

March 8, 1949.

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2,463,591

BOBBIN-SPINDLE ASSEMBLY

Filed Nov. 30, 1944

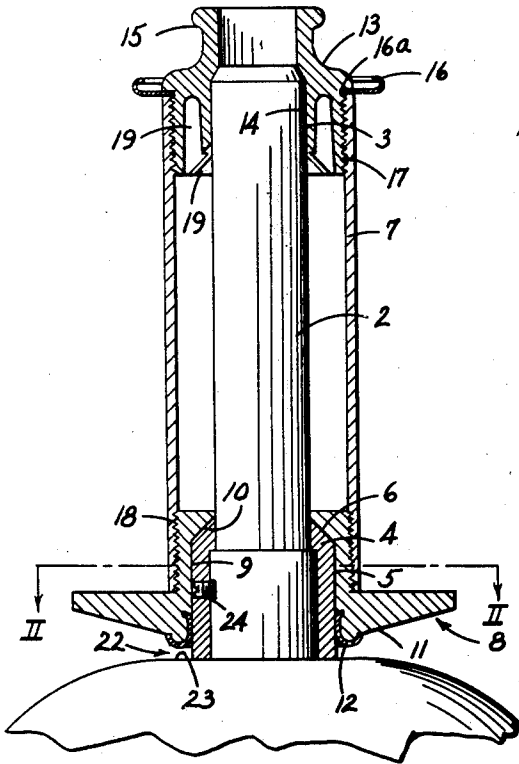


Fig. 1

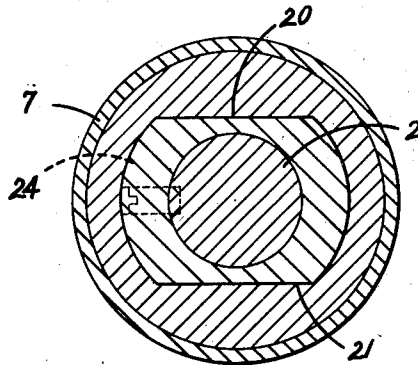


Fig. 2

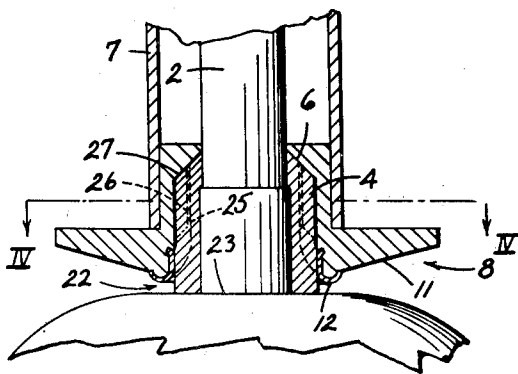


Fig. 3

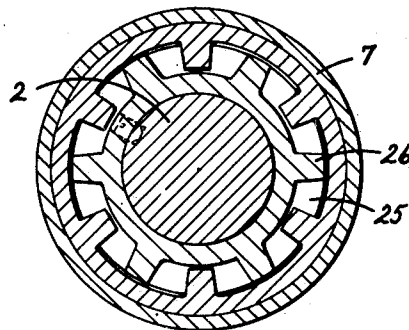


Fig. 4

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2,463,591

BOBBIN-SPINDLE ASSEMBLY

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Application November 30, 1944, Serial No. 565,875

7 Claims. (Cl. 242—46.2)

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This invention relates to an improved bobbin and spindle assembly for use in winding machines.

In a conventional bobbin-and-spindle assembly, the bottom flange of the bobbin usually rests on a seat which may be constituted by a clutch plate driven by the motor or by a machined surface of a housing for the motor driving the spindle, or by a whirl or a member attached to or connected with the whirl, there being provided, usually, a mechanical clutch means, as for instance, projecting lugs on the spindle and complementary recesses on the bobbin for insuring a positive drive relation between the spindle and bobbin. In such an arrangement, the juncture between the bottom of the bobbin and its seat provides a trap in which thread may be caught during lacing up or winding operations. Unless the operator is careful to remove all such trapped thread after each doffing, it frequently builds to such an extent that it prevents proper seating of the bobbin causing displacement thereof axially of the spindle, which results in poorly and irregularly built thread packages. Further, the trapped thread may ride upon the spindle during rotation thereof in the interim between doffing and reloading, particularly, when, as is often the case, the spindle tapers off upwardly. In such instances, the external surface of the tapered spindle and the substantially cylindrical internal surface of the bobbin do not bear upon each other sufficiently, or along a sufficient portion of their lengths, to force the thread downwardly on the spindle when a fresh bobbin is placed thereon, so that each new bobbin rides higher on the spindle, and badly wound thread packages are obtained. Removal of the trapped thread after each winding operation requires the expenditure of a considerable amount of the operator's time and this, together with the poorly built thread packages obtained when the trapped thread is not removed are disadvantages which are inherent in bobbin and spindle setups known heretofore. The present invention has as its main object the provision of a bobbin and spindle assembly in which any thread trapped below the bobbin is prevented from effecting axial displacement of the bobbin on the spindle. Another object is to provide an assembly in which thread trapped below the bobbin and which rides up on the rotating spindle during or after a doffing operation is forced down on the spindle out of contact with the bobbin when the latter is replaced on the spindle. A further object is to provide a bobbin and spindle assembly in which

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the bobbin is automatically self-centering on the spindle and is held in firm engagement therewith.

Essentially, the improved assembly of this invention comprises a spindle having a conically shaped external bearing surface disposed intermediately of two axially spaced substantially cylindrical external bearing surfaces, and a bobbin having a conically shaped internal bearing surface disposed intermediately of two axially spaced substantially cylindrical internal bearing surfaces the lower of which terminates short of the bottom of the lower cylindrical bearing surface of the spindle, the bearing surfaces of the bobbin and spindle being complementary and the conically shaped bearing surface of the bobbin being adapted to overlie and rest upon the conically shaped bearing surface of the spindle to provide an internal support for seating the bobbin on the spindle with its bottom free of support below.

In the accompanying drawing in which there is shown one form of assembly embodying the features of the invention,

Figure 1 is an elevational view, in cross-section, of a bobbin and spindle assembly;

Figure 2 is a cross-sectional view taken on line II—II of Figure 1,

Figure 3 is a fragmentary view of another embodiment of the invention; and

Figure 4 is a cross-sectional view taken on line IV—IV of Figure 3.

Referring to the drawing, reference numeral 2 indicates a spindle having a substantially cylindrical outer bearing surface 3 and provided at its lower end with a bushing 4 tightly fit thereon or keyed thereto and having a substantially cylindrical outer bearing surface 5 which is contiguous with a conical outer bearing surface 6. A bobbin 7 is shown positioned on the spindle. The bobbin is provided at its lower end with a demountable member 8 having a substantially cylindrical inner bearing surface 9 which is contiguous with a conical inner bearing surface 10. The member 8 terminates in a guiding surface or flange 11 which forms the lower head of the bobbin, and which facilitates placement and removal of the bobbin. A metal ring 12 may optionally be embedded in flange 11 to protect the bobbin against wear. The bobbin is provided at its upper end with a demountable head member 13 having a substantially cylindrical inner bearing surface 14 which bears against the outer cylindrical surface 3 of spindle 2. The head 13 is provided with a knob 15 and a metallic ring 16 is seated between the barrel of the bobbin and a

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shoulder 16a to provide a flange or upper head for the bobbin. Bobbin 7 is provided at its upper and lower ends with internal screw threads 17 and 18 which have screw-threaded engagement with exterior threads on demountable head member 13 and member 8, respectively. Alternatively, the threaded securement may be replaced by force fit, by welding or by cementing. Member 13 may be provided with a plurality of cut-out sections 19 to lighten the weight of the bobbin. As shown in cross-section in Figure 2, bushing 4 and member 8 are provided with flattened areas 20 and 21 which coincide and function as a positive drive clutch.

In the embodiment of the invention shown in Figures 3 and 4, the outer substantially cylindrical surface of bushing 4 is provided with a plurality of spaced recesses 25, which receive a plurality of ribs 26 on the inner substantially cylindrical surface of member 8, so that a positive drive relationship between the spindle and bobbin is assured. Ribs 26 have conical upper edges 27 which are contiguous with the conical bearing surface of bushing 4, when the bobbin is in position on the spindle.

As will be seen from the drawing, when bobbin 7 is placed on spindle 2, the bearing surfaces on the bobbin are in mating engagement with the complementary bearing surfaces on the spindle and the bobbin is held firmly with the bottom of its lower flange free and unsupported. The engagement of the bobbin with the spindle is such that both axial and rotative movement of the bobbin relative to the spindle is prevented, and the bobbin always runs true for accurate and efficient winding. The assembly has many marked advantages and is extremely simple of construction and practical in use. The bottom of the bobbin does not rest on a support, but is free, so that a clearance 22 is provided between the bobbin and the housing 23 for the motor driving the spindle in which thread trapped during lacing up or winding can accumulate without wedging against the bobbin to cause displacement thereof, and thread which is trapped and rides up on the cylindrical portion of the bushing secured to the spindle during doffing is forced downwardly out of contact with the bobbin, when the latter is replaced on the spindle. Further, the conical shape of the complementary bearing surfaces 6 and 10 forming an internal seat for the bobbin insures that the latter is automatically self-centering on the spindle.

The bobbin may be made of any suitable material, but preferably is made of a light metal such as magnesium, aluminum, or the like or of plastics, such as Bakelite, which, together with the special construction of the bobbin, makes for a well balanced bobbin of extremely light weight.

As shown, bushing 4 is secured to spindle 2 by means of set-screws 24. Alternatively, the bushing may be shrunk-fit to the spindle or it may be cemented or otherwise adhesively and permanently attached thereto.

It is to be understood that the foregoing detailed description is given merely by way of illustration, and that modifications may be made therein without departing from the scope of the invention or the spirit of the appended claims.

I claim:

1. Apparatus for use in a winding machine comprising a spindle having a conically shaped outer bearing surface disposed intermediately of two axially spaced substantially cylindrical outer bearing surfaces, and a bobbin having a conically

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shaped inner bearing surface disposed intermediately of two axially spaced substantially cylindrical inner bearing surfaces, said bobbin and spindle being adapted for assembly with their bearing surfaces in contact, the conical bearing surfaces forming an internal support for seating the bobbin on the spindle with its bottom surface free of direct support below.

2. Apparatus for use in a winding machine comprising a spindle having a conically shaped outer bearing surface disposed intermediately of two axially spaced substantially cylindrical outer bearing surfaces, a bobbin having a conically shaped inner bearing surface disposed intermediately of two axially spaced substantially cylindrical inner bearing surfaces the lower one of which terminates in a guiding surface forming a bottom flange on said bobbin, said spindle and bobbin being adapted for assembly with their bearing surfaces in contact, the conical bearing surfaces forming an internal support for seating the bobbin on the spindle with its bottom surface free of direct support below.

3. Apparatus for use in a winding machine comprising a substantially cylindrical spindle, a bushing surrounding the lower portion of the spindle and having a conically shaped outer bearing surface contiguous with a substantially cylindrical outer bearing surface, a bobbin, a head member for the lower end of the bobbin and having a conically shaped inner bearing surface contiguous with a substantially cylindrical inner bearing surface terminating in a guiding surface forming a bottom flange on said bobbin, a head member for the upper end of the bobbin and having a substantially cylindrical inner bearing surface, said spindle and bobbin being adapted for assembly with their complementary bearing surfaces in contact, the conically shaped bearing surfaces forming an internal support for seating the bobbin on the spindle with the bottom surface of the lower flange thereof free of direct support below.

4. Apparatus for use in a winding machine comprising a substantially cylindrical spindle, a bushing surrounding the lower portion of the spindle and having a conically shaped outer bearing surface contiguous with a substantially cylindrical outer bearing surface, a bobbin, a demountable head member for the lower end of the bobbin and having a conically shaped inner bearing surface contiguous with a substantially cylindrical inner bearing surface terminating in a guiding surface forming a bottom flange on said bobbin, a demountable head member for the upper end of the bobbin and having a substantially cylindrical inner bearing surface, said spindle and bobbin being adapted for assembly with their complementary bearing surfaces in contact, the conically shaped bearing surfaces forming an internal support for seating the bobbin on the spindle with the bottom surface of the lower flange thereof free of direct support below.

5. Apparatus for use in a winding machine comprising a substantially cylindrical spindle, a bushing surrounding the lower portion of the spindle and having a conically shaped outer bearing surface contiguous with a substantially cylindrical outer bearing surface, a bobbin, a head member for the lower end of the bobbin and having a conically shaped inner bearing surface contiguous with a substantially cylindrical inner bearing surface terminating in a guiding surface forming a bottom flange on said bobbin, a reinforcing ring in the flange and positioned about

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the inner periphery thereof, a head member for the upper end of the bobbin and having a substantially cylindrical inner bearing surface, and a flange about the upper periphery of the bobbin between the bobbin and the upper head member, said spindle and bobbin being adapted for assembly with their complementary bearing surfaces in contact, the conical bearing surfaces forming an internal support for seating the bobbin on the spindle with its bottom surface free of direct support below.

6. Apparatus for use in a winding machine comprising a substantially cylindrical spindle, a bushing surrounding the lower portion of the spindle and having a conically shaped outer bearing surface contiguous with a substantially cylindrical outer bearing surface, a bobbin, a head member for the lower end of the bobbin and having a conically shaped inner bearing surface contiguous with a substantially cylindrical inner bearing surface terminating short of the lower end of the bushing on said spindle in a guiding surface forming a bottom flange on the bobbin, a head member for the upper end of the bobbin and having a substantially cylindrical inner bearing surface, said spindle and bobbin being adapted for assembly with their complementary bearing surfaces in contact, said conical bearing surfaces

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forming an internal support for seating the bobbin with the bottom surface of its lower flange free of direct support below.

7. A bobbin having an upper head comprising a substantially cylindrical inner bearing surface, and a lower head comprising a substantially cylindrical inner bearing surface contiguous with a conical inner bearing surface, a metal ring forming an edge on the inner periphery of the head at its lowermost open end, and a flange on the lower head, said flange being integral with the cylindrical bearing surface, extending beyond the peripheral wall of the bobbin, and having a bottom wall which inclines outwardly and upwardly from the metal edge.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
936,526	Evans	Oct. 12, 1909
1,145,662	Baldwin et al.	July 6, 1915
1,156,579	Benjamin	Oct. 12, 1915
1,846,397	Kennedy	Feb. 23, 1932