May 19, 1959 E. K. BAUER 2,887,278

DRIVE UNIT FOR YARN COLLECTING APPARATUS

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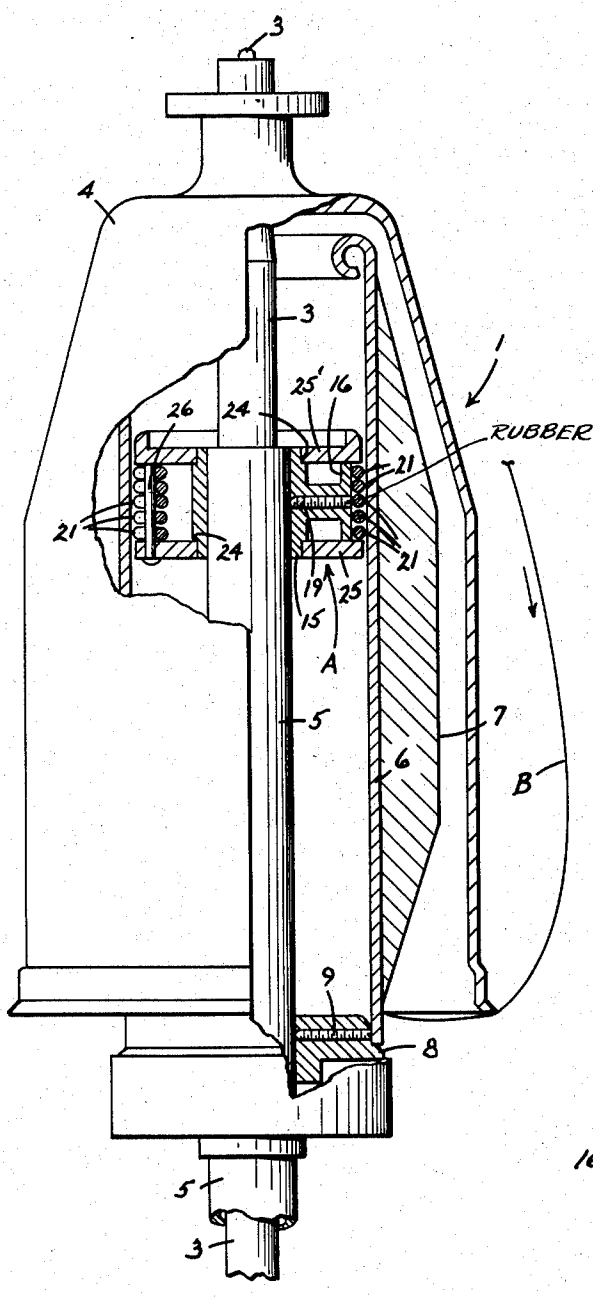


Fig. 1

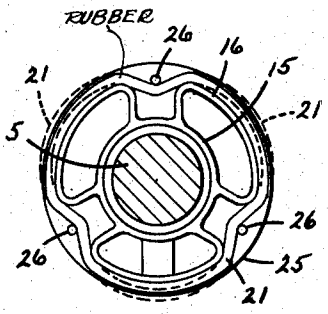


Fig. 3

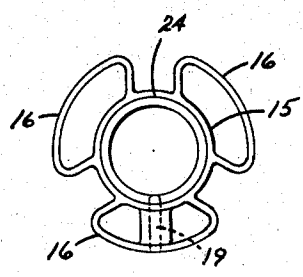


Fig. 2

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DRIVE UNIT FOR YARN COLLECTING APPARATUS

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1 Claim. (Cl. 242—46.5)

The present invention relates to a drive assembly for cap and tube type yarn collection assemblies for forming wound yarn packages.

With such assemblies, the yarn is wound up on a rotating yarn collection tube as the continuous yarn is traversed back and forth along the tube length whereby the yarn is built up on the collecting tube in even layers.

An object of the present invention is to provide a novel driving unit for rotating the tube in a cap and tube yarn collecting assembly.

Another object of the invention is to provide in a cap and tube yarn collecting assembly, a novel and improved drive unit for rotating a yarn collecting tube positioned over the unit. The drive unit comprises a driven rotatable hub having a rim with a plurality of resilient rings mounted on the rim structure. The rings are out of true driving or gripping engagement with the inner wall of the yarn collecting tube when the assembly is stationary but they expand when the hub is rotated, due to the centrifugal force created, to tightly grip the inner wall of the tube to provide a driving connection with the tube wall.

Other objects and advantages will become more apparent from a study of the following description and drawings in which:

Figure 1 is a view, partially broken away and partially sectioned, of a cap and tube yarn collecting assembly utilizing the drive unit of the present invention;

Figure 2 is an end view of a portion of the drive unit showing the rotatable hub and its rim structure; and

Figure 3 is an end view of the drive unit showing the resilient drive rings in their relaxed and expanded positions.

Briefly, my drive unit for a cap and tube type yarn collecting assembly comprises a rotatable hub driven by a drive shaft. The hub has a rim which is divided into sections so that gaps appear between the rim sections. A plurality of resilient rings are positioned around the rim sections. End plates are affixed to the hub and extend beyond the periphery of the rim structure to prevent the resilient rings from sliding off the rim structure. The end plates are held in position by connecting rivets which lie atop the resilient rings and extend through the gaps between the rim sections to depress the rings within the gaps and thereby retain the rings in place on the rim structure. The yarn collecting tube fits over the rings. When the assembly is at rest, the resilient rings are out of true driving or gripping engagement with the inner wall of the tube. When the hub is rotated, the resilient rings expand due to centrifugal force to tightly grip the inner surface of the tube to form a driving connection with the tube wall to rotate the yarn collecting tube.

Referring now to the drawings, Figure 1 in particular, there is shown a typical cap and tube yarn collecting assembly 1. Except for the tube driving unit A, the cap and tube assembly is of the type in general commercial use today. The cap and tube assembly 1 comprises generally a stationary vertical shaft 3 upon which is mounted a stationary housing or cap 4. A rotatable drive sleeve or shaft 5 fits over the stationary shaft 3 and is driven by a motor positioned below the assembly (not shown) and mounted on a vertically reciprocal rail (not shown) whereby in addition to its rotating, the drive sleeve or shaft 5 also reciprocates vertically within the stationary cap 4 to provide a traverse motion necessary for winding up a yarn B in even layers on a yarn collecting tube 6 of metal, wood, fiber or other suitable material positioned within the housing 4. A tube support 8 is locked by a set screw 9 to the drive sleeve or shaft 5 to rotate therewith and to loosely support the yarn collecting tube 6. The driving unit A is provided to form a driving connection between the drive sleeve or shaft 5 and the tube 6 whereby the collecting tube may be rotated and reciprocated vertically. The drive unit A is the inventive feature of the apparatus and will be described in greater detail hereinafter. A continuous yarn B is fed to and wound up upon the tube 6 in even layers to form a yarn package 7 as the tube 6 is both rotated and reciprocated vertically within the cap 4.

As shown in the drawings, the drive unit A comprises a hub 15 having a divided rim structure consisting of separate rim sections 16, 16 extending around the hub 15 whereby gaps are left between the rim sections. The hub 15 is locked to the drive sleeve or shaft 5 mentioned above by set screw 19. A plurality of resilient rings 21, 21, such as rubber O-rings, are positioned in side by side relationship over the rim sections 16, 16 of the hub 15. As seen in Figure 1, end plates 25, 25' are fitted over the drive sleeve 5 and over the shoulders 24, 24 of hub 15. The plates 25, 25' are held in position on the hub 15 by rivets 26, 26 or other suitable securing means, which extend through and connect the plates to lock them in position.

The rivets 26, 26 which retain the end plates 25, 25' in position on the hub 15 lie atop the resilient rings 21, 21 and extend through the gaps between the rim sections 16, 16. The rivets lie slightly below the line of curvature assumed by the peripheries of the rim sections 16, 16 whereby the resilient rings 21, 21 are depressed within the gaps to retain the rings in place or position on the rim sections 16, 16 (see Fig. 3). As seen in Fig. 1, the plates 25, 25' extend beyond the rim peripheries to prevent the rings from sliding off the rim sections during rotation.

When the cap and tube winding assembly is stationary, the resilient rings 21, 21 are out of true driving engagement with the inner surface of the tube 6 positioned thereover (Fig. 1). Sufficient contact, however, is present between the rings and the inner surface of the tube to initially rotate the tube as the winding apparatus is brought to normal operative speed. This contact mentioned above is not sufficient, however, to rotate the tube when a load is placed upon the cap and tube apparatus. As the r.p.m. and the centrifugal force of the drive sleeve 5 and tube drive unit A are increased, the resilient rings 21, 21 expand from their initial position and assume the dotted line position as indicated in Figure 3. The rings 21, 21 are thereby forced against the inner surface of tube 6 to provide a gripping connection between the driven hub 15 and the tube 6 which connection is strong enough to rotate the tube when a load is applied to the winding assembly.

Since the plates are secured by rivets 26, 26, the plates may easily be removed from the hub 15 to replace the rings 21, 21 should they become worn.

It is to be understood that changes may be made with respect to the above described apparatus without departing from the spirit and scope of the invention.

I claim:

A drive assembly for a yarn collecting tube comprising a drive shaft, a hub affixed to the shaft, a rim structure for the hub consisting of spaced-apart rim sections whereby a gap is provided between each rim section, a plurality of rubber O-rings positioned over the rim sections which rings lie out of driving contact with the inner wall of a yarn collecting tube positioned over the hub when the assembly is stationary but which expand upon rotation of the assembly to grip the tube wall to form a driving connection between the hub and the collecting tube, hub end plates positioned over the drive shaft and affixed to the hub which plates extend beyond the peripheries of the rim sections, and means for retaining the end plates and the rings in place, said retaining means overlying the rubber rings and extending through the rim gaps in a plane which is below the line of curvature as assumed by the peripheries of the rim sections whereby the rubber

O-rings are depressed within the gaps between the rim sections.

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