

Dec. 22, 1970

K. I. J. ROSEN

3,549,299

METHOD FOR STORING YARN FOR THE IMMEDIATE NEED OF
YARN OF KNITTING MACHINE

Original Filed April 27, 1967

2 Sheets-Sheet 1

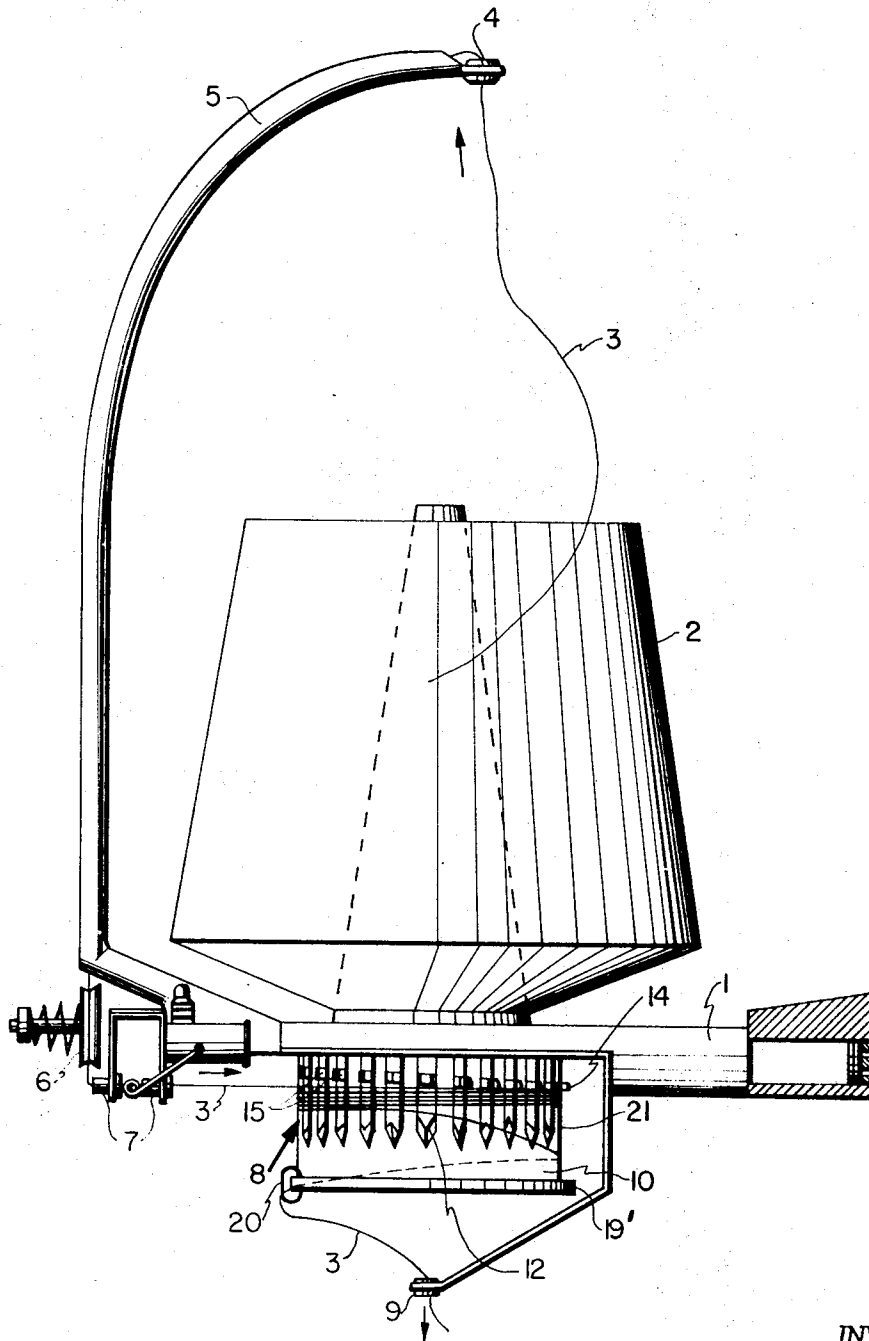


FIG. 1

INVENTOR

KARL ISAC JOEL ROSEN

BY

Wunderth, Lind & Torack

ATTORNEYS

Dec. 22, 1970

K. I. J. ROSÉN

3,549,299

METHOD FOR STORING YARN FOR THE IMMEDIATE NEED OF

YARN OF KNITTING MACHINE

Original Filed April 27, 1967

2 Sheets-Sheet 2

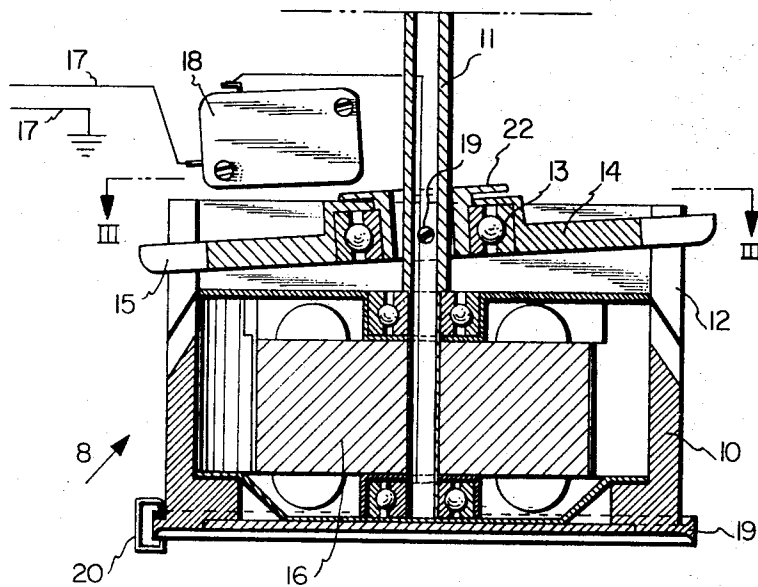


FIG. 2

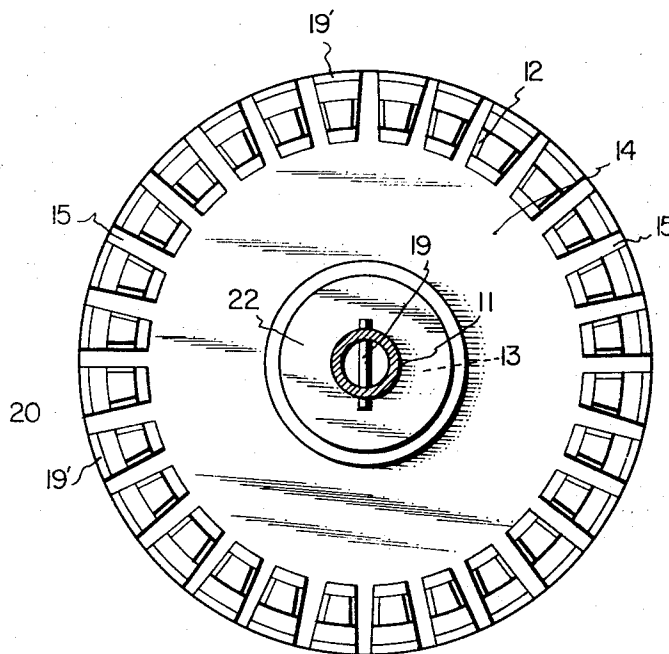


FIG. 3

INVENTOR

KARL ISAC JOEL ROSÉN

BY

Wendroth, Lund & Tonack
ATTORNEY

1

3,549,299

METHOD FOR STORING YARN FOR THE IMMEDIATE NEED OF YARN OF KNITTING MACHINES

Karl Isac Joel Rosén, Villagatan 39-41,
Ulricehamn, Sweden

Original application Apr. 27, 1967, Ser. No. 634,179, now Patent No. 3,419,225, dated Dec. 31, 1968. Divided and this application Nov. 1, 1968, Ser. No. 772,592
Claims priority, application Sweden, Mar. 22, 1967, 3,994/67

The portion of the term of the patent subsequent to Dec. 31, 1985, has been disclaimed
Int. Cl. B65h 51/20

U.S. Cl. 242-47.12

4 Claims

ABSTRACT OF THE DISCLOSURE

The present invention relates to a method for holding a yarn reserve ready for the immediate yarn need in knitting machines such that the yarn is fed with a very small and practically constant tension to the knitting place irrespective of the remaining quantity of yarn on the yarn cone. The quantity of yarn on the spool body controls the rotation of the spool body.

This application is a division of my application Ser. No. 634,179 filed Apr. 27, 1967, now U.S. Pat. No. 3,419,225 granted Dec. 31, 1968 entitled Device for Storing Yarn for the Immediate Need of Yarn of Knitting Machines.

The different feeders on knitting machines draw off the yarn from the cones in the quantities needed. As the yarn consumption continues, the diameter of the yarn cones decreases and thereby also the angle enclosed by the yarn running off and the axis of the yarn cone. Hereby, there is caused a change in the tension of the yarn and even though it mostly is a question of minor changes, these changes are sufficient to cause notable changes in the article manufactured. Furthermore, it occurs often at such a drawing off of yarn from yarn cones a jerky drawing off inter alia depending on varying adherence between the different yarn windings on the yarn cones.

In order to eliminate the drawbacks occurring at such a yarn drawing off, one has constructed several devices for feeding yarn to the knitting places. For circular knitting machines of Jacquard-type there has been used only the yarn feeding device which is characterized by a spool rotating with a high speed and the yarn being laid around this spool, the friction of the yarn increasing against the spool at tension increases such that the resistance from the spool is overcome. However, feeders of this kind have the disadvantage that there occur very quick yarn tension decreases at jerks from the spools and the jerks cause yarn from the feeder to be thrown forwards.

The purpose of the present invention is to provide a method which renders possible a knitting with a low and constant yarn tension also at intermittent and varying yarn consumption (cotton-machines, flat knitting machines and pattern knitting machines of all kinds).

Another purpose of the invention is to maintain a controlled (correct) yarn supply or reserve such that a sudden stop of the machine may be avoided and to make the yarn guards superfluous and thus to render possible a lower construction of the machine such that the yarn will be available at any place for the hands of a person of normal height.

The method involves practically that all the yarn is rewound before the knitting in such a way that the spool always has a constant diameter and a constant height and is kept in reserve immediately before the knitting place in such a way that bows are eliminated, such bows increasing the tension and eliminating stop devices.

2

Proposals have been made to use a device situated between the yarn bobbin and the knitting place, said device comprising a spool body on which the yarn is wound so as to form a yarn supply and means for controlling the winding on of yarn under the influence of the quantity of yarn wound on the spool body. By means of such a device a certain quantity of yarn is kept as a supply for the immediate need of stitching and the yarn is wound on the spool body—which preferably is cylindrical—perpendicularly to the axis of the spool body and is pulled off essentially in the direction of said axis. The yarn is wound on the spool body which by means of impulses is brought to rotate, in windings situated close to each other which are displaced in direction towards the drawing off place. The windings will be situated loosely close to each other and they could therefore easily be tangled. The yarn quantity kept as a supply on the spool body is controlled by means of a sensing device for the yarn quantity and the rotation of the spool body is controlled in such a way that when the yarn on the spool body is reduced to a predetermined minimum quantity, the spool body is brought to rotate and when the yarn supply at such a rotation is increased to a predetermined maximum quantity, the rotation of the spool body is interrupted. A device provided with a photoelectric cell which is delicate has been used as a sensing device which renders the machine complicated.

The invention relates to an improved method for the purpose explained in the foregoing. The main feature of the invention is to be seen therein that the means for controlling the quantity of yarn wound onto the spool comprises a disk provided with arms, said disk journaled in the spool body and its arms extend out through slots in the spool body in such a way that a change in the yarn quantity wound onto the spool body causes a change in the position of the disk, the latter adapted by means of its position change to interrupt or to start the winding of yarn onto the spool body. The arms on the disk cause the yarn during the winding to be situated in windings close to each other and the windings are displaced by means of a sliding along the spool body by swinging the disk towards the discharge end of the spool body when the yarn supply on the spool body approaches the predetermined minimum value. At this swinging of the disk and displacement of the yarn windings on the spool body the yarn winding onto the spool body is restarted. The disk with the arms functions as a sensing device and ensures at the same time that the yarn windings are placed close to each other on the spool body.

Tests have proven that by means of such a method the yarn tension may be kept at a practically constant value at its feeding to a knitting place even when considerable jerks occur in the yarn and variations occur in the yarn tension between the device and the supply yarn bobbin.

It is of course also possible, instead of driving the spool with an intermediate rotation, to increase or to decrease the rotation speed of the yarn spool so as to adapt its speed to the consumption of the yarn. It is also possible to obtain the winding onto the spool by means of a winding device orbiting around the spool body.

Further features and advantages of the invention will be understood from the following description with reference to the drawing, in which:

FIG. 1 shows a front view of a device for carrying out the invention,

FIG. 2 is a sectional view through a portion of the device shown in FIG. 1, and

FIG. 3 is a view on the section line III—III in FIG. 2.

In FIG. 1 there is shown an arm 1 which forms a holder for a yarn cone 2. A knitting machine may be provided with e.g. twelve such arms. The yarn 3, as shown by the arrows, is drawn off from the cone 2 in upward direction and runs through a yarn eye 4 and then through a slotted

3

or hollow arm 5 down to a yarn spanner 6. From the yarn spanner 6, the yarn runs through a stopper with eyes 7 to a winding device which as a unit has been denoted 8 and which is shown in detail in FIGS. 2 and 3. The yarn 3 is drawn off from the device 8 and runs thereafter via a further guiding eye 9 to the knitting machine (not shown).

There is in FIG. 2 shown a cross section through a preferred embodiment of the winding device 8 according to the invention. This device comprises a cylindrical spool body 10 which is carried on a vertical shaft 11. At its upper portion, the spool body 10 is provided with slots 12. There is in the upper portion of the spool body 10 on ball bearings 13 carried a disk 14 having arms 15 which extend out through the slots 12. In the embodiment shown the cylindric spool body 10 forms the rotor of an electric motor 16 housed in the interior of the spool body, said motor 16 through conduits 17 fed from a current source under the guidance of a micro switch 18. The latter is influenced by the disk 14 which is journaled on a pin 19 for being apt to be swung, said pin 19 extending through the shaft 11. The spool body 10 is at its lower end provided with a flange 19' of the same cross section shape as a rail of a railway. A C-shaped ring 20 is adapted to run on the flange 19' for guiding the yarn at its drawing off.

The method according to the invention is carried out in the following way. When starting the knitting machine, the yarn 3 is put through the eye 4 and the arm 5, the spanner device 6 and the yarn eyes 7 and is then laid some turns around the spool body 10, put through the running ring 20, through the yarn eye 9 and is then led to the knitting place of the machine. When only some few turns of yarn are situated on the spool body 10, the disk 14 inclines the most and the microswitch 18 is closed so that electric current is fed to the electric motor 16. At the start of the machine, the spool body 10 will rotate so that yarn is wound on a surface free of yarn on the spool body. The disk 14 moves the freshly and the previously wound yarn turns (to a certain limit) downwards on the spool body. As the number of turns on the spool body increases, there occurs a pressure on the disk 14 which forces the latter to change position by turning on the pin 19, the flange 22 influencing the microswitch 18 in such a way that the motor is disconnected and the spool body stops. The spool body 10 thus stops when a predetermined yarn quantity is wound on the same.

When the knitting machine needs yarn from the spool body in question, yarn is drawn off, as is indicated in FIG. 1, in the direction of the axis of the spool body 10 from the lower border of the yarn reserve 21 wound on the spool body, the yarn being guided by the ring or track 20 running along the flange 19'. It is hereby prevented that yarn by air drafts is freed in too large a quantity which could cause disturbances.

The risk for such disturbances, e.g. tangling of the yarn, is however, more pronounced in connection with certain yarn qualities than with other ones. By using, for the drawing off of the yarn, a guide, of which many constructions are possible, this risk is completely eliminated for all yarn qualities.

When at the drawing off the yarn reserve 21 decreases, the disk 14 is swung slowly about the pin 19 in such a way that the microswitch 18 at a certain minimum value of the yarn reserve closes the current circuit and the motor 16 restarts for winding a further quantity of yarn on the spool body 10. The yarn reserve then increasing will finally swing the disk 14 in such a way that at a predetermined maximum value of the yarn reserve 21, the disk 14 is brought to a position for interrupting the feeding of current to the motor 16 so that the spool body 16 ceases to rotate.

4

Several advantages are gained by means of the present invention among which may be mentioned first that the yarn 3 is always kept ready for being fed to the knitting place with a constant tension and without jerks. At a yarn break during the drawing off of the yarn from the cone 2 whereat the knitting machine is to be stopped, which requires a certain time, there is always a sufficient quantity of yarn kept in reserve for a careful stop of the machine without any risk of errors in the knitted article.

The most important advantage of the present invention is however that with machines having varying or intermittent yarn consumption there is rendered possible a knitting with a constant and a very low yarn tension.

The invention has been described in the foregoing for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims. It is thus possible to use photo electric as well as pneumatic devices for scanning the yarn reserve on the spool body 10 instead of the shown disk 14. Further, the spool body may be shaped somewhat conical or essentially cylindrical and conical only at one end. The motor for driving the spool body at its rotation may be arranged at other places than in the interior of the spool body 10. Another device than the ring 20 is also possible for guiding the drawing off of the yarn. Thus, it is possible to use a ring of a diameter somewhat larger than the diameter of the spool body 10 arranged on this body upon the flange 19', the latter in such a case not necessarily shaped with an outer wider portion. The yarn then runs between the ring and the surface of the spool body. At a certain shaping of the spool body 10 and in connection with certain yarn qualities it is possible to guide the yarn at its drawing off only by means of the eye 9 shown in FIG. 1. In FIG. 1 the device according to the invention is shown situated vertically below the yarn cone 2 but also in this respect many modifications are possible.

I claim:

1. A method for feeding yarn to a textile machine comprising:

- winding the yarn on a rotatable spool body having a disk movably mounted thereon, from a direction essentially perpendicular to the axis of said spool body to form on said body a plurality of windings in displacing engagement with said disk;
- drawing said yarn off from said spool body in a direction substantially parallel to the axis of said spool body axis to obtain a very low and substantially constant yarn tension;
- and controlling the rotation of said body by the position of said disk as displaced in response to the quantity of yarn on said spool body.

2. A method as claimed in claim 1 comprising winding said yarn on said spool body in yarn turns situated side by side, said turns being displaced in a direction towards the drawing off place.

3. A method as claimed in claim 1 comprising winding said yarn on said spool body so that said body is rotated for winding when the yarn reserve on said spool body by a drawing off for feeding the textile machine has been decreased to a predetermined minimum quantity.

4. A method as claimed in claim 1 comprising guiding the winding of the yarn on said spool body by changing the rotation speed of said spool body at such winding.

References Cited

UNITED STATES PATENTS

2,434,210	1/1948	Haley	242—47.12
3,083,924	4/1963	Vossen et al.	242—47.12
3,225,446	12/1965	Sarfati et al.	242—47.01X

NATHAN L. MINTZ, Primary Examiner