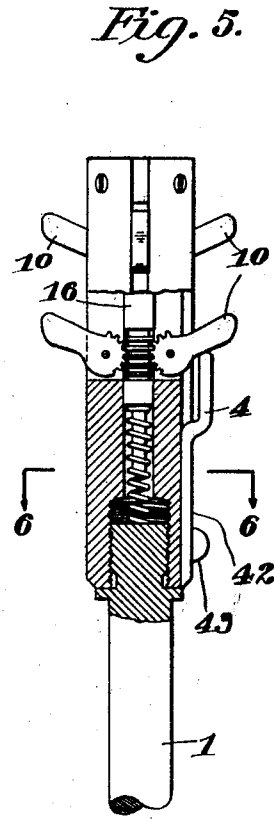
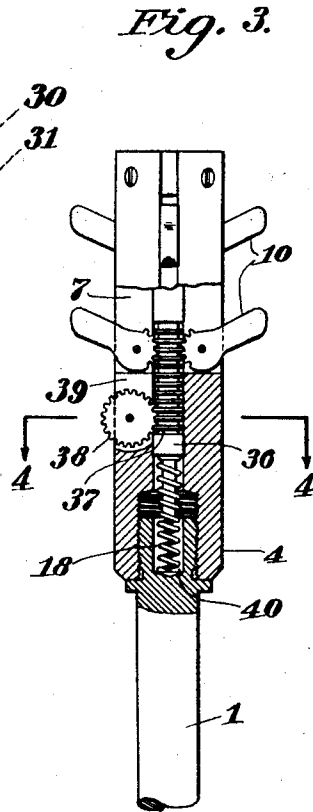
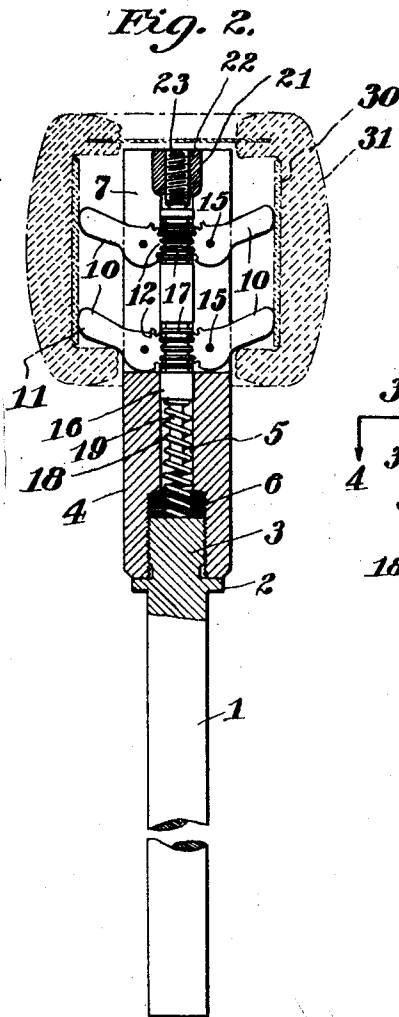
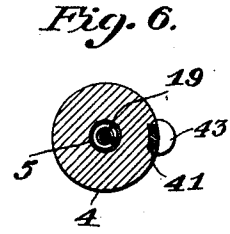
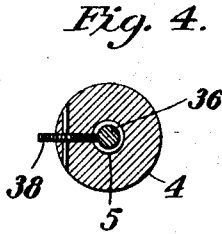
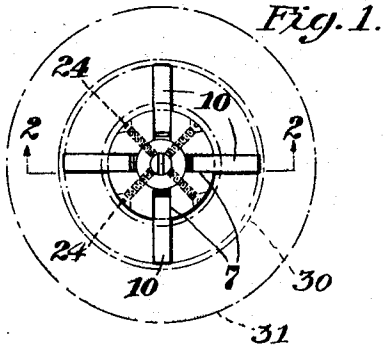


1,333,632.

Patented Mar. 16, 1920.



Inventor,
Elmer D. Robinson
by Roberts, Roberts & Cushman
his Attorneys

UNITED STATES PATENT OFFICE.

ELMER D. ROBINSON, OF CAMBRIDGE, MASSACHUSETTS.

SPINDLE.

1,333,632.

Specification of Letters Patent. Patented Mar. 16, 1920.

Application filed July 15, 1918. Serial No. 244,845.

To all whom it may concern:

Be it known that I, ELMER D. ROBINSON, a citizen of the United States of America, and resident of Cambridge, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Spindles, of which the following is a specification.

This invention relates to spindles, and especially to spindles adapted for winding or spinning machines intended to form a cop, ball or other wound package of material on a tube, quill or carrier, the invention relating especially to devices for removably supporting the carrier, tube or quill on which the wound mass is formed upon the spindle of the machine.

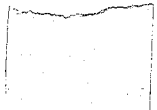
It has heretofore been proposed to employ many different kinds of connections for assembling the spindle and the bobbin, spool, tube or other carrier core for yarn or cordage being wound, the object in each case being to support the carrier, such as a tube of paper, in the proper position longitudinally and with respect to the center of rotation of the spindle and temporarily hold it against rotation on the spindle. I am not aware of any such device which is wholly satisfactory, common objections to them being lack of capacity for delicate or any adjustment, lack of adaptability to rapid loading or doffing, lack of certainty of holding power, and lack of capacity to define a cylindrical surface accurately central with respect to the winding spindle.

Objects of the present invention are therefore to provide a connector between spindle and carrier for the material being wound which shall be adapted to be delicately adjusted, which when adjusted shall define the position of the tube, quill, or other wound-mass carrier accurately in relation to the center of rotation, and which shall be adapted to release and receive by rapid movement of the operator a continuous succession of like quills or carriers without shifting the adjustment. Other objects of the invention are to provide a device of the improved characteristics mentioned which shall also be adapted to permit a ball overwound within the cylinder defined by the tube, quill or carrier to be doffed without disturbing the overwound end of the ball.

In the accompanying drawings, Figure 1 is a plan view; Figure 2 is a section on the line 2—2 of Fig. 1; Figure 3 is a view similar to Fig. 2 illustrating a modification; Figure 4 is a section on the line 4—4 of Fig. 3; Figure 5 is a view similar to Fig. 3 of another modification; and Figure 6 is a section on the line 6—6 of Fig. 5.

The spindle 1 may be of any desired or suitable construction but preferably comprises a flange 2 and screw threaded head 3 by which the spindle is adapted removably to receive a connector head 4 having a suitable axial bore 5 counter-bored and threaded at 6 for attachment to spindle 1.

The head 4 is radially slotted at 7 to receive any desired number of like carrier-holder arms 10, preferably made as lever arms having rounded outer ends 11 and gear segments 12 at their inner ends, central upon pivots 15 in bores in the arms 10 and head 4, and in planes perpendicular to the slots 7 and equidistant from the axis of the bore 5 and head 4. The arms 10 are arranged in outer and inner like series, but are all connected to move together about the pivots 15 by a common connection of the sort operating as a connection under both tensile and compression stresses, commonly known as a positive connection, and preferably made as a plunger 16 turned to a running fit in the bore 5 and having thereon cylindrical racks 17, 17, at suitable distances apart to engage the gear segments 12. The arms 10 are normally maintained projected outwardly from slots 7 by a spiral spring 18 surrounding a reduced end 19 of the plunger 16, and their maximum projection from the head 4 is adjustable by a suitable stop for the plunger 16. Preferably the head 4 is counter-bored at 21 to receive a plug 22 bored and threaded for a micrometer screw 23, the lower end of which constitutes the stop for the plunger 16. Preferably the plug 22 is held in place and the head 4 strengthened and made rigid by strong connections such as the screws 24, Fig. 1. Upward pressure on any of the arms 10 operating through the connection 16 moves all of the arms 10



of both series inward at the same angle, and at the extreme point of inward motion of the arms 10, houses all of the arms 10 in the slots 7 within the cylindrical surface of the head 4.

In a typical use the screw 23 is adjusted at the beginning of a day's work for the numerous spindles required to produce the desired number of balls or other packages of yarn or cordage to be wound on tubes 30 of a selected size. When so adjusted, the tubes 30 may be thrust upon the rounded outer ends of the arms 10 and held thereby in accurate relation without requiring any adjustments of the operator, or consuming any time. As illustrated in Fig. 2 the wound mass may be a ball 31 wound over the ends of the cylindrical tube or quill 30, and in that case doffing the complete ball is permitted by the uniform yielding of the arms 10, by reason of which the over-wound lower end of the ball is less disturbed by dragging over the arms than would be the case if one arm could yield more than another.

For some kinds of ball it is desired to relieve the yarn over-wound at the end of the quill from the duty of lifting the spindle and quill connector arms 10. This may be accomplished by providing a hand-operated connection between a place on the head 4 not occupied by the wound mass and the plunger operating the arms 10.

As illustrated in Fig. 3, a plunger 36 may be employed having a rack thereon at 37 adapted to be engaged by a pinion 38 housed in an extension 39 of one of the slots 7. The pinion 38 projecting beyond the surface of the head 4 provides an accessible thumb wheel by which the plunger 36 may be moved downwardly to retire the arms 10 into their slots 7. To provide room for a plunger long enough to carry the rack 37, the spindle 1 may be bored out as shown at 40 to receive the spring 18.

Another way of accomplishing the same purpose is shown in Figs. 5 and 6. The arms 10 being connected together as explained above it is sufficient to move one of them in order to move all of the others, and I may therefore provide an under-cut key way 41 in the head 4 in which a slide 42 having a thumb-piece 43 can move, the slide 42 being outwardly bent at 44 to take against one of the arms 10, so that the slide 42 can move against an arm 10 to lift it and all of the other arms at the same time.

What I claim is:

1. A spindle for winding having thereon series of pivotally mounted arms in series at different positions longitudinally of the spindle adapted to receive a carrier, and means positively connecting said series together for like angular movement of each

arm in both directions with respect to the axis of the spindle.

2. A spindle for winding having thereon series of pivotally mounted arms adapted to receive a carrier, means positively connecting arms of said respective series together for like angular movement in both directions with respect to the axis of the spindle, and means tending to displace said arms outwardly from the axis.

3. A spindle for use in winding machines having a head thereon, series of arms mounted on the head in radial planes, and means within the head positively connecting arms in different series in the same radial plane together whereby angular movement with respect to the axis of the spindle and one of said arms causes like angular movement of the remaining arms.

4. A spindle for use in winding machines having a head thereon, arms mounted on the head in different positions along the axis, means connecting said arms together whereby angular movement with respect to the axis of the spindle of the one of said arms causes like angular movement of the remaining arms, and means for simultaneously adjusting the maximum movement permitted the arms in one direction.

5. A spindle for use in winding machines having a head thereon, a plurality of series of like yielding arms radially and movably mounted on the head, and means for simultaneously adjusting the maximum distance from the axis of the spindle of the ends of said arms within which the arms can yield and return.

6. A spindle for use in winding machines having a head thereon, radially mounted arms at different places along the axis of the head, means positively connecting said arms together whereby angular movement with respect to the axis of the spindle of one of said arms causes like angular movement of all of the remaining arms, and means acting on the connection between said arms tending to move the arms outwardly away from the axis of the spindle.

7. A spindle for use in winding machines having a head thereon, radially mounted arms on the head, means positively connecting said arms together whereby angular movement with respect to the axis of the spindle of one of said arms causes like angular movement of the remaining arms, means acting on the connection between said arms tending to move the arms outwardly away from the axis of the spindle, and a stop for adjusting the maximum outward displacement of said arms.

8. A spindle for use in winding machines having a head thereon, radially mounted arms on the head, means positively connecting said arms together whereby angular

movement with respect to the axis of the spindle and one of said arms causes like angular movement of the remaining arms, means acting on the connection between said arms tending to move the arms outwardly away from the axis of the spindle, and a micrometer screw stop for adjusting the maximum outward displacement of said arms.

9. A winding machine having therein a spindle, a plurality of series of arms pivotally mounted on the spindle, means positively connecting said arms together for like angular movement with respect to the axis of the spindle, and means on the spindle accessible at a place exterior to the wound mass for hand operation whereby the arms of all of the series may be retracted.

10. A winding machine having therein a spindle, arms pivotally mounted on the spindle, means positively connecting two or more of the arms lying in the same radial plane at different axial positions together for like angular movement with respect to the axis of the spindle, and means on the spindle for moving said arms and connec-

tion by hand to retract the arms and release a wound mass held thereby.

11. A spindle and carrier connector for use in winding machines comprising a head adapted to be fastened on the spindle and having therein a longitudinal bore and radial slots, arms having gear sectors at their inner ends pivoted in said slots, a plunger in said bore having thereon racks engaging said sectors, and a spring housed in said bore between spindle and head adapted to act on said plunger to force said arms outwardly.

12. A spindle and carrier connector for use in winding machines comprising a head adapted to be fastened on the spindle and having therein a longitudinal bore and radial slots, arms having gear sectors at their inner ends pivoted in said slots, a plunger in said bore having thereon racks engaging said sectors, an adjustable stop for the plunger, and a spring for normally holding the plunger against the stop.

Signed by me at Boston, Massachusetts, this eighth day of July, 1918.

ELMER D. ROBINSON.