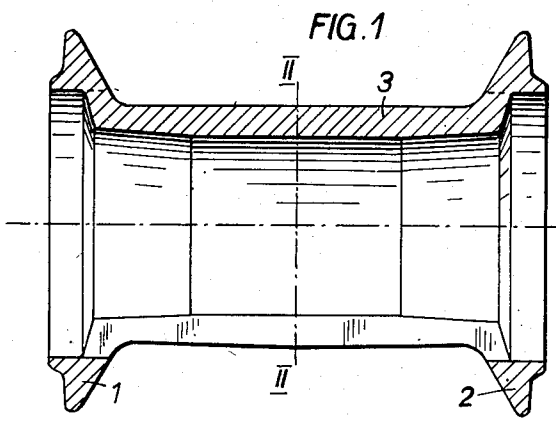
March 2, 1954 T. GRAUER 2,670,905

WINDING MEANS FOR TEXTILE THREADS AND SUPPORT THEREFOR

Filed Feb. 13, 1951

FIG. 1



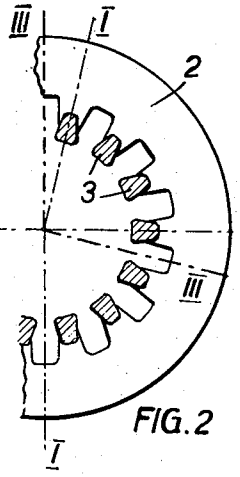


FIG. 2

FIG. 3

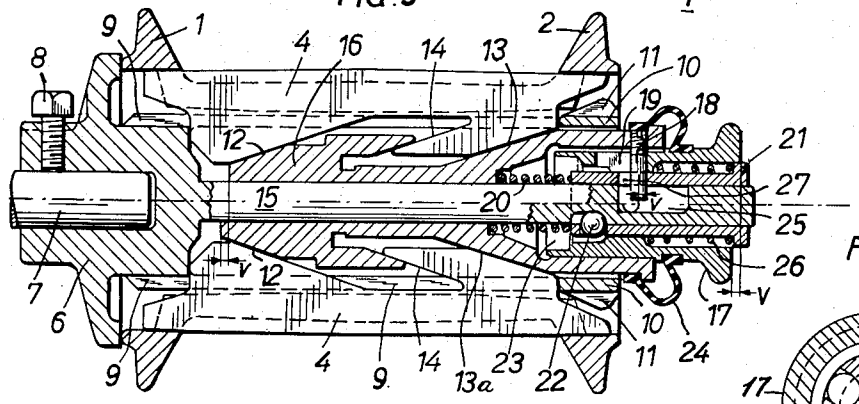


FIG. 7

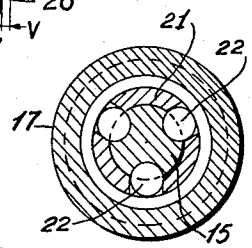


FIG. 4

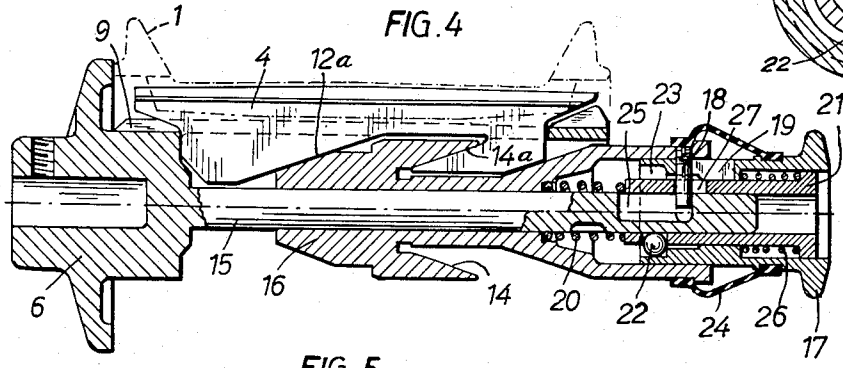


FIG. 5

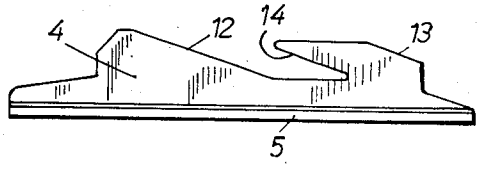
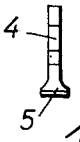


FIG. 6



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WINDING MEANS FOR TEXTILE THREADS AND SUPPORT THEREFOR

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6 Claims. (Cl. 242—72)

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This invention relates to winding means for fresh-spun artificial silk and like textile filaments onto a core on which they remain during aftertreatment and subsequent drying whereby they may shrink for the full amount without any risk of breaking.

For such purpose it is known in the art to provide variable-diameter bobbins, spools or cores for the fresh-spun artificial silk, for example, by forming the core bearing-face of rods which are radially movable outwardly or inwardly and fixable by special means extending between the stationary core flanges. Such cores solve the problem positively in making it possible to subject the package in slack condition to the various aftertreating steps and in ensuring at the same time that the package remains sealed laterally with respect to the core flanges. Such cores, however, possess certain disadvantages in that each single core (of which thousands are required) must comprise the rather complicated adjusting means which thus passes through all the aftertreating baths and drying chambers. Not only the costs of investment and maintenance are increased thereby, but also the wear and operating expenses, and further the weight of the cores is comparatively high on account of the special adjusting means.

The primary object of the present invention is to provide means for equalizing or compensating inaccuracies in the diameters of the winding cores.

According to the present invention two axially interdigitating movable parts are provided of which one serves as a core holder and the other as a winding core for the fresh-spun artificial silk or like thread material.

One form of this invention is illustrated in the accompanying drawing in which—

Fig. 1 is a longitudinal section of a winding core taken on the line I—I of Fig. 2,

Fig. 2 is a cross-section of the core taken on the line II—II of Fig. 1,

Fig. 3 shows the core mounted on or engaged by the holder, in longitudinal section taken on line III—III of Fig. 2,

Fig. 4 is a longitudinal section of the holder which is collapsed for the purpose of stripping the package and its core from the holder, the core being partly indicated in dash-and-dot lines,

Fig. 5 shows one of the bars in elevation, and Fig. 6 is an end view thereof.

Fig. 7 is a section through balls seen in Fig. 3.

The core (spool or bobbin) shown per se in

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Figs. 1 and 2 is of symmetrical structure, in contra-distinction to the form shown and described in Swiss Patent No. 215,116, to afford a much easier handling. The two flanges 1 and 2, which are interconnected by the web 3, are alike, and the core 1 to 3 thus may be mounted on the holder (Fig. 3) from either side or end of the latter. The proper position for winding is always ensured by virtue of the core holder to be presently described.

When the core 1, 2, 3 is slipped from the right end in Fig. 4 onto the collapsed holder or support, movable flat bars 4 (Figs. 5 and 6) enter into longitudinal slots extending between adjacent core webs 3 (Fig. 2) so that the filaments can be wound on the projecting enlarged heads 5 of the bars 4, protruding beyond the webs 3.

The holder or support (Fig. 3) through its hub 6 is mounted on the spindle 7 of a winding frame and may be permanently secured thereto by means of a set screw 8. Stems 9 connect the hub 6 to a guide ring 10. The latter is provided with projections 11 which serve as guides for the webs 3, when the core 1, 2, 3 is to be received and coupled to its holder, so that the bars 4 are protected against shock when the core is being mounted on the support.

To this end, it becomes always necessary to clamp the cores 1, 2, 3 in proper position, even though the cores substantially differ in diameter. For such purpose, the movable bars 4 (Fig. 5) have three inclined or cam faces 12, 13, 14 (Figs. 3 and 5) which correspond to three similar cam faces 12a, 13a, 14a provided on a cone member 16. The latter is axially movable on the axle pin 15 which is connected with the hub 6. When the cone 16 is pushed inwardly towards the hub 6 of the holder, the wedge faces 12a and 13a engage the corresponding faces of bars 4 and push the latter radially outwardly. When the cone 16, however, is pulled out to the position, as shown in Fig. 4, the wedge faces 14a thereof engage the bars 4 and pull the same radially inwardly.

After having mounted the core 1, 2, 3 on the loose holder bars 4, the attendant pushes the knob 17 (Figs. 3 and 4) inwardly, i. e. to the left in Fig. 4, until a bushing 21, which is moved along with the knob 17, is automatically locked, whereupon he may release the knob. In order to strip the core 1—3, however, the knob 17 is pulled outwardly, i. e. to the right in Fig. 3, the bushing 21 being unlocked in the first stage of such movement. The following elements are thus inserted between the knob 17 and cone 16: pin 18, the stop bushing or sleeve 21, springs 20 and

26, and one or more balls 22. The coaction between these elements or manipulating means will be more fully explained below.

The cone 16 is pushed inwardly through the spring 20. The pre-tensioned spring 20 does not materially change its form on pushing the bars 4 outwardly, until the latter abut against the peripheral walls of the core flanges 1 and 2. When the knob 17 is further pushed inwardly, the flat bars 4 and the cone 16 with pin 18 cannot be moved further, and thus the spring 20 is compressed. The tension of spring 20 therefore is increased and transmitted onto the bars 4 and the core 1—3 via the cone 16. After further inward movement of knob 17, the core holder is then automatically locked, as will be explained below.

When the knob 17 is pushed inwardly, it first takes along the ball or balls 22 until the latter escape into recesses provided in the axle pin 15. At this moment, the movement of bushing 21 is stopped, while the knob 17 is pushed further inwards, the spring 26 being slightly slacked, and the balls 22 being engaged in the narrower bore of knob 17, whereby the balls are prevented from leaving the axle-pin recesses.

A rubber sleeve 24 prevents the ingress of acid from the outside into the apparatus, and also prevents the pin 18 from falling out.

The pin 18 serves various purposes. First it is engaged in a milled slot 25 extending into the axle pin 15 and thus prevents a rotation of cone 16 about axle pin 15. Second it limits the strokes of cone 16. Third it serves to limit the range of movement of knob 17 and of bushing 21 with respect to cone 16. Fourth it locks the elements 17 and 21 against rotation about axle pin 15, which is necessary as otherwise the balls 22 would not engage the axle-pin recesses. Finally, the pin 18 serves for holding together the entire device and, therefore, only is inserted after all the elements have been assembled. The pin 18 could traverse the cone 16 diametrically, in which case the slots 19, 25 and 27 are to be continuous.

The helical spring 26 is not as strong as the main spring 20 and serves, as mentioned before, to urge knob 17 to the left so that the latter keeps the balls 22 trapped in their respective recesses. The spring 26 thus serves as locking spring for the elements 22 and 21.

After the package has been fully wound up on the flat bars 4 and the inwardly sloping faces of the flanges 1 and 2, the package and the core 1—3 have to be stripped from the holder structure. For such purpose, the holder has to be withdrawn into the position shown in Fig. 4. The attendant pulls the knob 17 from the position shown in Fig. 3 to the right to that shown in Fig. 4, and such movement is transmitted onto the various mechanisms. The first stage of such movement of knob 17 serves to release the balls 22, i. e. for unlocking the bushing 21. The large annular bore 23 in knob 17 permits the balls 22 to leave the axle-pin recesses and to slide axially along the axle-pin 15. The spring 26 then pushes the bushing 21 and the balls 22 to the right, and slacks suddenly as the balls become disengaged until the left end of slot 27 in bushing 21 abuts against the pin 18 (Fig. 4). The spring 20 then is only moderately tensioned. From this moment onward, all the aforesaid axially movable elements are moved together to the right as long as the slots 19 and 25 may be moved relative to the pin 18. The latter thus pulls the cone member 16 to the right, and the cone through its wedge faces 14 pulls the flat bars 4 inwardly. The core 1—3 and its package then are left entirely free, and the rubber sleeve 24 is extended (Fig. 4). When the knob 17 is released by the attendant, it is slightly moved to the left again until its inside shoulder abuts against the balls 22.

It is a special advantage of the core holder described that even cores (bobbins or spools) which have become distorted during use and through aftertreatments of the silk, may be firmly engaged thereon. In the lower portion of Fig. 3 is shown for example, how a core of maximum diameter is firmly held in position, while in the upper portion is shown a clamped core of minimum diameter. When comparing these two portions, the different positions of the various movable parts are readily comprehensive. The balls 22 are still located in their cages and the bushing 21 arrested, but the cone 16 in the case of the maximum-diameter core, has been pushed further inwards through the spring 20 than in the case of the minimum-diameter core, such difference being represented by the distance V. The knob 17 thus has further advanced to the left into the core by the amount V, as also in this position of the cone 16 it is pushed against the pin 18 by the spring 26.

On winding the package, the shrinking filaments exert a high pressure on the flat bars 4, on account of which the cone 16 is moved slightly to the right and the spring is slightly more compressed. Such movement and compression come to a stop when the pin 18 abuts against the right-hand end of the slot 27 in bushing 21. The core 1—3 then is held in position on its holder solely by the package built up between the flanges 1, 2 and bearing on the heads 5 of the flat bars 4. When the flat bars 4 are retracted, as described above, the core 1—3 and the package are entirely free or floating with respect to the holder. A full core 1—3 thus may be readily and conveniently slipped from the holder and replaced by an empty core. When slipping the full-wound core off the holder, the risk of damaging the sensitive artificial slip thus is substantially reduced.

What I claim as new and desire to secure by Letters Patent, is:

1. Winding means for textile filaments comprising a core, a support for said core, interengageable means for connecting said support with said core and for removal therefrom, said core comprising two end flanges and a web body interconnecting the same, said web body having a plurality of longitudinal slots extending from said web body into said flanges to form recesses in said flanges, said support comprising a hub, an axle engaging said hub, guide means for slipping the core on and off the support, a cone structure mounted for axial movement on said axle and having a plurality of inclined wedging faces, a plurality of radially extending bars adapted to project through said longitudinal slots and into said flange recesses to filament-supporting position, said bars being provided on their underside with a plurality of inclined faces engageable for cooperation with corresponding inclined faces provided on said cone structure when the latter is axially moved into said filament-supporting position or to core-stripping position, a bushing mounted axially movable at the free end of said axle for sliding movement thereon and having a plurality of cut-outs, a knob mounted for axial

movement along said bushing and having a plurality of axial bores of different diameters, means for limiting the movement of said knob and bushing, and a plurality of balls for disengageably locking said bushing to said axle; a first and a second helical spring of different strength; said first spring being stronger than the second one and being confined within a space provided between the cone structure and the bushing to urge the former into engagement with said bars so as to push the latter outwardly into abutment against the core flanges into said filament-supporting position or pulling same inwardly into said core-stripping position, said second spring being confined in a bore of said knob between the latter and said bushing to act as a locking spring for said balls, whereby any inaccuracies in the diametral dimensions of the core may be eliminated in said filament-supporting position.

2. Winding means according to claim 1, in which the knob and the bushing are each provided with a radial slot, said limiting means being in the form of a pin which traverses said slots.

3. Winding means according to claim 2, wherein said pin is rigidly secured to said cone structure.

4. Winding means according to claim 3, wherein said axle is provided with an elongated recess for engagement with said pin to hold together the cone structure and knob, as well as the bushing with said axle.

5. Winding means according to claim 4, wherein said axle and said bushing are provided with recesses for receiving and locking said balls in said filament-supporting position of said bars, said balls being displaceable for removal from said axle recesses to move said bars into said core-stripping position.

6. Winding means for textile filaments comprising a core body having opposite end flanges and spaced apart web elements providing longitudinal slots between said web elements which are connected to said end flanges, a support for and separable from said core body and including an axle, a cone-shaped member seated on said axle for sliding movement thereto, bar means insertable in said slots of said core body, said bar means and said cone-shaped member being provided with respective engageable cam surfaces,

spring-urged manipulating means slidable on said axle in opposite directions and adapted to be coupled with said cone-shaped member to thereby move the surfaces of the latter relative to the surfaces of said bar means to bring about in one direction of said manipulating means and under spring action an engagement position of said bar means with and in another direction of said manipulating means a disengagement position of said bar means from said core body, whereby said bar means project beyond said slots of said core body in said engagement position, said spring-urged manipulating means including first and second spring means, said manipulating means comprising a tubular knob, a bushing arranged for slidable movement in said knob, said first spring means being disposed between said bushing and said knob, means joining said knob and said bushing with said axle; said knob, said bushing and said axle being provided with registering slots through which said joining means extends, said second spring means being positioned on said axle and extending between said bushing and said cone-shaped member, and coupling means engageable in a recess provided in said axle to join said bushing with the latter and to thereby tension said second spring means for urging said cone-shaped member into said engagement position with said bar means, said first spring means being adapted to maintain said knob in position for preventing disengagement of said coupling means from said axle in said engagement position of said cone-shaped member with said bar means.

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