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TENSIONING MEANS

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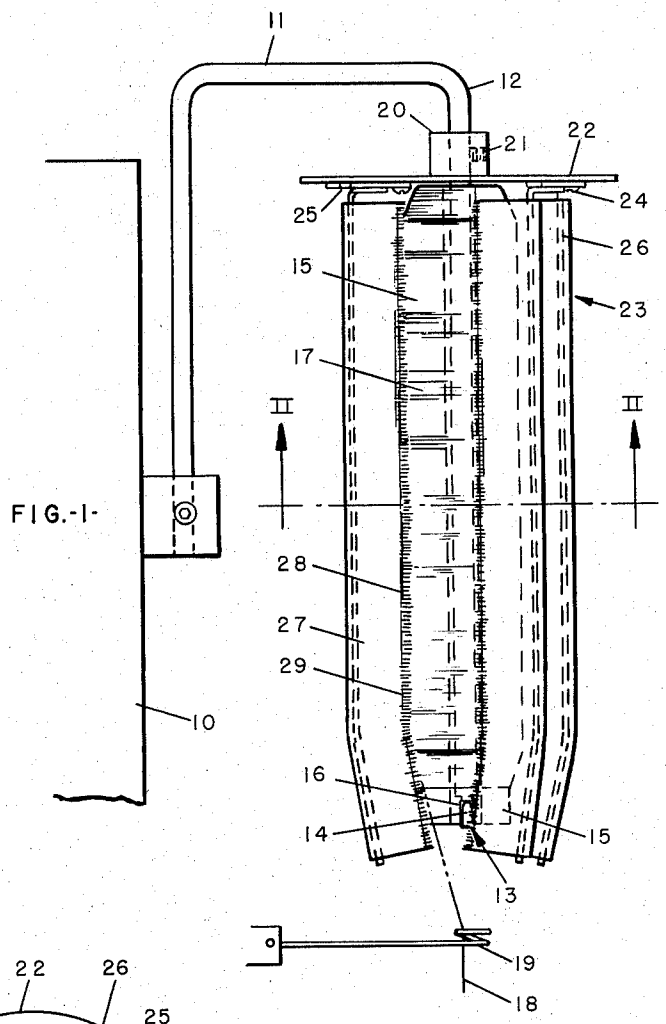


FIG.-1-

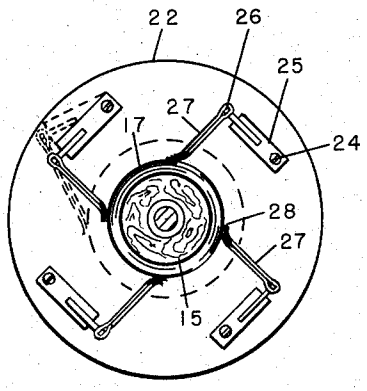


FIG.-2-

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TENSIONING MEANS

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3 Claims. (Cl. 242—156.1)

This invention relates to yarn tensioning means and more particularly to a tensioning means for initially tensioning a yarn end as it is drawn over-end from a supply bobbin, pirn or the like.

In the art of yarn handling, it is conventional to supply a plurality of yarn ends to a knitting, winding, twisting machine or the like by withdrawing the ends from supply packages in an over-end manner. In other words, the supply bobbin, pirn or the like is placed over a suitable support rod or spindle in non-rotating relationship therewith and a yarn guide is positioned on the extended axis of the rod or spindle so that a yarn end can be drawn over the end of the bobbin or pirn without rotation of the latter. Substantially no resistance to the unwinding of the yarn is inherently present in this arrangement so that as the yarn is withdrawn from the package it is in a practically tensionless condition a large portion of the time.

Previous to this invention it has been suggested that the yarn be drawn over the surface of a generally conical member between the supply package and the guide positioned on the extended axis of the pirn or bobbin so as to tension the yarn immediately subsequent to its being removed from the supply package, and it has also been suggested that a bobbin be employed having a head with an insert of felt material or the like so that the yarn end is tensioned as it is drawn over the head of the supply package. Numerous other suggestions have been made for imparting a small amount of tension to the yarn end as it is withdrawn from the supply package although none have been completely satisfactory primarily because in each instance there remains a short length of untensioned yarn between the supply package and the tensioning means.

It is an object of this invention to provide a tensioning means for imparting a small degree of tension to a strand of yarn, as it is withdrawn from a supply bobbin, pirn or the like, which overcomes the disadvantages of prior art tensioning means of this type.

It is another object of the invention to provide a tensioning means for tensioning a strand of yarn, as it is withdrawn from a supply bobbin or pirn, which is effective at the point at which the yarn is separated from the yarn supply.

It is still another object of the invention to provide a tensioning means which acts upon the turns of yarn upon a supply bobbin to hold them in proper position until such time as they are unwound therefrom.

It is a further object of the invention to provide a tensioning means which is extremely simple in construction, inexpensive in manufacture, and which requires a minimum of maintenance.

The above, as well as other objects of the invention, are accomplished by the combination of a support member, to be carried by a rod or spindle over which a supply bobbin, pirn or the like is placed, at least one support arm carried by said support member and extending generally parallel to the longitudinal axis of the supply bobbin or pirn, and an elongated strip or blade of flexible material supported by said arm along one longitudinal edge and positioned generally radially of the supply bobbin with the unsupported longitudinal edge in contact with the yarn supply. In the preferred embodiment of the invention the flexible strip of material comprises a doubled piece of closely woven cloth or the like supported at one edge by the elongated support member and unraveled, fringed or frayed along the unsupported longitudinal edge for approximately ¼ inch to thereby form a multitude of readily flexible serrations.

The novel tensioning device of this invention can be employed in any instance where a yarn end is to be withdrawn from a supply package in an over-end manner but is particularly well suited for use in combination with knitting machines handling highly twisted or elasticized yarns. As is well known to those skilled in the art, highly twisted or elasticized yarns display a marked tendency to loop, kink and snarl in any instance where they are placed in a tensionless condition, and in addition, the turns of yarn on the supply bobbin immediately preceding the free end display an annoying tendency to slide off over the end of the pirn or to become overlaid in such a manner as to prevent the pirn from being freely unwound. The new tensioning means of this invention effectively eliminates these difficulties and therefore fills a long felt need in the art.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a view in perspective of the novel tensioning device of this invention.

Figure 2 is a sectional view along the line 2—2' in Figure 1.

With reference to the drawings in greater detail there is illustrated a frame member 10 carrying an inverted U-shaped support rod 11 which terminates in a downwardly extending portion 12 of such diameter that it may be readily inserted within the bore of a bobbin or pirn. The downwardly extending portion 12 of support rod 11 is provided at its unsupported end with a releasable catch or detent means 13 comprising a pair of pivotable members 14, only one of which is visible, normally retained in a plane generally transverse to the longitudinal axis of portion 12 of rod 11 by means of gravity but which can be readily pivoted to permit a bobbin or pirn to be placed over portion 12 of rod 11.

Carried by portion 12 of support rod 11 is a cylindrical bobbin or pirn 15 which is generally tubular in shape and which is provided with a pair of diametrically opposed notches 16 in one end. The notches 16 are of such size that they are adapted to become positioned over the pivotable members 14 and thus prevent rotation of the pirn. The bobbin 15 is illustrated as being provided with a supply of yarn 17 from which a yarn end 18 is withdrawn through a pigtail guide 19 mounted on the extended axis of portion 12 of support rod 11.

Positioned on portion 12 of support rod 11 immediately above pirn 15 is an annular collar 20 retained in position by any suitable means such as, for example, set screw 21 and attached to lower face of collar 20 by any suitable means is a centrally bored, disc-shaped support member 22 having a radius at least about one or two inches in excess of that of the yarn supply carried by pirn 15. The support member 22 carries a plurality of depending arm members generally indicated by the reference numeral 23. The arm members 23 are secured to support member 22 by any suitable means such as by bolts 24 and have a first portion 25 extending generally parallel to the lower face of support member 22 and a second portion 26 ex-

tending at right angles to the portion 25 and generally parallel to the longitudinal axis of pirn 15. Arm members 23 are preferably made of sheet metal or the like so that the portions 26 have a width which is as large as compared to the thickness for reasons which will subsequently become apparent. The first portions of the arm members 23 should be of a length such that the portions 26 of the arms are in close proximity to the portion 12 of support member 11 when the first portions 25 of the arm members 23 are positioned substantially radially with respect to the disc-shaped support member 22 and are pivotably secured to the support member 22 so that the distance of portions 26 of arms 23 from the pirn 15 can readily be varied. The portions 26 of arm members 23 should be at least equal in length to pirn 15 and the unsupported ends of portions 26 are preferably bent slightly as illustrated in Figure 1 of the drawings so that when the arms 23 are in normal operating position, the curvature of portions 26 of arms 23 approximates the curvature of the yarn supply on pirn 15.

Carried by portions 26 of arms 23 are a plurality of strips or blades 27 of flexible material. The flexible strips 27 are supported along one longitudinal edge by portions 26 of arms 23 in a manner to prevent rotation of the strips on the arms, and in this instance this result is accomplished by making the portions 26 of flattened cross section. As is clearly seen in Figure 1 of the drawings, the strips 27 extend inwardly toward pirn 15 from portions 26 of arms 23 so that the unsupported longitudinal edge 28 is positioned longitudinally of pirn 15 and is in contact with the yarn supply thereon.

The strips 27 are preferably provided with a multitude of readily flexible serrations 29 along one longitudinal edge as this not only gives more adequate tension control but also serves to more positively retain the turns of yarn on the pirn in their proper position during the unwinding of the yarn from the pirn. The strips can be formed from substantially any readily flexible material but are preferably formed by doubling a width of closely woven cloth and stitching the layers together a distance from the fold slightly in excess of the width of portions 26 of arms 23 so as to form a suitable pocket therefor. The cut edges of the folded cloth can then be unraveled approximately ¼ inch to give a frayed edge with a multitude of flexible serrations. It is generally advantageous to employ a strip of cloth which has been impregnated with a synthetic resin or other binding and stiffening agent since this not only increases the body and rigidity of the cloth but also prevents the edges of the cloth in contact with the pirn from further unraveling once the tensioning device is placed in operation. If a cloth is employed which unravels readily, this may cause ends down in the apparatus to which the yarn is being fed due to tails of yarn from the strip of fabric in the tensioning device clinging to the yarn being unwound from the pirn. If desired, the stiffening agent can be applied by means of a roller or the like to leave the frayed edges of the cloth in a soft pliable condition but this is generally unnecessary since, even when the entire strip is impregnated, the stiffening agent is largely removed from the frayed edges by flexure and abrasion, once the device is in operation, and they thereby rapidly attain an adequate degree of pliability. It is also possible to employ a fabric having a thin coating of metal on one surface

in the formation of strips 27 and if the fabric is folded with the metallic surface on the inside of the fold and if the arms 23 are made of metal or other electrically conducting material, this furnishes a path to ground for any static charges that might otherwise collect along the edge of the strips in contact with the yarn on the pirn.

In operation, the supply bobbin or pirn 15 containing a supply of yarn is placed over portion 12 of support member 11 and secured in position in the conventional manner. Arm members 23 are then pivoted so that the frayed or serrated edge of flexible strips 27 are in contact with the yarn supply and unless a subsequent adjustment is contemplated, the arms should be so positioned that the flexible strips 27 are displaced or bent to a sufficient extent that the serrated edge will remain in contact with the yarn supply until it is completely exhausted. Yarn end 18 is then drawn from pirn 15 and passed through guide 19 to the apparatus to which the yarn is to be supplied and the apparatus is then placed in operation. As the yarn end 18 is withdrawn from the package, it is tensioned to a slight extent by contact with the serrated edge of flexible strips 27 and in addition the edges 28 of flexible strips 27 in contact with the yarn on pirn 14 effectively overcome any tendency of the yarn to become slack on the package. It will be seen, therefore, that at no time can there be any appreciable length of the yarn in a tensionless condition and that kinking and coiling of the yarn is effectively prevented.

Having thus described my invention, what I desire to claim and secure by Letters Patent is:

I claim:

1. Yarn package unwinding apparatus comprising in combination: a yarn package support for holding yarn packages in position for over end yarn delivery; yarn tensioning means including a plurality of blade-like members extending longitudinally at least the length of said package position, spaced circumferentially thereabout, each of said members being formed of textile material the greater part of the width of each being relatively stiff as opposed to its yarn package contacting portion which is frayed to present a multitude of relatively flexible thread ends to engage an end of yarn as it is drawn from the package; and means rigidly supporting the unfrayed edge of each of said blade-like members throughout its length; whereby yarn is positively prevented from kinking or snarling as it is withdrawn from the package.

2. The combination according to claim 1 wherein the fabric constituting the blade-like members is coated with a stiffening agent except for its frayed yarn engaging edges.

3. The combination according to claim 1 wherein the supporting means for each of said blade like members is formed of an electrically conducting material and said fabric has an electrically conducting surface which contacts said supporting means.

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