

[54] **DANCING RING ASSEMBLY FOR
KNITTING MACHINES**

[75] Inventor: **Eugene Piersimoni**, Peckville, Pa.

[73] Assignee: **Sauquoit Fibers Company**,
Scranton, Pa.

[22] Filed: **May 7, 1971**

[21] Appl. No.: **141,189**

143,268	9/1873	Webber	242/153 X
1,169,185	1/1916	Pasurka	242/147 R
2,143,485	1/1939	Janssen	66/146
2,566,006	8/1951	Ward	66/146 X
2,615,655	10/1952	Guild	242/153
2,660,041	11/1953	Schmidt	66/146
2,793,823	5/1957	Lipe, Jr.	242/147 R
3,130,453	4/1964	Haigher, Jr.	242/157 R X
3,323,753	6/1967	Spurgeon	66/146 X

[52] U.S. Cl. **66/146**, 66/125 R, 242/147

[51] Int. Cl. **D04b 15/44**, D04b 27/12, D04b 35/00

[58] Field of Search..... 242/147, 153, 157,
242/131.1; 66/125, 125 A, 146

[56] **References Cited**

UNITED STATES PATENTS

1,915,200	6/1933	Parks	242/131.1 X
2,483,160	9/1949	Suggs	242/131.1
2,571,523	10/1951	Bennett	66/125 R X
3,224,228	12/1965	Roizentul	66/125 R

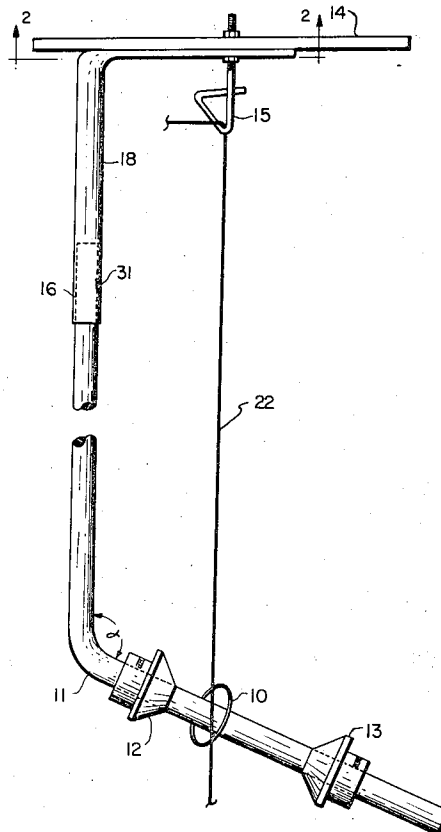
Primary Examiner—Robert R. Mackey

Attorney—George W. F. Simmons and Donald C. Simpson

[57] **ABSTRACT**

An apparatus for use on knitting machines to guide yarn off of packages and prior to knitting including an attachment to the knitting machine having thereon an inclined rod or pair of rods with a ring thereon which, while retained on the rods, may move freely thereon.

6 Claims, 5 Drawing Figures



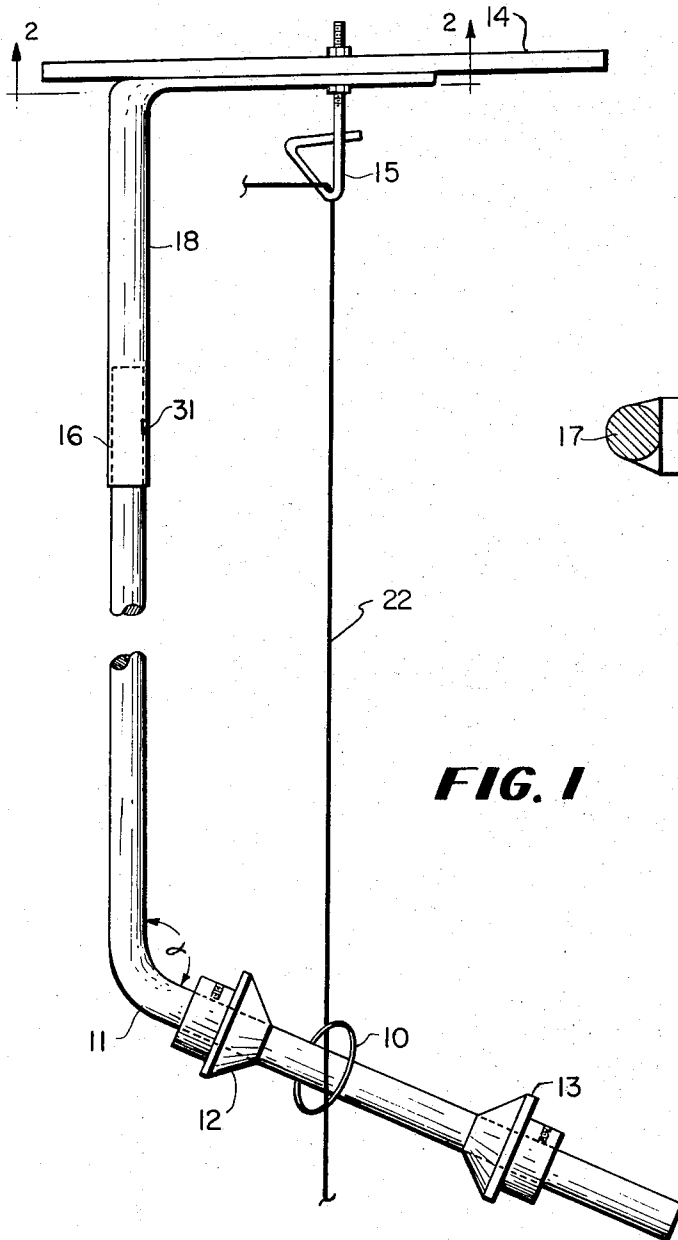


FIG. 1

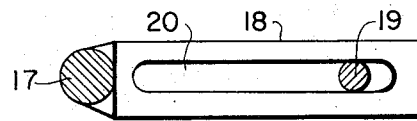


FIG. 2

INVENTOR
EUGENE PIERSIMONI

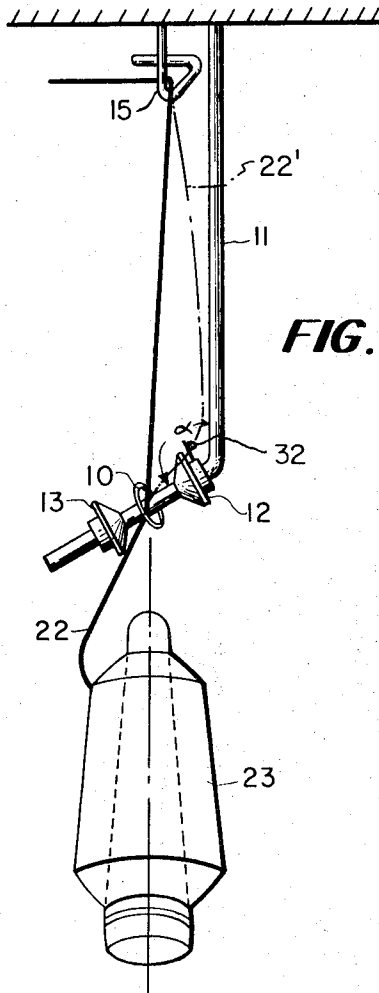


FIG. 3

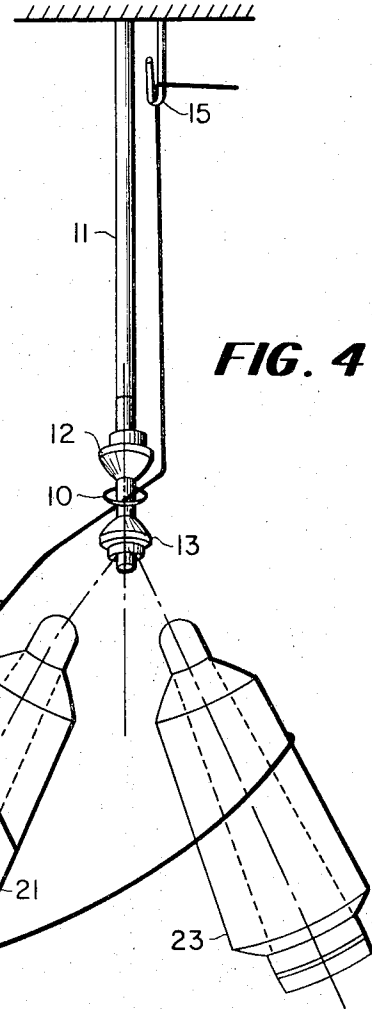


FIG. 4

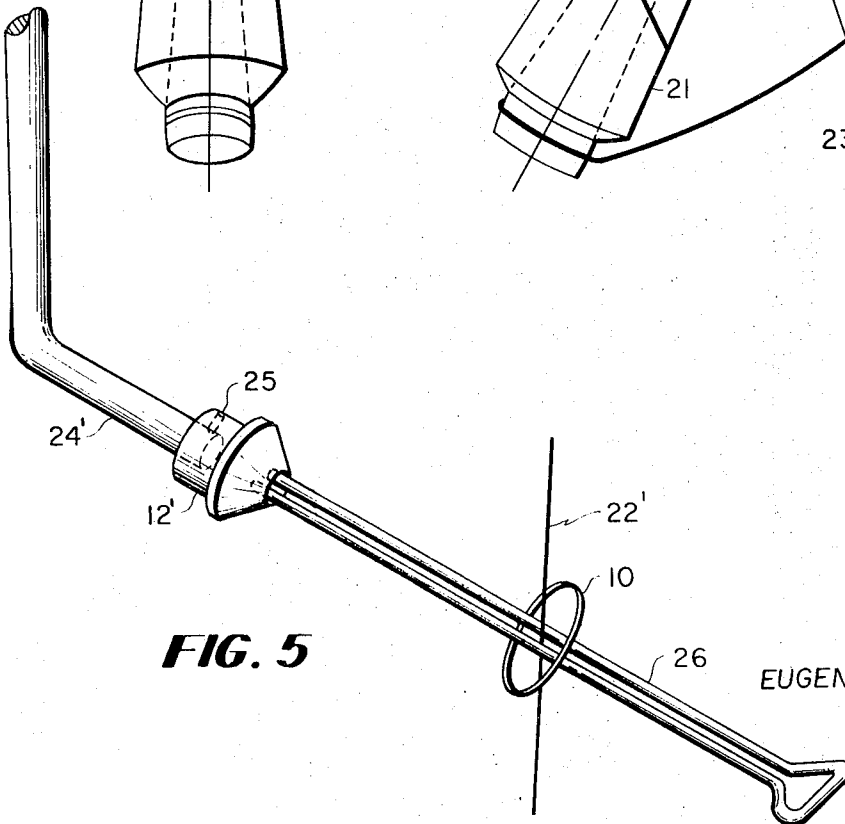


FIG. 5

INVENTOR
EUGENE PIERSIMONI

DANCING RING ASSEMBLY FOR KNITTING MACHINES

BACKGROUND OF THE INVENTION

1. Brief Description of the Invention

The present invention is directed to a dancing ring for guiding yarn off of packages used in knitting machines. More particularly, the present invention is directed to a dancing ring which is held on but moves freely along an inclined path defined by a single or pair of rods running through the center of the ring. The rod or rods are attached to a support on the knitting machine, and adjustably located on that the ring, when in operation, will be positioned substantially at the point of intersection of the axes of the packages supplying yarn to the ring.

2. Summary of the Prior Art

A significant problem in the use of large scale knitting machines for the production of materials such as panty hose, etc., is the number of units which must be discarded due to snarls therein. Further, in the prior art, it has been impractical, if not impossible, to run a knitting machine continuously, since changing from cone to cone requires shut down of equipment. Previously, the problem of tying into new packages required shut down of the equipment, and also could result in wasted yarn.

One manner of using the maximum amount of yarn was to take packages which had been almost completely used, and place them on the creel of a knitting machine which had been adapted to a second creel in close proximity to the first. As the knitting progressed on this machine, the tail of a package on one creel was attached to the free end of the bottom creel. However, in this operation, when the first package was used to completion, it could not be removed since it was required for feeding from the second package through a dancing ring attached to the cap of the yarn on the first package. Thus, the system was limited to the use of only two cones and a single transfer. Also, the above yarn transfer steps further accentuated problems with snarls in the yarn. The present invention, on the other hand, is designed to overcome these problems by allowing continual knitting from an almost endless supply of yarn by adapting a hanging dancing ring to the yarn feed from the package.

The use of dancing rings is known in the prior art, in particular, for use as tensioners. In U.S. Pat. No. 2,566,006, a dancing ring is used as a thread tensioner by hanging it vertically along a pair of rods connected at one end thereof. The amount of tension is thus controlled by the weight of the ring, since the ring hangs very freely along the rods. This system, however, is not directed to preventing snarls or allowing for the continuous operation of a knitting machine, but appears to be directed merely to a method of tensioning the yarn used in the process. In U.S. Pat. No. 2,942,803, a further use of a free standing ring is disclosed. However, this ring, like the previous ring, is used to tension thread which passes through a rod. Thus, this system, like the previously discussed system, does not consider the use of a hanging or dancing ring to control feed from a plurality of directions to a knitting machine, and thus allow for continual knitting.

It is an object of the present invention to provide for this continual knitting process by providing an apparatus which allows for the transfer of feed from one cone

to the other in a continuous manner for as many times as desired.

It is a further object of the present invention to prevent yarn from walking off the package therefor, and thus minimize the number of snarls created in the running yarn and in the product.

It is a further object of the present invention to provide for this relatively snarl free provision of yarn by means of easy transfer of from one package to another.

SUMMARY OF THE INVENTION

The present invention is directed to an apparatus for the continuous knitting of garments or other goods. This continuous knitting is accomplished by the use of an ordinary knitting machine to which is attached a creel arrangement having a plurality of places for yarn cones which will provide a plurality of yarn feeds to the knitting operation. At each of the yarn feeding stations, there are a plurality of angularly disposed positioning means for the yarn packages, the axes of which meet at a central point. At this point, a dancing ring on an inclined shaft or pair of shafts having means at the ends thereof to prevent the ring from sliding off the shaft or shafts, is located. The yarn passes through the ring along the side of one of the shafts, or between the shafts when a pair is used, and onto further feeding and tensioning means prior to being knitted. By means of this apparatus, the tail from one package of yarn may be tied to the free end of a second package to allow for the continual use of the knitting machine. That is, when a single package has been used, the tying knot causes the second package to be being utilized. The first package may then be replaced with a fresh package and the free end thereof tied to the tail of that of the second package. In this manner, the continual operation of the knitting machine is assured. Further, by use of the present dancing ring, the number of snarls produced in the final knitted product is decreased due to the dancing ring preventing the yarn from walking off of the package.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a drawing of the apparatus of the present invention, showing it attached to a yarn rack assembly, but deleting a showing of the packages therefor;

FIG. 2, section 2—2 of FIG. 1 shows the adjustable nature along a relatively horizontal plane of the apparatus of the present invention;

FIG. 3 shows a different view of the present invention, and includes a showing of a cone as it would be positioned in the present invention;

FIG. 4 shows the two cones used in one adaptation of the present invention, in the manner in which the respective free ends and tails thereof may be tied together;

FIG. 5 shows another embodiment of the present invention wherein two shafts are used in conjunction with the hanging dancing ring.

DESCRIPTION

In FIG. 1, ring 10 surrounds angularly disposed inclined shaft 11, and is held on the shaft by means of adjustably mounted frusto-conical positioners 12 and 13. Shaft 11 is angularly bent and attached to yarn rack assembly 14 at guide 15 through adjustable assembly 16. The angle of inclination of shaft 11 should be from between 90° and 180°, and is preferably 110° to 120°,

most preferably, as shown in the drawing, the angle α is 115° .

In the embodiment shown in FIG. 1, the hanging dancing ring attachment is fully adjustable by means of the adjusting assembly 16 which allows for vertical movement of the shaft, and also by means of slit 20 shown in FIG. 2, which allows for horizontal movement of the assembly. In this way, the apparatus of the present invention can be adjustably located in accordance with the package positioning of standard knitting equipment, without requiring great expense for the installation thereof. Adjusting assembly 16 is shown as a telescoping tube with a set screw, but could be any suitable arrangement.

Further, positioners 12 and 13 are adjustable in accordance with the requirements for, for example, the type of yarn, or the number of packages used, and also positioner 13 is mounted, for example, by means of the shown set screw so that it may be removed for the placing of rings of different materials or different sizes in accordance with the desired effects of the hanging dancing ring. The positioners may be made of either metal or plastic, but metal is preferred for its wear characteristics.

Shaft 11 may be of any suitable metal, but is preferably brass or steel and is, for example, approximately one-fourth inch in diameter and may be either solid or hollow, although a hollow shaft would be preferred due to, e.g., weight considerations.

The dancing ring, as the shaft, may be of any suitable metal, ceramic, or plastic, but is preferably formed from brass or steel. The inside and outside diameters of the ring may be varied in accordance with the type of knitting desired, as well as with the type of yarn used. For example, in knitting panty hose, it might be preferable to use different size or weight rings for the leg portions, as compared with the panty portions.

In FIG. 2, the section 2—2 of FIG. 1, the adjusting means in the horizontal plane are shown. The shaft is shown as circular section 17 and the adjustable portion 18 has slit 20 therein which allows the hanger, shown by section 19, to be tightened against the adjustable portion 18 at varying places. Further adjustment can be done at adjusting means 16 in FIG. 1 wherein a set screw 31 is used to fix the telescoping section of shaft 11 to the overhanging portion of adjustable means 18. By correct adjustment at these two points, the attachment of the present invention may be positioned directly over the yarn as it was previously placed on the machine without any modifications to the machine.

When this correct placement is done, the hanging dancing ring of the present invention moves the yarn away from its normal path of travel, i.e., away from the line formed by the axis of the package, when there are changes in tension in the yarn takeup. The result is that when the tension is lowered, or totally removed, the ring tends to fall against positioner 13 and the yarn is thus prevented from uncoiling from the package during periods of very slack tension. This effect tends to prevent the package from uncoiling and thus decreases chances of snarling and kinking, along with allowing for easy transfer from one package to the other when the first package has been emptied. Further, the adjustable character of the present hanging dancing ring allows the present apparatus to be applicable to different forms of yarn feeding packages, for example, yarn on large or small cones, large or small parallel tubes, large

or small pirns, etc. The height of the guide over the supply package is adjustable and can be set to be the appropriate distance from the supply packages, for example, approximately 2 inches, depending on the package used, and the knitting being done.

In the view shown in FIG. 3, a single cone 23 is shown feeding yarn 22 through ring 10 to guide 15. This figure shows the feed path of the yarn, and also shows that when the tension is slack, the ring will tend to slide down shaft 11 toward positioner 13, thus controlling the yarn feed.

FIG. 4 shows another view of the apparatus of the present invention, and also shows the manner in which a pair of cones may be arranged so that continuous yarn feeding is possible. As shown, yarn 22 is being fed from cone 21 while the tail of the yarn on cone 21 is tied to the free end of the yarn on cone 23. When the yarn is depleted from cone 21, there is no need to stop the knitting operation and replace the cone, because yarn from cone 23 immediately begins being fed to the operation. Any tension decrease due to the depletion of the yarn on cone 21, and thus any tendency to snarl, is immediately taken up by the downward movement of ring 10 in the manner previously described, and thus continuous, relatively trouble free operation is assured. Further, while yarn is being fed from cone 23, cone 21 can be removed and replaced with a new full cone, and tied to the tail of cone 23, thus allowing continual operation.

In the embodiment shown in FIG. 5, positioner 12' is attached to a shorter shaft 24' by set screw 25, and has on the end thereof rod 26 bent in such a manner that there are two parallel portions for a major portion of the length thereof. The rod, at its lower extremity, is bent to a relatively triangular shape in order to form the function of positioner 13 in the apparatus shown in FIGS. 1-4. However, positioner 13 could be utilized by using two separate rods and e.g., a pair of set screws. The rod may be of any suitable diameter, and the parallel sections spaced apart by different distances depending upon the type of yarn expected to be used as well as the type of product being knitted.

In this embodiment of the present invention, the yarn is passed between the two parallel portions of the wire as well as inside of the ring, but otherwise operates in the same manner as previously described. That is, if there is a decrease in tension during, for example, transfer from one package to another, the ring tends to travel downwardly along the rods, and would come to rest against the triangular shaped section of the wire without sliding off if the tension decrease was sufficient to allow it to do so. In this preferred mode of operation, a more consistent flow of the yarn is achieved than in the other modes of operation of the present invention. In the single shaft operation, the transfer from one package to the other may cause the yarn to come in contact with the shaft. However, in this preferred embodiment, the yarn, by passing through the area between the two wires or shafts, does not change its contact pattern when yarn is being fed from different packages, or when a change in feed package occurs.

As shown in FIG. 3, an additional textile guide 32 may be placed on the positioner 12 with the yarn 22 passing as shown in the dashed yarn path 22'.

Thus, it can be seen that, by the operation of the present invention, yarn feed is greatly improved in consistency of tension and character, the possibility of the

5

yarn slipping on the cone or other yarn package is significantly decreased, and transfer from one package to another is accomplished without requiring discontinuous operation of the knitting apparatus.

I claim:

1. In a knitting machine including means for knitting yarn, a creel for yarn packages, and feeding means for feeding yarn from said packages to said knitting means, the improvement comprising a vertically and horizontally adjustable feeding means including a freely move-
able ring mounted above said packages and along in-
clined positioning means, said positioning means com-
prising a central guide means and end means adapted
to keep said ring on said central guide means, wherein
said central guide means is adjustably located so that
the ring, when in operation, is positioned substantially

6

at the point of intersection of the axes of said packages supplying yarn to the ring and said vertical adjustment is obtained by means of a telescoping tube.

2. The apparatus of claim 1 wherein said guide means is a single tubular shaft.

3. The apparatus of claim 1 wherein said guide means is a pair of parallel rods.

4. The apparatus of claim 3 wherein the lower of said end means on said incline is formed of said rods, in a triangular shape.

5. The apparatus of claim 1 wherein said guide means is a shaft inclined at an angle from 90° to 180° from the perpendicular.

6. The apparatus of claim 5 wherein said angle is 115°.

* * * * *

20

25

30

35

40

45

50

55

60

65