

J. H. SHEARN.
 COLLAPSIBLE SPINDLE.
 APPLICATION FILED FEB. 5, 1918.

1,296,864.

Patented Mar. 11, 1919.

Fig. 2.

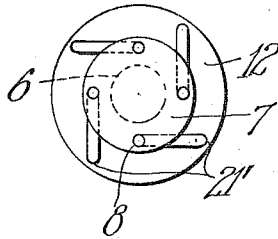


Fig. 1.

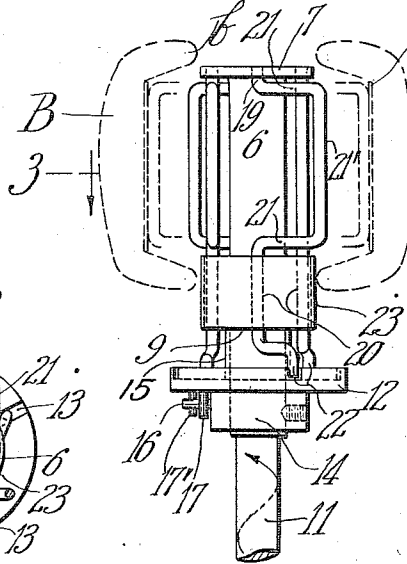


Fig. 4.

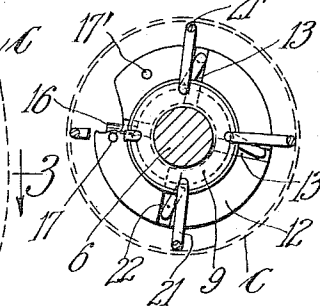
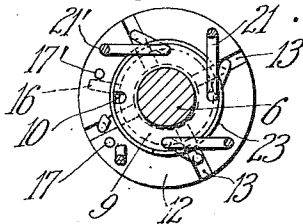


Fig. 3.



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COLLAPSIBLE SPINDLE.

1,296,864.

Specification of Letters Patent.

Patented Mar. 11, 1919.

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To all whom it may concern:

Be it known that I, JOSEPH H. SHEARN, a citizen of the United States, residing at Leeds, in the county of Hampshire and State of Massachusetts, have invented certain new and useful Improvements in Collapsible Spindles, of which the following is a specification.

This invention relates to improvements in collapsible spindles used in connection with winding machines and on which a hollow core is commonly placed for the purpose of being rotated and wound with yarn or the like. The yarn is preferably wound so as to form a hollow ball, with two inwardly-extending end portions, one at each end. The end openings of the finished ball are in diameter less than the diameter of the cylindrical core on which the ball is formed. According to my invention, I provide improved core-engaging or holding means or members movable as desired, to collapsed or expanded positions, to hold or release the core in the winding or releasing functions. According to one feature of the invention, I provide improved construction, arrangement, and mode of operation for the core-engaging members.

An embodiment of my improved structure will now be described with reference to the following drawing, in which—

Figure 1 is an elevation of the collapsible spindle with the core-engaging members in their collapsed position. The expanded position of the engaging members, the core, and the ball of yarn are shown in dotted lines;

Fig. 2 is a plan view of the spindle with the core-engaging members shown in their collapsed position;

Fig. 3 is a cross-section on the line 3—3 of Fig. 1 with the core-engaging members in a collapsed position; and

Fig. 4 is a cross-section on the line 3—3 of Fig. 1 with the core-engaging members in an expanded position and engaging the core shown in dotted lines.

As illustrated, the spindle comprises the shaft 6 having on its upper end the flange 7 in which are located concentrically and in spaced apart relation the openings 8. The flange or hub 9 of the shaft has on its periphery the semi-circular grooves 10 in axial alinement with the openings 8 of the flange 7. The lower axial shank portion 11

of the shaft is adapted for engagement with any suitable rotating means, such, for example, as the chuck of a winding machine. The disk 12 having the radial slots 13 may be oscillated on the shaft 6 and is retained longitudinally thereon by the set collar 14 and the spacing sleeve 15 adjacent the hub 9. The stop-pin 16 of the set collar 14 lies between the pins 17 17' of the disk. These pins limit the angular movement of the disk by their abutting engagement with the pin 16.

The core-engaging members are preferably made of wire bent to the form illustrated and consist of the bearing portions 19 and 20 in axial alinement and the spacing portions 21 connecting with the offset core-engaging portions 21' which are parallel with the alined bearing portions. The lower ends of the rods are bent at right angles to the bearing portions in the form of cranks 22 which are in engagement with the slots 13 of the disk 12. The cranks also are offset in an angular relation with the core-engaging portions 21', as will be seen by referring to Figs. 3 and 4. The core-engaging members are mounted on the spindle by their bearing portions 19 being pivoted in the openings 8 of the shaft flange, and their bearing portions 20 in engagement with the groove 10 of the shaft hub, the latter bearing portions being retained within the grooves by the tubular sleeve 23 encircling and fitting tightly the hub of the shaft. The core-engaging members are thus mounted for oscillation freely from a collapsed to an expanded position, or vice versa.

The core engaging members when in the collapsed position, as best shown in Fig. 3, are limited from a further collapsing movement toward the center of the spindle. This limitation is accomplished by the cranks 22 of the core-engaging members having brought the stop-pin 17' into abutting engagement with the pin 16. From the collapsed position the core-engaging members are adapted to oscillate with a relative uniform movement to an approximate radial position with respect to the axis of the spindle. To overcome any collapsing tendency due to radial pressure, the core-engaging members are arranged to oscillate into the expanded position shown in Fig. 4, in which position it will be seen that the spacing portions 21 of the core-engaging members lie

preferably at a slight angle to the radius. When in this expanded position, the rods are prevented from a further rotation by reason of the cranks 22 having turned the disk 12, which action brings the pin 17 in abutting relation with the pin 16. Thus, it will be seen that pressure applied to the face of the core-engaging members, and in a direction toward the center of spindle and radial thereto, will not cause their rotation in a direction to collapse them, but will serve to maintain them in the locked expanded or open position, as shown in Fig. 4.

In practice, the spindle is suitably mounted in a winding machine, as by securing the shank 11 in a rotatable chuck or any other suitable holding means. With the pins 16 and 17' in abutment, the core-engaging members 21' are positioned so as to permit a tubular core to be slipped axially thereupon. The core as used is of substantially uniform diameter from end to end and its internal diameter is slightly less than the diametrical distance between the outer core-engaging surfaces of two opposite members 21', when in expanded position. Thus, such members, when expanded by turning disk 12 relatively to shank 11 until pins 16 and 17 abut, will firmly hold the core by frictional engagement.

The usual operation of winding is begun, preferably while the spindle is at rest, by first putting the end of the yarn into a suitable cut made in the core, or otherwise securing the yarn and core, after which the yarn may be led thereon in any desired form, but preferably in the form of a ball, as at B (Fig. 1). When the yarn is thus wound, it is desirable to extend the winding beyond the ends of core to form the annular and inwardly-extending end portions *b*. When the ball has been wound to the desired size and shape, the machine usually stops automatically and the yarn led to it is severed in the usual manner, after which the ball is removed by the operator. The removal is accomplished by grasping the completed ball and giving the ball a slight twist to bring pins 16 and 17' into engagement, which will cause the core-engaging members to swing to collapsed position as in Fig. 3. In the collapsed position the core-engaging members are in position to readily permit the passage of the end portions *b*. After the removal of the ball, another core is slipped on the members, while in collapsed

position, and the members may then be moved to expanded position by the turning of the disk 12 until the pins 17 and 16 are brought into abutment.

Having described and illustrated the preferred embodiment of my invention, it will be seen by reference thereto that many changes may be made in its specific form without departing from the scope of my invention.

What I claim is:

1. A collapsible spindle, comprising, a spindle, and core holding devices pivotally mounted thereon to swing about axes substantially parallel to that of the spindle from collapsed to radial positions and beyond to expanded and core holding positions, mechanism independent of the core and engageable with each of said devices to maintain a relative uniform movement of the latter, and means to limit the angular movement of said devices.

2. A collapsible spindle, comprising in combination pivotally-mounted core-holding devices for engaging a core of yieldable material and arranged to swing about axes parallel to the axis of the spindle between collapsed and expanded positions and mechanism coöperating with said core-engaging devices to maintain uniform movement thereof between collapsed and expanded positions irrespective of the engagement with said yieldable core.

3. A collapsible spindle, comprising in combination, pivotally-mounted core-engaging devices constructed and arranged on axes parallel to the axis of said spindle and adapted to swing between collapsed and expanded positions, an oscillatable disk, said core-engaging devices having crank portions in engagement with said disk, a pair of stops in spaced relation, and a stop-pin on the spindle arranged between said pair of stops to restrict the angular movement of the core-engaging devices in either direction.

4. A collapsible spindle, comprising in combination, a main spindle portion, two spaced flanges on the spindle, core-holding devices pivoted on the flanges on axes parallel to the main spindle portion, a disk mounted on the spindle for limited oscillation, and means connecting the disk and said devices whereby the latter must operate together in uniform relation between the holding and releasing positions.

JOSEPH H. SHEARN.