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Schiltknecht et al.

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[45] **Jan. 14, 1975**

[54] **METHOD AND APPARATUS FOR WINDING YARN FROM OPEN END SPINNING DEVICES**

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[22] Filed: **Sept. 7, 1972**

[21] Appl. No.: **287,012**

Related U.S. Application Data

[63] Continuation of Ser. No. 883,011, Dec. 8, 1969, abandoned.

[52] **U.S. Cl.** ..... **242/45,** 74/192, 242/18 DD

[51] **Int. Cl.** **B65h 59/38**

[58] **Field of Search** .... 242/45, 18 CS, 18 DD, 75.5, 242/26; 74/191, 192, 193

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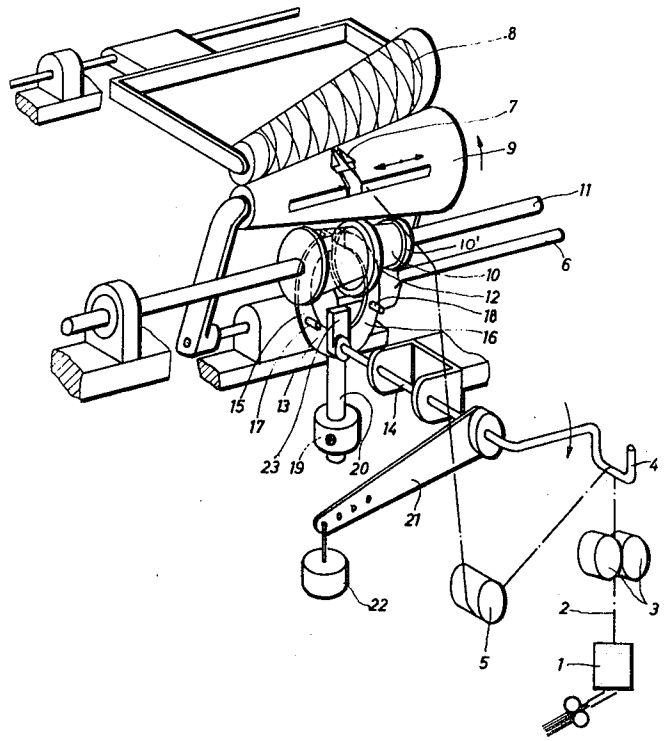
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Attorney, Agent, or Firm—Kenyon & Kenyon Reilly Carr & Chapin

[57] **ABSTRACT**

The yarn is wound up from the spinning device at a constant tension. The apparatus includes a shiftable friction ring which varies the speed of the winding drum in response to the yarn tension as determined by a yarn feeler. The actuation of the control means to shift the friction ring can be immediate or delayed.

14 Claims, 13 Drawing Figures



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SHEET 1 OF 4

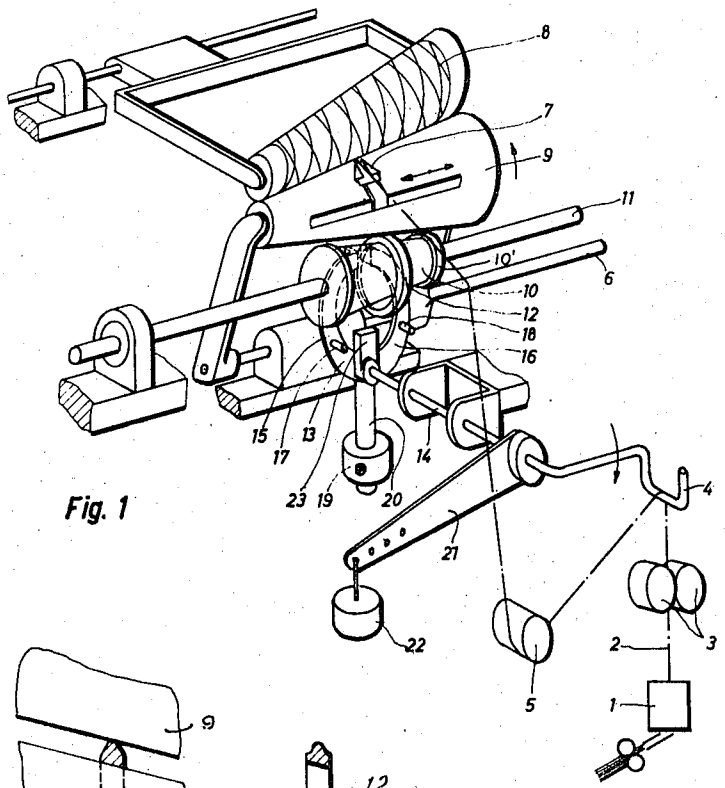


Fig. 1

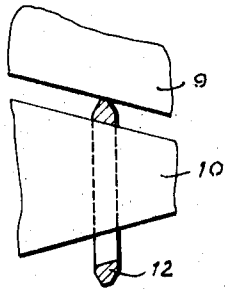


Fig. 2

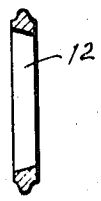


Fig. 3

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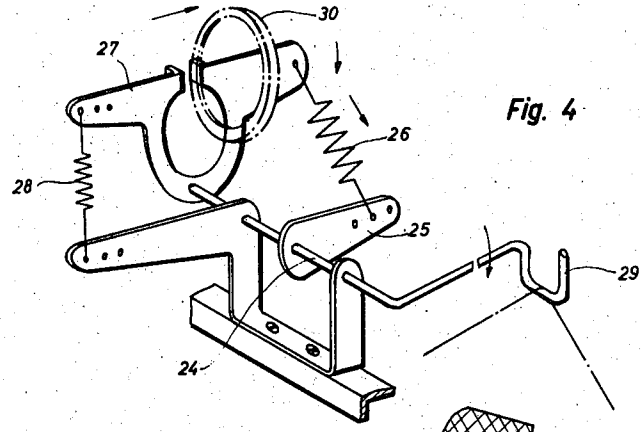


Fig. 4

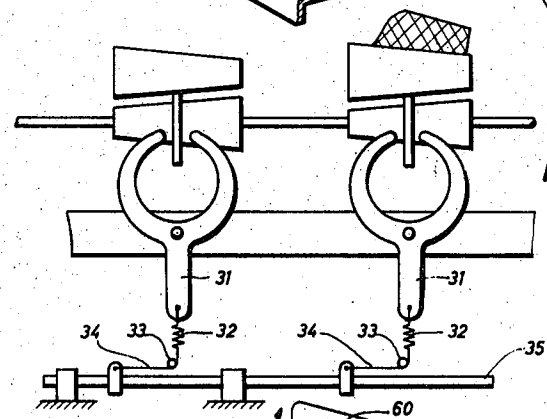


Fig. 5

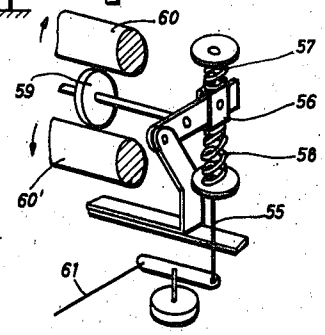


Fig. 8

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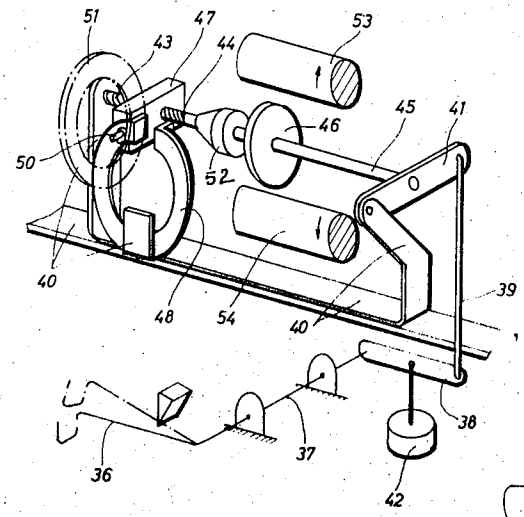


Fig. 6

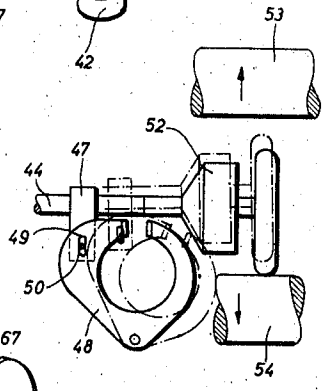
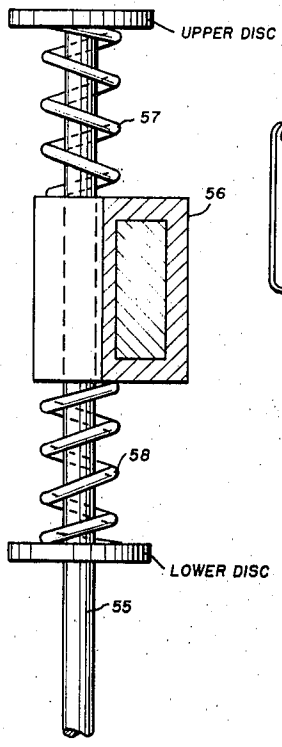


Fig. 7

Fig. 12



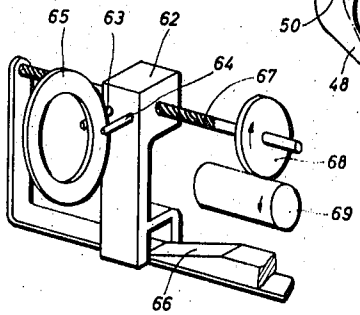


Fig. 9

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Fig. 10

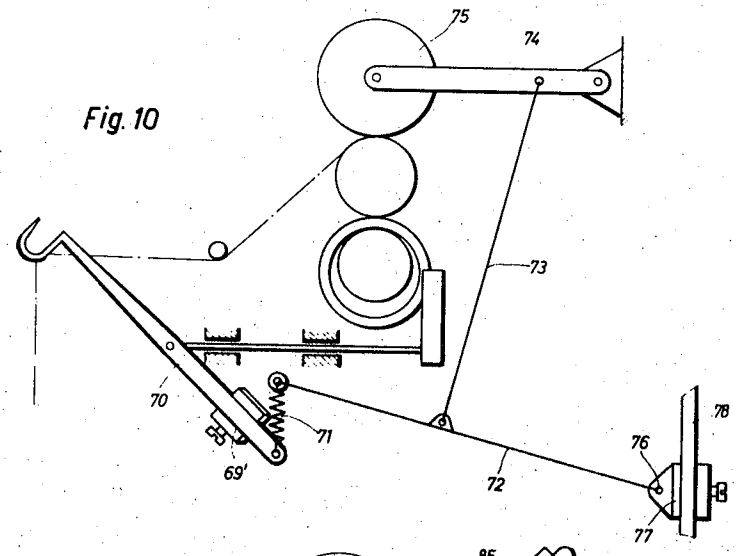
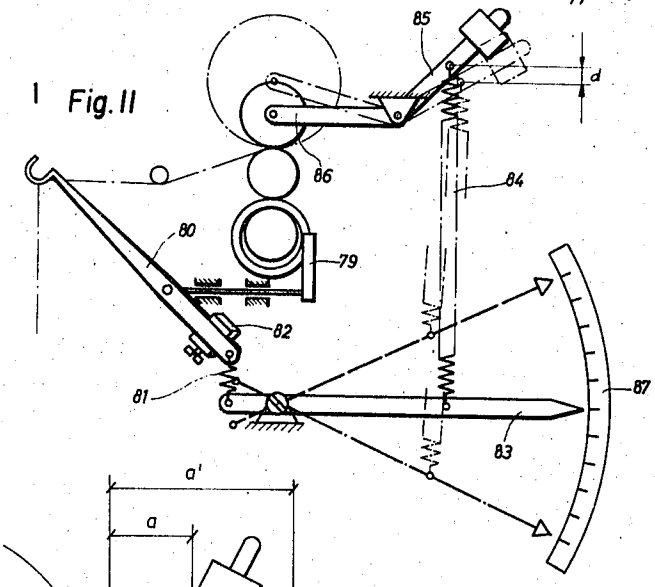


Fig. 11



P~P' Tension-Force
Momentum : a·P<a'·P'

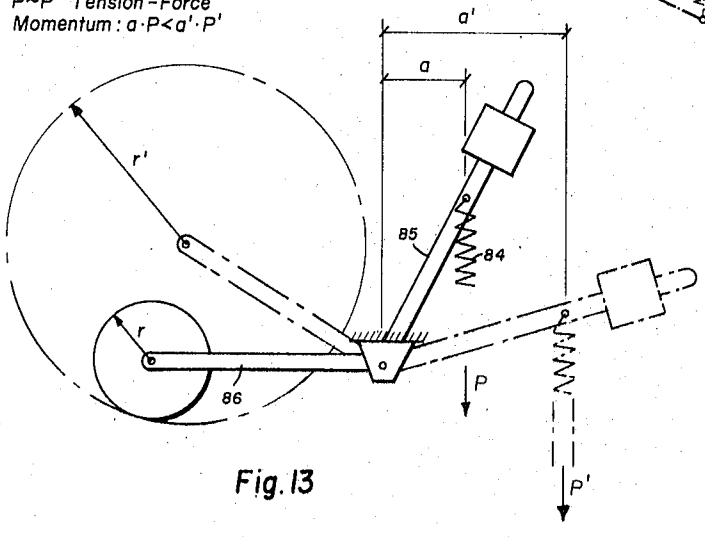


Fig. 13

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METHOD AND APPARATUS FOR WINDING YARN FROM OPEN END SPINNING DEVICES

This is a continuation of Application Ser. No. 883,011 filed Dec. 8, 1969, now abandoned.

This invention relates to yarn winders. More particularly, this invention relates to a method and apparatus for winding yarn from an open end spinning device.

Generally, other than in rewinding on a winder, where yarn is taken off yarn packages at variable speeds which change according to the conditions in an open end spinning device, when yarn is taken off from an open end spinning device, such is done at a constant speed. However, a satisfactory yarn package can be formed only if a certain winding tension is maintained.

In order to wind the yarn from an open end spinning device at such a tension, winding devices i.e., friction drums or grooved drums which contact the yarn package, have been operated at constant winding speed while the drive of opening elements, spinning rotors and take-off rolls have been operated at an adjustable speed ratio relative to the winding speed, which ratio has been maintained constant during operation. On the other hand, the yarn path length between the take-off rolls associated with the spinning device and the winding point has varied due to the traverse needed for the package build. This yarn path length difference has been taken up by yarn extension alone on the known open end spinning machines. Thus, in the extreme positions of the yarn, while the yarn is wound onto the edges of the package, i.e., the traverse reversal points, very high yarn tensions have occurred while a certain minimum tension needed for proper winding has been maintained in the midpoint of the traverse. This procedure is quite satisfactory as long as the winding traverse is relatively small and the yarn path length differences do not exceed a certain limit. The resulting yarn package, however, in all cases is very tightly wound, which for certain yarn styles and package types, e.g., dying packages, is undesirable. If softer packages are attempted, package build becomes unsatisfactory as the yarn is wound too loosely if small differences in friction between the yarn package and the friction drum prevail, so that wraps can be pushed out of the package or wraps can slough off which impairs or even renders unpracticable further processing of the yarn.

Accordingly, it is an object of the invention to achieve control of yarn tension according to a program during the package build.

It is another object of the invention to maintain constant yarn tension in order to produce a package build as homogeneous as possible.

It is another object of the invention to balance out the yarn path length differences caused by the yarn traverse triangle.

It is another object of the invention to level out the winding speed differences necessarily occuring in winding out cones between the extreme yarn traverse positions and to level out the inevitable slippage.

It is another object of the invention to produce soft yarn packages.

It is another object of the invention to use the forces acting on the yarn to control the speed levelling action.

Briefly, the invention provides a method and apparatus for winding yarn from an open end spinning device onto a yarn package at constant tension.

The method is characterized in that the yarn tension is gauged between a take-off point at the open end spinning device and a winding point at the yarn package and that if the yarn tension varies, the difference between the take-off speed and the winding speed is also varied in response to the yarn tension variation. That is, as the yarn tension diminishes, the difference in speeds is increased or if the tension increases, the difference is reduced.

The method in one instance utilizes the position of a tension feeler such that as the tension feeler is moved from a balanced position due to changes in yarn tension, the movement is used to control the speed difference.

In another instance, the method can vary the speed difference by increasing or decreasing the winding speed. In this case, the speed difference can be influenced after a time delay after a change in yarn tension or can be effected only if a predetermined change in yarn tension occurs.

An apparatus of the invention comprises a winding device with a tiltable yarn package drive drum, a yarn package contacting the drum in frictional driving relation with the yarn produced being traversed and wound onto the package, a drive roll, a friction ring between the drive drum and drive roll which is shiftable in an axial direction so as to transmit the drive roll circumferential speed prevailing at the ring position to the drum and means for shifting the ring in response to a change in the tension of the yarn, as detected by a yarn feeler.

These and other objects and advantages of the invention will become more apparent from the following detailed description and appended claims taken in conjunction with the accompanying drawings in which:

FIG. **1** illustrates a schematic perspective view of a winding apparatus according to the invention with an open end spinning device;

FIG. **2** illustrates a fragmentary view of tbe friction ring with respect to the drive roll and drive drum;

FIG. **3** illustrates a cross-sectional view of the friction ring;

FIG. **4** illustrates a schematic perspective view of another embodiment of a winding apparatus according to the invention;

FIG. **5** illustrates a fragmentary view of a plurality of winding apparatus according to the invention;

FIG. **6** illustrates a further embodiment of the invention;

FIG. **7** illustrates a fragmentary view of the winding apparatus illustrated in FIG. **6** during operation;

FIG. **8** illustrates another embodiment of the invention;

FIG. **9** illustrates another embodiment of the invention;

FIG. **10** illustrates a view of a modified embodiment of the invention;

FIG. **11** illustrates a view similar to FIG. **10** of a further embodiment of the invention;

FIG. **12** illustrates a detailed view of the embodiment shown in FIG. **8**; and

FIG. **13** illustrates a partial view of the double armed lever of FIG. **11**.

Referring to FIG. **1**, an open end spinning device **1** has a yarn **2** produced therein which is taken-off at constant speed by take-oof rolls **3** and is transferred to a winding apparatus. This winding apparatus includes a

pivoting arm or tension feeler 4 which transfers the yarn 2 over a fixed roll 5, a fixed guide rod 6 and a traversing yarn guide 7 to a conical bobbin 8 which contacts a pivotably mounted conical bobbin drive roll or package winding drum 9 driving the bobbin or package 8 frictionally at an average circumferential speed. A second conical drive roll 10 is arranged below the bobbin drive roll 9 in an inverse manner and is mounted in an axially adjustable manner via a suitable adjusting means 10' such as a set screw on a drive shaft 11 extending along the drive rolls 9, 10. A friction ring 12 of suitable cross-section profile (see cross-section profiles shown in FIGS. 2 and 3) is also mounted on the drive roll 10. Owing to the weights of the bobbin 8 and roll 9, the roll 9 is pressed against the friction ring 12 which in turn is pressed against the drive roll 10. The position of the friction ring 12 is determined by a suitable means such as a two-pronged fork 13 which guides the ring 12 on the side on which the surface of rolls 9 and 10 move towards the nip, in order to avoid jamming. The fork 13 is supported by a pivoting arm shaft 14 so as to be freely rotatable in a perpendicualr plane of this shaft 14. The fork 13 has prongs 15, 16 which are provided with stops 17, 18, respectively and an extension 20 which is provided with an adjustable weight 19 to determine the middle position or position of equilibrium. The pivoting arm 4 is held in its middle position by means of a lever 21 rigidly connected to the shaft 14 along with a shiftable weight 22. The lever 21 and weight 22 thereby serve to hold the arm 4 in a position of equilibrium relative to a predetermined yarn tension. An extension or carrier level 23 which is rigidly connected to the shaft 14 protrudes between the stops 17, 18 on the fork 13.

In operation, if the yarn tension increases due to a yarn path length difference and to the speed differences in winding onto the bobbin edge and middle zone of the conical bobbin 8 and exceeds the normal tension corresponding to the balanced position of the pivoting arm 4, the pivoting arm 4 swings in the direction of the arrow indicated in solid lines, until the extension 23 meets the stop 18. The extension 23 then moves the fork 13 towards the right, as viewed, which movement also causes the friction ring 12 to shift to the right and changes the transmission ratio between the drive shaft 11 and the bobbin drive rill 9 in the sense of a speed reduction of the bobbin drive roll 9 and the bobbin 8. The friction ring 12 is thus shifted only after a cetain pivoting movement of the pivoting arm 4. If the yarn tension drops, the corresponding inverse sequence of movements occurs, resulting in a speed increase of the bobbin drive roll 9.

A similar solution, somewhat simpler but without delayed speed correction by the above-mentioned stops 17, 18 of the fork is shown in FIG. 4, the friction drive roll not being shown for better clarity. Here, a lever 25 is rigidly connected to the shaft 24 of the pivoting arm 29 which lever 25 influences by means of a spring 26 a freely pivotable fork 27 supported also by the shaft 24. A spring 28 which is mounted to the frame on one side and on the opposite side to the fork 27 maintains the pivoting arm 29 in a balanced position at a predetermined yarn tension. The friction ring 30 is indicated with dash-dotted lines. The function of this arrangement corresponds to the one of the arrangement shown in FIG. 1; however, without the ring shifting movement being delayed.

Referring to FIG. 5, instead of an individual choice or setting of the balanced condition of the pivoting arm, the sensitvity of the correction mechanisms of all winding positions of a whole machine can be suitably selected centrally. For example, as shown, a tension spring 32 is attached at one end to the lower end of each fork extension 31 and at the other end is connected via a flexible cord 34, partially wrapped around a roll 33, to a setting rail 35 extending along the machine. The rail 35 is adjustable at the end of the machine (not shown).

Referring to FIG. 6, shifting of the friction ring can be effected in a different manner and, at the same time, reactions of the shifting forces onto the pivoting arm can be avoided. For example, the pivoting arm 36 is connected via an arm 38 fixed on the pivoting arm shaft 37 and a wire connecting piece 39 linked to the arm 38 to a pivotable lever 41 supported in the apparatus frame 40. A weight 42 on the arm 38 maintains the system balanced. One end 43 of an adjusting rotatable spindle 44 is linked to the frame 40 while the other end 45 is linked to the lever 41. The spindle 44 is provided with a fixed drive element, such as a disc 46 and with a shifting piece 47 which is connected to a fork 48 pivotably supported in the frame 40 by a pin 50 penetrating through a slot 49 (compare FIG. 7). Again, the friction drive ring 51 is placed between the prongs of the fork 48 and a lifting cone 52 is fixed on the spindles 44 between the shifting piece 47 and disc 46.

In operation, the fork 48 shifts the friction ring 51 in an analogous manner to FIG. 1, correspondingly to the position of the shifting piece 47 on the spindle 44, which position depends on the yarn tension prevailing. The delay in the shifting movement is effected in that disc 46 contacts one of the shafts 53, 54 rotating in opposite directions after a certain upward or downward movement only and then transmits the corresponding rotation to the sprindle 44 so as to move the shifting piece 47 and friction ring 51. If a yarn break occurs, yarn tension vanishes entirely, the pivoting arm 36 moves to the position indicated with broken lines in FIG. 6 and disc 46 contacts the lower drive shaft 54 (FIG. 7). The shifting piece 47 moves the fork 48 so far to the right that its right prong contacts cone 52 and lifts up the spindle 44 so the disc 46 is lifted from shaft 54 and spindle 44 is stopped.

Referring to FIG. 8, it is also advantageous if the connection between the connecting piece 39 and the lever 41 supporting the spindle 44 (as in FIG. 6) is elastic. To this end, a link rod 55 is provided with a shifting piece 56 which is connected via two springs 57, 58 to the link rod 55. This presents a double advantage as the impact of disc 59 on either drive roll 60 or 60' is damped and as the pivoting arm shaft 61 can be further pivoted while the pivoting arm (not shown) is moved down further during a rethreading operation. This can prove advantageous under certain space conditions of the machine design.

Referring to FIG. 12, the rod 55 is arranged alongside the back of the shifting piece 56. The spring 58 surrounds the rod 55 and is held between the shifting peice 56 and the illustrated low disc which is fixed on the rod 55. A spring 57 also surrounds the rod 55 above the shifting piece 56 and is held between the shifting piece 56 and the uppermost disc which is fitted to the end of the rod 55. It can be seen in FIG. 8 that the rod 55

passes to the back of the shifting piece **56** and the lever to which the shifting piece **56** is secured.

Referring to FIG. **9**, instead of using a fork, a shifting piece **62** mounted on a spindle **67** for longitudinal movement thereon can be used to directly shift the friction ring **65** by means of two pins **63, 64.** Furthermore, the manner of roll lifting is changed in so far as, if the shifting piece **62** moves to the right, a position is reached in which the shifting piece **62** is forced to glide up on a tapered surface **66** arranged on the frame so that spindle **67** is lifted and roll **68** is lifted from the drive roll **69.** The roll **68** which is mounted on the spindle **67** in driven contact with the drive roll **69,** instead of being lifted in its extreme position, can be mounted on the spindle **67** by means of a slip clutch. The roll **68** then continues to rotate in its extreme position with a somewhat higher torsional momentum.

Referring to FIG. **10,** the bobbin drive roll speed can also be controlled by a weight **69'** which is mounted on a pivoting arm **70** adjusted according to the desired yarn winding tension, and in combination with the yarn tension, acts against a spring **71** which is increasingly tensioned via a lever arrangement **72, 73** and **74** as the bobbin diameter increases. Thus, the medium position of the pivoting arm **70** is moved counterclockwise as viewed as the present yarn tension is lowered and the winding tension is lowered according to the spring characteristics of the spring **71** and to the lever ratios chosen for the lever arrangement **72** through **74** as the bobbin diameter increases. By changing the supporting point **76** of the lever **72** by means of moving a shoe **77** on a vertical rail **78** the tension change characteristics can be set or varied. This shoe **77** can be centrally moved and, if needed, can be moved continuously according to any program desired so that another control program can be superimposed on the bobbin diameter increase. Thus, if fixed settings are used, winding tension is controlled as a function of the bobbin diameter increase, and if continuous movement of the pivoting point according to a given program is provided, winding tension is controlled according to other governing influences to be superimposed.

Referring to FIG. **11,** an apparatus can also be used for achieving constant yarn tension in combination with decreasing contacting pressure of the bobbin on the bobbin drive roll as the bobbin diameter increases. To this end, a pivoting arm **80** is connected with a fork **79** and is provided with a spring **81** and a weight **82** adjustable arranged on the pivoting arm **80** for setting the desired yarn tension. On another arm **83,** the setting of which can be fixed, a spring **84** is mounted which is connected directly with a knee-type lever **85** of a bobbin holder **86.** This spring generates the contacting force of the bobbin on the bobbin drive roll. On a dial **87,** th desired conditions can be chosen by a setting lever **83.** If lever **83** is moved clockwise as viewed, so that the yarn tension is lowered, spring **84** is tensioned and thus the contacting pressure of the bobbin on the drive roll is reduced. This arrangement allows that simultaneously with the setting of the yarn winding tension to a low or a high average value (dash-dotted or broken lines respectively), the contacting pressure of the bobbin is also reduced or increased, the increasing bobbin weight being more or less compensated by the spring **84** being pre-tensioned at varying degrees. The small path difference is neglegible as the elongation of the spring **84** caused by the setting for lever **83** exerts much more influence. Reference character *d* is a measure of the distance between an upper and a lower position of pivotable lever **85.** The upper position exists when the bobbin **8** is empty (at the beginning) while the lower position exists when the bobbin is full (at the end of the winding process).

FIG. **13** illustrates the manner of operation of the device shown in FIG. **11.** As indicated, a decreasing contact pressure of a bobbin on the drive roll as the bobbin diameter increases is caused by an increasing momentum caused by the tension-force of the spring **84** acting on the lever **85.** The feeler arm **80** (FIG. **11**) is not affected at all after the arm **83** (FIG. **11**) is fixed.

Achievement of the speed difference control by adapting the yarn take-off speed determined by the take-off rolls instead of adapting the winding speed can be imagined. This solution, however, implies more complications as not only the speed of the take-off roll but also the speed of the other elements of the spinning device coupled with them must be adapted.

The method according to the invention is advantageous as the varying slippage rates between an initially small diameter bobbin nearing completion of the package build. Also, yarn tension variations caused by start-up accelerations or unsufficient drive transmission to still empty bobbins are evened out automatically.

What is claimed is:

1. An apparatus for winding yarn from an open end spinning device onto a yarn package at constant yarn tension comprising

a winding device including a tiltable yarn package driving drum;

a yarn package contacting said drum in frictional driving relation for winding of a yarn emitted from the open end spinning device thereon;

a rotatable drive roll in the form of a cone;

a yarn tension feeler in the path of the yarn between the open end spinning device and said package;

a friction ring between said drive roll and said drum in shiftable relation axially of said drive roll and said drum for transmitting the circumferential speed of said drive roll prevailing at the position of said ring to said drum; and

means for shifting said ring in response to the tension in the yarn between the open end spinning device and said package, said means including a fork disposed about said ring to shift said ring axially of said drum and drive roll, and a delay mechanism between said feeler and said fork for delaying the transmission of the movement of said feeler to said fork, said delay mechanism including a carrier lever connected to said feeler for activating said fork after a predetermined movement of said feeler.

2. An apparatus as set forth in claim **1** which further includes a re-setting element connected to said fork to maintain said fork in a balanced position corresponding to the average yarn tension.

3. An apparatus as set forth in claim **1** wherein said drum is in the form of a cone and said drive roll is in the form of a cone positioned inversely of said drum.

4. An apparatus as set forth in claim **1** which further comprises means for adjusting said feeler into a balanced position of equilibrium.

5. An apparatus as set forth in claim **1** which further comprises a drive shaft mounting said drive roll thereon in axial adjustable relation.

6. An apparatus for winding yarn from an open end spinning device onto a yarn package at constant yarn tension comprising

a winding device including a tiltable yarn package driving drum;

a yarn package contacting said drum in frictional driving relation for winding of a yarn emitted from the open end spinning device thereon;

a rotatable drive roll in the form of a cone;

a friction ring between said drive roll and said drum in shiftable relation axially of said drive roll and said drum for transmitting the circumferential speed of said drive roll prevailing at the position of said ring to said drum; and

means for shifting said ring in response to the tension in the yarn between the open end spinning device and said package, said means including a pivoting arm shaft, a yarn tension feeler mounted on said pivoting arm shaft, a pivotable lever connected to said pivoting arm shaft to pivot in response to movements of said feeler, and a spindle rotatably mounted in said pivotable lever to move therewith in response to said feeler, a shiftable piece supported on said spindle, a drive element on said spindle located between a pair of driven shafts, said shafts being mounted for rotation in opposite directions to each other to alternately cause rotation of said spindle upon movement of said spindle in response to said feeler to move said drive element into contact with a respective one of said shafts.

7. An apparatus as set forth in claim 6 wherein a fork is connected to said shiftable piece to lift said drive element from one of said shafts upon said piece reaching a predetermined extreme position on said spindle.

8. An apparatus for winding yarn from an open end spinning device onto a yarn package at constant yarn tension comprising

a winding device including a yarn package driving drum;

a yarn package contacting said drum in frictional driving relation for winding of a yarn emitted from the open end spinning device thereon;

a rotatable drive roll in the form of a cone;

a friction ring between said drive roll and said drum in shiftable relation axially of said drive roll an said drum for transmitting the circumferential speed of said drive roll prevailing at the position of said ring to said package;

a yarn tension feeler in the path of the yarn for sensing the tension in the yarn between the opening end spinning device and said drum;

means for shifting said ring in response to a movement of said tension feeler, said means including a shaft rigidly connected to said feeler for rotation thereby and a fork freely mounted on said shaft for independent rotation therein; and

a delay mechanism between said feeler and said shifting means for delaying the transmission of the movement of said tension feeler to said means, said delay mechanism including a pair of prongs extending from said fork and an extension rigidly connected to said shaft and located between said prongs in spaced relation thereto.

9. An apparatus as set forth in claim 8 which further comprises an adjustment means for holding said means for shifting said ring in a position of equilibrium relative to a predetermined yarn tension.

10. An apparatus as set forth in claim 8 which further includes an extension depending from said fork and a weight adjustably mounted on said extension for holding said fork in a position of equilibrium.

11. An apparatus as set forth in claim 8 which further includes an extension depending from said fork, an adjustable setting rail, a tension spring connected at one end to said extension and a flexible cord connected to an opposite end of said spring and to said rail.

12. In a winding machine having a plurality of winding devices each including a driving drum, a drive roller, a friction ring between said drum and said roller for transmitting motion therebetween, a fork for shifting said ring on said drive roll and means for moving said fork to shift said ring; an adjustable setting rail extending along said machine, an extension depending from each fork, a tension spring connected at one end to each extension, and a flexible cord connected between each spring and said rail whereby said forks are adjustable in common.

13. An apparatus for winding yarn from an open end spinning device onto a yarn package at constant yarn tension comprising

a winding device including a tiltable yarn package driving drum;

a yarn package contacting said drum in frictional driving relation for winding of a yarn emitted from the open end spinning device thereon;

a rotatable drive roll in the form of a cone;

a friction ring between said drive roll and said drum in shiftable relation axially of said drive roll and said drum for transmitting the circumferential speed of said drive roll prevailing at the position of said ring to said drum;

a cylindrical rotatable drive roll; and

means for shifting said ring in response to the tension in the yarn between the open end spinning device and said package, said means including a spindle, a shiftable piece mounted on said spindle for longitudinal movement thereon, a pair of pins extending from said shiftable piece about said ring, a roll mounted on said spindle in driven contact with said cylindrical drive roll and means for lifting said spindle roll from contact with said cylindrical drive roll in an extreme position of said shifting piece on said spindle.

14. An apparatus for winding yarn from an open end spinning device onto a yarn package comprising

a winding device including a tiltable yarn package driving drum;

a yarn package contacting said drum in frictional driving relation for winding of a yarn emitted from the open end spinning device thereon;

a rotatable drive roll in the form of a cone;

a yarn tension feeler in the path of the yarn between the open end spinning device and said package;

a friction ring between said drive roll and said drum in shiftable relation axially of said drive roll and said drum for transmitting the circumferential speed of said drive roll preailing at the position of said ring to said drum;

means for shifting said ring in response to the tension in the yarn on said feeler between the open end spinning device and said package, said means including a fork disposed about said ring to shift said ring axially of said drum and drive roll;

a knee-type lever connected to said yarn package to move in response to changes in diameter of said yarn package;

a settable arm;

a first spring connecting said arm to said lever to vary the contact pressure between said yarn package and said driving drum; and

a second spring connecting said feeler to said arm to adjust said feeler in response to changes in position of said settable arm.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,860,186 Dated January 14, 1975

Inventor(s) Adolf Schiltknecht et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Title page insert the priority particulars to read as follows:

-- Switzerland No. 18690/68 December 9, 1968--

Column 2, line 39, "tbe" should be --the--.

Column 2, lines 67, "take oof" should be --take off--.

Column 3, line 32, "level" should be --lever--.

Column 3, line 46, "rill" should be --roll--.

Column 3, line 48, "cetain" should be --certain--.

Column 4, line 3, "sensitvity" should be --sensitivity--.

Column 4, line 39, "sprindle" should be --spindle--.

Column 4, line 62, "peice" should be --piece--.

Column 4, line 63, "low" should be --lower--.

Column 5, line 49, "adjustable" should be --adjustably--.

Column 5, line 55, "th" should be --the--.

Column 5, line 68, "for" should be --of--.

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,860,186 Dated January 14, 1975

Inventor(s) Adolf Schiltknecht et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

PAGE 2

Column 7, line 45, "an" should be --and--.

Column 8, line 62, "preailing" should be --prevailing--.

Signed and Sealed this

twenty-second Day of *July 1975*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks

FORM PO-1050 (10-69)

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