March 4, 1958 H. P. FRY, JR 2,825,624

METHOD FOR INDICATING THE TERMINATION OF A YARN CAKE WINDING

Filed Nov. 29, 1954

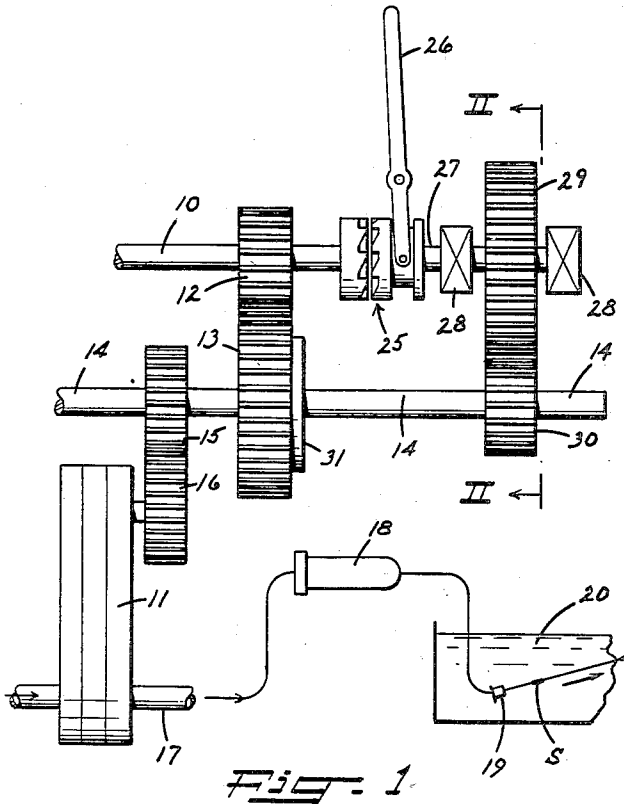


Fig. 1

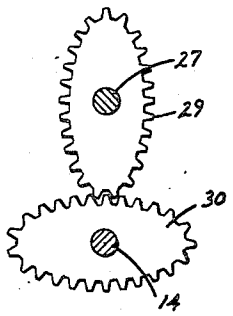


Fig. 2

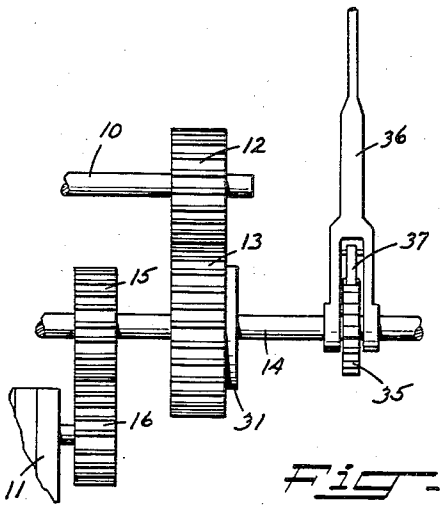


Fig. 3

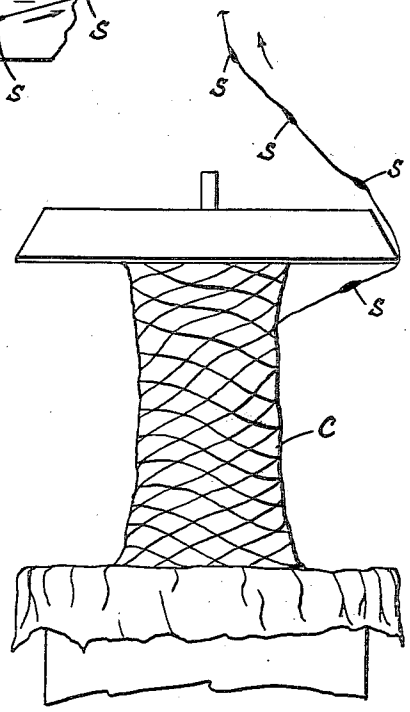


Fig. 4

United States Patent Office 2,825,624 Patented Mar. 4, 1958

2,825,624

METHOD FOR INDICATING THE TERMINATION OF A YARN CAKE WINDING

Horace P. Fry, Jr., West Chester, Pa., assignor to American Viscose Corporation, Philadelphia, Pa., a corporation of Delaware

Application November 29, 1954, Serial No. 471,833

3 Claims. (Cl. 18—54)

This invention relates to a method of selectively eliminating the innermost layers of a cake or package of synthetic filament and more particularly to the provision of controlled slugs in the filament as it is produced at the spinning machine.

When artificial filaments are produced on the box-type spinning machine, the yarn strand, after being properly treated and washed, is spun into cakes in the conventional spinning pots. These cakes, when completed, are individually removed from the pots and then subjected to further liquid treatment and drying after which the yarn is unwound from the cakes and in turn wound on bobbins, cones, beams or other suitable mandrels in accordance with the customer's needs. I have found that in the process of handling and treating the cakes from the time they are removed from the spinning pots to the time when they are wound onto cones or bobbins, the inner layers of windings of the cakes are frequently damaged so that it may be impossible or impractical to use up these damaged layers or windings. Such damage may occur from the actual manual manipulation of the cakes or it may result from damage due to the insertion of rods or mandrels through the cakes in the course of various processing and drying steps.

The present invention has for its primary object the provision of a method for imparting structural changes into filaments during the spinning of the same.

A further object of the invention is to provide a method for inducing slubs or spurts of spinning fluid through the spinneret which in turn form "bumps" or slubs on the yarn so that the winding machines will automatically stop due to actuation of the slub catcher.

A further object of the invention is to provide a method of inducing slubs in the extruded yarn filaments when a yarn cake has been substantially completed.

A further object of the invention is to provide a method for eliminating the damaged turns adjacent the bore of a yarn package.

Further objects will be apparent from the specification and drawings in which:

Figure 1 is a fragmentary detail of a spinning machine partly schematic showing a preferred embodiment of the present invention;

Figure 2 is a transverse section as seen at II—II of Figure 1;

Figure 3 illustrates a modified form of the apparatus of Figure 1; and

Figure 4 shows the introduction of the slubs to the final windings of a yarn cake.

The invention comprises essentially the provision of accelerating instantaneously the speed of the pump shaft on the spinning machine to induce a series of slubs in the yarn at a predetermined time before each cake is completed. When the yarn in the cake is being unwound in the beaming machine or other winding machine, the slubs which occur near the last internal windings of the cake actuate the slub catching device on the winding machine, thus automatically interrupting further winding and permitting the operator to remove the cake before any damaged or inferior windings are transferred from the cake onto the cone or beam.

Referring more particularly to the drawings, apparatus for practicing the method of the present invention is shown in Figures 1 and 2 and comprises an auxiliary drive for the main pump shaft 10. In normal operation, the drive for the metering pump 11 is through shaft 10, spur gears 12 and 13 to shaft 14. From thence the pump 11 is driven through mating spur gears 15 and 16. Viscose is thereby pumped through conduit 17 to filter 18 and spinneret 19 positioned in the conventional coagulating bath 20. When the cake C is nearly completed, the operator intentionally produces slubs S, S in the yarn by engaging clutch 25 through actuation of lever 26. This operation transfers the driving connection to shaft 27 journaled at 28, 28 thence through eliptical gears 29 and 30 to shaft 14. The minimum pitch diameter of gear 30 is equal to or greater than the pitch diameter of gear 12 so that a cyclic increase in rotational speed is imparted to shaft 14 in accordance with the contour of gears 29 and 30. Since gears 12 and 13 are in constant mesh, I provide an over-running clutch 31 of any conventional variety so that, although gears 12 and 13 turn at constant speed to turn shaft 14 through the clutch 31, they are not effective to turn shaft 14 when gears 29 and 30 are engaged.

It will thus be understood that for every revolution of elliptical gear 30, two shots or slugs of viscose are injected through spinneret 19 by reason of the increased rotational speed of shaft 14. This in turn provides the slubs S, S in the yarn. As shown in Figure 4, these slubs are positioned at the portion of the yarn which is located sufficiently radially inward from the bore of the cake to have escaped any possible damage in processing. When the slubs or the first one of them reaches the slub catcher in the winding machine, the stop motion device automatically stops the machine so that there is no danger of winding any damaged yarn onto the cone or beam as the case may be.

The apparatus of Figures 1 and 2 is semi-automatic in that the operator need only throw lever 26 to induce the slubs in the yarn. The slubs will, of course, continue to be spun until clutch 25 is disengaged. The same result can be achieved in a complete manual operation with the apparatus shown in Figure 3. In this construction the main driveshaft 10 operates the pump 11 through gears 12, 13 and 15, 16 as described in connection with Figure 1. However, instead of intermittently increasing the speed of shaft 14 through the medium of elliptical gears, a ratchet 35 is keyed to the shaft 14 on the other side of over-running clutch 31. A lever 36 is pivotally mounted on shaft 14 and straddles ratchet 35. Pawl 37 connects lever 36 with the ratchet so that the operator can intermittently increase the speed of shaft 14 by actuating the lever 36 back and forth. Engagement between pawl 37 and ratchet 35 transmits torque from the lever to the shaft in the direction of rotation of shaft 14 so that the speed of the shaft and, consequently, the pump is increased to produce the slubs in the same manner as described previously.

The present invention provides a simple and satisfactory manner for automatically inducing slubs at the desired position in the extruded yarn, and it will be understood that the apparatus can be made fully automatic provided the time required to spin the desired amount of slub-free yarn is known.

Having thus described my invention, I claim:

1. The method of providing a yarn cake with struc-

tural means for use in indicating the termination of a yarn cake winding including the steps of extruding a filament-forming material through a spinneret at a substantially uniform rate, collecting the extruded filament as a continuous yarn in wound cake form, varying the flow of filament-forming materials through the spinneret at intermittent intervals as the termination of the cake winding is approached, and continuing the intermittently varying flow of filament-forming material through the spinneret until the final yarn cake windings are completed.

2. The method of providing a yarn cake with structural means for use in indicating the termination of a yarn cake winding including the steps of extruding a filament-forming material through a spinneret at a substantially uniform rate, collecting the extruded filament as a continuous yarn in wound cake form, increasing the flow of filament-forming material through the spinneret at intermittent intervals as the termination of the cake winding is approached, and continuing the intermittently increased flow of filament-forming material through the spinneret until the final yarn cake windings are completed.

3. The method of providing a yarn cake with structural means for use in indicating the termination of a yarn cake winding including the steps of extruding a filament-forming material through a spinneret at a substantially uniform rate, collecting the extruded filament as a continuous yarn in a wound cake form, altering the cross-sectional shape of the extruded filament at intermittent intervals along its length as the termination of the yarn cake winding is approached, and continuing the intermittent alteration of the filament cross-sectional shape until the final yarn cake windings are completed.

References Cited in the file of this patent

UNITED STATES PATENTS

2,517,946	Kohorn	Aug. 8, 1950
2,624,070	McDermott	Jan. 6, 1953
2,671,929	Gaylord	Mar. 16, 1954
2,712,489	Abbott	July 5, 1955