Aug. 23, 1949. O. FRICK ET AL 2,479,826

THREAD ANTISLACK DEVICE

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Fig. 1

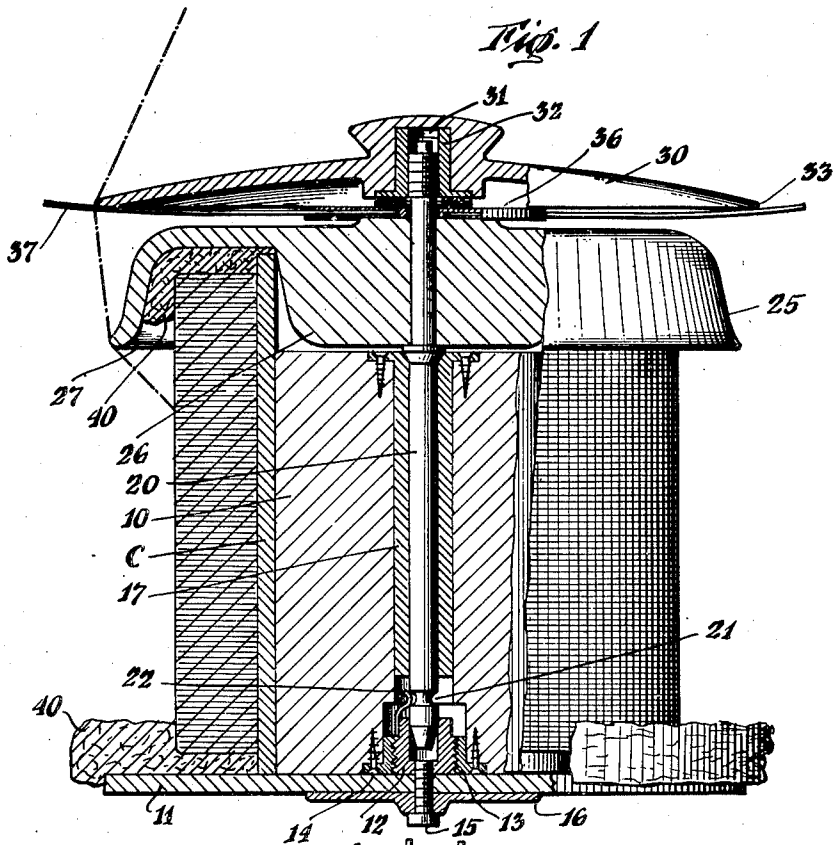
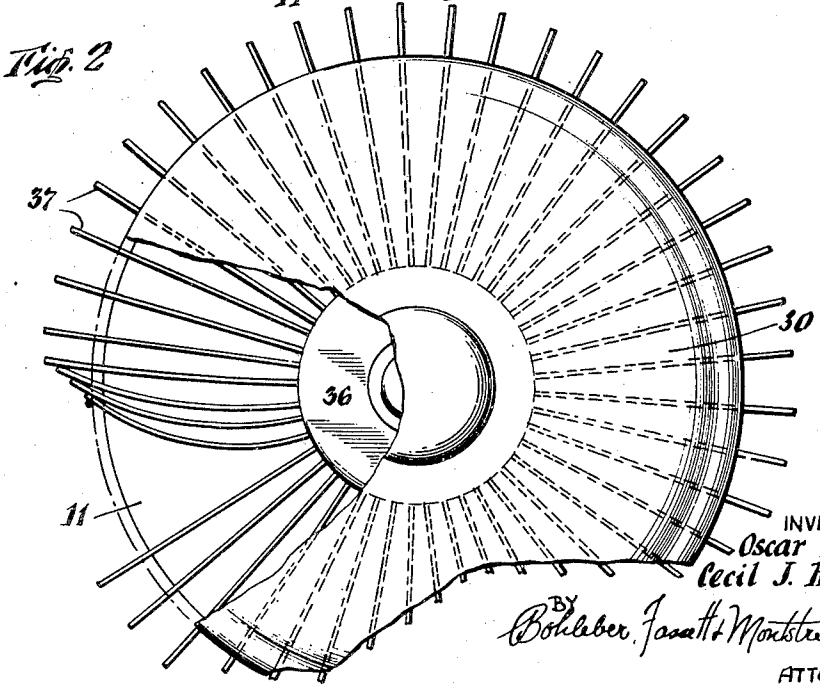


Fig. 2



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Fig. 3

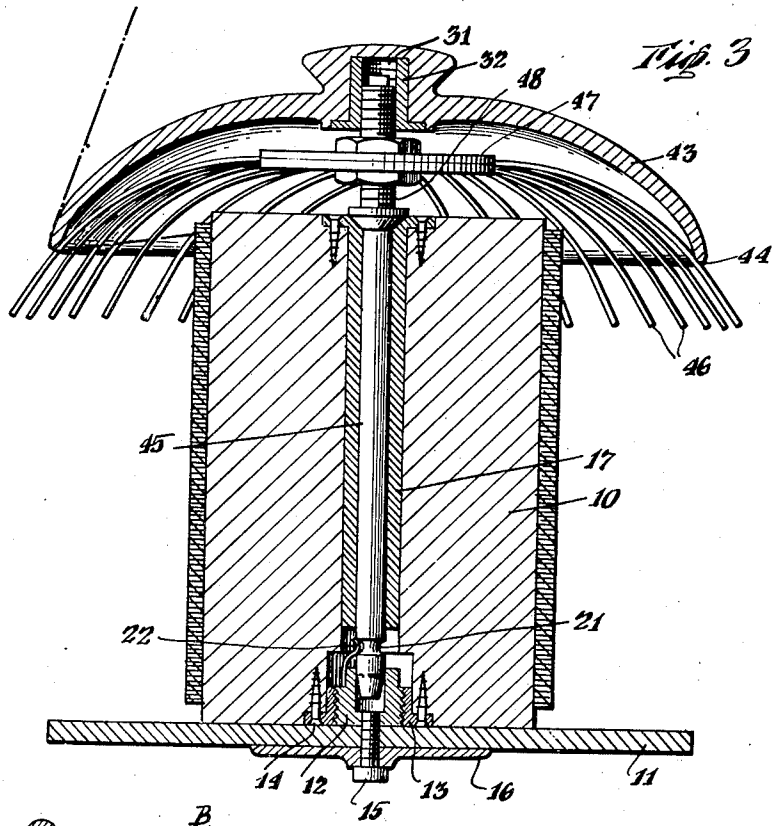
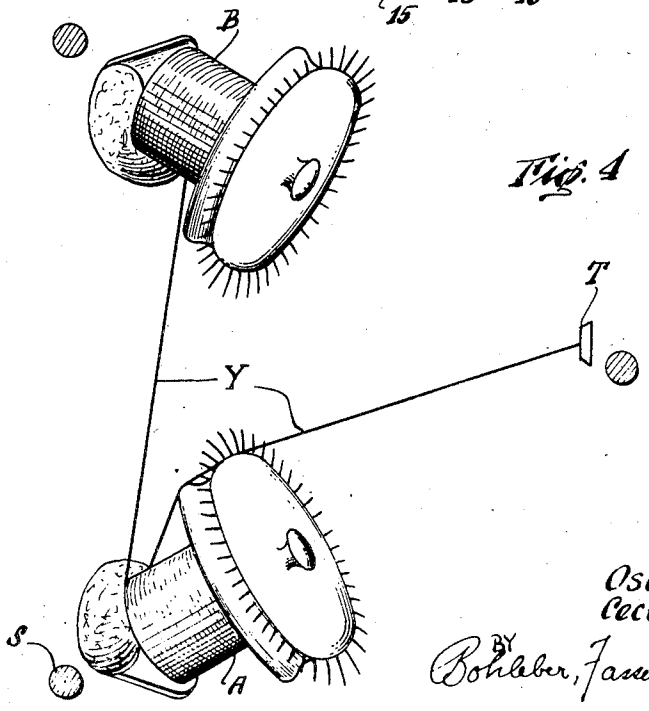


Fig. 4



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UNITED STATES PATENT OFFICE

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THREAD ANTISLACK DEVICE

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15 Claims. (Cl. 242—128)

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The invention relates to an anti-slack device for the prevention of snarling of yarn when it is withdrawn overhead or axially from a stationary package or cone of yarn in which feeding of the yarn requires stops and starts. In feeding yarns and particularly crepes, combination crepes, or any other snarly yarns to a warper or other textile machinery, it is customary to feed the yarn circumferentially from and hence rotate the package as the yarn is withdrawn therefrom. A rotating package has the great disadvantage that it canot be magazined. However, this invention permits a stationary package which can be magazined.

The magazining feature consists of having the inner end or tail of the yarn of a package protruding at the base and tied to the outer end of a reserve or transfer package located adjacent to the package from which the yarn is being fed. These ends remain tied while the yarn is being pulled off from the first package, and when the yarn is exhausted from the first package, a third will be mounted in its place whereupon the second package is magazined to this third one. This permits continuous operation of the warper or other machine with no stops when the package runs empty. The present rotating method necessitates stoppages when individual packages run empty, for replacement with full packages, or doffing.

The overhead or axial feeding of yarn from a package or cone has been impossible heretofore with a highly twisted yarn in operations which required stopping and starting in unison with other packages. The yarn when fed overhead necessarily loops when it is withdrawn, with the result that if any slack exists in the yarn, when the machine is stopped for any reason, such as to knot a broken thread or to inspect the material or the machine, the twist in the yarn causes the slack portion to twist upon itself and form snarls. When the machine is again started, these snarls frequently break the thread and must be removed before the yarn continues to be fed toward the machine. The anti-slack device of the invention to be described overcomes this difficulty by always keeping the yarn taut when the machine is stopped. The device may be used wherever the yarn is fed from a stationary package or cone, such as when fed to a warping machine, copping or quilling machines, doubling machines, and the like.

The anti-slack device may also be used with advantage for tire yarn or for monofilament yarns, used in the manufacture of tire carcasses

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and screens respectively, etc. Both these yarns are relatively stiff and produce a big balloon when run off overhead from packages at high speed. Ballooning is nothing more than slack in motion, and this anti-slack device does not allow a balloon to form or substantially reduces its size or extent. At a sudden stop there will be no loops formed which may or would have a tendency to become entangled with other loops from neighboring packages.

It is an object of the invention to produce a new and novel yarn anti-slack device which prevents slack, loops or ballooning or substantially reduces the latter from occurring in the yarn as it is fed overhead from a package or cone of yarn.

Another object is to construct an anti-slack device which has no or substantially no inertia, so that when the machine to which the yarn is fed is stopped, the device keeps the yarn taut so that snarls and loops and the like will not form.

A still further object is to produce a yarn anti-slack device utilizing resilient bristles or fibers of relatively substantial length and stiffness for keeping the thread taut as the yarn is fed overhead from a package whereby snarling of the yarn does not occur.

Another object is to construct a yarn anti-slack device which draws the yarn away from the sides of the package in the direction of the center thereof, so that the yarn is not pulled or does not fall over the sides of the package, causing breaks.

A still further object is to construct a yarn anti-slack device utilizing resilient fibers which fibers are supported so that they are not pulled forward axially by the yarn without restricting the circumferential flexibility of the fibers.

Another object is to construct a yarn anti-slack device having no or little inertia.

Other objects of the invention will be more apparent from the following description taken in connection with the accompanying drawings illustrating preferred embodiments of the device in which:

Figure 1 is a partial longitudinal section through a cone or package of yarn with the anti-slack device mounted upon the end thereof.

Figure 2 is an end view of the anti-slack device.

Figure 3 is a partial section of another form of the invention.

Figure 4 is a perspective view showing the manner of mounting the packages or cones with

respect to a yarn tensioning means when feeding yarn to a textile machine such as a warper.

The yarn anti-slack device enables the thread or yarn Y to be removed axially from a cone or package formed by the yarn being wound upon a tubular cylinder C. The cone may be suitably supported that illustrated including a core 10 having a base flange 11 carried on one end thereof in any suitable fashion. The construction illustrated includes a bushing 12 upon which is threaded a second bushing 13 having screws 14 secured to the core. Bushing 12 receives a screw 15 which clamps the base flange between a plate 16 and the bushings 12 and 13.

The yarn anti-slack device is mounted at the other end of the package of yarn. Any suitable means may be used to retain the same upon the end of the package, the means shown including a rod or spindle 20 which projects into the spindle tube 17 carried by the core. The spindle has a groove 21 at one end thereof within which is received a spring retainer or catch 22 carried by the bushing 12. The rod may be readily held within or withdrawn from the core merely by pressing the same into position or pulling it out of the spindle tube 17.

A cup or flange 25 may have a hub 26 which fits within the yarn tube C and is secured upon the spindle 20. The cup carries a flange 27 which extends outwardly over the end of the cylinder of yarn wound upon the package core. The flange has a smooth rim around which the yarn will travel as it is removed axially from the cone. The cup shaped flange is approximately twice the diameter of the yarn tube or cylinder C. The relation between the diameter of the cup and the cylinder should be such that the yarn at no time assumes a position at or close to a diameter of the flange. It has been found that a ratio of diameter of the cup or flange to the minimum diameter of the yarn package withdrawn greater than 10 to 6 may occasion trouble which increases as the ratio increases.

A disc 30 is also carried by the spindle 20 and is secured thereto in any suitable fashion such as by the screw threads 31 carried by a collar 32 to which the disc is secured. The disc is approximately the same diameter as the cup but is preferably slightly greater in diameter. The disc has a smooth rim 33 around which the yarn travels as it is withdrawn axially from the cone.

Between the cup and the disc there is provided a fiber holder or frame 36 to which is secured fibers or bristles 37. These bristles extend beyond the circumference of the rim 33 so that the ends thereof are in the path of the yarn as it circles the disc as it is being withdrawn from the cone. The fibers are also adjacent to or in contact with the rim of the disc 30 in order to prevent axial movement by contact with the yarn being withdrawn. The fibers are distributed throughout the circumference of the drag device and a sufficient number thereof are provided so that the yarn is at all times engaged by at least one fiber. As the yarn is withdrawn it circles the rim 33 and bends the fiber. The fiber has sufficient resiliency so that it keeps the yarn taut between the package and a tensioning means illustrated in Figure 4. The fibers are soft enough so that they have no or slight inertia yet they are stiff enough to provide sufficient resiliency to keep the yarn taut. For relatively fine yarn a nylon fiber number 10 mills has been found satisfactory. Heavier yarns would require a heavier bristle.

In the operation of the drag device it is mounted upon a package of yarn and the package is then mounted upon a support S as shown in Figure 4. The yarn, as it is withdrawn axially from the package, passes from the package over the rim of the cup and disc and to the tensioning means T from which the yarn goes to the textile machine such as a warper, quiller or other device which receives the yarn. A second package with a yarn anti-slack device B is mounted adjacent to the first and the tail or inner end of the yarn of the package A may be tied to the beginning or outer end of the unit B so that when the yarn is exhausted upon the package A, the package B supplies the yarn without the necessity of stopping the machine to which the yarn is fed.

As the yarn is withdrawn from the package the yarn circles the same and contacts with and runs around the rim 27 of the cup 25. The rim 27 in extending over the end of the package directs the yarn away from the side of the package. If the yarn was drawn off from the package directly axially there would be a tendency for some of the underlying layers to pull off and fall down at the side or end of the package. Since with the cup the pull is away from the side of the package, this objectionable action is avoided. The yarn then passes to the rim of the disc 30 which it circles as the yarn is withdrawn and to the tensioning means T. As the yarn circles the rim 33 of the disc it bends one or more of the fibers 37 in a circumferential direction. When the yarn passes beyond the end of a bent fiber it springs back to its radial position. However the yarn is now engaging at least one other fiber so that at all times a tension is maintained upon the yarn and should the machine be stopped, the fiber has sufficient resiliency to keep the yarn taut between the package and the tensioning means. The fibers, however, are so light that they have no or substantially no inertia and consequently they remain in position at the moment the machine stops to continue pressure upon the yarn so that it remains without slack which would cause snarls.

The fibers are distributed uniformly throughout the circumference. The number of such fibers which have been used have varied from 30 to 90 with the diameter of discs being about 8 inches. Even with 90 fibers distributed around the periphery they are relatively widely spaced. Too few fibers around the circumference provides intervals or moments when the yarn would not be engaged by a fiber and hence the yarn may not at all times be kept taut. Too many fibers tend to whip them together so that sometimes they become tangled. With a diameter of disc of about 8 inches 45 fibers distributed uniformly around the circumference has been found to give the best results. It is desirable to have a fiber which is relatively long for several resasons. A fiber having a free end or that portion beyond the point of anchorage of about three inches has been found satisfactory. Shorter fibers have been used but they necessarily must bend farther in the operation of the device thereby increasing their liability to fatigue and break off. Fibers up to ½ inch free length have operated satisfactorily however. A short fiber also provides increased tension upon the yarn as a consequence of which the yarn tension is not uniform particularly at high speed; that is during operation the tension upon the yarn will vary considerably thereby increasing the strain upon the yarn. The short

fiber works more satisfactorily at high speeds although its shorter life as compared to a longer fiber is a disadvantage.

Wool felt, fleece or other material 40 may be provided at the sides of the package of the yarn in order to assist in preventing the sides of the package of yarn from collapsing, and to assist in threading up of the package. This fleece is usually provided only upon the upper half of the cone of yarn.

Another form of construction is illustrated in Figure 3. A cup or cup shaped flange 44 is provided which may be secured upon the end of the cone or package of yarn in any desired manner, the construction illustrated utilizing a rod or spindle 45 which is inserted centrally of the package. The spindle has a groove which receives a spring retainer or catch 22 to releasably retain the cup upon the end of the package. The rim 44 of the cup extends beyond the end of the yarn carried upon the package so that the yarn is at all times withdrawn from the package in a direction away from the sides thereof.

Radially extending bristles 46 may be secured within the cup either upon the cup itself or preferably the fibers are carried by a holder 47 which is received upon the threads 48 on the spindle 45. With this construction the relative position of the fibers may be adjusted with respect to the cup by threading the holder to the desired position on the spindle. Furthermore it allows the holder to be turned around from time to time giving the bristles a chance to work and bend in the opposite direction, thereby preventing them from receiving a definite set. The fibers extend along the inner wall of the cup 43 or adjacent thereto and extend a short distance beyond the smooth rim 44 of the cup. The rim of the cup has a smooth surface so that the yarn may rotate freely thereabout. The fibers are distributed around the entire circumference of the cup.

In operation the yarn is withdrawn from the cone axially thereof and as it is withdrawn the yarn circles around the rim of the cup and engages one or more of the fibers, bending them circumferentially to exert a slight pressure upon the yarn. If the machine should stop then the fiber exerts sufficient tension on the yarn so that no slack occurs between the package and the tensioning device and consequently snarls cannot occur therebetween. The fibers are located near enough to each other so that at least one fiber is at all times engaging the yarn. It will be noted in the construction of Figure 3 that the cup backs up the fiber so that the fibers are not pulled axially by the moving yarn in the direction of movement of the yarn.

It is clear that a fiber of any material may be used so long as it has sufficient resiliency. Fibers of horse hair have been used as well as nylon of 10 mills fine. Fibers of steel wire may also be used so long as it has sufficient resiliency.

Although the anti-slack or drag devices particularly illustrated and described show each fiber anchored or secured at its inner end and extending radially outward, it is to be understood that the direction in which the free end of the fiber extends is immaterial and the fiber may extend radially inwardly so long as the yarn engages the free end of at least one fiber as the yarn is drawn off from the head of the package.

The invention is presented to fill a need for improvements in a thread anti-slack device. It is understood that various modifications in structure, as well as changes in mode of operation,

assembly, and manner of use, may and often do occur to those skilled in the art, especially after benefiting from the teachings of an invention. Hence, it will be understood that this disclosure is illustrative of preferred means of embodying the invention in useful form by explaining the construction, operation and advantages thereof.

What is claimed is:

1. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off of the end of a cone or package of yarn comprising means providing a rim adapted to be mounted adjacent the end of the package, the rim having a diameter with respect to the minimum diameter of the yarn package in a maximum ratio of ten to six, a frame, a plurality of relatively long resilient fibers extending radially from the frame around the entire periphery thereof, the fibers being mounted in a range between contact with and closely adjacent to the periphery of the rim, the fibers being spaced a distance apart and having a length extending at all times into the path of the yarn so that at least one fiber is engaged by the yarn at all times, the ends of the fibers being in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the frame and being released when the yarn passes the end of the fiber, and the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped, and tensioning means for the yarn mounted ahead of the frame and rim means.

2. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off the end of a cone or package of yarn comprising means providing a rim adapted to be mounted at the end of the package, the rim having a diameter with respect to the minimum diameter of the yarn package in a maximum ratio of ten to six, a frame, a plurality of relatively long fibers having one end anchored towards the axis of the package and the other end extending radially outward from the frame, the fibers extending around the entire periphery of the frame, the fibers being mounted in a range between contact with and closely adjacent to the periphery of the rim, the fibers being spaced a distance apart and having a length extending at all times into the path of the yarn so that at least one fiber is engaged by the yarn at all times, the ends of the fibers being in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the frame and being released when the yarn passes the end of the fiber, the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped, and tensioning means for the yarn mounted ahead of the frame and rim means.

3. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off of the end of a cone or package of yarn comprising a frame adapted to be mounted adjacent the end of the package, a plurality of relatively long fibers extending radially from the frame around the entire periphery thereof, the fibers being spaced a distance apart and having a length extending at all times into the path of the yarn so that at least one fiber is engaged by the yarn at all times, the ends of the fibers being in the path of the yarn being withdrawn from the package and bending circumfer-

entially as the yarn circles the frame and being released, the fibers being light so that they have little inertia and having resiliency sufficient to maintain the yarn taut should the feeding of the yarn be stopped, and means backing up the fibers and providing a rim adapted to extend over the end of the package so that the yarn is withdrawn away from the ends of the package, the rim having a diameter with respect to the minimum diameter of the yarn package in a maximum ratio of ten to six.

4. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off the end of a cone or package of yarn comprising a rod having means to secure the same to a package, a cup carried by the rod and having a rim larger in diameter than a package and extending outwardly to project over the end of the package so that the yarn is withdrawn away from the ends of the package, the cup having a diameter with respect to the minimum diameter of the yarn package in a maximum ratio of ten to six, a frame carried upon the rod, a plurality of relatively long fibers having one end anchored to the frame towards the axis of the cup and the other end extending radially outward from the frame, the fibers extending around the entire periphery of the frame, the fibers being mounted in a range between contact with and closely adjacent to the periphery of the cup, the fibers, being spaced a distance apart and having a length extending at all times into the path of the yarn so that at least one fiber is engaged by the yarn at all times, the ends of the fibers extending beyond the cup so that they are in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the cup and being released when the yarn passes the end of the fibers, the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped.

5. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off the end of a cone or package of yarn comprising a frame adapted to be mounted at the end of the package, a plurality of relatively long fibers having one end anchored towards the axis of the package and the other end extending radially outward from the frame, the fibers extending around the entire periphery of the frame, the fibers being spaced a distance apart and having a length extending at all times into the path of the yarn so that at least one fiber is engaged by the yarn at all times, the ends of the fibers being in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the frame and being released when the yarn passes the end of the fibers, the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped, and means to back up the fibers and providing a rim adapted to extend over the end of the yarn of the package so that the yarn is withdrawn away from the ends of the package, the rim having a diameter with respect to the minimum diameter of the yarn in a maximum ratio of ten to six.

6. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off of the end of a cone or package of yarn comprising a frame adapted to be mounted at the end of the package, a plurality of relatively long fibers having one end anchored

to the frame and the other end extending radially from the frame, the fibers extending around the entire periphery of the frame, the fibers being spaced a distance apart and having a length extending at all times into the path of the yarn so that at least one fiber is engaged by the yarn at all times, the ends of the fibers being in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the frame and being released when the yarn passes the end of the fibers, the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped, and means backing up the fibers by being in a range between contact with and closely adjacent to the fibers and having a diameter with respect to the minimum diameter of the yarn in a maximum ratio of ten to six.

7. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off of the end of a cone or package of yarn comprising a frame adapted to be mounted at the end of the package, a plurality of long fibers having one end anchored with respect to the frame towards the axis of the package and the other end extending radially outward from the frame, the fibers extending around the entire periphery of the frame, the fibers being spaced a distance apart so that at least one fiber is engaged by the yarn at all times, the ends of the fibers being in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the frame and being released when the yarn passes the end of the fibers, the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped, and means backing up the fibers by being in a range between contact with and closely adjacent to the fibers and having a diameter with respect to the minimum diameter of the yarn in a maximum ratio of ten to six.

8. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off of the end of a cone or package of yarn comprising a frame adapted to be mounted at the end of the package, a plurality of long fibers having one end anchored to the frame and the other end extending radially from the frame, the fibers extending around the entire periphery of the frame, the fibers being spaced a distance apart and having a length extending at all times into the path of the yarn so that at least one fiber is engaged by the yarn at all times, the ends of the fibers being in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the frame and being released when the yarn passes the end of the fiber, the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped, means providing a rim adapted to extend over the end of the package so that the yarn is withdrawn away from the ends of the package, the rim having a diameter with respect to the minimum diameter of the yarn in a maximum ratio of ten to six, and means backing up the fibers.

9. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off the end of a cone or package of yarn comprising a frame adapted to be mounted at the end of the package, a plurality of long fibers having one end anchored with re-

spect to the frame towards the axis of the package and the other end extending radially outward from the frame, the fibers extending around the entire periphery of the frame, the fibers being spaced a distance apart and having a length extending at all times into the path of the yarn so that at least one fiber is engaged by the yarn at all times, the ends of the fibers being in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the frame and being released when the yarn passes the end of the fibers, the fibers being light so that they have little inertia and having resiliency sufficient to maintain the yarn taut should the feeding of the yarn be stopped, means providing a rim adapted to extend over the end of the package so that the yarn is withdrawn away from the ends of the package, the rim having a diameter with respect to the minimum diameter of the yarn in a maximum ratio of ten to six, and means backing up the fibers.

10. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off the end of a cone or package of yarn comprising a cup having a rim larger in diameter than a package and extending parallel to the axis over the windings adjacent one end of the package so that the yarn is withdrawn away from the ends of the package and a center hub to receive the end of a package, a disc having a smooth rim and a diameter approximately equal to that of the cup, the disc being mounted adjacent to the cup, a frame mounted between the cup and disc, a plurality of long fibers having one end anchored to the frame towards the axis of the cup and disc and the other end extending radially outward from the frame, the fibers extending around the entire periphery of the frame, the fibers being spaced a distance apart so that at least one fiber is engaged by the yarn, the ends of the fibers extending beyond the cup and disc so that they are in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the cup and disc and being released when the yarn passes the end of the fibers, the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped.

11. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off the end of a cone or package of yarn comprising a rod having means to secure the same to a package, a cup mounted upon the rod having a rim larger in diameter than a package and extending parallel to the axis over the windings adjacent one end of the package so that the yarn is withdrawn away from the ends of the package and a center hub to receive the end of a package, a disc having a smooth rim and a diameter approximately equal to that of the cup, the disc being mounted adjacent to the cup, a frame mounted between the cup and disc, a plurality of long fibers having one end anchored to the frame towards the axis of the cup and disc and the other end extending radially outward from the frame, the fibers extending around the entire periphery of the frame, the fibers being spaced a distance apart so that at least one fiber is engaged by the yarn, the ends of the fibers extending beyond the cup and disc so that they are in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the cup and disc and being released when the yarn passes the end of the fibers, the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped.

12. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off the end of a cone or package of yarn comprising a cup having a rim larger in diameter than a package and extending parallel to the axis over the windings adjacent one end of the package so that the yarn is withdrawn away from the ends of the package, a plurality of long fibers having one end anchored towards the axis of the cup and the other end extending radially outward adjacent the inner wall of cup, the fibers extending around the entire periphery of the cup, the fibers being spaced a distance apart so that at least one fiber is engaged by the yarn, the ends of the fibers extending beyond the cup so that they are in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the cup and being released when the yarn passes the end of the fibers, the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped.

13. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off the end of a cone or package of yarn comprising a cup having a rim larger in diameter than a package and extending parallel to the axis over the winding adjacent one end of the package so that the yarn is withdrawn away from the ends of the package, a plurality of long fibers having one end anchored within the inner wall of the cup and towards the axis of the cup, the other end of each fiber extending radially outward, the fibers extending around the entire periphery of the cup, the fibers being spaced a distance apart so that at least one fiber is engaged by the yarn, the ends of the fibers extending beyond the cup so that they are in the path of the yarn being withdrawn from the package and bending circumferentially as the yarn circles the cup and being released when the yarn passes the end of the fibers, the fiber being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped.

14. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off the end of a cone or package of yarn comprising a cup having a rim larger in diameter than a package and extending parallel to the axis over the windings adjacent one end of the package so that the yarn is withdrawn away from the ends of the package, a frame mounted within the cup, a plurality of long fibers having one end anchored to the frame towards the axis of the cup and frame and the other end extending radially outward from the frame adjacent the inner wall of the cup, the fibers extending around the entire periphery of the cup, the fibers being spaced a distance apart so that at least one fiber is engaged by the yarn, the ends of the fibers extending beyond the cup so that they are in the path of the yarn being withdrawn from the package around the rim of the cup and bending circumferentially as the yarn circles the cup and being released when the yarn passes the end of the fibers, the fibers being light so that they

have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped.

15. A thread anti-slack device for preventing snarls, looping and ballooning when withdrawing thread axially off the end of a cone or package of yarn comprising a cup having a rim larger in diameter than a package and extending parallel to the axis over the windings adjacent one end of the package so that the yarn is withdrawn away from the ends of the package, a frame mounted within the cup, a plurality of long fibers having one end anchored to the frame towards the axis of the cup and frame and the other end extending radially outward from the frame adjacent the inner wall of the cup, the fibers extending around the entire periphery of the frame and cup, the fibers being spaced a distance apart so that at least one fiber is engaged by the yarn, the ends of the fibers extending beyond the cup so that they are in the path of the yarn being withdrawn from the package

and bending circumferentially as the yarn circles the cup and being released when the yarn passes the end of the fibers, the fibers being light so that they have little inertia and having sufficient resiliency to maintain the yarn taut should the feeding of the yarn be stopped, and means to adjust the position of the frame axially with respect to the cup.

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