Oct. 15, 1963 R. ATWOOD ET AL 3,107,067

SLIP SLEEVE TEXTILE BOBBIN

Filed June 25, 1958

FIG. 2.

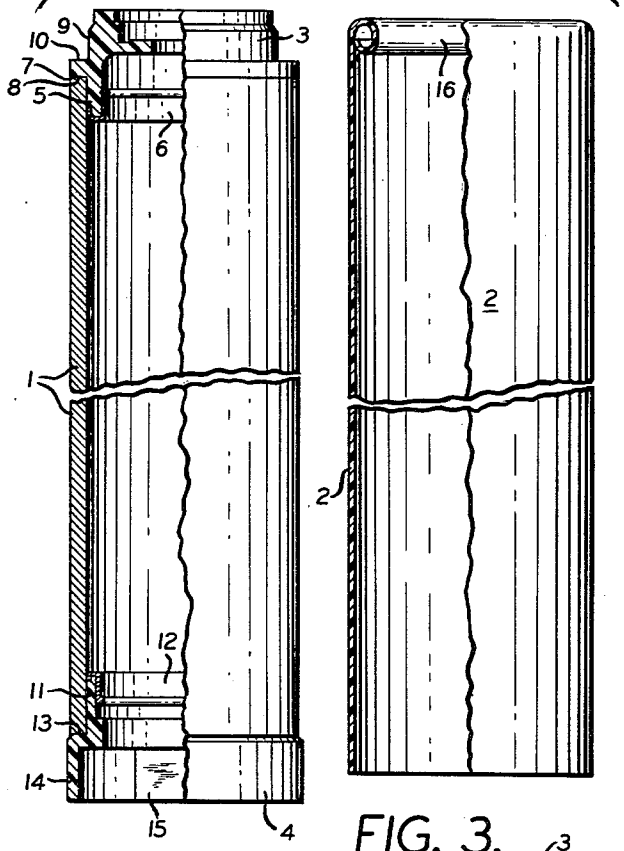


FIG. 1.

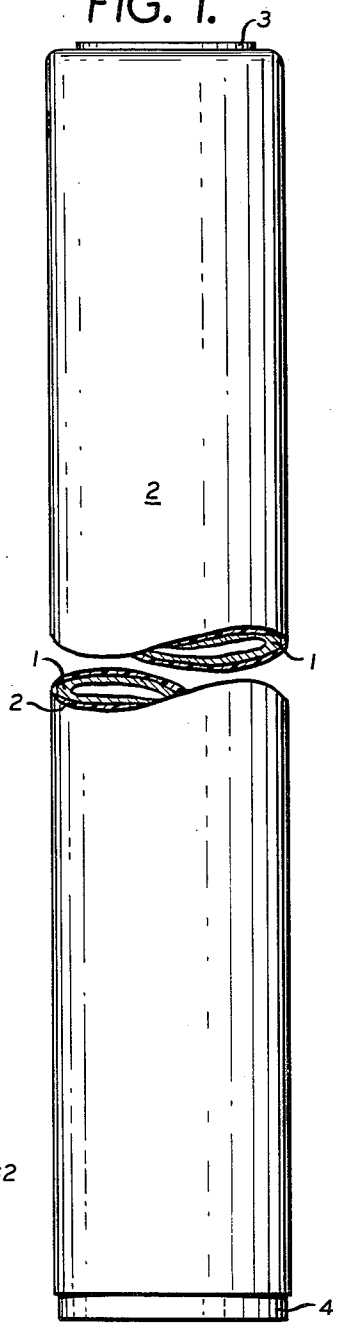
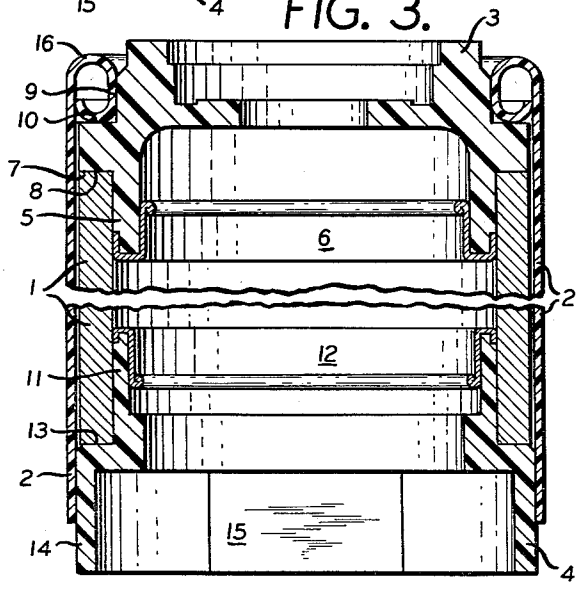


FIG. 3.



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SLIP SLEEVE TEXTILE BOBBIN

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This invention relates to textile bobbins, and more particularly to bobbins of composite construction, such as bobbins having a steel or other barrel member and a covering of plastic or other material.

Bobbins of this general type have been made by coating or molding the plastic covering onto the barrel member, and by shrinking a tubular cover element onto the barrel or expanding the barrel into a tubular cover element. Such bobbins, while satisfactory in service, are difficult to re-cover when the surface becomes worn or damaged, and it is an object of the present invention to provide a bobbin with a cover or barrel surface element which may readily be replaced when worn or damaged.

Other covered bobbin constructions have utilized plastic or other sleeve elements as barrel covers, the sleeve being slid onto the barrel with a fit which may range from a driven fit to a loose sliding fit. With commercial barrel and cover elements, necessarily involving some tolerances on diameters and also some deviation from precise straightness, it has not been possible to provide bobbins of this type which will permit ready replacement of cover elements and at the same time hold a plastic covering sleeve securely in position on the barrel. It is an object of the present invention to provide a slip-fit covering for a bobbin which will remain securely in position but can also be removed and replaced very readily.

A bobbin embodying the invention in a preferred form will now first be described with reference to the accompanying drawing and the features forming the invention will then be pointed out in the appended claims.

In the drawing:

FIG. 1 is a side elevation of a bobbin embodying the invention in a preferred form;

FIG. 2 is a view, partly in axial section and partly in elevation, showing the barrel and sleeve elements separately; and

FIG. 3 is a view in axial section, and on an enlarged scale, showing the end construction of the bobbin.

The bobbin comprises a structural barrel member 1 and covering sleeve 2, together with end fittings 3 and 4.

Barrel member 1 is a tubular piece, typically of steel, but may be made of any other suitable metal or material having the required properties of mechanical strength and obtainable at a competitive cost for the particular class of service which may be involved. The barrel may have internal reinforcing or bearing elements, such as shown, for example, in application Serial No. 494,405, now Patent No. 2,953,317, filed March 15, 1955 for Spool. These internal barrel features, if present, form no part of the present invention and, accordingly, are not shown or described herein.

The upper end fitting 3 is generally as shown in application Serial No. 494,405, and comprises a plastic element having a lower cylindrical or tubular portion 5 which fits within barrel member 1, being equipped with a metal ferrule or shoe 6, which is pressed into the plastic so as to hold member 3 and has a secure driving fit in barrel member 1, so as to retain member 3 in place. Upwardly of the portion 5, the member 3 is widened, as at 7, so as to be radially flush with the barrel and form a shoulder 8 seating against the end of member 1. Above the widened portion 7, the member

3 again has a reduced diameter, as at 9, and an upwardly facing shoulder 10.

The bottom fitting 4 is again made of plastic, comprising a tubular portion 11 equipped with metal ferrule or shoe 12 driven into the barrel member 1, a shoulder 13 seating against the barrel end and a widened lower portion 14, which has a cylindrical outer surface and is slightly greater in diameter than the barrel member 1. Suitable flats 15 or other drive lug engaging means may be formed in the lower element 4. The specific drive lug, or spindle or chuck bearing means employed in connection with the end fittings 3 and 4 form, in themselves, no part of the present invention and may be varied as desired.

Fittings 3 and 4 may be made of any convenient material and may be secured to (or formed with) the barrel member 1 in any desired manner, the essential characteristics of these elements being their peripheral surface configuration in relation to the barrel member. Nylon is one suitable material for the fittings 3 and 4, and the material employed should have comparable or greater resistance to compression and resistance to cold flow ("memory").

The plastic cover comprises a tube (generally extruded) of plastic or synthetic resin, such as Kralastic (acrylonitrile resin-rubber synthetic resin) curled over at the top end, as at 16, and fitting the barrel member 1 and end fittings 3, 4 as shown.

In order to bring out clearly the essential features of the method and bobbin of the invention, typical dimensional details of a specific bobbin will be given by way of example, it being understood that, in general, this is for the purpose of describing the essential relationships between the elements and applicable to bobbins of a variety of other proportions.

In a bobbin about 1¾ inches in outside diameter and a foot long, typical dimensions may be about, as follows:

Outside diameter of barrel member 1, 1.751"____ ±.002
Inside diameter of cover sleeve 2, 1.760"_____ ±.003
Outside diameter of base portion 14, 1.769"____ ±.003

There is thus clearance at all points along the barrel between barrel 1 and sleeve 2, this clearance (diameter difference) ranging from .004" to .014". Ovality of either element or bowing out of axial trueness of either element may cause local contact between sleeve and barrel at some points. However, such contact will not create any substantial tendency to resist axial sliding of sleeve on barrel.

However, the sleeve 2 has an interference fit over base portion 14, the interference (diameter difference) ranging from .003" to .015" in the case given, and the sleeve extending down over or overlapping the end portion 14 for a substantial part of the length (axially) of this portion. In the construction shown, the overlap is somewhat over half the axial length of the portion 14, or about ¼". With this overlap it is found that the sleeve is held securely under all normal service conditions, even with minimum interference fit, but can be applied and removed by hand even when maximum interference fit exists. For example, in the bobbin shown in the drawing, where the top end fitting 3 projects slightly beyond the cover 2, the bobbin may be dislodged by grasping the bobbin upside down in the hand and rapping the upper end against a table or other surface. Thereafter, the cover may be pulled off by hand with no difficulty. In other structures, the initial dislodging is easily accomplished by supporting the upper end fitting on an arbor and forcing the cover a short distance toward the upper end of the bobbin.

It will be observed that the cover 2 is slightly loose on the barrel 1, having up to about .007" clearance. With preferred cover materials, such as Kralastic, having

elongations of 50% or greater, and in thicknesses of about 1/32", the cover compresses evenly and smoothly onto the barrel under yarn pressure without difficulty due to wrinkling, being seated firmly on the metal after any considerable thickness of yarn has been wound. When the winding commences, the plastic cover has sufficient rigidity to support the yarn under the comparatively light tension or yarn pressure of the first layers and it thereafter compresses evenly and smoothly onto the metal supporting barrel.

As will be apparent, a bobbin according to the invention may be made in a variety of dimensions and proportions, with various degrees of slip and interference fit. In general, clearance (diameter difference) between barrel and cover of about 0.2% on the diameter, or in a range from 0.1 to 0.4% will be satisfactory in use and obtainable with practical, econical manufacturing methods. The interference (diameter difference) fit may vary with thickness and elasticity of the cover, but in general an interference of about 1% will be satisfactory, and interferences in a range from 0.1 to about 2.0% may be found suitable.

What is claimed is:

1. A textile bobbin comprising a cylindrical metal barrel member having a surface of substantially uniform diameter and less than a predetermined diameter, and an end fitting of greater diameter than a second and greater predetermined diameter, a cylindrical tubular cover for the said barrel having an inside diameter intermediate between the two said predetermined diameters, whereby the cover fits slidingly and slips over the barrel without forcing and has an interference fit on the said end fitting, and a second end fitting for the opposite end of the barrel having a diameter less than the first said predetermined diameter, the cover having an inward curl engaging the second end fitting for positioning it on the bobbin and determining its length of engagement on the first said end fitting.

2. A textile bobbin comprising a cylindrical barrel having a surface generally of substantially uniform diameter and an end portion of somewhat greater diameter, and a cylindrical plastic tubular cover for said barrel having an inside diameter intermediate between the two said diameters, whereby the cover fits slidingly and slips over the barrel without forcing and has an interference fit on the said end portion, the cover having sufficient rigidity to support initial layers of yarn when wound thereon and elongation permitting compression of said cover against the barrel smoothly and without wrinkling, and in which the plastic tubular cover at its other end is curled inwardly, the curled end abutting against the barrel end for retaining the cover in position axially of the bobbin.

3. A textile bobbin comprising a cylindrical barrel having a surface generally of substantially uniform diameter and an end portion of somewhat greater diameter, and a cylindrical plastic tubular cover for said barrel having an inside diameter intermediate between the two said diameters, whereby the cover fits slidingly and slips over the barrel without forcing and has an interference fit on the said end portion, the cover having sufficient rigidity to support initial layers of yarn when wound thereon and elongation permitting compression of said cover against the barrel smoothly and without wrinkling, and in which the bobbin has an end fitting of lesser diameter than the barrel generally at its other end and the tubular plastic cover is curled inwardly at said end fitting, the said end fitting holding the tubular cover in position substantially concentric with the said cylindrical barrel.

4. A textile bobbin comprising a cylindrical metal barrel member having a surface of substantially uniform diameter and less than a predetermined diameter, and an end fitting of greater diameter than a second and greater predetermined diameter, a cylindrical tubular cover for the said barrel having an inside diameter intermediate between the two said predetermined diameters, whereby the cover fits slidingly and slips over the barrel without forcing and has an interference fit on the said end fitting, and a second end fitting for the opposite end of the barrel having a diameter less than the first said predetermined diameter, and means on the end of the cover, opposite its end which has the said interference fit on the first said end fitting, engaging the second end fitting for positioning it on the bobbin and determining its length of engagement on the first said end fitting.

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