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2,349,237

UNWINDING YARN

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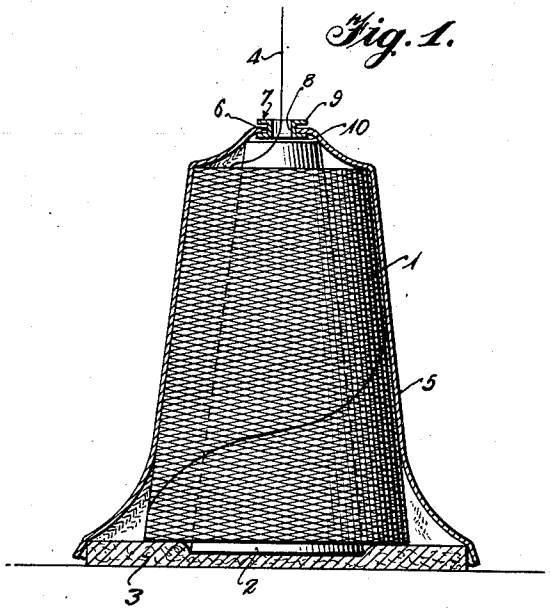


Fig. 3.

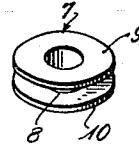


Fig. 4.

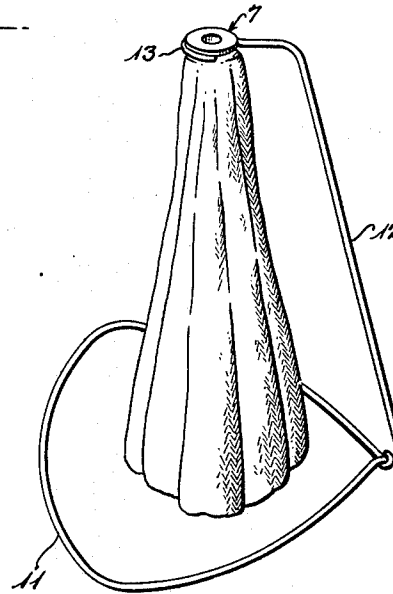
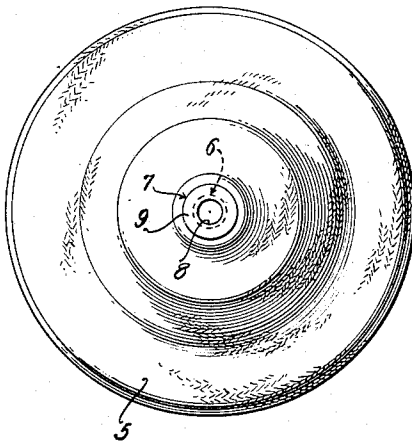


Fig. 2.



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UNWINDING YARN

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8 Claims. (Cl. 242—130)

This invention relates to the handling of thread, yarn and the like in the course of its fabrication into cloth. More particularly, this invention concerns a method and an apparatus for avoiding the occurrence of irregularities in highly twisted rayon thread during the course of unwinding from a supply package on a fabricating machine such as full-fashioned hosiery machines.

In the production of hosiery on full-fashioned knitting machines the thread delivered overhead from supply cones is directed by way of various guiding and tension devices to the knitting mechanism by which it is laid in flat courses to form the body of the hose, and the length of the course which the thread travels depends upon the width of the fabric to be knitted. To secure a uniformly knitted fabric it is necessary, of course, that the thread be maintained under uniform tension while it is being knitted. However, due to the fact that the mechanism which lays the thread must reverse itself at the end of each stroke, the amplitude of which depends on the width of the fabric, a slight delay is incurred which tends to introduce slack in the thread, the result being kinking of the thread which, if it did not cause breakage of the needles, would produce an imperfect fabric. Thus, the knitting operation and, therefore, the supply of thread to the machine is intermittent and complex devices have been devised to take up the slack in the thread and prevent kinking thereof at the knitting point. Such devices operate only upon the section of thread between the knitting point and the first pre-tensioning device to which the thread is led after leaving the supply package.

However, when knitting certain types of thread, for example, highly twisted threads of rayon or other synthetic fibers, the intermittent cessation of the knitting operation causes the thread coils to be loosened at the point of departure from the supply package and slack to be introduced between the package and the first pre-tensioning device. The torque in the thread causes it to kink and as a result thereof, may cause breakage of the thread in its path from the supply cone to the needles or even breakage per se of the needles, or the kinks may occur as defects in the knitted fabric. Up to the present time no satisfactory means have been devised to avoid the occurrence of kinks between the supply package and the pre-tension devices.

In attempting to overcome this difficulty, it has been proposed to place the thread under tension as quickly as possible after leaving the supply package in order to either offset the tendency of the thread to kink or to iron out the kinks prior to the introduction of the thread into the knitting elements of the fabricating machine proper. Among the proposals made for the application of early tension to thread withdrawn from a conical cross-wound package may be mentioned the ap-

paratus described in United States Patent No. 2,222,921, to van den Bergh, wherein the thread cone is enclosed in a container having a cup-shaped outlet for the thread, tension being applied by causing a spherical element to press against the thread in its passage through the outlet. This device was of considerable practical importance as a preliminary tension mechanism but was only partially successful in ironing out the kinks caused by loosening of the coils on the thread package.

The present invention is designed to overcome these difficulties and has for its object the provision of a method and apparatus for inhibiting the kinking of highly twisted thread adjacent the supply package when the withdrawal of thread therefrom is momentarily stopped.

Another object is the provision of an improved device for applying tension to thread as it is withdrawn overhead from a supply package. With these and other objects in view, the invention contemplates the provision of an apron of pliable, light-weight cloth or other suitable material, designed to drape over and substantially cover, a supply package, such as a cone. The apron falls loosely about the cone, contacts the outer coils of thread thereon, holds them in place and inhibits the introduction of slack in the thread when withdrawal from the cone is momentarily stopped.

The invention will be better understood from a consideration of the following detailed description when read in conjunction with the accompanying drawing, wherein

Figure 1 is an elevation in partial section of the invention in operation upon a conical supply package;

Figure 2 is a plan view of the apron showing the eyelet through which thread is withdrawn from the cone;

Figure 3 is an enlarged view in perspective of the grommet or eyelet through which the thread is withdrawn from the cone; and

Figure 4 illustrates in perspective a modified form of the invention wherein a standard is employed to support the apron.

In Figure 1, a package of thread 1, cross-wound upon a conical core 2 rests upon a pad 3 of felt or other suitable material. Thread 4 is withdrawn overhead from package 1 and is directed by way of guides and tensioning devices, not shown, to a fabricating machine such as a full-fashioned knitting machine, also not shown. At the time a temporary stoppage occurs in the delivery of thread to the knitting elements of the machine either resulting from thread-breakage, machine repair, or momentary feed-stoppage due to the reversal of thread-laying during knitting of the fabric, slack is introduced in the thread 4 between the supply package and the first de-

vice employed for placing the thread under tension. When knitting a highly twisted thread, under such conditions, particularly thread made of rayon or other synthetic material, the coils on the supply package become loosened and the inherent torque in the highly twisted thread causes it to kink up and form knots which, if they do not impair the machine elements with which they come in contact, are carried over into the finished fabric and appear as defects therein.

In order to maintain the thread coils in place at all times and inhibit the introduction of slack in the thread between the supply package and the first pre-tension device, an apron 5 preferably made of pliable, light-weight cloth such as rayon net, is provided, the general shape of which is circular, as shown in Figure 2. The center of the apron is provided with an opening 6 in which is affixed an eyelet or grommet 7 made of metal or other suitable material and comprising a hollow cylindrical portion 8 and flanges 9 and 10.

In operation, thread 4 is threaded through eyelet 7 and the apron draped over conical package 1 with the eyelet positioned centrally above the thread package. The contact of the apron with the surface of the package holds the coils thereof in place while offering only slight resistance to the withdrawal of the thread, thus preventing the occurrence of slack in the thread adjacent the package. The thread withdrawn through eyelet 7 is then led by way of guides and tension devices to the knitting machine.

In the modification shown in Figure 4, the apron is supported by a standard made from a single strip of metal and comprising a base 11, and an upright portion 12 having its upper end bent to form a hook 13 adapted for insertion between flanges 9 and 10 of eyelet 7. In operation the supply package is placed within the confines of base 11 and covered with the apron 5, and the height of upright portion 12 is so chosen that hook 13, and therefore eyelet 7, is centrally supported slightly above the apex of the cone 2.

It will thus be seen that by employing the present invention thread unwound overhead from a cross-wound supply package may be conducted to a knitting machine and fabric made therefrom without danger of breaking machine parts or the appearance of defects in the knitted material as a result of kinks occurring in the thread between the supply package and the first pre-tension device.

Having now described our invention in its preferred embodiment it should be understood that it is subject to variations and modifications without departing from the spirit thereof, and it is intended that the invention be limited only by the scope of the appended claims.

We claim:

1. A device for inhibiting the introduction of slack in a thread adjacent a stationary supply package during unwinding from the outside to the inside thereof, comprising an apron adapted to contact the outer surface of said supply package and an opening in said apron for the free passage of thread therethrough.

2. A device for inhibiting the introduction of slack in a thread adjacent a stationary supply package which decreases in diameter during unwinding from the outside to the inside thereof, comprising an apron adapted to contact the outer surface of said supply package, said apron having an opening therein for the free passage of thread

therethrough and means independent of said supply package for supporting said apron.

3. A method of inhibiting kinking of highly twisted thread in the outer layers of a supply package maintained stationary when the thread is withdrawn progressively from the outside to the inside of the package during the unwinding operation which comprises placing sufficient tension on the outside layers of thread prior to, and during, its withdrawal to maintain the thread coils in place at all times and prevent the occurrence of slack therein, but insufficient to impede its withdrawal therefrom.

4. In combination with a supply package maintained stationary during unwinding from the outside to the inside thereof, a device for inhibiting kinking of highly twisted thread during cessation of withdrawal of the thread from the package which comprises means constantly, progressively in contact with the outer layers of thread of said package and means carried by said first means defining an opening through which the thread can be withdrawn.

5. In combination with a supply package maintained stationary during unwinding from the outside to the inside thereof, a device for inhibiting kinking of highly twisted thread during cessation of withdrawal of the thread from the package which comprises collapsible means supported by, and constantly, progressively in contact with, the outer layers of thread of said package and means carried by said collapsible means defining an opening through which the thread can be withdrawn.

6. In combination with a spool supported, supply package maintained stationary during unwinding from the outside to the inside thereof, a device for inhibiting kinking of highly twisted thread during cessation of withdrawal of the thread from the spool which comprises a collapsible apron supported by, and constantly, progressively in contact with, the outer layers of thread of said package and means carried by said collapsible apron defining an opening through which the thread can be withdrawn.

7. In combination with a supply package maintained stationary during unwinding from the outside to the inside thereof, a device for inhibiting kinking of highly twisted thread during cessation of withdrawal of the thread from the package which comprises collapsible means constantly, progressively in contact with the outer layers of thread of said package, means carried by said collapsible means defining an opening through which the thread can be withdrawn and separate means adapted to engage said second means for supporting said collapsible means in operative position.

8. In combination with a spool supported, supply package maintained stationary during unwinding from the outside to the inside thereof, a device for inhibiting kinking of highly twisted thread during cessation of withdrawal of the thread from the spool which comprises a collapsible apron constantly, progressively in contact with the outer layers of thread of said package, means carried by said collapsible apron defining an opening through which the thread can be withdrawn and separate means adapted to engage said last means for supporting said collapsible apron in operative position.

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