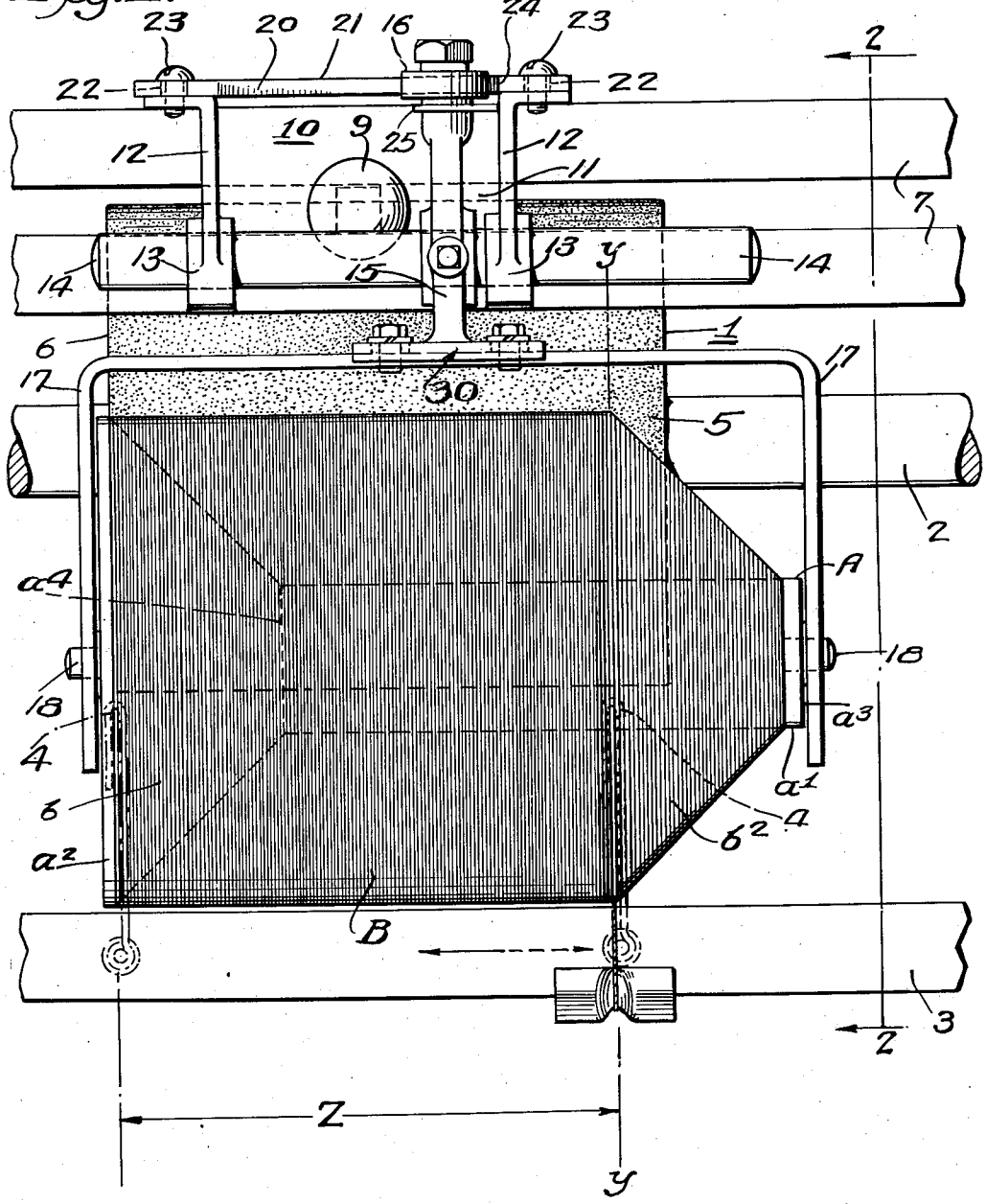
Sept. 13, 1949. H. ROESSEL 2,481,619

BOBBIN BUILDING MOTION

Filed May 16, 1946 4 Sheets-Sheet 1

Fig. 1.



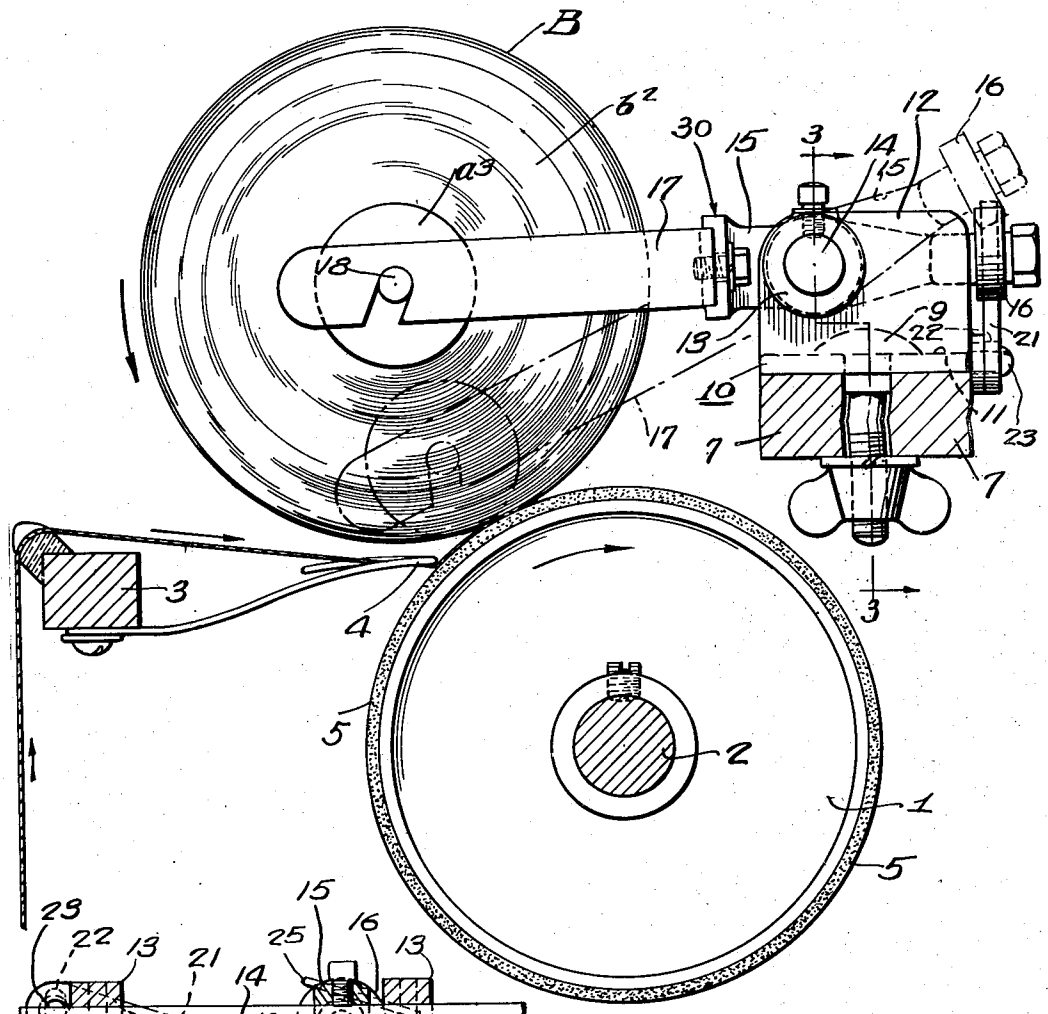
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Sept. 13, 1949. H. ROESSEL 2,481,619

BOBBIN BUILDING MOTION

Filed May 16, 1946 4 Sheets-Sheet 2

Fig. 2.



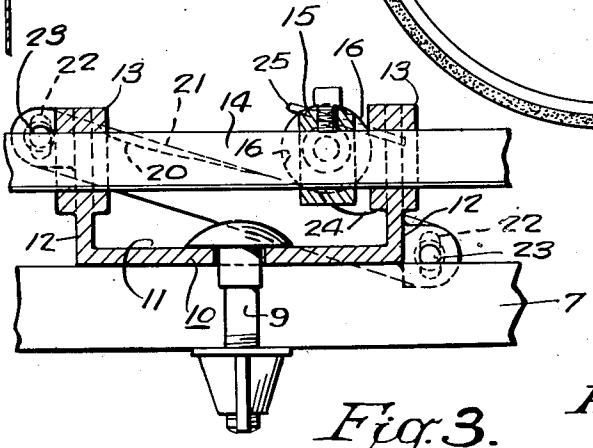


Fig. 3.

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Sept. 13, 1949. H. ROESSEL 2,481,619

BOBBIN BUILDING MOTION

Filed May 16, 1946 4 Sheets-Sheet 3

Fig. 4.

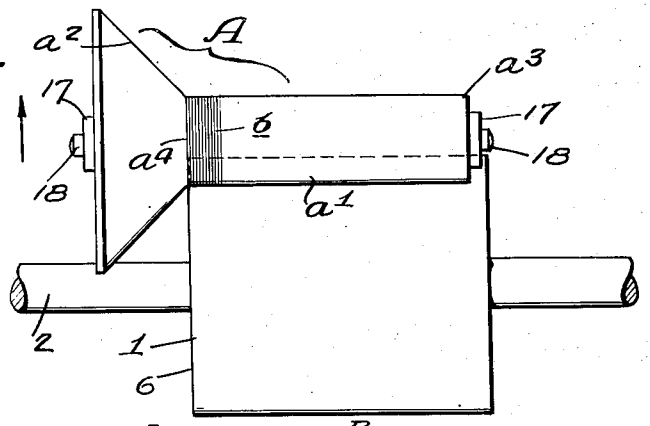


Fig. 5.

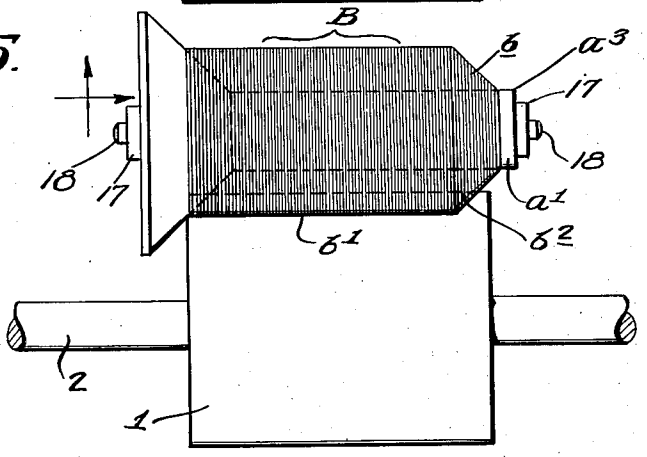
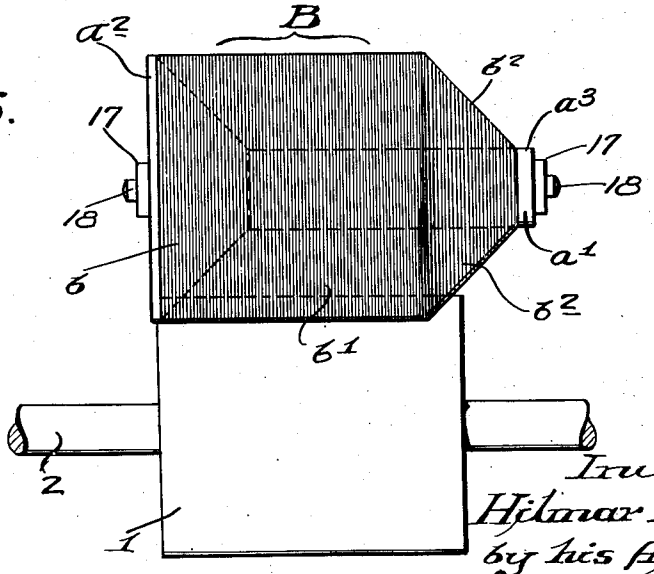


Fig. 6.



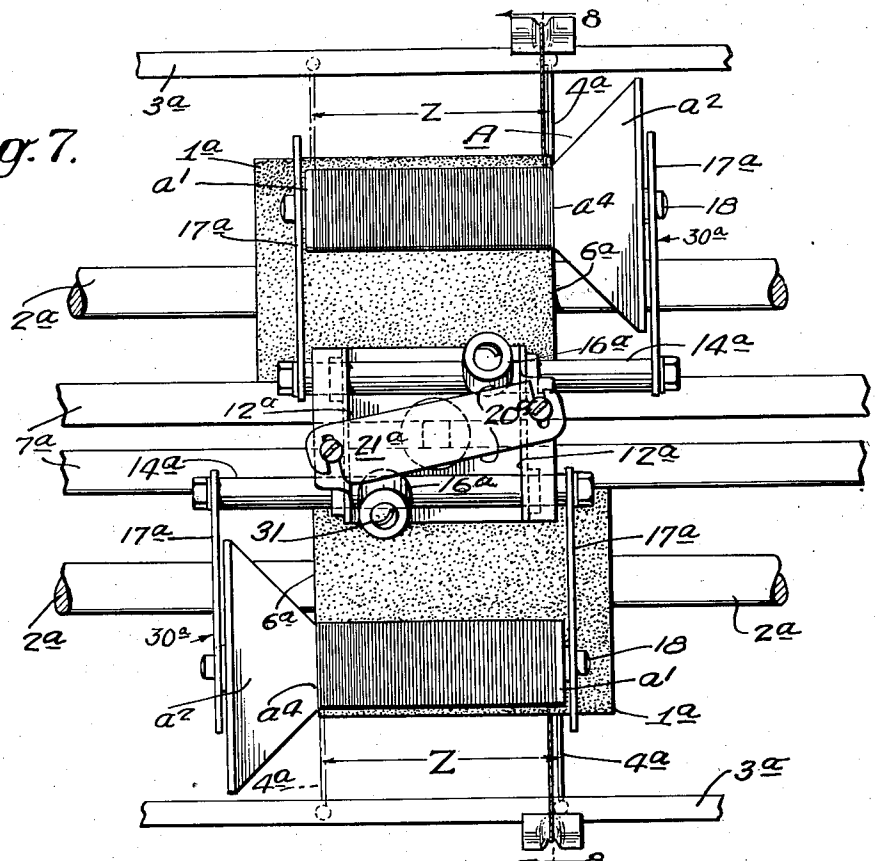
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BOBBIN BUILDING MOTION

Filed May 16, 1946 4 Sheets-Sheet 4

Fig. 7.



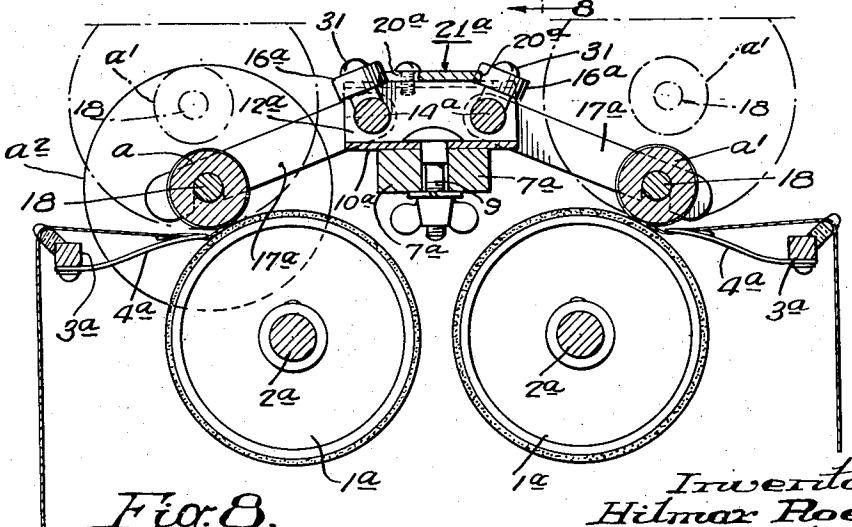


Fig. 8.

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UNITED STATES PATENT OFFICE

2,481,619

BOBBIN BUILDING MOTION

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Application May 16, 1946, Serial No. 670,215

4 Claims. (Cl. 242—18)

1

This invention relates to bobbin building motions for yarn winding machines; and more particularly to a bobbin building motion for producing a bobbin having a cylindrical body with a frusto-conical draw-off end.

One object of the present invention is to provide a bobbin building motion of simple construction adapted for application to a conventional single or double bank winding machine or twisting and winding machine having a simple uniformly reciprocating traverse motion, by which the building of the aforesaid type of bobbin may be effected without necessitating any alteration in the simple traverse motion or any other part of the machine.

Another object of the present invention is to provide a bobbin building motion embodying simple means for shifting the bobbin under construction axially with respect to the uniformly reciprocating guide eye of the traverse motion, as the diameter of the bobbin gradually increases, for producing the frusto-conical draw-off end on the bobbin.

Another object of the invention is to utilize power developed by the gradual increasing of the diameter of the bobbin, to shift the bobbin axially for forming the frusto-conical draw-off end on the bobbin.

Other advantages and features of the present invention will become apparent from the following description and the accompanying drawings, of which:

Fig. 1 is a plan view of the building motion of the present invention and sufficient of the cooperating parts of a conventional winding machine to illustrate the manner of functioning thereof;

Fig. 2 is a transverse sectional view taken on the line 2—2, Fig. 1;

Fig. 3 is a sectional elevation taken on the line 3—3, Fig. 2;

Figs. 4, 5, and 6 are front elevational diagrams showing a bobbin in three stages of building;

Fig. 7 is a plan view of a modified form of the invention; and

Fig. 8 is a transverse sectional elevation taken on the line 8—8, Fig. 7.

For the purpose of this description only those arts of a conventional winding machine as are necessary for a clear understanding of the operation of the present invention are disclosed in the present drawings.

One of a plurality of bobbin driving drums or cork wheels normally found in a conventional winding machine is illustrated at 1. The drum 1

2

is secured, with the others, to a common rotary shaft 2 which is journaled in suitable bearings carried by the framework of the machine. The machine also includes a longitudinally reciprocable traverse bar 3 which is slidably mounted in the frame of the machine and receives a uniform reciprocating motion.

The means for reciprocating the traverse bar 3 and for rotating the shaft 2, being of common construction in conventional winding machines, have not been shown in the present drawings.

The traverse bar 3 carries a plurality of yarn guide eyes or porcelain fittings of usual construction, one of which is illustrated at 4 in Fig. 1 of the drawings.

In the present instance the guide 4 travels uniformly back and forth across and parallel to the peripheral face 5 of the drum 1, from a position in a transverse plane substantially coincident with the plane of one end 6 of the drum 1, to a position in a transverse plane y, y spaced a predetermined distance from the end 6 of said drum, said uniform reciprocation being indicated by the double arrow z in Fig. 1.

Parallel to the shaft 2 and traverse bar 3, the machine frame includes or carries a longitudinal slotted structural beam 7 which bears a fixed relation, transversely of the machine with respect to the shaft 2 and traverse bar 3. Secured to the beam 7 is a main bracket 10 forming part of the attachment upon which the present invention is predicated.

The bracket 10 includes a base 11 adapted to be secured to the beam 7 for adjustment longitudinally thereof, by a bolt 9. The bracket 10 also includes a pair of laterally spaced upright members 12, 12 carried by and at the opposite ends respectively of the base plate 11.

Mounted in bearings 13, 13 formed on the uprights 12, 12 is a pivot bar 14 which is axially slidable and rotatable in the bearings 13, 13. Intermediate the uprights 12, 12 and secured to the rotatable and axially reciprocable bar 14 is a lever 15, which forms part of a bobbin carrier frame 30. One end of the lever 15 is provided with a roller 16, while the opposite end of said lever carries a yoke portion 17 of the bobbin carrier frame 30. The yoke 17 is adapted to receive a spindle 18 about the axis of which a bobbin core A is adapted to rotate while in peripheral tangential contact with the peripheral face 5 of the drum 1.

The bobbin core A includes a cylindrical portion $a1$ with a diametrically enlarged frusto-conical base $a2$ at one end thereof, the opposite end $a3$

being the same or lesser diameter than the cylindrical body *a1* to facilitate the subsequent drawing-off of the yarn B from the core A.

The body of yarn B is composed of a multiplicity of circumferential superposed layers of a filament *b* wound in cylindrical form *b1* on the cylindrical body *a1* and extending up the incline of the frusto-conical base *a2* of the core A, with the opposite end of the body of yarn B in a frusto-conical form *b2* corresponding to the frusto-conical base *a2* of the core A.

As the core A is rotated by a contact with the drum 1, and as the traverse bar 3 reciprocates parallel to the peripheral face 5 of the drum 1, the filament *b* is laid in said circumferential superposed layers on the core A; and as the diameter of the body B of yarn being wound on the core A increases, the core A and yarn body B are shifted axially to produce the frusto-conical draw-off end *b2* on the bobbin.

The aforesaid axial shifting of the core A, etc., is effected by an inclined cam surface 20 formed in or on a fixed cam plate 21 which is adjustably secured to the uprights 12 of the main bracket 10. The cam surface 20 is engaged by the aforesaid roller 16 mounted on the second end of the yoke lever 15.

As shown in Fig. 4, the building of a bobbin begins with the cylindrical body *a1* of the core A in contact with the face 5 of the drum 1, and with the line of intersection *a4* of the cylindrical body *a1* with the incline of the frusto-conical base *a2*, in a plane substantially coinciding with the plane of the end 6 of the drum 1.

The total traverse of the guide 4 is substantially equal to the axial length of the cylindrical body *a1* of the core A, from the line *a4* to the end *a3* of said body.

As the circumferential layers of yarn are successively layed on the core A, the diameter of the yarn body B increases. As the diameter of the yarn body increases the yoke lever 15 is rocked about the axis of the pivot bar 14 and presses the roller 16 downwardly against the cam surface 20 with such force that a horizontal component force is produced in the direction of the axis of the core A, which moves the entire bobbin axially with respect to the constant uniform traverse of the yarn guide 4. Thus the frusto-conical end *b2* is gradually formed on the bobbin as the filament *b* is built up in the yarn body B, layer by layer.

The incline of the cam surface 20 is less than 45°, thus a firm resistance is set up thereby to the rocking of the lever 15 and a corresponding resistance is also set up to the axial movement of the bobbin. The feed of the bobbin axially is therefore maintained under control at all times.

The angle of inclination of the cam surface 20 may be varied to obtain and maintain the proper degree of resistance to the rocking of the lever 15, so that the bobbin will be shifted axially in proper timing with the gradual increase in the diameter of the body B of yarn on the core A to result in the formation of a uniform angle on the sides of the frusto-conical end *b2* of the finished bobbin, as shown in Fig. 6.

Fig. 5 illustrates an intermediate position of the bobbin relative to the drum 1, as the yarn is built layer by layer on the core A.

In order to adjust the angle of the cam surface 20, the cam plate 21 is slotted at 22, 22 to receive a pair of bolts 23, 23 by which the cam plate 21 is secured to the rear faces of the uprights 12, 12 respectively on the base plate 11.

The cam plate 21 is recessed at 24 adjacent the lower end of the incline 20 to receive the roller 16 and relieve the pressure of the roller 16 against the cam surface 20 when a bobbin is completed or when it may be desirable to discontinue the axial feed of the bobbin; and the roller end of the lever 15 is adapted to be moved under a pin or other stop 25 carried by the upright adjacent the recess 24, to hold the bobbin feeding mechanism out of operation when desired.

The structure shown in Figs. 7 and 8 is adapted for use in a double bank winding machine wherein the elements of the machine proper, as shown in Figs. 1 and 2, are duplicated at opposite sides respectively of a median vertical longitudinal plane of the machine.

As shown in Figs. 7 and 8, a pair of bobbin driving drums *1a*, *1a* lie opposite each other at opposite sides respectively of said median plane. The drums *1a*, *1a* are secured to rotary drive shafts *2a*, *2a*, respectively. Traverse bars *3a*, *3a* with guide eyes *4a*, *4a* thereon lie adjacent the drums *1a*, *1a* and receive constant uniform longitudinal reciprocation as previously described in regard to the bar 3.

A bracket *10a* is secured to the structural bar *7a*, *7a* and is provided with uprights *12a*, *12a* in which are slidably mounted, in laterally spaced parallel relation to each other, a pair of pivotable and axially shiftable pivot bars *14a*, *14a*. The pivot bars *14a*, *14a* form part of a pair of bobbin carrier frames *30a*, *30a* each of which includes a pair of yoke arms *17a*, *17a* secured to opposite ends respectively of the pivot bars *14a*, *14a*. These carrier frames *30a*, *30a* are adapted to rotatably support a pair of bobbin cores A, A with the intersections *a4*, *a4* between the cylindrical parts *a1*, *a1* and the frusto-conical parts *a2*, *a2* of the bobbin cores coinciding with the planes of the ends *6a*, *6a*, of the drums *1a*, *1a* respectively.

Rotatably mounted on studs *31*, *31* which project at an angle to the arms *17a*, *17a* from the axes of the pivot bars *14a*, *14a* respectively, are cam follower rollers *16a*, *16a*. The cam followers *16a*, *16a* bear against cam surfaces *20a*, *20a* formed on opposite side edges respectively of a cam plate *21a* which is adjustably secured at its opposite ends respectively to the upper ends of the uprights *12a*, *12a* of the common bracket *10a*.

The bobbin building devices lying at opposite sides respectively of the aforesaid median plane of the machine are adapted to operate independently of each other in substantially the same manner as previously described in regard to the structure shown in Figs. 1, 2, 3, 4, 5 and 6.

The advantage of the construction shown in Figs. 7 and 8 resides in the ability to place two of the bobbin building devices directly in line with each other, transversely of the machine, and to use but one cam *21a* and one supporting bracket *10a* to serve both of the oppositely arranged units. Thus relative staggering of the units at opposite sides respectively of the median longitudinal plane of the machine is avoided.

I claim:

1. A bobbin building motion for a yarn winding machine having a bobbin driving drum and a uniformly reciprocable yarn guide operable parallel to the axis thereof, said motion comprising a fixed bracket adjacent said drum, a shaft rockable and axially slidable in said bracket, a lever fixed to said shaft, a yoke on one end of said lever for maintaining a bobbin in peripheral rolling contact with said drum, a cam roller rotatably mounted on the opposite end of said

lever, and a cam fixed on said bracket and engageable by said roller to shift the bobbin axially as it increases in diameter to form a frusto-conical end on said bobbin.

2. A bobbin building motion for a yarn winding machine having a bobbin driving drum and a uniformly reciprocable yarn guide operable parallel to the axis thereof, said motion comprising a fixed bracket adjacent said drum, a shaft rockable and axially slidable in said bracket, a lever fixed to said shaft, a yoke on one end of said lever for maintaining a bobbin in peripheral rolling contact with said drum, a cam roller rotatably mounted on the opposite end of said lever, a cam having a follower engaging surface inclined with respect to the axis of said drum and fixed on said bracket and engageable by said roller to shift the bobbin axially as it increases in diameter to form a frusto-conical end on said bobbin, and means for varying the angle of inclination of said cam surface relative to the axis of said drum to vary the angle of inclination of the sides of said frusto-conical end of said bobbin.

3. In a bobbin winding machine employing rotary bobbin driving drums and uniformly reciprocable yarn guide eyes operating parallel to the axes of said drums at opposite sides respectively of the longitudinal median plane of the machine, a bobbin building motion associated with each of a pair of oppositely disposed drums, a bobbin carrier associated with each of said pair of drums, a rotatable and axially shiftable pivot bar for each carrier, a common supporting bracket for said pivot bars, a cam follower on each carrier, and a double-edge cam plate carried by said common bracket and engaged by said cam followers.

4. A bobbin building motion for a yarn winding machine having a bobbin driving drum and a reciprocable yarn guide operable parallel to the axis thereof, said motion comprising a lever pivoted adjacent one end thereof about an axis parallel to the axis of said drum, a carrier at the other end of said lever for maintaining a bobbin in peripheral rolling contact with said drum, and cam means at the first named end of said lever arranged to resist rocking of said lever due to radial enlargement of said bobbin and to effect axial shifting of said bobbin relative to the limits of reciprocation of said guide, said cam means adjustable to vary the ratio of the said rocking movement of the lever to the resulting axial shifting movement of the bobbin.

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