV of Fig. 1;

and

Fig. 5 is a section on line V-V of Fig. 1.

Referring now to the drawings a capstan

overfeed arrangement for a textile twisting machine, and particularly a 2 for 1 twister, comprises a housing 11, a driven overfeed roller 12 supported in the housing 11 a separator roller 13 arranged in spaced, generally parallel disposition relative to the overfeed roller 12 and mounted on the housing 11 for limited movement laterally of such overfeed roller 12 against the restraint of resilient means 14, and switch means 15 sensitive to the position of the separator roller 13 and operable upon deviation of the separator roller 13 from a datum position by a predetermined amount to indicate such deviation and/or to brake the yarn feed package spindle and, if required, the wound package.

The housing 11 comprises a plate 16 of truncated triangular form having a peripheral wall about three of the four edges thereof, the housing being disposed in a vertical plane when fitted to the twisting machine, the top edge 18 of such housing, when so fitted, being downwardly inclined outwardly of the machine (not shown) and the wall 19 at such edge terminating in an integral socket 20 to receive a pin 21 pivotally to mount the housing 11 in a hinge 22 secured to the machine framework in a manner and for a purpose hereafter to be made apparent. The wall continues from the upper inclined edge 18 of the plate along the front and bottom edges 23, 24, there being a lug 25 in the angle between the plate and the front wall 26 in closely spaced disposition relative to the top edge 18 of a height equal to approximately one half of the height of the wall 26 and for a purpose hereafter to be disclosed. A through hole 27 is provided in the wall 19 approximately centrally thereof, whilst two spaced threaded holes 28, 29 are provided in the bottom wall 30 closely adjacent to the front wall 26, one such hole 29 being in axial register with lug 25.

Overfeed roller 12 is mounted for rotation on a stud 31 engaged with plate 16 to extend perpendicular thereto, and is of an axial dimension to protrude substantially beyond the plane defined by the edge of the wall, that part of the roller 12 disposed outwardly of the housing being the yarn receiving part of such roller.

The separator roller 13 is carried in a holder 32 mounted on an upstanding lug 33 formed integrally with a stop motion lever 34 disposed within the housing and adjacent the top wall 19, the lever 34 being pivotally supported, at one end thereof, on stud 35 and lug 33 protruding through hole 27 to receive holder 32 outwardly of the housing. That end of the stop motion lever 34 remote from stud 35 terminates closely adjacent front wall 26 and includes a downwardly facing surface 36 having a counterbore 37 in axial register with threaded hole 28 in bottom wall 30. Lever 34 is pivotal on stud 35 within limits imposed by

the geometry of such lever and the holder 32 in relation to the top wall 19.

The resilient means 14 against the restraint of which stop motion lever 34 moves comprises two helical compression springs 38, 39 arranged in parallel side-by-side disposition, spring 38 being located by and between a spring adjustment nut 40 on a screw 41 engaged with threaded hole 28 and counter-bore 37 and spring 39, which spring is stronger than spring 38, being interposed between a spring adjustment nut 42 on a screw 43 engaged with threaded hole 29 and a plunger 44 located relative to lug 25 and engaged with the upper end of the spring, such plunger including a push rod 45 which extends through a hole 46 in the lug 25 and abuts the downwardly facing surface 36 of the stop motion lever. Push rod 45 is so dimensioned as to protrude from the upper side of lug 25 with shoulder 47 of the plunger in abutment with the underside of such lug. Spring 39 provides a restraint to movement of lever 34 only in conditions of excessive tension in the yarn, for example such as would arise on snagging of the yarn, whereas spring 38 provides a resilient loading on lever 34 throughout its full range of movement.

Switch means 15 is mounted within the housing and at the inner face of the top wall 19 on a stud 48, and comprises a micro-switch 49 having opposed contacts 50, 51 respectively operable by laterally spaced contact plates 52, 53 on a cranked operating plate 54 secured to the stop motion lever 34. Plate 54 is of such form and is so positioned that pivotal motion of lever 34 in a clockwise sense as seen in Fig. 1 under the influence of spring 38 will bring contact plate 52 into operating engagement with its related contact 50, whilst motion of the lever in an opposite sense against the restraint of springs 38, 39 will cause contact plate 53 to operate contact 51.

Drive of overfeed roller 12 is effected through a drive band 55 extending between that part of the roller 12 disposed within the housing 11 and a drive roller 56, tension in the band 55 being maintained by a compression spring 57 acting between a fixed support 58 and the housing, the spring 57 serving to urge the housing in clockwise direction about the axis of pin 21 and thus to move the overfeed roller 12 away from the fixed drive roller 56. A release arm 59 mounted on and outwardly of the housing 11 has an enlargement 60 for cooperation, on limited pivotal motion of the arm in an appropriate sense, with the machine housing 61 to cause the housing 11 to pivot in an anti-clockwise direction about pin 21 against the restraint imposed by spring 57, and hence reduce the tension in drive band 55.

A cover plate 62 is provided on the housing 11, such plate being apertured to provide

clearance on the overfeed roller and being secured to the peripheral wall.

In use, a yarn 63 under processing is wrapped in multiple turns about the overfeed and separator rollers 12, 13 respectively, springs 38, 39 being adjusted as necessary to space contact plates 52, 53 from the respective associated contacts 50, 51.

On increase in yarn tension the separator roller 13 is moved closer to the overfeed roller, and stop motion lever 34 is pivoted, against the restraint of springs 38, 39 eventually to bring contact plate 53 into operating engagement with contact 51 and trip the switch to brake the yarn feed package spindle. Conversely, a reduction in yarn tension will move the lever 34 in clockwise direction under the effect of spring 38, and will eventually cause contact plate 52 to operate contact 50 and again brake the yarn feed package spindle.

If it is required manually to interrupt the drive to the overfeed roller, then release arm 59 is shifted from the position shown in Fig. 2 in clockwise direction through the over centre position illustrated, whereupon the tension in drive band 55 is relieved and drive to the overfeed roller stopped.

An indicator lamp 64 is connected to the switch means to indicate automatic stoppage, and an audible alarm can be fitted if desired.

By means of the present invention we are able to monitor the tension in the yarn during passage to a take up package and automatically to brake the yarn feed package spindle in the event of a deviation in the tension in excess of predetermined limits. The individually adjustable springs enable us to vary the sensitivity of the device according to the yarn being processed.

The invention is not limited to the exact features of the embodiment hereinbefore described, since alternatives will readily present themselves to one skilled in the art. Thus, for example, it may be found sufficient, in some circumstances, simply to detect an increase or decrease in tension relative to a datum, in which case the switch means will be modified accordingly.

As an alternative to the mechanical arrangement hereinproposed, the deviation in yarn tension from a norm may be determined by means of a load cell or the like sensitive to the load applied to the separator roller by the yarn and connected with electrical circuitry adapted to indicate the occurrence of a deviation of predetermined proportions and to interrupt yarn feed upon detection of such occurrence.

125 CLAIMS

1. A yarn feed mechanism for a textile winding machine, the said mechanism being sensitive to the tension in the yarn being fed and comprising spaced rollers collectively to receive the yarn thereabout and means sensi-

tive to the loading applied to one at least of the said rollers by the yarn in engagement therewith in a direction towards or away from the other roller.

5 2. A yarn feed mechanism as claimed in claim 1, comprising first and second rollers arranged in spaced, generally parallel disposition, mounting means supporting the first roller for movement towards and away from
10 the second roller, resilient means resisting movement of said first roller towards the said second roller, under the effect of a yarn extending about said rollers as considered collectively, and switch means sensitive to the
15 position of the said first roller and actuable upon movement thereof relative to a datum position in excess of a predetermined extent.

3. A yarn feed mechanism as claimed in claim 2, wherein the first roller is supported
20 on a pivoted lever and the resilient means operates on said lever to resist movement thereof towards the second roller.

4. A yarn feed mechanism as claimed in claim 2 or 3, wherein the resilient means
25 comprises side-by-side helical springs of different respective strengths, the stronger spring being operable to restrain movement of the first roller during part only of its range of permitted movement and in conditions of excessive tension in the yarn.
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5. A yarn feed mechanism as claimed in claim 4, wherein the resilient means includes a push rod mounted on the stronger spring and engageable with the mounting means
35 supporting the first roller only in conditions of excessive tension in the yarn, there being means limiting movement of the push rod in a direction towards the first roller.

6. A yarn feed mechanism as claimed in claim 5, wherein the push rod is flanged for cooperation with a shoulder, thus to limit movement of the push rod in said direction.

7. A yarn feed mechanism as claimed in any one of the preceding claims 2 to 6,
45 including a housing supporting the spaced rollers in parallel disposition thereon, and means for pivotally mounting the housing on a winding machine about an axis parallel to the respective axes of the rollers.

8. A yarn feed mechanism as claimed in claim 7, further including resilient means loading the housing about the pivot axis thereof and away from the winding machine.

9. A yarn feed mechanism as claimed in claim 8, further including a release arm operable, in conjunction with the structure of the winding machine, to pivot the housing against the restraint of the resilient means.

10. A yarn feed mechanism as claimed in
60 any one of claims 7 to 9, wherein the switch means is mounted in the housing, the means for mounting the first roller being adapted for cooperation with the switch means to effect actuation thereof on movement of the first
65 roller from a datum position in excess of a

predetermined extent.

11. A yarn feed mechanism as claimed in claim 10, wherein the means mounting the first roller comprises a pivoted lever, and such
70 lever is adapted for cooperation with the switch means to effect actuation thereof.

12. A yarn feed mechanism as claimed in claim 11, wherein the switch means comprises means having oppositely directed
75 switch contacts and the lever includes a cranked operating plate secured to the pivoted lever and having respective parts thereof located in spaced opposed disposition relative to the switch contacts in the datum position of
80 the first roller.

13. A yarn feed mechanism as claimed in any one of the preceding claims 2 to 12, wherein the resilient means is adjustable.

14. A yarn feed mechanism substantially as
85 hereinbefore described with reference to and as illustrated in the various figures of the accompanying drawings.

15. A textile winding machine including a
90 yarn feed mechanism as claimed in any one of the preceding claims.

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