Oct. 10, 1944. J. NOGUERA 2,360,153

WINDING AND TWISTING DEVICE FOR TEXTILE FIBERS

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FIG. 1.

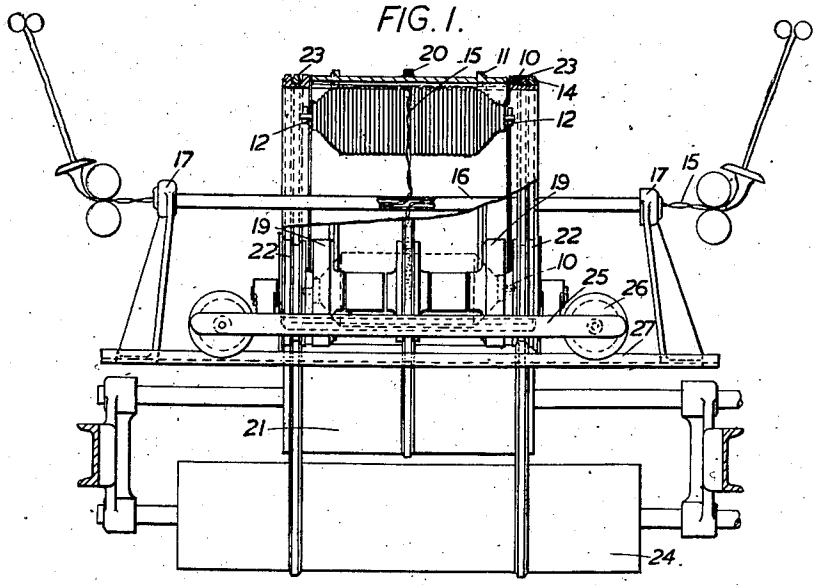
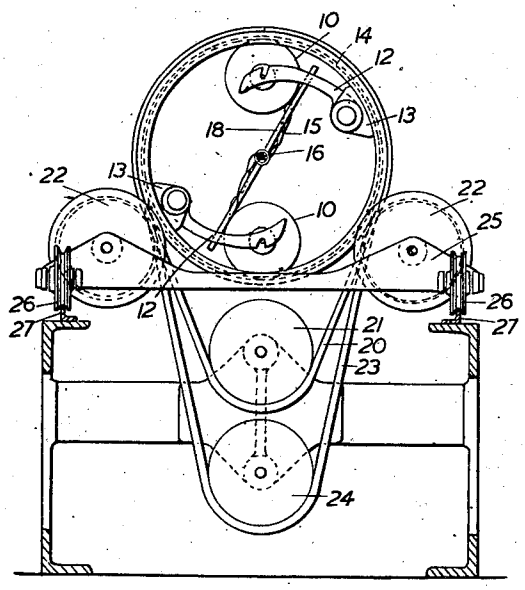


FIG. 2.



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FIG.3.

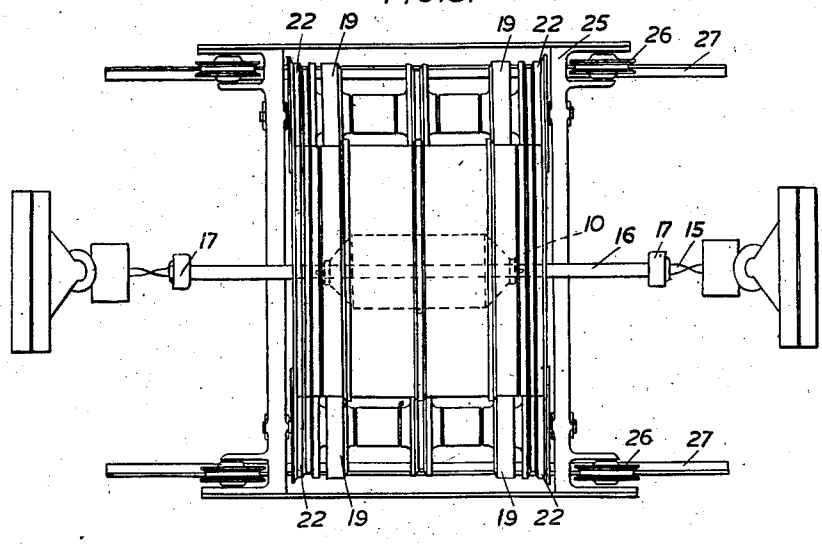


FIG.4.

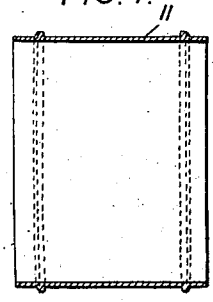


FIG.5.

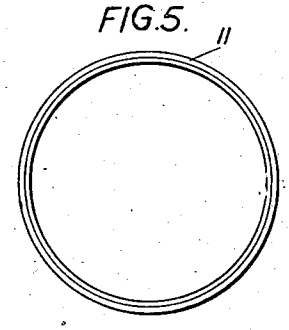


FIG.6.

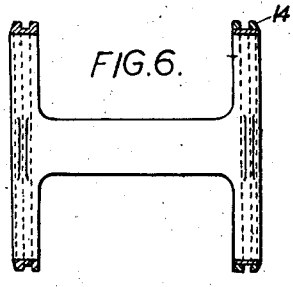
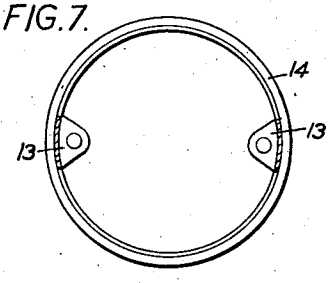


FIG.7.



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UNITED STATES PATENT OFFICE

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WINDING AND TWISTING DEVICE FOR TEXTILE FIBERS

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Application April 20, 1943, Serial No. 483,780
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9 Claims. (Cl. 57—69)

This invention relates to machines such as are used in the textile industry for twisting rovings or yarns and winding them on to the bobbins or spools.

In such machines, the bobbin or spool is usually mounted on a spindle which rotates about a fixed axis whilst the roving or yarn being twisted and wound and the associated guiding device rotates about the bobbin or spool. The necessity of swinging the textile material round the flyer or spindle unit means that the textile material is subjected to considerable friction and stresses due to such factors as air resistance and centrifugal force.

To overcome these disadvantages, it has been proposed to reverse the arrangement, that is to say, to feed the textile material along a fixed axis and to cause the spindle or bobbin to rotate about said fixed axis whilst revolving on its own axis. For such an arrangement to function successfully, particularly at high speeds, it is necessary to provide means for balancing the centrifugal outward thrust of the bobbin as it moves around the material to be wound. However, this presents mechanical difficulties, since the weight of the bobbin is constantly increasing as it is being filled, and the resulting mechanism is in any case too bulky and complicated for effective use at high speeds, whilst the high cost of construction renders its use uneconomical.

It is among the objects of the present invention to provide a winding and twisting mechanism of the kind in which the bobbin or spool rotates bodily about the material to be wound, but in which the rotation of the unit is automatically and correctly balanced and the mechanical construction of the mechanism simple and effective.

In a winding and twisting device according to the present invention, two ends of the material to be wound and twisted are fed separately from opposite ends along a fixed axis to two bobbins which are diametrically disposed about said fixed axis and are adapted to be rotated bodily about said fixed axis while rotating on their own axes.

According to a preferred embodiment, the bobbins are mounted on a frame and are rotated, by the rotation of said frame, within an outer drum or casing, against the inner surface of which the bobbins are caused to bear to effect rotation on their own axes.

The hollow casing or drum is driven by any convenient means, such as a belt drive, and the relation between the speed of the drum and the speed of the bobbin frame determines the rate at which winding takes place and therefore the amount of twist per unit length wound, since one turn of twist is imparted for each revolution of the frame. The winding speed is thus a definite and straight-forward factor, easily and exactly controllable at will.

The material to be wound and twisted is fed to the mechanism from the opposite ends of a single feed tube or the like which extends through the whole unit along the horizontal axis thereof and is formed with suitably disposed outlets for the material to pass from the tube to the bobbins.

Relative transverse motion between the feed device and the bobbins may be obtained by reciprocating either the bobbins or the central feed device, but it is preferred to keep the feed device fixed and reciprocate the bobbins.

One embodiment of the invention will now be described with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a side elevational view of the mechanism partly in section.

Figure 2 is a corresponding end elevational view.

Figure 3 is a corresponding plan view.

Figures 4 and 5 are longitudinal sectional and end views of the outer casing or drum, and

Figures 6 and 7 are longitudinal sectional and end views of the bobbin frame.

Referring to the drawings, two bobbins 10 are rotatably supported in slotted arms 12 which are pivotally secured to lugs 13 located in diametrically opposed positions on a frame 14. The bobbins 10 are caused to bear against the internal surface of a cylindrical drum or casing 11, whereby, on relative motion between the drum or casing 11 and the frame 14, the bobbins are rotated on their own axes. The arm 12 are initially urged to maintain the bobbins in contact with the internal surface of the drum 11 by means of springs (not shown) but this action is assisted by centrifugal force during the subsequent operation of the machine.

The material 15 to be wound is fed to the bobbins from the opposite ends of a single feed tube 16 which is mounted in supports 17 and is indirectly driven by means of a double-bladed roving guide or presser member 18 which is fixedly mounted on the feed tube 16 and is arranged with its blades transversely tangential to the bobbins 10 whereby the feed tube 16 is caused to rotate when the frame 14, and therefore the bobbins 10, are rotated.

The drum or casing 11 is supported and guided by rollers 19 and is rotated thereon by the belt drive 20 from the drum 21. Similarly, the frame 14 is supported and guided by rollers 22 and is rotated thereon by the belt drive 23 from the drum 24.

Relative transverse motion between the feeding device and the bobbins to cause the material to be spirally wound is achieved by reciprocating the whole winding and twisting unit. To this end, rollers 19 and 22 are mounted on a carriage 25 which is itself mounted on wheels 26 whereby the carriage can be reciprocated along the rails 27 by known means (not shown).

It will be seen that the drum 11 and frame 14

are independently mounted and, in the operation of the machine, are driven separately in the same direction but at different speeds. The mechanism functions completely without rotating the outer drum 11, but in this case, the amount of twist imparted to the material is too small in relation to the length wound. It is to increase the amount of twist that the frame 14 is rotated in the same direction as the drum 11 but slightly slower. The amount of twist imparted to the material per unit length wound can be varied by varying the relative speed between the frame 14 and the drum 11. If the frame 14 were driven at the same speed as the drum 11, the material would receive one turn of twist for each revolution of the frame 14 but no winding would take place. The arrangement according to the present invention secures a uniform winding speed at all stages i. e. at all the different diameters of the bobbin as the material is being wound thereonto.

A winding and twisting device according to the present invention handles two ends of material and, therefore, its relative cost of construction per working unit is low.

What I claim and desire to secure by Letters Patent of the United States is:

1. A winding and twisting device for textile fibers, consisting of a frame, two bobbins mounted thereon in diametrically opposed positions, means for rotating said frame and therewith said bobbins, a drum against the interior surface of which the bobbins are disposed to bear to effect rotation on their own axes, means for rotating said drum in the same direction as said frame, and a feed tube which extends through the device along the horizontal axis thereof and is formed with suitably disposed outlets for two ends of material which are fed from opposite ends of said feed tube, through said openings and on to said bobbins.

2. A winding and twisting device for textile fibers, consisting of a frame, two bobbins rotatably supported in slotted arms pivotally secured in diametrically opposed positions on said frame, means for rotating said frame and therewith said bobbins, a cylindrical drum against the inner curved surface of which the bobbins are caused to bear to effect rotation on their own axes, means for rotating said drum in the same direction as said frame, and a feed tube which extends through the device along the horizontal axis thereof and is formed with suitably disposed outlets for two ends of material which are fed from opposite ends of said feed tube, through said openings and on to said bobbins.

3. A winding and twisting device according to claim 1, in which said frame and said drum are independently mounted on rollers, and including independent means for rotating said frame and said drum on said rollers.

4. A winding and twisting device for textile fibers, consisting of a frame, two bobbins mounted thereon in diametrically opposed positions, means for rotating said frame and therewith said bobbins, a drum against the inner curved surface of which the bobbins are caused to bear to effect rotation on their own axes, means for rotating said drum in the same direction as said frame, a feed tube which extends through the device along the horizontal axis thereof and is formed with suitably disposed outlets for two ends of material which are fed from opposite ends of said feed tube, and means for reciprocating said frame and said drum with respect to said feed tube.

5. A winding and twisting device for textile fibers, consisting of a frame, two bobbins mounted thereon in diametrically opposed positions, said frame being rotatably mounted on rollers, a cylindrical casing against the inner surface of which the bobbins are caused to bear to effect rotation of their own axes, said casing being rotatably mounted on rollers, a feed tube extending along the horizontal axis of the device and formed with suitably disposed outlets for two ends of the material fed from opposite ends of said feed tube, and a carriage which is adapted for reciprocatory motion with respect to said feed tube and upon which the rollers supporting said frame and said casing are mounted.

6. A winding and twisting device for textile fibers consisting of a frame, two bobbins mounted thereon in diametrically opposed positions, means for rotating said frame and therewith said bobbins, a drum against the internal surface of which the bobbins are caused to bear to effect rotation on their own axes, means for rotating said drum in the same direction as said frame, a feed tube which extends through the device along the horizontal axis thereof and is formed with suitably located outlets for two ends of material fed from opposite ends of said feed tube, and means for transmitting the rotary motion of said bobbins about said feed tube to said feed tube.

7. A winding and twisting device according to claim 6, in which the means for transmitting the rotary motion of said bobbins about said feed tube to said feed tube, consists of a double-bladed roving guide which is fixedly mounted on said feed tube with its blades transversely tangential to the bobbins.

8. A winding and twisting device for textile fibers, consisting of a frame, two bobbins rotatably supported in slotted arms pivotally secured in diametrically opposed positions on said frame, said frame being rotatably mounted on rollers, means for rotating said frame and therewith said bobbins on said rollers, a cylindrical casing against the interior surface of which said bobbins are adapted to bear to effect rotation on their own axes, said casing being rotatably mounted on rollers, means for rotating said casing on said rollers in the same direction as said frame, a feed tube which extends through the device along the horizontal axis thereof and is formed with suitably disposed outlets for two ends of material which are fed from opposite ends of said feed tube, a carriage which is adapted for reciprocatory motion with respect to said feed tube and upon which the rollers supporting said frame and said casing are mounted, and a double-bladed roving guide which is fixedly mounted on said feed tube with its blades transversely tangential to said bobbins, whereby the rotary motion of said bobbins about said feed tube is transmitted to said feed tube.

9. A winding and twisting device for textile fibers in which two ends of material to be wound are fed separately from opposite ends along a fixed axis, comprising a frame, two bobbins mounted thereon in diametrically opposed positions, means for rotating said frame and therewith said bobbins, a casing against the inner surface of which the bobbins are caused to bear to effect rotation on their own axes, and means for feeding two ends of material to said bobbins along a fixed axis from opposite ends thereof.

JOSEPH NOGUERA.