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SPOOL OR BOBBIN FOR SUPPORTING YARNS, THREADS, CORDS, OR THE LIKE

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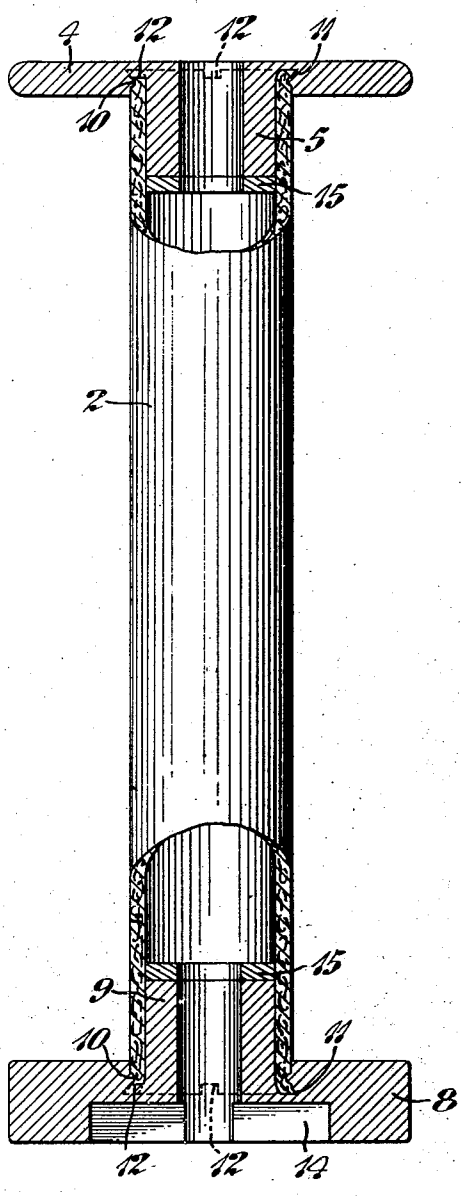

Fig. 1.

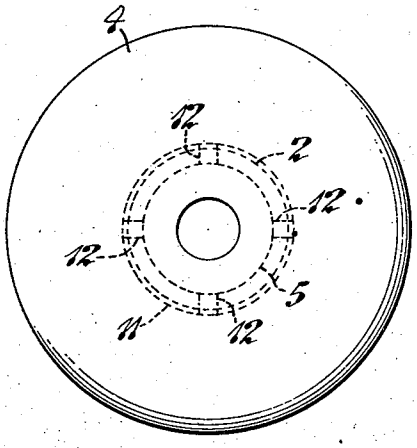

Fig. 2.

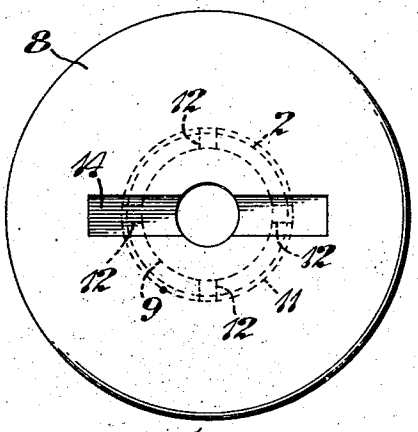

Fig. 3.

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SPOOL OR BOBBIN FOR SUPPORTING YARN, THREAD, CORD, OR THE LIKE

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Application June 22, 1944, Serial No. 541,509

6 Claims. (Cl. 242—119)

This application is a continuation-in-part of United States application, Serial No. 500,224, for improvements in textile bobbins and methods for producing same, filed August 27, 1943.

The present invention relates to improvements in spools or bobbins for supporting yarn, thread, cord or the like for use in textile machines and to a method of producing the same.

One object of the invention is to provide a lightweight spool or similar yarn-support of simple construction having smooth exterior surfaces, not subject to splitting, splintering, cracking or becoming dented or roughened and more durable in use than wooden or other spools previously used for like purposes.

Another object is to provide a spool or bobbin of the type indicated comprising a tubular paper or fiber barrel with molded plastic heads or flanges at its ends rigidly secured thereto.

Another object is to provide a spool or bobbin of the type indicated having plastic heads or flanges bonded to its ends and formed with portions lining the interior of the tube to provide bushings with axial bores for mounting the spool on a spindle or shaft.

Another object is to provide a spool or bobbin of the type indicated in which the ends of the paper or fiber barrel are embedded in and completely surrounded by the plastic material of the heads or flanges.

Another object is to provide a spool or bobbin of the type indicated in which the heads or flanges are rigidly secured to the ends of the barrel to prevent them from turning thereon or becoming displaced longitudinally thereof.

Another object is to provide a method of molding the plastic heads or flanges on the ends of the barrel of the spool or bobbin to secure a rigid permanent joinder therewith.

Further objects of the invention are set forth in the following specification which describes a preferred form of construction of the improved spool or bobbin and a method of producing the same, by way of example, as illustrated by the accompanying drawing. In the drawing:

Fig. 1 is a longitudinal view of a spool or yarn-support incorporating the novel features of the present invention;

Fig. 2 is a plan view of the plastic head at one end of the spool; and

Fig. 3 is a similar plan view of the head at the opposite end of the spool.

The present invention relates generally to spools, bobbins and the like comprising tubular axially-extending barrels with heads or flanges at their opposite ends. While as herein shown the spool is provided with heads or flanges of substantial diameter, it is to be understood that such parts of the assembly may take other forms, for example, various shapes as usually employed for different types of cop-tubes, bobbins and the like used in textile apparatus.

Referring to the present drawing, Fig. 1 illustrates a spool such as used for containing tire-cord during the winding of the material thereon and delivering it therefrom in various processes in the manufacture or use of the material. The spool or bobbin may comprise a tubular barrel 2 of relatively extended length with disk-like flanges at its opposite ends. The barrel 2 of the spool is preferably constructed of fiber or layers of paper cemented together in superimposed relationship with the heads or flanges of plastic material molded around the terminal portions of the barrel. As herein shown, one of the plastic heads may consist in a relatively thin disk 4 having a rounded peripheral rim and an integral bushing or thimble 5 molded within the cylindrical wall of the tube 2. The opposite head or flange 8 may be in the form of a disk of somewhat thicker cross-section terminating in a cylindrical periphery and having an integral bushing or thimble 9 molded within the interior of the barrel 2. The outer end of the flange 8 may be provided with a diametrical slot or recess 14 for receiving a key or spline projecting from the spindle or shaft on which the tube is mounted to connect the spool for rotation therewith. In order to permanently secure the opposite plastic heads to the ends of the tubular barrel 2, the terminal portions of the latter are prepared in the manner as next explained.

Each end of the tubular barrel 2 is scored or indented to form an annular groove 10 which may be of arcuate shape in cross-section or of other contour. Outwardly beyond the groove 10 at each end of the barrel 2 its terminal portion is expanded slightly as shown at 11 to provide a sharp-edged fin projecting radially beyond the periphery of the barrel. The opposite ends of the barrel 2 are preferably further provided with shallow cuts or notches 12, usually four in number spaced at ninety degrees apart around its circumference.

With the fiber or paper tube 2 prepared in this manner, the end heads are applied thereto by forming the plastic material therearound in a suitable mold or molds. A single mold for forming both heads may comprise complemen-

tary parts having cavities in their walls shaped to enclose the barrel 2 of the spool and to conform to the contour of the heads to be produced. With a spool of the type shown in the present drawing, a cylindrical spindle may be used as an insert in the mold extending axially through its cavity and of a diameter corresponding to that of the bores to be formed in the bushings or thimbles 5 and 9 at its ends. Relatively thin plugs or washers 15 may be inserted within the ends of the tubular barrel 2 at points adapted to confine the flow of the plastic material constituting the bushings 5 and 9 whereof to form the latter with flat ends. If preferred, relatively short spindles or cores may be provided projecting into the ends of the cavity of the mold to form the bores in the bushings 5 and 9 without requiring a spindle or insert extending throughout the whole length of the mold.

With the tubular barrel 2 held in the cavity of the mold and properly located longitudinally thereof the plastic material may be injected into the mold at opposite points and caused to flow into the cavities thereof to shape the end heads in accordance with any particular contour desired. The molding process is practiced by closing the parts of the mold together in the usual manner and forcing the plastic material into its cavities by the use of rams or pistons as usually provided with molds of this type. The plastic material may be either in fluid or powdered form and under the action of heat and pressure it will be plasticized and forced into the cavities in the mold while being caused to flow around the end of the tubular barrel 2 to completely fill the grooves 10 and enter the interior of the barrel surrounding the cores or mandrels projecting axially thereof. The expanded terminal portions of the tube will thus be embedded in and completely enclosed by the plastic material. The plastic material will also flow into the notches 12 at each end of the barrel 2, thus, when cured, serving to key or lock the heads from turning thereon. It will be noted by reference to the drawing that the plastic material completely surrounds the terminal portions of the tubular barrel 2, both as regards its outer and inner periphery and the raw edges of the paper or fibrous material thereof. In this way a secure and substantially permanent bond is made between the heads and the barrel of the spool, the heads being prevented from turning on the barrel by the plastic material engaging in the notches 12 and also from becoming displaced axially thereof due to the binding of the plastic material in the grooves 10 and across the edges of the terminal portions of the barrel.

The plastic heads at opposite ends of the tubular barrel 2 completely surround the terminal portions of the barrel to form a firm bond therewith while at the same time providing bushings within its interior formed with axially alined bores for supporting the spool on a shaft or spindle. When cured, the plastic material is of dense structure, but nevertheless somewhat resilient so that if the spool is subjected to rough handling, dropped on a cement floor or brought into contact with adjacent objects it will resist severe impact without splitting, chipping, splintering or denting as is the case with spools having wooden heads or flanges. Furthermore, all exterior portions of the improved spool present a smooth surface for the yarn, thread, cord or other textile material wound thereon to insure against abrading or catching the strand or strands when they are unwound therefrom. The bores in the bushings 5 and 9 at the ends of the spool provide smooth bearings for mounting the spool on a shaft or spindle and as a most important feature, these bores are disposed exactly concentric with the exterior of the tubular barrel and heads of the spool so that it will not run out when rotated with or on the spindle of the machine with which it is used.

It will be observed from the foregoing specification that the present invention provides an improved method of producing spools or bobbins of improved construction, relatively light in weight, economical to manufacture and possessing maximum resistance to splitting, chipping, denting or marring whereof to insure greater durability thereof under hard use. The heads at the ends of the barrel being constructed of thermosetting plastic or other vulcanizable material molded directly on and firmly bonded to the fibrous material of the barrel provide an extremely strong and permanent structure, proof against injury under continuous use.

By molding the plastic material directly onto the fiber barrel the present method of producing the improved article may be practiced without especial skill or expertness while resulting in greater accuracy in forming the heads and bushings concentrically of the axis of the barrel. While the improvements are herein shown as applied to a spool of particular type, it is to be understood that the shape and dimensions of the heads of the spool may be varied and other changes made in the form and structure of the spool, for example, it may have a solid barrel, without departing from the spirit or scope of the invention. Therefore, without limiting ourselves in this respect, we claim:

1. A spool or bobbin of the type indicated comprising a tubular fiber barrel having an annular groove on its periphery adjacent its end, and a head formed of plastic material molded around the terminal portion of the barrel and filling the groove therein, said head having an integral thimble portion projecting into the interior of the barrel and provided with an axial bore extending therethrough.

2. A spool or bobbin of the type indicated comprising a tubular barrel having a peripheral groove adjacent its end and notches spaced around its terminal portion, and a head of plastic material molded around the end of the barrel and projecting radially outward beyond its periphery, said head having an integral thimble portion molded within the interior of the barrel and formed with an axial bore extending therethrough.

3. A spool or bobbin of the type indicated comprising a tubular fiber barrel formed with peripheral grooves adjacent its ends with the terminal portions of the barrel expanded radially outward, and heads molded from plastic material with portions projecting radially outward from the periphery of the barrel and other portions projecting within the interior of the barrel to form bushings with axial bores extending therethrough, the terminal portions of the barrel being completely embedded in and surrounded on all sides by the plastic material of the heads to form a permanent bond therewith.

4. The method of producing spools or bobbins consisting in taking a tubular barrel of fibrous material, forming a peripheral groove adjacent an end thereof and molding a head of plastic material around said end of the barrel while

causing said material to flow into the end of the barrel and line its interior whereby to completely embed the terminal portion of the barrel within the plastic material surrounding it on all sides and with said plastic material projecting into the peripheral groove at the end of the barrel.

5. A method of manufacturing spools or bobbins comprising forming a tubular barrel by winding a sheet of fibrous material about a mandrel and cementing the superimposed layers together with an adhesive, forming an annular groove on the periphery of the barrel adjacent its end, forming notches in the end of the barrel spaced therearound, and molding plastic material around the end of the barrel to embed the terminal portion thereof in the plastic material enclosing it on all sides and cause it to flow into the notches and peripheral groove therein.

6. A method of manufacturing spools or bobbins consisting in taking a tubular barrel, forming an annular groove on the periphery of the barrel adjacent an end thereof, forming spaced openings through the wall of the barrel, and molding a plastic head around the end of the barrel to embed the terminal portion of the barrel in the plastic material enclosing it on all sides to cause said plastic material to flow through the openings in the barrel and securely bond the head thereto.

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