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YARN END CONTROLLING DEVICE FOR A CENTRIFUGAL SPINNING MACHINE

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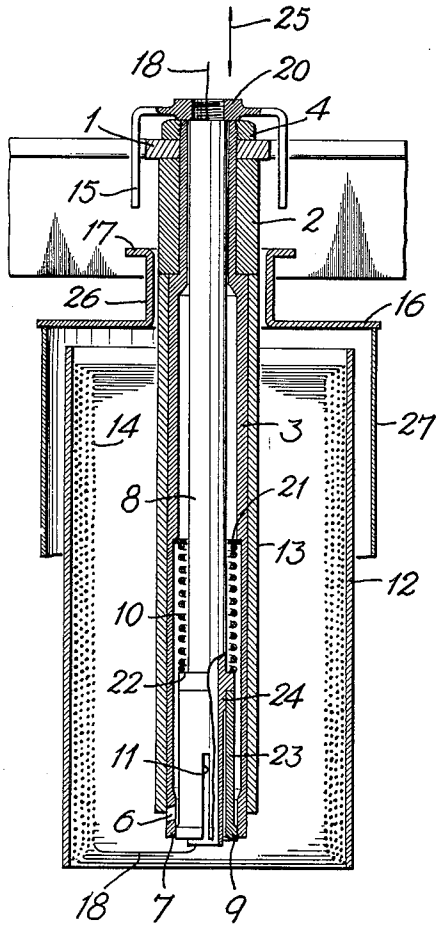


FIG. 1

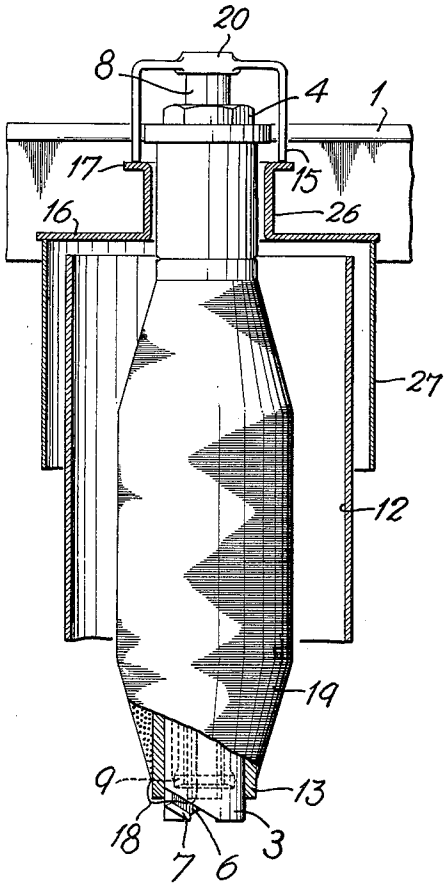


FIG. 2

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YARN END CONTROLLING DEVICE FOR A CENTRIFUGAL SPINNING MACHINE

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This invention relates to an improvement in a yarn controlling device for spinning machines such as a centrifugal spinning machine, a twisting machine and an analogous machine in which the yarn to be led to a bobbin from a front roller is cut at the end of a yarn guide tube at doffing.

In the centrifugal spinning machine known heretofore, the yarn advancing to a bobbin from a front roller through a yarn guide tube was manually handled and cut when taking off the bobbin at the time of doffing. For this reason the yarn ends to be suspended from the front roller were not uniform in length. Some of them often deviated from the yarn guide tube due to the reaction of the yarn caused by handling and cutting. Thus, the yarn ends were often immediately suctioned into the yarn guide tube at the beginning of the following spinning thus causing the disadvantage of having to introduce them by hand operation and resulting in scrapped slivers. In order to remove these disadvantages, many attempts for providing a yarn end controlling device have been made, but all are not yet reliable in effect until now.

In accordance with this invention, having the object to provide an apparatus which can positively remove the above disadvantages, every yarn led and wound onto the bobbin from the front roller through the yarn guide tube is so cut during doffing at an approximately similar portion so as to have uniformly each end of the yarn suspended from the front roller in the yarn guide tube or so controlled as to have each end of the yarn exposed a little in a pot through the yarn guide tube.

An understanding of the present invention may be had from the following description taken in connection with the accompanying drawing, illustrating the embodiment of this invention in which:

FIG. 1 is a schematic cross-sectional view illustrating the condition of spinning operation of a yarn controlling device according to this invention; and

FIG. 2 is a schematic sectional view illustrating the condition of doffing.

In FIG. 1, 1 designates a well known yarn guide rail on the lower surface of which a bobbin supporting tube 3 with a collar 2 is so fixed with nut 4 as to be suspended, and the lower end portion of said supporting tube 3 is provided with an inclined groove 6 which is opened at the bottom edge of the tube 3. A sharp knife edge 7 is provided along the under sidewall of the groove 6 on the inner surface of the tube 3.

Further a yarn guide tube 8 is so inserted into the above-mentioned bobbin supporting tube 3 as to be freely slidable longitudinally and is downward pressed at all time by a spring 10. The spring 10 around a part of the yarn guide tube 8 is positioned between shoulders 21 and 22 of the tubes 3 and 8. To the top of the yarn guide tube 8 is rigidly secured a cap 20 with a pair of legs 15. Thus the tube 8 is normally pulled down under the tension of the spring 10 so that the cap 20 secured to the top of the tube 8 may abut upon the upper end of the tube 3 and nut 4.

Further onto the reduced lower part 24 of the yarn guide tube 8 is tightly fitted a cutter sleeve 23 which has a blade 9 at the outside bottom circumference thereon.

The cutter sleeve 23 is provided with several long slits 11 thereby giving a suitable elasticity to the sleeve 23

so that a favorable engagement between the knife edge 7 and the blade 9 may be effectively made during the cutting operation of a yarn 18.

While the bobbin supporting tube 3 is moved up and downwardly together with the yarn guide tube 8 by means of the driving rail 1 in the direction of an arrow 25 as shown in FIG. 1, a pot 12 does not move longitudinally but rotates rapidly in the stationary position. Above the top of the pot 12 is stationarily mounted a guard casing 27. On the top of the guard casing 27 is rigidly located a cover 16 with a cylinder 26 encircling a part of the tube 3. The cylinder 26 of the cover 16 is provided at its top with a flange 17, the upper surface of which is opposite to the lower ends of the legs 15 of the cap 20.

In operation of the controlling device for the centrifugal spinning machine according to this invention, a spinning bobbin 13 is previously fitted onto the supporting tube 3 and the yarn 18 led from a front roller (not shown) is sucked into the yarn guide tube 8 so as to let the free end of the yarn 18 deliver out of the lower opening of the tube 8.

When the free end of the yarn 18 is caught by the inside wall of the revolving pot 12 under the action of its centrifugal force, the up and downward movement of the tubes 3 and 8 and of the bobbin 13 and the cap 20 by means of the driving rail 1 distributes the yarn in the usual manner as in conventional centrifugal spinning machines, and the cake 14 of the yarn 18 is formed on the inner surface of the pot 12. When the cake 14 has finally reached the desired form and quantity, the yarn guide tube rail 1 together with the assembly descends to their lowest position and thus the bobbin supporting tube 3, the bobbin 13 and the yarn guide tube 8 also descend to the respective lowest positions. At the last step of the downward movement of the yarn guide tube 8 of the assembly which is about to reach the lowest position, the tube 8 is restrained from descension by the engagement of the legs 15 of the cap 20 with the flange 17 of the stationary cover plate 16.

However, the assembly still goes down further and as the spring 10 is compressed the bottom of the tube 8 and the blade portion 9 of the cutter sleeve 23 are retracted into the tube 3 as shown in FIG. 2. When retracted, the part of the yarn 18 is introduced along the groove 6 from its opening to the closed part of the same and caught by the bobbin 13 and rewound on it to form a cop 19 thereon, because the pot 12 with the cake 14 inside revolves around the bobbin 13 standing still at the lowest position as shown in FIG. 2.

When cop 19 is thus completed and yarn guide rail 1 is raised again from the position as shown in FIG. 2 to that of FIG. 1, the legs 15 get off from the flange 17 of the cover 16 and the yarn guide tube 8 as well as the cutter sleeve 23 are pushed back by the spring 10 to the original position in the internal surface of bobbin supporting tube 3, resulting to produce the downward slide of the sleeve 23 with the blade 9 relative to the knife edge 7. Accordingly the cutting blade 9 provided at the lower circumferential end of the sleeve 23 cuts the yarn 18 in the engagement with the knife edge 7 of the tube 3 and starts again the same operation above-mentioned in the original condition shown in FIG. 1, with best effect of achieving the desired purpose.

The present embodiment as above-stated is to be considered in all respects merely as illustrative and not restrictive within the form shown in the appended drawing. A modified means may be employed, such as for instance, instead of partially restraining the downward movement of the yarn guide tube 8 to its lowest position during descent of yarn guide rail 1, said yarn guide tube may be fixed to rail 1 and bobbin supporting tube 3 can be completely slidably projected. Or a variety of modi-

fied designs may be provided such as the downward cutting blade on yarn guide tube 8 may be formed as an integral part of yarn guide tube 8. All these modifications of means and design will be considered to be within the scope of this invention.

What is claimed is:

1. A yarn end controlling device comprising a bobbin supporting tube member, a yarn guide tube member slidably supported within said bobbin supporting tube member, means for reciprocably moving the members with respect to one another, the bobbin supporting tube member having an end which is provided with a groove opening externally at said end for engaging yarn in said groove during a winding operation of yarn onto a bobbin supported on said bobbin supporting tube member, said bobbin supporting tube member having a sharp edge bounding said groove to constitute a knife edge, and cutter means on said yarn guide tube member and movable therewith for cooperating with said knife edge to sever yarn contained in said groove upon relative reciprocating movement between the tube members.

2. A yarn end controlling device as claimed in claim 1, comprising a spring between said tube members resisting relative reciprocating movement.

3. A yarn end controlling device as claimed in claim 2, comprising a cap on said yarn guide tube member, a rail supporting said members, and means, fixed with respect to said members, for engaging said cap after initial displacement of said rail to restrict further movement of said cap and said yarn guide tube member therewith such that further movement of said rail causes relative movement between said tube members.

4. A yarn end controlling device for a centrifugal spinning machine, comprising a bobbin supporting tube having an end which has an inclined groove opening externally at said end, said tube having a sharp edge bounding said groove to form a knife edge, a yarn guide tube slidably supported within said bobbin supporting tube, a cutter sleeve including a blade on said yarn guide tube and movable therewith, said blade being in contact with said bobbin guide tube and passing said knife edge upon relative sliding movement between said tubes whereby a cutting operation can be effected on yarn in said groove, a spring between said tubes for resisting relative sliding movement between said tubes, and a cap secured to one of the tubes for cooperating with a fixed support to limit movement of said one tube.

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