March 12, 1963 J. V. KEITH 3,081,044

INITIAL STRAND END SNAGGER

Filed April 21, 1961

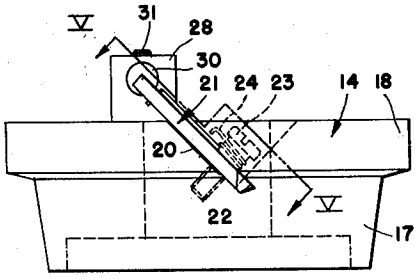



FIG. 3

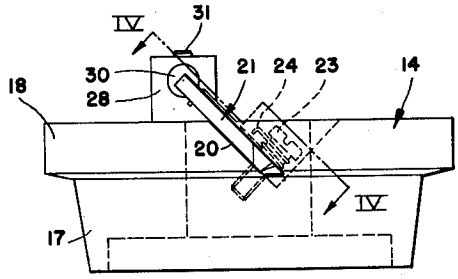



FIG. 2

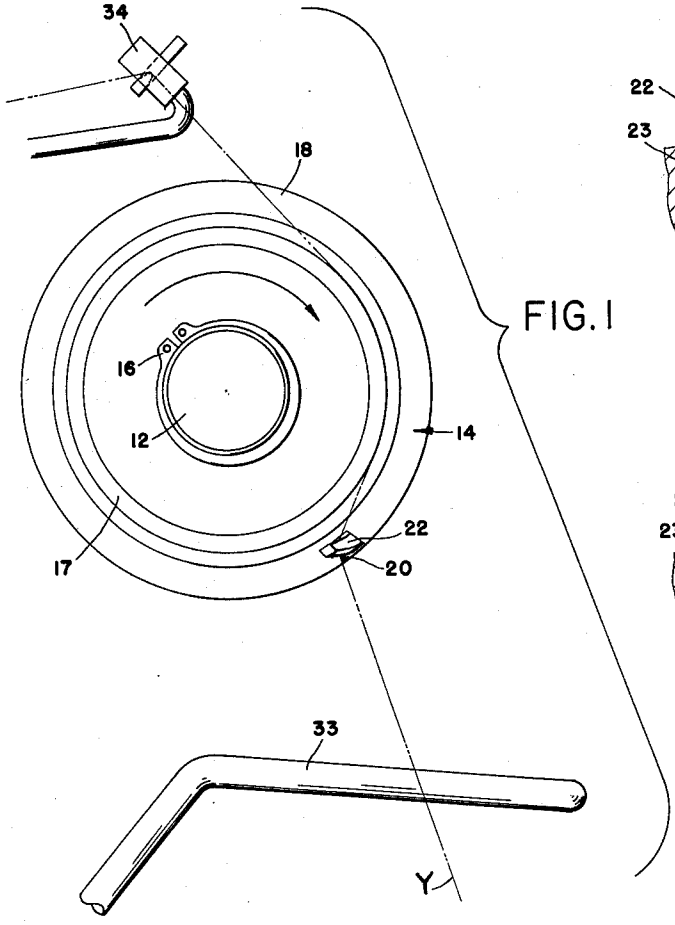



FIG. 1

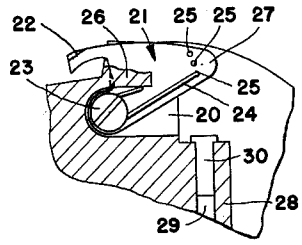



FIG. 5

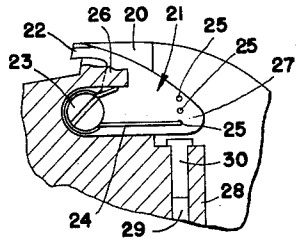



FIG. 4

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3,081,044

# INITIAL STRAND END SNAGGER

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3 Claims. (Cl. 242—18)

The present invention relates to winding machines and more particularly relates to such a machine for winding a continuously advancing strand of yarn having means for starting the winding cycle.

In the following specification and claims the term "yarn" is employed in a general sense to apply to all kinds of strand material, either textile or otherwise, and the designation "package" is intended to mean the product of the winding machine whatever its form.

In the manufacture of yarn and more particularly in the manufacture of synthetic yarn the output of the spinning machine is a strand of yarn which is continuously advancing at a high rate of speed. One of the problems of synthetic manufacture is to catch this running strand of yarn, secure it to the spindle of a winding machine, and place the winding machine in operation to wind the strand at the same rate that it is advanced by the spinning machine, all while the strand is continuously running or advancing. All of this must be accomplished without permitting any slack or excess yarn to accumulate between the winding machine spindle and the spinning machine and without breaking the running strand of yarn.

Application Serial Number 644,783, now Patent No. 2,998,202, filed March 8, 1957 by John V. Keith and Carlton A. Steele for Textile Machine discloses a winding machine capable of catching a running strand of yarn, securing it to the winding spindle and placing the winding machine in operation.

The widing machine disclosed in said application Serial Number 644,783 has a movable finger mounted on the winding spindle which is movable from a first position to a second position under the influence of centrifugal force so that when it is in said second position it will catch the running strand of yarn to start the winding cycle. This movable finger is held in its retracted position by means of a spring the force of which is overcome by centrifugal force to cause the finger to extend into the yarn path. It has been found that this finger extends to the second position somewhat slowly as centrifugal force builds up to move the finger and it occasionally happens that this relatively slow advance of the finger causes it to catch only part of the filaments making up the yarn bundle.

It is, therefore, one object of the present invention to provide a winding machine having means for securing a continuously advancing strand of yarn to the spindle thereof wherein said means will operate rapidly to avoid damaging the winding strand of yarn.

Another object of the present invention is to provide a winding machine having means for automatically securing a continuously advancing strand of yarn to the spindle thereof wherein said means will move into operative position rapidly when the winding spindle reaches a predetermined speed.

Other objects of the invention will be obvious and will in part appear hereinafter.

The invention accordingly comprises the apparatus possessing the construction combination of elements and arrangement of parts, which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings wherein:



FIGURE 1 is an end view of the winding spindle of a winding machine and the cap thereon showing the manner in which the strands of yarn are positioned thereon prior to the start of the winding cycle;

FIG. 2 is a plan view of the cap showing the yarn catching finger in its retracted position;

FIG. 3 is a view similar to FIG. 2 but showing the finger in its extended position;

FIG. 4 is a fragmentary sectional view taken along the line IV—IV in FIG. 2; and

FIG. 5 is a fragmentary sectional view taken along the line V—V of FIG. 3.

The present invention comprises a cap or end piece fixed to the end of the winding spindle of a winding machine and having mounted thereon a finger which is projected by centrifugal force into the yarn path to catch a strand of yarn and to cause it to start winding on the winding spindle. The cap or end piece of the present invention can be employed on any suitable winding machine, as for example, the winding machine described in detail in said patent application 644,783. Inasmuch as the winding machine as a whole is not pertinent to the present invention no further description of a winding machine is deemed necessary or thought desirable herein.

The outermost end of winding spindle 12 has a cap 14 fixed thereon by any convenient means as, for example, a key not shown, and retaining ring 16. The diameter of cap 14 is slightly smaller than the inner diameter of the package receiving core which will be mounted on the spindle so that the core will slide over the cap when an empty core is placed on the spindle 12 and when a wound package is removed therefrom. Cap 14 has a frusto-conical nose 17 axially aligned with and fixed to annular flange 18. Slot 20 is formed in the periphery of flange 18 at an angle of approximately 45° to the longitudinal axis of the cap and has yarn engaging member 21 pivotally mounted therein. Yarn engaging member 21 is generally triangular in shape, formed from magnetic material, and is provided with a yarn catching finger 22 at one apex thereof as an extension of one side. Member 21 is pivotally mounted in slot 20 with finger 22 adjacent the periphery of flange-like base 18 and directed towards nose 17 by the stud 23 which passes through an aperture in said member adjacent a second apex thereof and threadedly engages cap 14. A spring 24 surrounds stud 23 and has one of its ends selectively engaged in one of the holes 25 formed in the member 21 adjacent the third apex 27 thereof. The other end of spring 24 is in engagement with the shoulder 26 overhanging stud 23 to resiliently urge said member 21 inwardly of said cap with finger 22 retracted into slot 20. A plurality of holes 25 are provided in member 21 so that the spring loading on said member can be changed. A boss 28 projects rearwardly of and beneath the third apex 27 of yarn engaging member 21. A bore 29 is formed in said boss and a bar magnet 30 is adjustably mounted in said bore by means of a set screw 31. Suitable guides 33 and 34 are mounted on the winding machine to guide the running strand of yarn from the spinning machine across the frusto-conical nose 17.

The yarn engaging member 21 functions in the following manner to catch a running strand of yarn and to start the winding cycle. The running strand of yarn is guided across the frusto-conical nose 17, by means of guides 33 and 34. As the speed of rotation of spindle 12 increases the apex 27 of member 21 is urged radially outwardly by centrifugal force. However, spring 24 and magnet 30 hold said apex radially inwardly until such time as the rotation of the spindle has attained the predetermined

desired speed at which it is desired to catch the running strand of yarn Y. When that speed is reached the centrifugal force in apex 27 will be sufficiently great to cause that apex to break away from magnet 30 and to project finger 22 across frusto-conical nose 17 to catch said strand of yarn Y. Inasmuch as the attraction exerted by a magnet on a piece of magnetic material varies inversely with the square of the distance a very small movement of apex 27 will greatly reduce the force tending to retain it in slot 20 thus permitting finger 22 to be projected from the slot with great rapidity. Obviously spring 24 will exert some holding force on member 21. However, spring 21 should be relatively weak to exert very little holding force on said finger and to primarily serve the purpose of returning said member 21 to contact with magnet 30 when the spindle has been stopped. The rotational speed at which finger 22 will move out of slot 20 can be changed by changing the magnetic force exerted upon member 21 by magnet 30. This can be accomplished by substituting stronger or weaker magnets or by moving magnet 30 towards or away from apex 27.

Since changes may be made in the above apparatus without departing from the scope of the invention herein involved, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in the limiting sense.

What is claimed is:

1. A device for use with a rotatable winding spindle and adapted to catch a running strand of yarn to start said strand winding upon said spindle comprising a member mounted on said spindle for rotation therewith, said member having a nose portion contacted by the running strand, a yarn engaging finger movably mounted on said member and movable in response to rotation of the member from a retracted position adjacent said nose portion to a projected position wherein it extends over part of said nose, a permanent magnet rotatable with said member for holding said finger in said retracted position, the magnetic holding force exerted on said finger by said magnet being such that it is overcome by the centrifugal force on said finger when a predetermined speed of rotation is attained whereby said finger is released for movement to said projected position.



2. A device for use with a rotatable winding spindle as defined in claim 1 wherein said member is provided with a flange adjacent said nose, said flange having a slot formed therein and said finger being mounted in said slot.

3. A device for use with a rotatable winding spindle as defined in claim 2 wherein said finger is pivotally mounted.

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