

Feb. 13, 1940.

C. C. SCHOLL

2,190,085

SPOOL

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Fig. 2

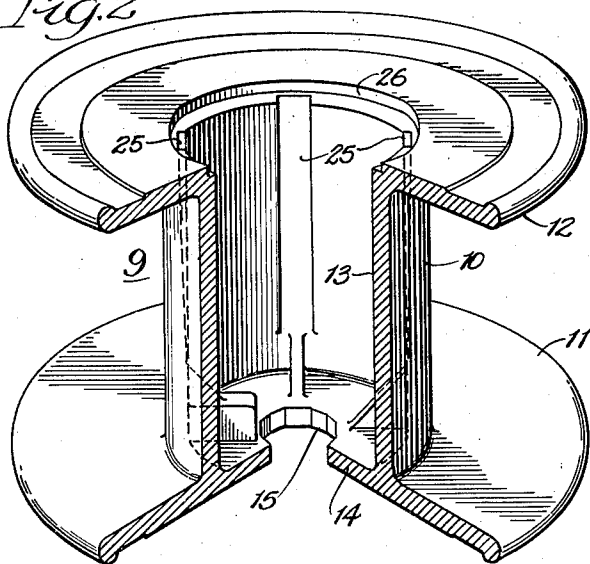


Fig. 4

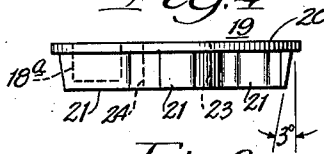


Fig. 3

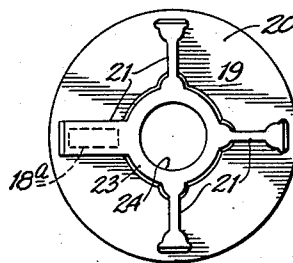


Fig. 1

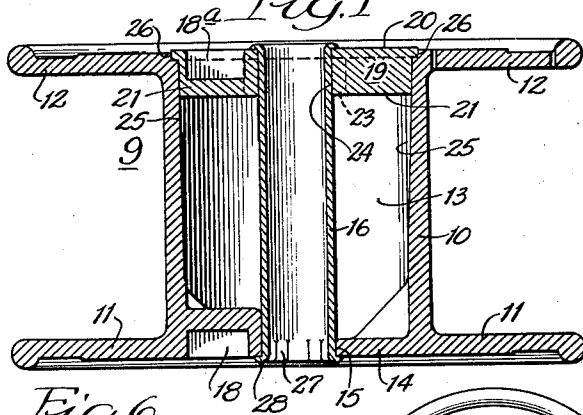


Fig. 5

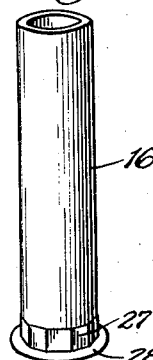


Fig. 6

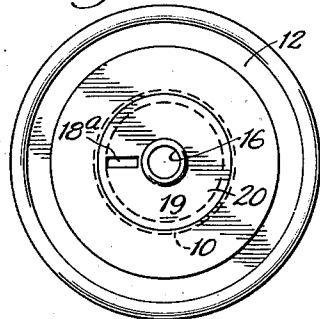
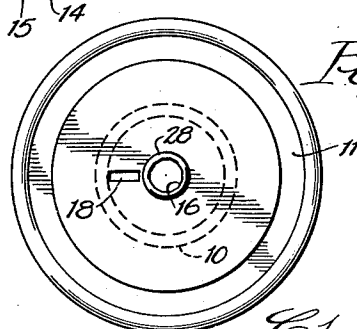


Fig. 7



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UNITED STATES PATENT OFFICE

2,190,085

SPOOL

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4 Claims. (Cl. 242—123)

My invention relates broadly to spools for wire or the like, and has particular relation to wire spools of the type used in connection with automatic, high speed coil winding machines or similar equipment.

Spools of this type are required to meet a number of exacting and to some extent conflicting requirements, and the provision of a fully satisfactory spool for this use has proven a most troublesome problem to the art. In the first place, to minimize winding time and to prevent excessive bending of the wire during spooling and during unspooling, the body of the spool should be of fairly large diameter. At the same time, usual machine operating conditions require that the spool shall be of light weight construction and shall be provided with a small diameter, central bearing, the axis of which coincides with the axis of the spool.

Further, in order to best realize all of the advantages of present day high speed coil winding machines, the spools used in connection therewith should be sufficiently strong structurally to permit a driving mechanism to be applied to one end of the spool and a braking mechanism to be applied to the other end. Also, from an economic viewpoint it is most important that these spools shall be relatively inexpensive.

The principal object of the present invention, therefore, is to provide an improved spool which will fully meet all of the previously enumerated requirements and which can be readily manufactured at low cost, preferably by die casting or molding operations. Other objects and the numerous advantages of my invention will be made clear by reference to the accompanying drawing and the following description of one particularly satisfactory embodiment of the invention. Referring to the drawing—

Figure 1 is an axial sectional view of a wire spool embodying the features of the present invention;

Figure 2 is a perspective view, partially in section, of the unitary body member which constitutes a part of the complete spool illustrated in Figure 1;

Figure 3 is a bottom plan view of the end closure disc forming a part of the spool illustrated in Figure 1;

Figure 4 is a side elevational view of the disc illustrated in Figure 2;

Figure 5 is a perspective view of the central tube forming a part of the spool illustrated in Figure 1; and

Figures 6 and 7 are reduced end elevations of

the completely assembled spool illustrated in Figure 1.

Referring to the drawing, the embodiment of the invention therein illustrated includes a cast or molded unitary body member 9 having a barrel 10 and two outwardly projecting, circular, end flanges 11 and 12 integral therewith. The bore 13 of the tubular body 9 is partially closed at one end by an inwardly projecting annularly shaped member 14 formed integrally with the lower flange 11. The member 14 is provided with a polygonally shaped opening 15 adapted to receive and support the lower end of a bearing tube 16 which extends through the bore 13 of the barrel 10. The central portion of the outer surface of both flanges is flat in order that a brake shoe forming a part of the coil winding or other machine with which the spool is used may be applied thereto, and the lower flange 11 is provided with a rectangularly shaped recess 18 for the purpose of receiving a keying member.

The other end of the bore 13 is adapted to be closed by a separate, annularly shaped disc member 19 illustrated particularly in Figures 3 and 4. This disc member 19 includes a flat surfaced, circular body portion 20, and a plurality of symmetrically arranged ribs 21 cast integrally therewith. One of the ribs 21 is preferably provided with an enlarged portion which is hollowed out in order to provide a key opening 18a at the upper end of the spool. The disc member 19 is also provided with an annular hub 23 adjacent its central portion and a circular opening 24 for receiving the upper end of the bearing tube 16 which extends through the barrel 10.

As will be seen particularly by reference to Figure 4, the outer edge of the ribs 21 forming a part of the washer member are tapered, preferably at an angle of about 3°, and each rib is adapted to engage a cooperating tapered slot or groove 25 formed in the inner surface of the barrel 10.

The upper end of the body 9 is provided with an annular recess or seat 26 for receiving the peripheral edge portion of the disc member 19, and when this disc member is seated in this recess 26, as is illustrated in Figure 1, a wedging action will result from the engagement of the tapered edge portions of the ribs 21 and the cooperating grooves 25 in the barrel 10. This wedging action serves to accurately center and position the disc member 19 in the end of the spool member 9, and at the same time positively locks that member against rotative movement relative to the spool member 9. The locking of

the disc member 19 is of great importance in permitting a drive mechanism to be connected to either end of the spool by means of one of the key slots 18 or 18a and a braking mechanism to be applied to the flat surface at the other end of the spool.

The disc member 19 is held in place and a bearing is provided for the entire spool assembly by means of the central bearing tube 16. Prior to assembly of the spool, one end of the bearing tube is expanded as, for example, by the use of a mandrel and die, to form a polygonal section 27 adapted to fit within the polygonal opening 15 in the lower end of the spool body 9, and also an enlarged annular head portion 28 for holding the bearing tube 16 against longitudinal movement when it is assembled into the spool.

During the assembling operation the bearing tube 16 which has previously been cut to proper length and which has had one of its ends formed with the polygonal section 27 and the enlarged head portion 28 as described above, is inserted through the opening 15 in the partially closed lower end of the spool body 9. The disc 19 is then put in place over the upper end of the tube 16 with the edge portions of the ribs 21 engaging the cooperating slots 25. With the parts so positioned, the outer end of the tube 16 is spun or swedged over to complete the assembling of the spool, as is illustrated in Figure 1. During this final operation it is desirable that substantial tensional stresses shall be set up in the bearing tube 16 in order that the parts of the spool shall be permanently locked in place.

The barrel 10 of the spool is preferably of relatively large diameter, whereas the bearing tube 16 is of relatively small diameter and spaced a considerable distance from the inner wall thereof. This construction is particularly advantageous in that it permits the convenient manufacture of a large spool of light weight construction, especially when the spool is cast of a light weight alloy, or molded from material such as a phenolic resin condensate.

The utilization of a special disc member 19 of the type described for closing the open end of the spool considerably simplifies the casting or molding operation and at the same time, by virtue of the tapered construction of the positioning slots 25 for the disc and the radial ribs 21 cast integrally with the disc, permits the manufacture of spools by die casting or molding operations which may be easily and accurately assembled without necessitating any machining whatsoever, and which at the same time are fully as strong as one piece spools. Moreover, this construction makes possible the manufacture at low cost of accurate, light weight spools provided with keying means at either end thereof which are sufficiently strong to permit a driving or braking mechanism to be used at either end of the spool without danger of displacement of the spool parts during use.

It will be apparent that various types of spools embodying the principles which I have disclosed in the foregoing may be evolved, and it is my desire that the accompanying claims shall be accorded the broadest reasonable construction consistent with what is expressly stated therein and the prior art.

I claim the following as my invention:

1. A spool comprising a cast or molded tubular body, the bore of which is open at one end and partially closed at the other end by a support formed integrally with said body, a bearing tube extending longitudinally through the bore of said body and supported at one end by said support, and an annular disc seated in the open end of said body, said body having an annular recess adjacent the open end of said bore for seating said disc and the inner wall of said bore being provided with a plurality of spaced, tapered slots, said annular disc being provided with tapered projections for engaging said tapered slots whereby said disc may be accurately centered in said bore and may be keyed to said body.

2. A spool comprising a one piece, cast or molded barrel having externally projecting, integral end flanges thereon, coaxial apertured closures for the ends of said barrel, and a bearing tube coaxial within the barrel and fitting within the apertures of the closures and mechanically tying together said closures, one of said closures being cast integrally with said barrel and flanges, and the other of said closures comprising a separate, annular disc, said barrel being provided with an annular recess for engaging the edge of said annular disc and with a plurality of tapered slots, said annular disc being provided with a plurality of ribs having tapered, peripheral edge portions for wedgingly engaging said tapered slots to position said disc centrally within the bore of said barrel and to lock said disc against movement relative to said barrel.

3. A spool comprising a cast or molded barrel having externally projecting, integral end flanges, the bore of said barrel being closed at one end except for a centrally located opening by a support means cast integrally therewith, the bore of said barrel being open at the other end and said barrel being provided with a concentric, annular recess adjacent said open end, a generally flat, annularly shaped disc adapted to be seated in said annular recess for closing the open end of said barrel, said disc being provided with a plurality of strengthening ribs having tapered, peripheral edge portions, said barrel being provided with a plurality of tapered slots for wedgingly engaging the tapered edge portions of said ribs, and a bearing tube extending through the central opening in said disc and through the opening in said support means, the ends of said tube being swedged over in order to lock said disc in place.

4. A spool comprising a cast or molded barrel having externally projecting, integral end flanges thereon, coaxial apertured closures for the ends of said barrel, and a bearing tube coaxial within the barrel and fitting within the apertures of the closures and mechanically tying together said closures, one of said closures being integral with said barrel and flanges, and the other of said closures comprising a separate annular disc, said barrel being provided with an annular seat for receiving said annular disc and with a plurality of spaced slots, said annular disc being provided with a plurality of similarly spaced projections which engage said slots with a wedging engagement, whereby said disc may be accurately centered in said bore and may be keyed to said body.

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