June 2, 1925. 1,539,972

F. C. TODD

CONE SUPPORT FOR WINDING MACHINES

Filed Oct. 31, 1924

FIG. 1.

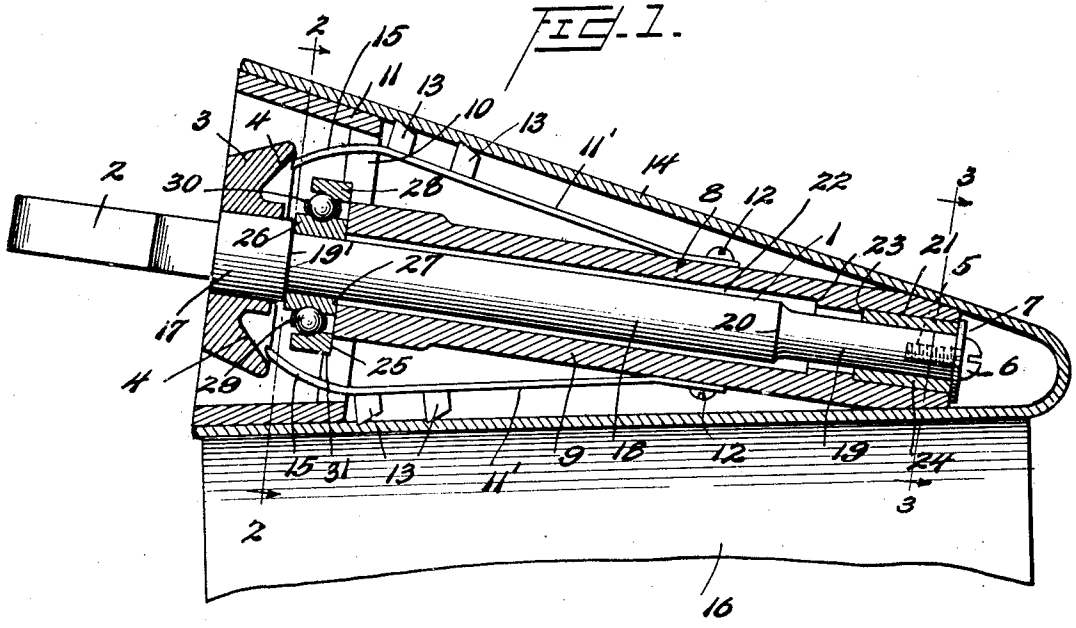


FIG. 2.

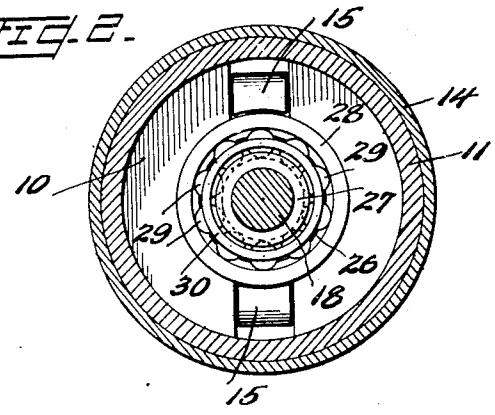
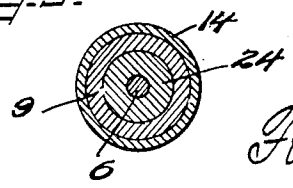


FIG. 3.



Inventor

Floyd C. Todd

By H. H. Benjamin

Attorney

Patented June 2, 1925. 1,539,972

UNITED STATES PATENT OFFICE.

FLOYD C. TODD, OF GASTONIA, NORTH CAROLINA.

CONE SUPPORT FOR WINDING MACHINES.

Application filed October 31, 1924. Serial No. 747,019.

To all whom it may concern:

Be it known that I, FLOYD C. TODD, a citizen of the United States, residing at Gastonia, in the county of Gaston and State of North Carolina, have invented certain new and useful Improvements in Cone Supports for Winding Machines, of which the following is a specification.

My invention relates to cone-winding machines, that is to say machines adapted to wind cotton or other yarn upon cones of paste-board or the like, said cones being the commercial form in which such yarns are prepared for use upon knitting machines or analogous devices. My invention relates particularly to that part of such machines the function of which is to support and to rotate the cone to wind the yarn thereupon, and has particular reference to a particular and widely used type of machine, in which the cone arbor, or part which supports the cone, is rotated upon a stationary spindle by means of a rotating cylinder which makes frictional contact with the cone or the yarn wound thereupon.

It is old to use in connection with such machines a stationary spindle lying in a direction slightly tilted from the horizontal and to fit upon this spindle a cone supporting arbor, said arbor comprising a hollow, cylindrical shank having a bore of sufficient size to make an easy but not loose fit upon the spindle, said spindle having a collar at one end and a screw and washer at the other end by which the spindle is retained in said bore, and said arbor having in addition a flange, perpendicular to said shank and upon the outer edge of said flange an apron or so-called cone surface upon which the lower end of the paste-board cone rests. The arbor in addition has certain cone securing devices which are familiar to those skilled in this art and which as they do not relate to my present invention need not be further discussed.

The arbor support mentioned is the one most widely used upon machines of this type, many thousands being in use at the present time especially for winding cotton yarn, and it has the advantages of simplicity and easy replacement and relative cheapness over more complicated devices used for the same purpose. It has certain defects, however, which greatly impair its usefulness, one of which being that it must be constantly lubricated by hand, oil holes being provided in the shank of the cone arbor for that purpose, and when so oiled, especially by the relatively low grade of skilled labor employed in the cotton mills, the lubrication is often carelessly done with the result that oil is thrown out or spilled upon the yarn of adjacent cones, ruining the same, or the bearing is not adequately lubricated and quickly wears out. At best, the spindles and arbors have a very short life, the arbor soon wearing loose upon the spindle, the spindle being scored and worn whereupon the arbor and spindle must be replaced, the old arbor and spindle when discarded having no commercial value except as "junk" metal.

Many attempts have been made to overcome the disadvantages of these cone supports and devices have been designed in which the cone arbor is supported in ball or other non-friction bearings, but these are relatively complicated and expensive and require structural changes in the winding machine itself and so far as I am aware have not come into any extensive use in the industry.

An object of my invention is to provide an antifriction cone-supporting device which is readily interchangeable with the standard cone supporting device now in use upon such machines, the use of which does not involve any structural changes in the machine itself.

A further object of my invention is to provide such a device in which no lubrication of the spindle or arbor shank is required, the only lubrication being upon a bearing of such nature that it will need lubrication only at infrequent intervals and so situated as to protect the yarn from splashed or spilled oil.

A further object of my invention is to provide such a device as will be attached to the winding machine in precisely the same way as the cone supports now in use, thus obviating the necessity of instructing the labor now employed in the method of using the new device.

A further object of my invention is to provide such a device as may be used for replacement purposes as the present supports now in use wear out without the necessity of replacing still usable devices of the old type all at one time.

A further object of my invention is to provide such a device as may be constructed in large part of the old elements of the cone supports now in use.

A further object of my invention is to provide such a device as will permit of utilization in its construction of worn out spindles and cone arbors, which are otherwise useless, and by the saving thus effected to more than offset the cost of the parts which must be added in order to produce a more efficient anti-friction support.

A further object of my invention is to provide such a device as may be produced by simple machine shop operations, thus obviating the necessity of shipping the worn out spindles and arbors back to the factory for remodeling.

My invention is capable of embodiment in a variety of forms within the spirit of the claims forming part thereof, one of which for purposes of illustration is shown in the accompanying drawings.

In the drawings:

Fig. 1 is a longitudinal section of the cone supporting device with a cone thereon.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a section on line 3—3 of Fig. 1.

1 is a spindle secured to the winding machine frame by its shank 2. Upon the spindle is a loose cup 3 having a cam surface 4.

The spindle is provided with a screw-threaded socket 5 to receive a securing screw 6. Upon the securing screw 6 is a washer 7.

Surrounding the spindle is a cone arbor 8 comprising a cylindrical hollow shank 9, a flange 10 and a skirt or cone surface 11.

Attached to the cone arbor are a pair of spring members 11′ secured by screws 12 and provided with dogs 13 the latter adapted to engage the inner surface of a cone 14 and secure the latter upon the arbor. The ends of the members 11 are turned inward as at 15 to such position as adapts them to be engaged by the cam surface 4 of the cup 3 and by moving this cup (to the right in Fig. 1 of the drawing) the spring members 11 may be flexed inward to cause the dogs to release the cone, whereupon the cone may be removed from the support.

By 16 is indicated a driven cylinder, forming part of the winding machine and adapted to make frictional contact with the cone or the layers of yarn wound thereon and thus revolve the cone and arbor upon the spindle as an axis.

The structure so far described is old and a part of winding machines of the type to which my invention relates.

In my improved device, the spindle 1 is of reduced diameter to have a very loose fit within the bore of the shank 9 of the cone-arbor 8. The spindle is preferably of greatest diameter at the butt end 17 with an intermediate portion 19 smaller than the butt and an end portion 18 smaller than the intermediate portion 18, thus forming a shoulder 19′ between the butt and the intermediate portion and a shoulder 20 between said intermediate portion and said end portion.

The bore of the shank 9 is of considerably greater diameter than the greatest diameter of the spindle and is preferably not of uniform diameter but the internal diameter of its bore is greatest at the end 21 and reduced through the portion 22, thus forming a shoulder 23. Within the portion 21 is a bushing 24, which I preferably make of wood, said bushing being of such a length as to extend from the end of the shank 9 to the shoulder 23 whereby it may be retained in position by said shoulder and the washer 7. The bushing has a snug fit within the bore of the shank 9 and a snug but not binding fit upon the end portion 19 of the spindle 1. The flange 10 of the arbor 8 is provided with a circular recess 25 concentric with the bore of the shank 9 and opening into said bore.

Between the arbor 8 and the spindle 1 is a thrust bearing 26, preferably a ball thrust bearing and shown as having an inner ring 27 and an outer ring 28, said rings being separated by and forming a race for balls 29. A ball retaining frame 30 may be inserted between the rings.

The ring 27 of the bearing 26 has a driven or wedging fit upon the intermediate portion 18 of the spindle 1 and abutting against the shoulder 19.

The ring 28 of the bearing 26 has a wedging fit against the peripheral wall 31 of the recess 25.

To position a yarn receiving cone upon the arbor and wind the yarn thereupon, the spindle 1 which is attached to the frame of the winding machine is swung upon a pivot (not shown) away from the drive cylinder 16. The cone is placed over the arbor and the open end positioned on the cone surface 11 at the same time the cup 3 is moved forward in a direction toward the pointed end of the cone and the cam surface 4 engages the spring members 11 and moves them inward, thus moving the dogs 13 inward. When the cone is in position, the cup is released and the spring members 11 move the dogs 13 outward to secure the cone. The spindle is then turned upon its pivot to position the cone upon the driving cylinder 16 so that the cone is revolved by said cylinder, the cone being supplied with yarn by mechanism of the winding machine (not shown). I have found that in practice as the cone is revolved by the cylinder, the arbor is forced against the thrust bearing 26 which carries practically the whole weight and the bushing 24 is necessary only to preserve the alinement and thus receives

little wear and may be made of material such as wood which does not require lubrication and so lubrication of the bore of the shank of the arbor may be dispensed with and thus the danger of oil being thrown upon adjoining yarn cones avoided. The ball thrust bearing does require light oiling at infrequent intervals but as this is positioned within the skirt 11 of the arbor 8, the danger of oil being thrown outward upon the yarn of adjoining cones is avoided.

To make my improved device, I take a spindle and arbor of the type described preferably using for economy a worn out and discarded spindle and arbor.

The spindle is placed in a tool such as a lathe and the diameter reduced so as to make it fit loosely within the bore of the arbor shank, thus removing any scored or worn surfaces of the spindle. The sections 17, 18 and 19 are turned to the required diameters thus producing shoulders 19 and 20.

The shank of the arbor is also bored out upon a lathe or other tool and at the same time the recess 25 may be produced in the flange 10. The bore of the end of the shank is enlarged forming the shoulder 23. The wooden or other bushing is then inserted in the bore of the shank abutting against the shoulder 23.

The thrust bearing in assembled form and having an internal diameter adapted to give it a binding fit upon the intermediate portion 18 of the spindle 1 is placed over said spindle and forced along until it abuts against the shoulder 19. The spindle is then placed within the arbor and moved forward until the outer ring of the bearing is forced into the recess of the flange 10. The retaining screw 6 with the washer 7 thereon is screwed into the socket 5 thus securing the arbor and spindle in fixed relation.

It will be noted that the mode of attaching the cone to my improved supporting device is identical with that required with the old supporting device herein described, thus obviating the necessity of instructing the winder-hand in the use of the new device.

What I claim to be new is:

1. In a cone supporting device for winding machines and the like, a stationary spindle, a cone arbor upon said spindle, said bearing comprising a pair of concentric flanges with balls between, one of said flanges having a wedging fit upon said spindle and the other flange a wedging fit within said arbor.

2. In a cone supporting device for winding machines and the like, a stationary spindle, a cone arbor surrounding said spindle, said arbor provided with a recessed flange adjacent one end of said arbor and a ball thrust bearing seated in said recess and revolvably supporting said arbor from said spindle.

3. In a cone supporting device for winding machines and the like, a stationary spindle, a cone arbor surrounding said spindle, said cone arbor having a cylindrical hollow shank, a flange substantially perpendicular to said shank, and a cone surface at the periphery of said flange, a thrust bearing fitting within a recess of said flange and a bushing fitting within the bore of said shank, said bearing and bushing supporting said arbor in spaced relation to said spindle.

4. In a cone supporting device for winding machines and the like, a stationary spindle, a cone arbor surrounding said spindle, said cone arbor having a cylindrical hollow shank adapted to receive the spindle, a flange at one end of said shank substantially perpendicular thereto, said flange having a recess concentric with the bore of said shank and a ball thrust bearing having a wedging fit within said recess and a wedging fit upon said spindle whereby said arbor is supported in revolvable relation to said spindle.

5. In a cone supporting device for winding machines and the like, a stationary spindle, said spindle comprising a butt section, a middle section of less diameter than the butt section and an end section of less diameter than said middle section, a cone arbor surrounding said spindle, said cone arbor having a hollow cylindrical shank, a flange at one end of said shank and substantially perpendicular thereto, a recess in said flange concentric with the bore of said shank, a bushing adjacent the end of said shank and a bearing fitted in said recess, said bushing and bearing supporting said arbor in revolvable relation to said spindle.

6. In a cone supporting device for winding machines and the like, a stationary spindle, said spindle having three cylindrical sections of progressively decreasing diameter, a cone arbor surrounding said spindle, said cone arbor having a hollow cylindrical shank, a flange at one end of said shank and substantially perpendicular thereto, a recess in said flange concentric with the bore of said shank, a ball thrust bearing positioned between the peripheral wall of said recess and a section of said spindle, and a bushing positioned between the bore of said shank and a smaller section of said spindle.

7. In a cone supporting device for winding machines and the like, a stationary spindle, said spindle having three cylindrical sections of progressively decreasing diameter, a cone arbor surrounding said spindle, said cone arbor having a hollow cylindrical shank of uniform bore, a flange at one end of said shank and substantially perpendicular thereto, a recess in said flange concentric with the bore of said shank, a channeled ring

having a wedging fit within said recess, and a second channeled ring having a wedging fit upon the intermediate cylindrical section of said spindle and against the section of said spindle which is of the greatest diameter, said rings forming together the raceway of a ball thrust bearing, and a wooden bushing adjacent the extremity of said shank and forming a bearing surface for the cylindrical section of said spindle of least diameter.

In testimony whereof I affix my signature.

FLOYD C. TODD.