

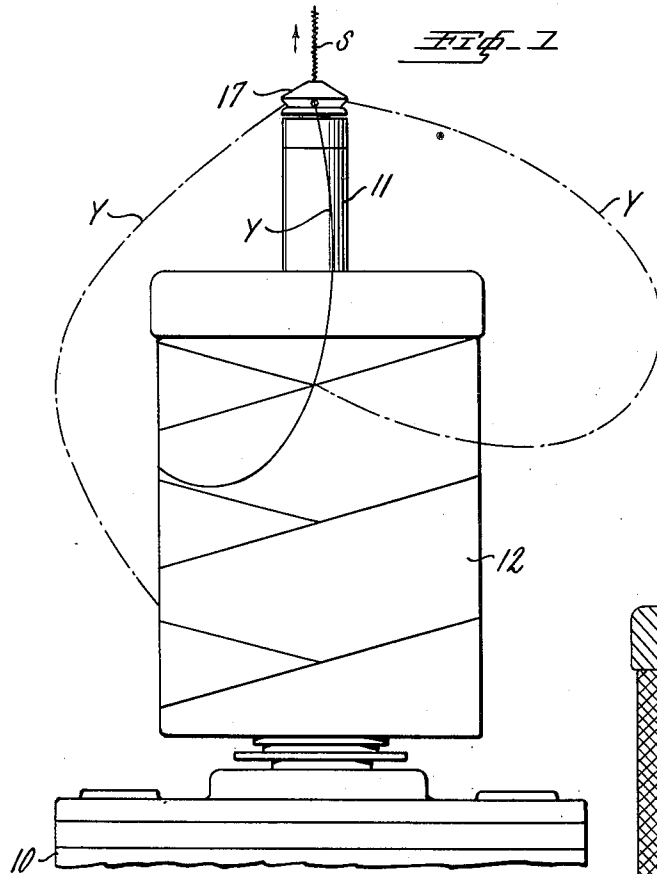
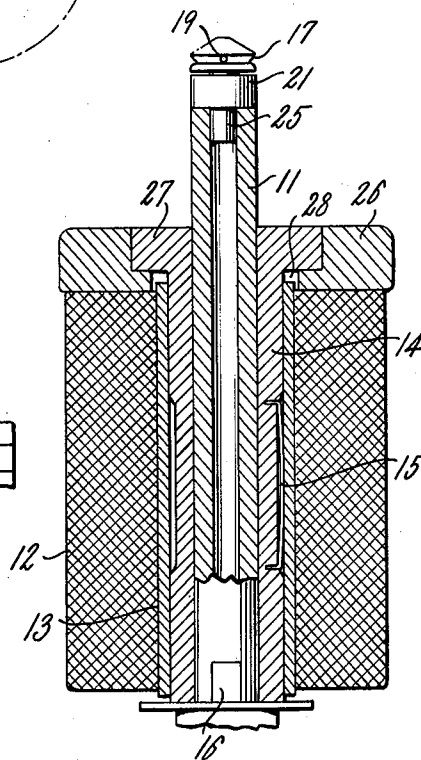
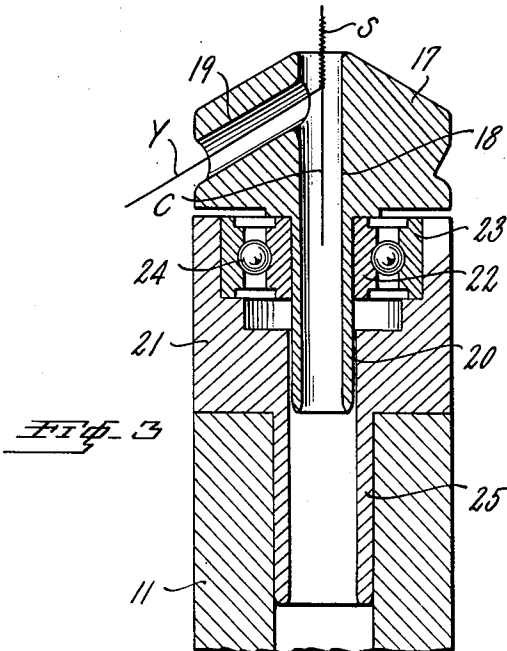
Nov. 22, 1949

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2,488,970

CORE COVERING DEVICE

Filed June 12, 1948



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2,488,970

CORE COVERING DEVICE

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Application June 12, 1948, Serial No. 32,631

4 Claims. (Cl. 57—18)

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This invention relates to a core covering device, and more particularly to a yarn tensioning cap rotatably mounted upon the upper end of a rotating core covering spindle. This yarn tensioning device may be used on core covering machines, to cover rubber thread, wire or other strands, and it may also be used to perform a variety of twisting and spinning operations.

The object of the present invention is to increase the speed of core covering machines over those now in commercial use and to improve the quality of the covered product.

Core covering machines have been extensively used heretofore, two different types are commonly employed. One of these is the filer type in which a light weight wire filer is employed to control the covering yarn as it passes from the rotating yarn package to the core covering position. The other is the ring and traveler type in which a fixed ring is positioned adjacent an end of the rotating yarn package and a yarn engaged traveler slides around this ring to control the covering yarn as it passes from the supply package to the core.

These prior core covering machines work very well for spindle speeds up to about 10,000 R. P. M. but if operated at much higher speeds excessive breakage of the covering yarn occurs and other difficulties are experienced.

The present invention contemplates a core covering device that does not use either the filer or the ring and traveler above mentioned, but employs in place thereof a small yarn tensioning device comprising a freely rotating top piece or cap disposed at the upper end of the rotating core covering spindle. This yarn tensioning device is very simple in construction and comprises a top piece or cap no larger than the core covering spindle in diameter and supported at the upper end of this spindle by an anti-friction bearing so that it can turn freely relatively to the spindle. The cap has a central opening therethrough through which the core to be covered passes, and a downwardly inclined outwardly extending passage through which the core covering yarn passes inwardly to the core covering position.

The device of the present invention is capable of covering cores at speeds far greater than any other known device, and it does this with a minimum of interference from take-off tension as it draws the covering yarn from the yarn package, and with a minimum of wrapping tension as it winds the yarn around the core. Also with a minimum of distance between the point where the yarn engages the tensioning device and the point

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where it is wound upon the core; that is the distance between the point where the yarn contacts the inwardly extending passage of the cap and the point where it contacts the core is much shorter than the distance, for example, between the ring traveler and core. Furthermore the size of the yarn package used with this type of core covering apparatus is limited only by the practical load capacity of the spindle, and spindle drive to which the device is applied.

The above and other features of the present invention will be further understood from the following description when read in connection with the accompanying drawing, wherein:

Fig. 1 is a side elevation of a core covering device constructed in accordance with the present invention.

Fig. 2 is a vertical sectional view through the core covering device of Fig. 1; and

Fig. 3 on a larger scale is a vertical sectional view through the upper end of the rotating hollow spindle and yarn tensioning device of Figs. 1 and 2.

The yarn tensioning device of the present invention can be applied to various types of core covering machines now in use to increase their speed of operation and the quality of the product, as well as upon new core covering machines of various types.

The device of the present invention is shown in the drawing as applied to a motor driven core covering spindle of the general type shown in the Cobb Patent No. 2,079,433, and more particularly the lower core covering unit of such patent, but will work equally as well upon the belt driven type of core covering spindle.

In the drawing, 10 designates the upper end portion of an electric motor the central shaft of which is made hollow and projects upwardly a substantial distance from the motor casing to provide the integral, hollow spindle 11 adapted to support and rotate a yarn package 12 at high speed. The yarn of this package is wound upon the usual paper tube 13, which tube fits snugly upon an adapter having the hollow body 14 that is usually made of wood, and the central portion of this body is provided with the bow springs 15 disposed 120° apart around the tubular body to frictionally engage the inner bore of the tube 13. The body 14 is notched at its lower end to engage the usual driving key 16 provided near the base of the rotating spindle 11.

The apparatus so far described by reference numerals is old and well known and constitutes one of a number of types of core covering units

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which may be provided with the yarn covering device of the present invention which will now be described.

The hollow spindle 11 extends upwardly some distance beyond the upper end of the yarn package 12 and the upper end of this spindle is provided with a freely rotating top piece or cap 17 adapted to guide and tension the covering yarn. This cap as best shown in Fig. 3 has a central vertical passage 18 therethrough through which a core C to be covered passes in an upward direction. The cap 17 is also provided with a side yarn guide in the form of an outwardly extending and downwardly inclined passage 19 through which the yarn Y supplied by the package 12 passes inwardly to be wound upon the core C to thereby form the covered strand S.

In the construction shown the cap 17 is provided with a downwardly extending tube 20 that projects into the bearing housing 21 that serves to increase the height of the cap 17 above the yarn package. This cap is rotatably supported in this housing by a miniature ball bearing having the inner race 22 and outer race 23 between which lie the balls 24. The bearing housing 21 has a downwardly extending tubular portion 25 which fits snugly in the bore of the spindle 11. This however constitutes only one of a number of constructions that can be used to rotatably support the cap 17 at the upper end of the spindle 11 so that it may rotate freely relatively to such spindle, and turn back and forth upon the rotating spindle 11 as dictated by the tension of the yarn Y being wound upon the core C. The direction in which the yarn package 12 is rotated by the spindle 11, as is customary, is such that it will keep this yarn wound about the package, except for the relatively short length of the yarn which is shown in full line in one position in Fig. 1 and in dot and dash lines in two positions to indicate how the yarn balloons out as it leaves the package and passes upwardly to the inclined passage 19 within the cap 17.

When the core covering unit shown in the drawing is operated at high speed, the yarn Y will balloon outward as shown, and this prevents it from dragging against the surface of the yarn package, but when the core covering spindle is being started up or slowed down the yarn may tend to drag over the surface of the yarn package 12 when the speed is not sufficient to cause it to balloon outwardly. In order to reduce this dragging action it is found highly desirable to provide the adapted or hollow body 14 with a spool head 26 at its upper end. This spool head is preferably formed of tough durable fibrous material or plastic material that will provide a smooth surface over which the yarn will slide freely and which will not dent readily. This spool head 26 is rigidly secured to the upper end of the body 14 by any suitable means, such as by providing the tubular body 14 with the enlarged upper end 27 to which the spool head 26 is glued or otherwise secured. The head 26, it should be noted, is relatively thick to thereby provide a wide outer edge upon which the yarn may slide, and the outside diameter of this head 26 should be slightly greater than the diameter of the full yarn package 12 so that the unwinding yarn will engage this head rather than the surface of the yarn package. In the construction shown the paper tube 13 projects a slight distance from each end of the yarn package 12. The spool head 26 is therefore cut away at its

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lower face to form the annular recess 28 adapted to clear the upper end of the tube 13.

The operation of the present core covering device is as follows:

As the yarn package 12 is revolved at high speed by the spindle 11 the yarn Y which has been threaded through the yarn guide hole 19 of the cap 17 and attached to the core C, will be wrapped around the core, which, at this time is being advanced upwardly through the hollow spindle and cap 17 at a definite speed. This upward travel of a core C draws the yarn Y from the package 12 through the incline hole 19 while at the same time this yarn is being wound rapidly about the core by the high speed of the yarn package. The ballooning action of the yarn Y, together with the free rotation of the cap 17 to accommodate the rate at which the yarn unwinds from the package 12 serves to control the tension of the yarn as it is wound helically upon the core C.

Since the diameter of the cap 17 does not exceed that of the spindle 11 the adapter 14, 26 with the yarn package 12 thereon can be placed on the core covering spindle and removed therefrom without disturbing this cap.

It is found in practice that the yarn tensioning device of the present invention operates in a highly satisfactory manner and subjects the yarn to much less tension than do the filer and ring and traveler types of covering devices above referred to, with the result that present core covering devices can be operated at speeds far above that of the core covering units available heretofore. In fact the present core covering unit will operate satisfactorily at speeds up to and in excess of 25,000 R. P. M. This high speed is due largely to the anti-friction mounting for the cap 17 whereby the cap will rotate freely as required by the tension of the yarn Y. This avoids the dragging friction which occurs when a filer or ring-traveler is rotated at high speed.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A core covering device capable of operating at very high speed, comprising in combination a hollow spindle having means for rotating it at high speed and adapted to support a package of core covering yarn, a yarn guiding and tensioning cap rotatably supported by a ball bearing at the top of said spindle to turn freely independently of the spindle and having a central core-receiving passage and a side passage communicating therewith and through which the core covering yarn of the package passes to be wound upon a core, and said cap being sufficiently small in diameter to permit the package to be placed on and removed from the spindle without disturbing the cap.

2. A core covering device capable of operating at very high speed, comprising in combination a hollow spindle having means for rotating it at high speed and adapted to support a package of core covering yarn, a yarn guiding and tensioning cap rotatably supported by an anti-friction bearing at the top of said spindle to turn freely independently of the spindle and having a central core-receiving passage and a side passage communicating therewith and through which the core covering yarn from the package passes to be wound upon a core, this yarn being free of guides from the time it leaves the package until it reaches said cap.

3. A high speed core covering device capable

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of operating at speeds in excess of 25,000 R. P. M. comprising in combination a hollow spindle having means for rotating it and adapted to support a package of core covering yarn, a yarn guiding and tensioning cap rotatably supported by an anti-friction bearing at the top of said spindle to turn freely independently of the spindle and having a central core-receiving passage and a side passage communicating therewith and through which the core covering yarn from the package passes to be wound upon a core, and said cap being sufficiently small in diameter to clear a package as it is placed on the spindle.

4. A core covering device capable of operating at very high speed, comprising in combination

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a hollow spindle having means for rotating it at high speed and adapted to support a package of core covering yarn, a yarn guiding and tensioning cap rotatably supported by an anti-friction bearing at the top of said spindle to turn freely independently of the spindle and having a central core-receiving passage and a side yarn guide for guiding the core covering yarn supplied by the package to the core, and said cap with its yarn guide being sufficiently small in diameter to permit the package to be placed on and removed from the spindle without disturbing the cap.

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No references cited.