

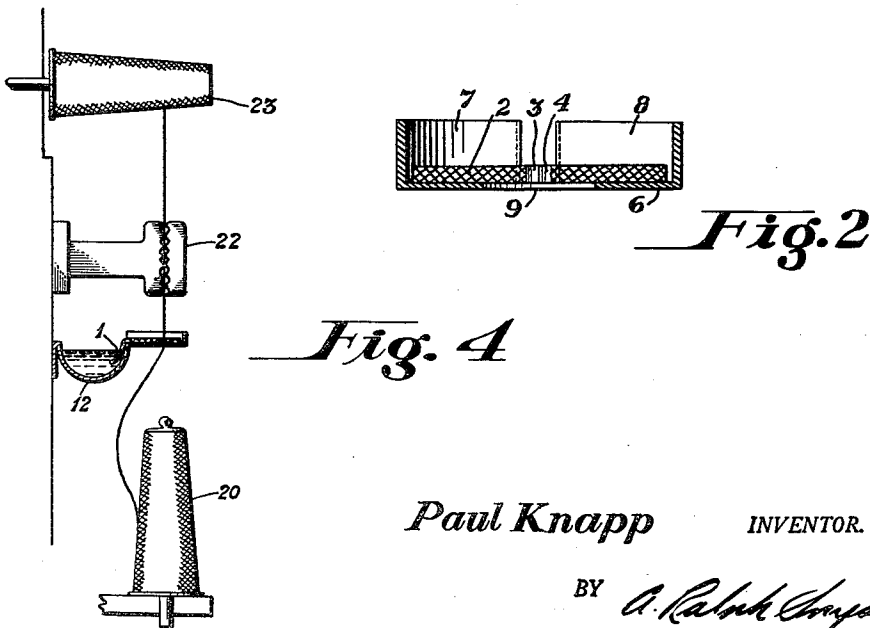
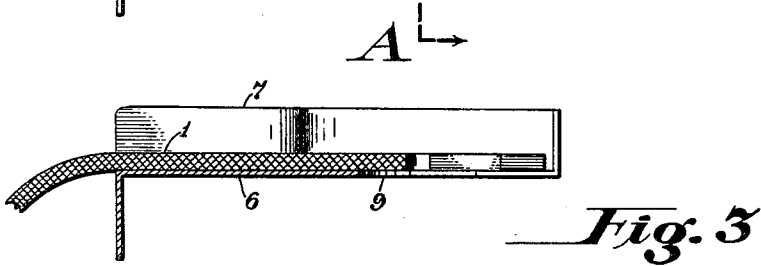
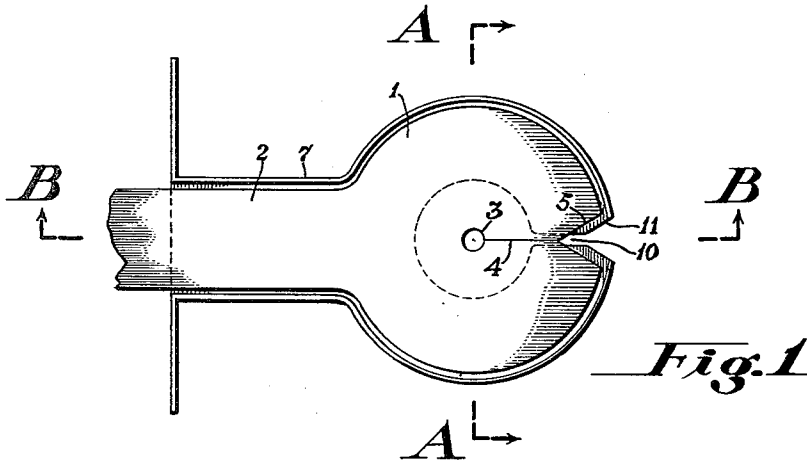
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ANNULAR WICK OILER

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ANNULAR WICK OILER

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This invention relates to a device for applying a liquid to a textile yarn while the yarn is being wound into a package such as a cone or the like. More particularly, this invention relates to a device for applying a uniform quantity of a suitable dressing such as oil or other lubricant to a running yarn traveling at a varying speed.

While rayon yarns are frequently treated with a liquid finishing composition prior to the step of rewinding the yarn package into a final shipping package, yarn destined for use on knitting machinery generally requires additional oiling or lubrication to render it sufficiently supple and flexible to loop satisfactorily in the knitting operation. Accordingly, in the final winding step, a composition of lubricating and softening oils is frequently applied to the yarn. The composition should, of course, be applied uniformly so that the yarn throughout all portions of the package contains substantially a constant amount of the oily composition. Should the final package be formed at a constant wind-up speed, for instance, on a winder where the package is surface driven by a constant speed drive roll, uniformity of oil application is not difficult to attain. However, in the synthetic yarn industry, precision winding machines, such as coning machines, are commonly of the type wherein the wind-up package is rotated at a constant angular velocity. Under these conditions, the yarn speed increases as much as two, three or more times from the beginning to the end of the package. When liquid compositions are applied to yarn, under such conditions, it is obviously necessary to provide a suitable liquid applying device that will apply to each yard of running yarn substantially the same amount of the desired liquid composition.

Numerous devices with this desideratum in view have been proposed and many have been used commercially with some success. In general, however, uniformity of the liquid composition application to the running yarn has not been entirely satisfactory and additionally the compensating liquid applying devices heretofore proposed have necessitated numerous bends in the path of the yarn travel, which combined snubbing angularities have, at times, increased the tension on the yarn to an undesirably high level, frequently necessitating the slowing down of the winder. Furthermore, since snubbing angularity increases the tension on the yarn in proportion to the initial tension, slight irregularities in the take-off package become so greatly magnified at the wind-up point as to result in serious degradation of the yarn.

It is, therefore, an object of the present invention to provide an improved means for applying a substantially uniform quantity of a liquid composition to yarn being wound at a constantly changing rate while at the same time maintaining substantially a straight line travel from the take-off package to the cone or other wind-up package. Other objects will be apparent from the description that follows.

The objects of this invention are accomplished by the use of a liquid applicator hereinafter particularly described in connection with the accompanying drawing wherein:

Figure 1 is a plan view of the liquid applicator of this invention;

Figure 2 is a section on the line A—A of Figure 1;

Figure 3 is a section on the line B—B of Figure 1; and

Figure 4 is a generally diagrammatic illustration showing the adaptation of the device of this invention in a conventional arrangement for winding yarn into a final package.

Referring to Figure 1, the liquid applicator constructed in accordance with the principles of this invention comprises a wick support and flat wick having an annularly shaped end portion 1 and an elongated extension or tail 2 adapted to dip into a supply of treating fluid, e. g., a lubricating and softening oil composition. The central hole of the annular portion of the wick, which defines an annular wall or thread-contacting surface 3 (Figs. 2 and 3), is small but relatively large in comparison to the diameter of the yarn which passes therethrough in the operation of the device. A slot or cut 4 extending through the wick from the central hole and terminating in a V-shaped yarn-guiding notch 5 at the outer edge of the annular portion 1 provides a convenient means for threading-up of the yarn. The wick may be of any suitable material such as felt or the like.

The wick support comprises a bottom 6 and upwardly extending side walls 7 and 8, the bottom and side walls together forming an open-topped container for the wick. The bottom 6 is of the same outline as the wick and is provided in its annular portion with a central hole 9, a slot 10, and a notch 11 corresponding to the hole, slot and notch respectively in the wick. The diameter of the hole 9 and the width of the slot 10 are, however, somewhat greater than the corresponding dimensions of the hole and slot in the wick so that the running yarn passing through the applicator contacts the wick only.

A downwardly extending flange 11 is provided at the outer end of the tail section of bottom 8 to permit attachment of the device to any suitable support such as a treating fluid trough as shown in Fig. 4, or the frame of the winding machine. Any suitable expedient for supplying treating liquid to the wick may be employed; in the preferred embodiment, the tail of the wick dips into treating fluid contained in a trough 12 (Fig. 4). However, any other convenient means, e. g., a fountain, may be used for this purpose.

Referring now to Figure 4, a pirn or other core 20 with yarn wound thereon is shown from which the yarn is being withdrawn and wound up as a cone or the like. Vertically above the center of the pirn is located the circular hole in the wick, which wick in the modification shown dips into the oil in the trough 12. The wick holder is suitably fastened to the side of the oil trough. The yarn then passes upwardly through a tensioner 22, for instance, the conventional wash board type tensioner, over the bale wire (not shown) and is led onto the cone 23 by the usual traverse button (not shown). Due to the balloon of the yarn as it is withdrawn from pirn 20, it continuously rubs around the annular wall 3 of the wick thereby picking up the desired liquid composition.

When winding is started on an empty cone, the yarn speed is relatively low and the centrifugal force or balloon acting on the yarn as it passes through the wick is relatively small. Consequently, the yarn presses relatively lightly against the annular wall of the wick. Toward the end of the winding period, when the cone is increased to two, three or more times its original diameter, the yarn speed is proportionately increased and the centrifugal force or balloon of the yarn causes it to rub against the annular wall of the wick much harder and consequently, even though the yarn speed is increased several fold, the increased pressure against the wick due to ballooning compensates for this difference and the finished cone of yarn will be found to have substantially uniform oil content throughout. For example, typical oil analyses taken from the inside, middle and outside of the cone are given below.

Cone A

	Percent
600 denier—254 filament bright yarn:	
Inside	1.00
Middle	0.90
Outside	1.10

Cone B

	Percent
200 denier—64 filament pigmented yarn:	
Inside	1.15
Middle	1.40
Outside	1.40

In comparison with these figures when using a patented wiper of the prior art disclosed in Coleman U. S. P. 1,767,203, specifically designed to

compensate for differences in yarn speed, maximum variations several times greater than the above were obtained.

The amount of oil or other liquid composition applied to the yarn may be regulated by altering the rotation of the speed of the cone, which affects the centrifugal force on the yarn as it passes through the hole in the wick, by varying the diameter of the hole, by increasing the thickness of the wick or by changing the material comprising the wick.

The device of this invention is exceptionally useful for the oiling of yarns comprised of continuous filaments of cellulose organic acid esters, such as cellulose acetate, but is applicable to the oiling of any rayon yarn or yarns comprised of other continuous filaments of synthetic origin, such as viscose rayon, cuprammonium rayon, nylon, Vinyon, etc.

In addition to obtaining more uniform oil or other liquid compositions on the yarn being wound, the liquid applying device of this invention permits a substantial straight line wind-up from pirn to cone. Thus, the packages can be wound, when desired, at very low tension and with greater uniformity of tension. Also, when the winding position is to be used or the winding of yarn which has already been oiled or for the winding of yarn on which no oil is desired, the wick can be quickly substituted by a circular yarn guide which may conveniently be prepared from thermoplastic molding compositions, for example, cellulose acetate molding composition, shaped to fit into the annular section of the wick support. By this simple expedient, the straight line wind-up is obtained without tearing down and rebuilding the winding position whenever a change-over from one production to another is desired.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that I do not limit myself to the specific embodiments thereof except as defined in the appended claims.

I claim:

1. A device for applying liquid compositions to running, ballooning yarn which comprises a flat wick having a small hole therein through which the yarn passes, said hole being substantially larger than the diameter of the yarn, means for supporting said wick in operative position, and means for supplying a liquid composition to said wick.

2. A device for applying liquid compositions to running, ballooning yarn which comprises a flat wick having an annularly shaped section providing a yarn-contacting inner wall, the inner diameter of said section being substantially larger than the diameter of the yarn to be treated, means for supporting the wick in operative position, and means for supplying a liquid composition to said wick.

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