Jan. 21, 1964 C. H. SHANKS 3,118,626

LOCKING SPINDLE FOR A TUBE WINDING MACHINE

Filed July 30, 1962 2 Sheets-Sheet 1

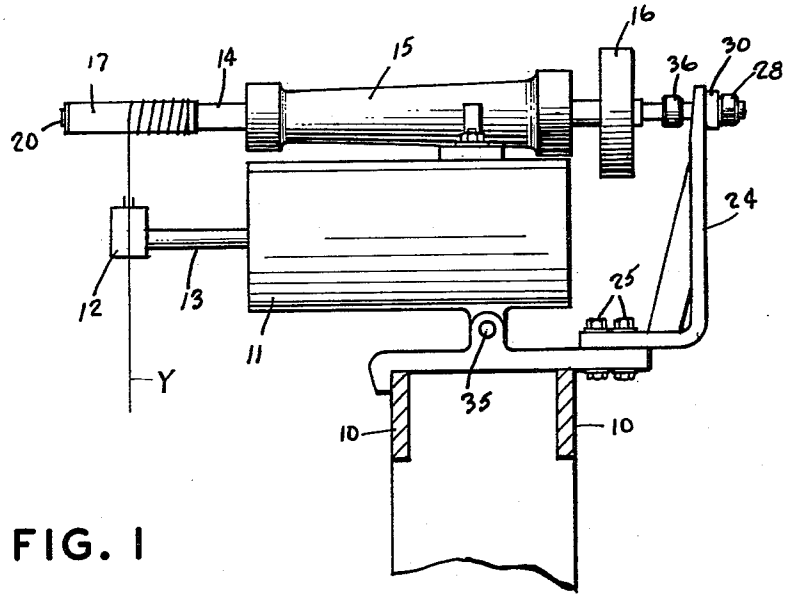


FIG. 1

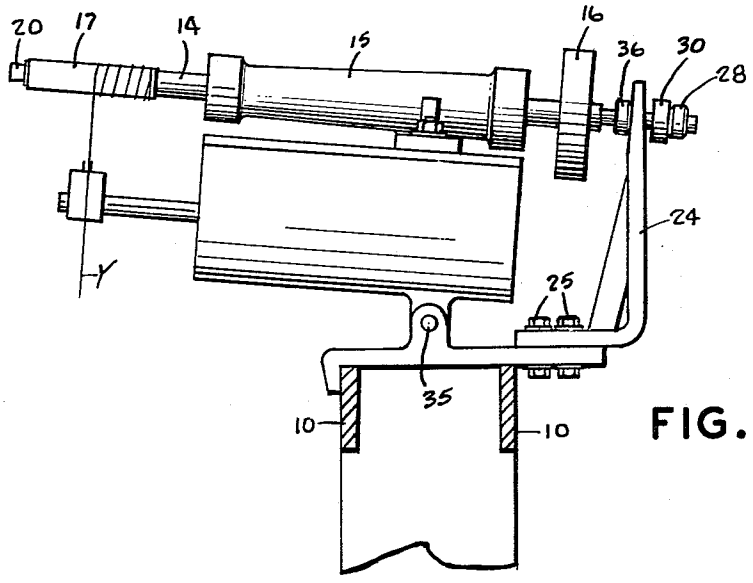


FIG. 2

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LOCKING SPINDLE FOR A TUBE WINDING MACHINE

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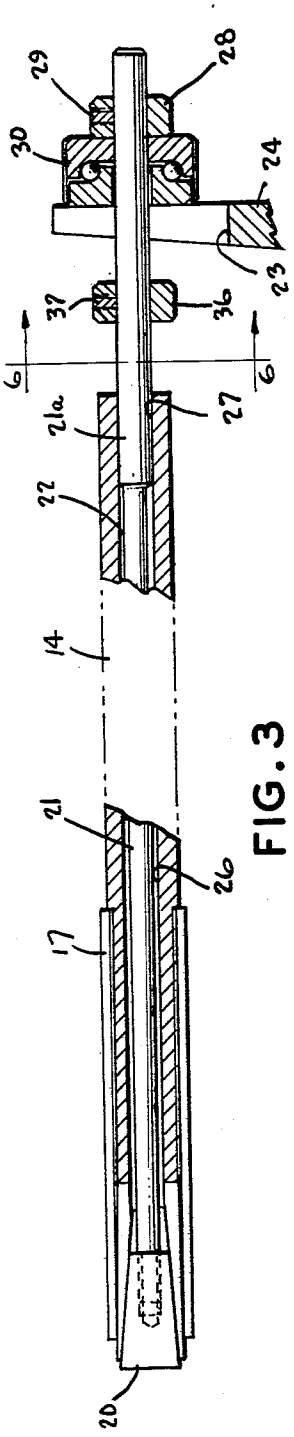


FIG. 3

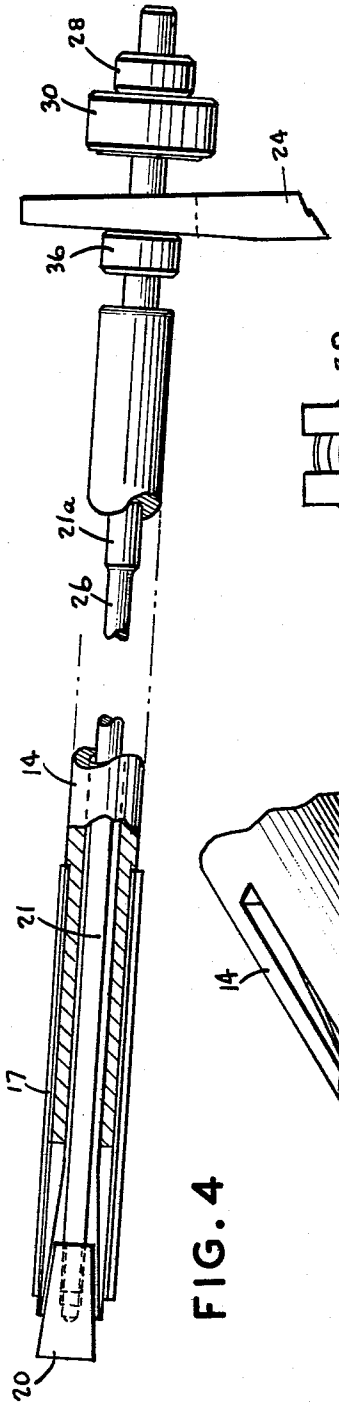


FIG. 4

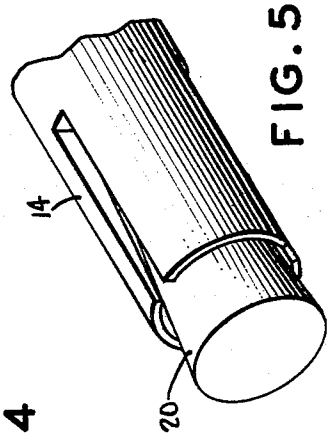


FIG. 5

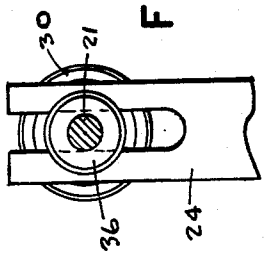


FIG. 6

United States Patent Office 3,118,626 Patented Jan. 21, 1964

3,118,626
LOCKING SPINDLE FOR A TUBE WINDING MACHINE

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Filed July 30, 1962, Ser. No. 213,497
3 Claims. (Cl. 242—18)

This invention relates to textile yarn winding equipment and more particularly to an automatic device for locking the spindle to the tube when installed on a winding machine.

On machines for winding yarn packages such as cakes or cheeses, it has heretofore been necessary for the tube on which the yarn cake is wound to be manually secured to the spindle of the yarn winding machine. This operation is time consuming and always requires the presence of the operator.

The present invention incorporates an automatic locking device for securely attaching the tube to the spindle of the yarn winding machine which, for example, may be a winding machine of the type known in the trade as the "Foster 77."

A primary object of the present invention is to provide an automatic expanding collet for the spindle of a yarn winding machine which tightens the tube on the spindle when the winding assembly is dropped, and conversely which releases the collet from the spindle when the spindle assembly is raised.

A further object of the invention is to provide a shaft extending through the spindle of a tube winding machine, said shaft being provided with a pair of spaced limit stops at one end and a collet on the other end adjacent the split end of the spindle.

Further objects will be apparent from specification and drawings in which

FIG. 1 is a side view of the winding head of a yarn winding machine such as the Foster 77, for incorporating the present invention,

FIG. 2 is a view similar to FIG. 1 of the spindle assembly in the raised or doffing position,

FIG. 3 is an enlarged detail of the spindle of FIG. 1 with the expanding collet tightened to maintain the tube on the spindle,

FIG. 4 is an enlarged detail of the spindle of FIG. 2 in which the spindle is raised to the doffing position, thereby releasing the collet,

FIG. 5 is a perspective showing the collet end of the spindle in released position, and

FIG. 6 is an end view of the structure of FIG. 3.

The invention comprises essentially the provision of a slotted bracket secured to the frame of a tube winding machine in such a position that the slot in the bracket is in general alignment with the axis of the spindle of the winder. A shaft extends through the hollow spindle and is provided with a collet at its outboard end (front of the winding machine), and at the other end a pair of adjustable limit stops are mounted on the shaft on either side of the slotted bracket so that when the spindle assembly is lowered, the bracket pulls the shaft axially through the spindle to cause the collet to expand the slotted outer end of the spindle and thereby retain the tube on the spindle. In the doffing position the second limit stop strikes the front face of the slotted bracket to urge the shaft in the opposite direction, thus releasing the collet and permitting the spindle to contract.

A winding machine of the type well known in the art has a plurality of spinning heads or assemblies mounted on a main frame shown partially at **10**. Such a winding machine ordinarily has **12** or more spinning assemblies on a single frame. The assembly includes a traverse mechanism **11** which controls an oscillating yarn guide **12**

mounted on arm **13**. The spindle **14** is journaled in a housing **15** and driven by means of a pulley **16** from a belt (not shown) driven from the main shaft and motor of the winding machine. A tube **17**, which ordinarily comprises a cardboard cylinder, is fastened on the outboard end of the spindle **14** by means of a collet **20** which is drawn into the split ends of the spindle to expand them against the bore of the tube **17**. Such expansion of the spindle on a winding machine is conventional but the collet must be returned into the spindle by hand to effect proper expansion thereof. Instead of this manual expansion of the collet, I provide a shaft **21** which extends into bore **22** of the spindle and through a slot **23** in an angle bracket **24** mounted on frame **10** by means of bolts **25, 25**. The shaft **21** is relieved at **26** to provide free sliding movement in the bore **22** of spindle **14** and the shaft is also threaded into the bore of collet **20**. An enlarged diameter **21***a* of the shaft **21** maintains the shaft in proper concentric alignment with the back portion of the spindle **14** as shown at **27** in FIG. 3. The locking limit stop or collar **28** is secured to the shaft **14** by means of a set screw **29** and is provided with thrust bearing **30** which bears against the back face of bracket **24** to prevent undesired wear between the bracket and the limit stop **28**. The front face of bracket **24** is beveled or tapered as shown in FIGS. 3 and 4 so that when the winding head is pivoted upwardly on hinge **35** (FIG. 1) to the position of FIG. 2 the limit stop **36** strikes the beveled face of the bracket **24** to move shaft **14** axially in the bore of spindle **14**, thus releasing the collet **20** from contact with the end of the spindle. Limit stop **36** is adjustable on the shaft by means of a set screw **37**. In the winding position of FIG. 1, the yarn Y is carried over the yarn guide **12** and around the tube **17** across which it is traversed back and forth to form a conventional yarn package or cheese. It will be apparent that when the yarn package is complete and the assembly automatically tilts or pivots to the stop position of FIG. 2, the yarn package can be released simply by the operator's sliding it from the end of the spindle without any other manipulation. It is then only necessary to insert an empty yarn tube on the spindle, lace up the yarn and drop the assembly to achieve the complete doffing operation.

The invention is extremely simple and inexpensive, yet saves substantial doffing time and furthermore is important in preventing damage to the spindle caused by too tight manual expansion of the collet and spindle.

Having thus described my invention,

I claim:

1. In yarn winding apparatus having a pivotal yarn winding head movable from a winding position to a doffing position, a spindle journaled in said yarn winding head, means for locking said spindle in a yarn tube and a yarn traverse mechanism on said pivotal head, the subcombination which comprises a shaft slidable axially in the bore fo the spindle, means on one end of said shaft for setting and releasing the locking means, and a nonpivotal stationary member cooperating with the other end of the shaft for axially positioning the shaft in the spindle to set the locking means when the winding head is in the winding position and to release the locking means when the winding head is pivoted to the doffing position.

2. An automatic locking device for textile winding machines and the like comprising a winding sub-assembly having a pivotal frame movable from a winding position to a doffing position, a hollow spindle journaled on said pivoting frame, a yarn traverse mechanism on said pivotal frame, means for turning said spindle, a shaft movable axially in said spindle, a tapered collet secured to one end of said shaft, an expandable end portion on the spindle actuated by the collet for receiving and locking a yarn

tube on the spindle, a rigid non-pivotal bracket positioned at the other end of said shaft, and means on said other end of the shaft for cooperating with the bracket to move the shaft axially in the spindle in one direction to thereby cause the collet to expand said end portion of the spindle when the frame is pivoted to said winding position and to move the shaft in the opposite direction to permit the end portion of the spindle to contract when the frame is pivoted to said doffing position.

3. Apparatus in accordance with claim 2 in which the means on the shaft cooperating with the bracket comprises a pair of spaced collars secured to the shaft, and a thrust bearing positioned between one of said collars and the bracket.

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