Nov. 3, 1942. H. D. CLINTON 2,300,650

SPOOL OR BOBBIN

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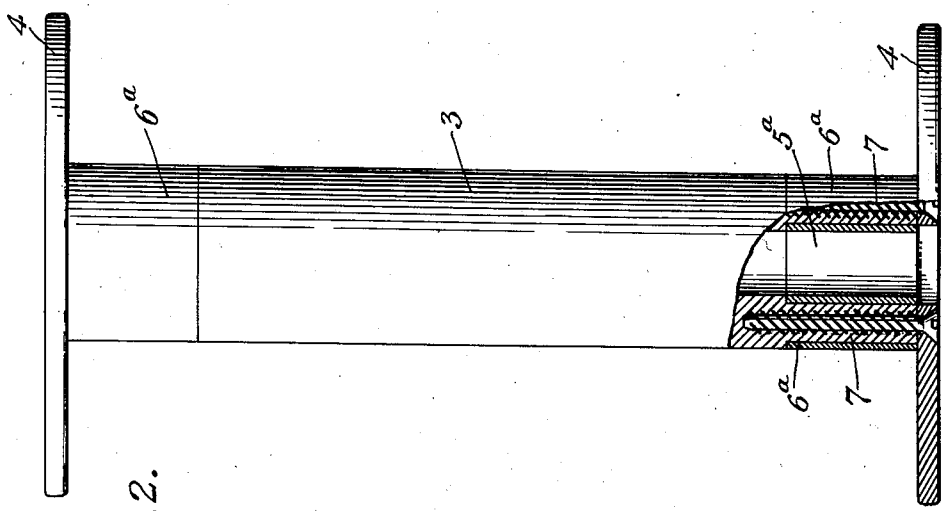

Fig. 2.

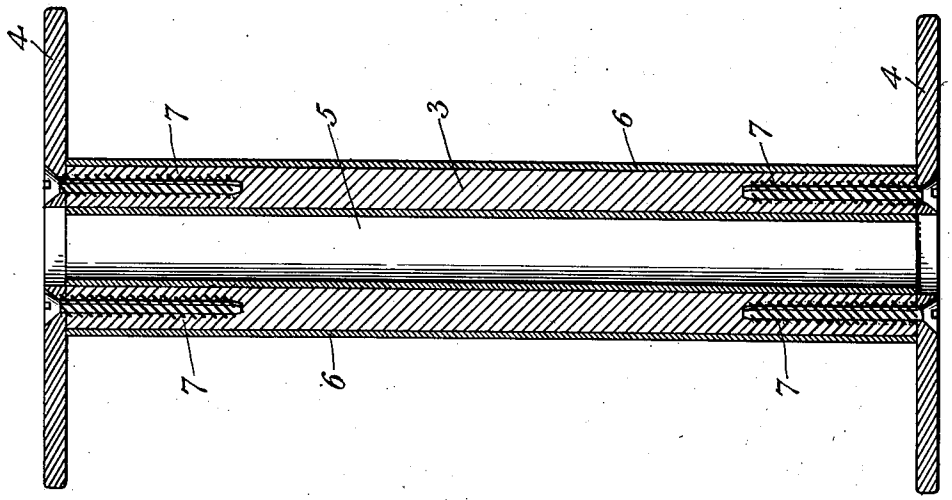

Fig. 1.

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SPOOL OR BOBBIN

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5 Claims. (Cl. 242—123)

This invention relates to improvements in textile spools and bobbins, having reference to the various types or kinds and forms of such articles as used in different mill operations.

An object of the invention is to provide an improved spool or bobbin capable of withstanding the hard and rough usage to which these articles are subjected in the mills, especially in such operations as steaming or alternate steaming and cooling, which is injurious to the ordinary article of the kind.

Another object is to provide an improved spool of simple construction which will be inexpensive to make as compared with the ordinary article of the kind, wherein a very small saving in unit cost represents a considerable saving in operation and maintenance costs during any given period of mill operation.

Other objects, as well as the particular concept and principal advantages of the invention, will be stated or made to appear in the following specification in which the invention will be further described with reference to the appended drawing, illustrating one practical embodiment of the same, along with a modification, in the form of a conventional warping spool or the like.

In said drawing:

Fig. 1 is a longitudinal sectional view of the spool showing the composition and relation of the several parts; and

Fig. 2 is a side elevation, with a portion thereof shown broken away, representing a possible modification of the same.

The illustrative embodiment or spool comprises the usual barrel **3** and heads **4** secured at either end. It will be understood that this barrel and said heads may be of any desired proportions, according to the size and type or kind of spool desired to be produced; that is, the composite article may have any length and diameter and any central bore desired and that the interior bore may be perfectly straight or cylindrical, or tapered to fit a spindle, as the case may require. In the case of a bobbin, as distinguished from a spool, one of the end heads may be smaller than the other, or may be omitted altogether, in which latter case the omitted head may be substituted by a cap or closure for the barrel at said end. Thus, the construction is not limited to any particular type or form of spool or loader, but on the contrary may be varied as necessary to suit the particular form or kind of spool to be produced. Emphasis is made upon this point to avoid possible limitation or interpretation in a limited sense, since the invention itself is of broad application as applied to the various different kinds or types and forms of spools and the like used in different textile mills and in different milling or weaving operations.

The aforesaid barrel **3** is preferably composed of wood or compressed vegetable fiber or other equivalent material which tends to expand, especially when subjected to moisture and to heat. It consists in this instance of a hollow wooden tube or cylinder having a central bore of the size desired to fit any particular machine gudgeon or spindle on which the spool is to be mounted for rotation or support. The interior or bore of this barrel is lined with a tube **5** of much stronger material, such as metal, which is preferred, or of Bakelite or the like. When composed of metal, the thickness of this liner need only be great enough to afford the proper strength and rigidity, although in some cases, and also in the use of Bakelite or some other material, this thickness may necessarily be somewhat greater. Metal such as magnesium alloy has been found to be admirable, while certain alloys of aluminum, stainless steel and brass have also been found to be quite suitable. This liner **5** is of a length equal to the length of the barrel itself and fits tight or snug into the bore thereof. Incidentally, its inside diameter is preferably equal to the diameter of the central bore of the heads **4**, later described, in order to be retained more securely or non-movably in place after assembly of the several parts, although this is not an actual essential and in certain forms or constructions it might be desirable for the liner to be formed with a reduced neck or extension at each end so as to pass through the central aperture or bore of the heads, with a swaging over the outer faces of the latter. Such an arrangement or adaptation will be so obvious that it does not require illustration or further description here, especially inasmuch as instances are abundantly to be found in the existing art, such for instance as this applicant's own prior Patent No. 2,225,551 (Fig. 5).

The outer circumference of the barrel is faced or covered with a tube **6**, also composed of metal, Bakelite or other suitable material, the same as the liner tube **5**. In practice, it will be preferable to make this outer tube or jacket of the same material as the inner liner tube, the description of which, as above made, applies likewise to this outer jacketing tube, except that the latter will not in any event be formed with any end extension, but will always terminate with the end or ends of the barrel itself. It will be understood in connection with these two facing or covering

tubes that the thinner and lighter the material which is used therefor, the lighter will be the construction and weight of the completed spool or bobbin. For such reason, it is desirable to use a very thin or narrow thickness of metal, such as magnesium alloy, which has the advantage of being unusually light and at the same time very strong. Like the inner liner, said outer jacket tube fits tight and snug upon the wooden barrel. Said wooden barrel is consequently engaged or encompassed close between the two facing tubes, where it cannot be contacted or affected readily by the outside atmosphere or atmospheric conditions and is in effect imprisoned between the two protective tubes.

The heads 4 are applied to the end of the barrel thus composed of the wooden cylinder between the two facing tubes, the central apertures or bores of said heads being registered of course with the inner circumference of the inner liner or core tube 5. Said heads are secured to the barrel ends by screws 7 extended through holes therefor in the heads into the material of the wooden cylinder or barrel part. These screws 7 are preferably of a self-threading type, such as the well-known type of tap or drive screws, and are advantageously countersunk in the faces of the heads, as shown. The ends thereof are blunt or untapered and provision for their entry through and into the named parts is effected by preliminary drilling to a somewhat smaller diameter. In consequence, as said screws are driven into place by blows or pressure on the heads thereof, they expand or compress the material of the wood therearound between the two metallic or facing tubes of the barrel, thereby not only drawing and holding the heads tightly to place against the barrel ends, but effectually anchoring themselves into place within the material of the wooden cylinder part of the barrel. Expanding the material of said cylinder tight between the facing or jacketing tubes of the barrel at the points of entry around and at either end of the barrel, said screws create a tension or wedge-like hold within the barrel which so greatly strengthens the hold by bind and pressure of the parts that the heads cannot be removed except by intense force or pulling pressure amounting to as much as 5000 pounds or more. Actual test has shown that it takes at least 5000 pounds direct pressure application to the heads to so much as loosen them very slightly. The screws tend to break or snap before the heads can be drawn away from the barrel. Incidentally, the heads will tend to warp or distort out of shape before they can be drawn or pulled from the barrel ends. Stress is placed upon this feature of the invention, inasmuch as it is the important factor upon which the strength or security of head attachment to the barrel primarily depends. In other words, it is the bind from expansion of the wooden part of the barrel between the facing tubes from which the greatly increased hold or security of head attachment results. This feature and provision is therefore a primary and important consideration and element of the invention, wherein its novelty and differentiation from other constructions principally resides. It will be noted that the same result would not be obtained if the wooden cylinder or barrel part of the spool were faced only on its inner or outer side, rather than on both sides, i. e., both inner and outer. Mere threading of screws in any form into the wood alone, or into the wood without confinement between two rigid facing tubes, would not produce any effectual bind or hold for securing the heads to the barrel. It requires the tension created by the several screws expanding the wood between the confined parts which produces the exceptional bind and strength of hold or attachment producing the substantial improvement of this invention.

The advantages of such a construction will be quite obvious to anyone familiar with this art and the difficulty of attaining a simple construction in a spool of great strength adapted to withstand the hard and very rough usage to which these articles are subjected in textile mills. The heads are applied so tightly and securely to the barrel ends that said ends are completely shrouded or protected from the outside atmosphere or atmospheric conditions. Hence, it matters not if the spool is subjected to steaming or to repeated steaming process in treatment of thread or yarn wound thereon. Any moisture or effect of the hot steam which penetrates to the wooden material between the shrouding parts simply expands said material a little more to further increase the strength of hold between the head and barrel parts. Of course, the expansion resulting from the heat of such treatment will have the same effect or result, whereas the contraction from alternate cooling or removal from the steaming atmosphere will have no or little effect from the resultant contraction of the metal parts. The spool can thus be used to the fullest advantage in steaming operations repeatedly and without any deleterious effect upon the spool, either from loosening or from corrosion of the parts. For so long as the parts are unruptured or undistorted, and remain free from defective cuts, dents and bruises, they will hold firmly together.

A further advantage resides in the fact that any conventional type of twister attachment for instance can be applied to an end of the spool to transform it into a conventional twister spool or bobbin, such as shown, for example, in this applicant's prior Patent No. 2,130,265. Similarly, any desired or different type of head can be substituted for the flat disc type head shown in the present embodiment. It makes no difference what kind of head is used, so long as it is applied in the manner described, i. e., by self-threading screws driven into the wood or other expansible material of the barrel between the inner and outer facing parts or jackets. Of course, a heavier head may require a thicker or larger barrel, but this is a mere matter of degree and does not affect the principle of the invention involved. The value and economy of the invention resides in the simple expedient of threading the head attaching screws into the expansive material squeezed or confined between metal or other stronger facings at opposite sides, which produces a bind and tension sufficient to hold the parts securely together.

Referring now to the modification of Fig. 2, the inner and outer facing parts or tubes 5 and 6 of the barrel may either or both be abbreviated to the form of mere ferrules at either end of the barrel. In this modification, both of said inner and outer tubes, indicated at 5^a and 6^a respectively, are so abbreviated. That is, they are not extended the full length of the barrel, but extend only a short distance from either end—a distance great enough merely to bind or hold them securely to the wooden part 3 of the barrel. The only reason for this would be to conserve the use of the metal or other material used for the jacketing or tube parts, or to produce a particular design. Ordinarily, this form of construction

would not be so desirable as that in which said jacket or tube parts are extended the full length of the barrel, because it exposes the intermediate wooden part of the barrel to atmosphere or atmospheric conditions. However, in very long spool constructions, such for instance as in a warping beam, it might be desirable to conserve the use of the metal or other material employed for the jacket on the inner and outer sides of the wooden cylinder part. It is desirable in such a construction to slightly reduce the thickness of the wooden cylinder or part of the barrel at the point or in the places occupied by the ferrule or facing parts, so as to render the surfaces of the latter flush with the remaining portion of the wooden part, but this is not absolutely essential, especially if the material of the ferrules or facer parts is a very thin metal not much greater in thickness than the extent to which the material of the wood would be contracted or compressed in applying said ferrule parts thereto. Said ferrules or metal parts would ordinarily be sweated into place, or otherwise applied so as to attain a firm hold upon or against the material of the wood in order not to be readily removable even before the material of the wood therebetween is expanded by the screwing or driving of the self-threading screws into place.

It is believed the particular advantages of a spool of this very simple and economic construction will be readily apparent. Not only does it save the cost of more complicated or more involved constructions, insofar as mechanical features and machining is concerned, but it saves the cost of expensive materials both in quantity and quality, having reference to special steels or alloys in which modern spools are very largely made. Wood has always been a good and reliable material of which to compose spool and bobbin barrels, because it is especially adaptable to various expedients of fastening the heads thereto, either by mechanical or other means, such as gluing and the like. Wood is relatively light and inexpensive, as well as readily procurable on the market, and its fibrous character which is susceptible to ready expansion with a high bindive effect makes it particularly appropriate to this use. In consequence, the spool produced by this very simple expedient, and in the very few parts here involved, is particularly advantageous and more than usually strong, durable and easily manufactured.

It will be understood that various changes in the form, combination and arrangement of the several parts may be made to suit different requirements or working conditions and types of spools desired to be produced, without departing from the nature and scope of this invention. Therefore, the appended claims are not intended to limit the invention to the specific construction illustrated and described, or beyond the limitations which are imposed by the terms of said claims themselves.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. A spool or bobbin comprising a wooden barrel of cylindrical form, a metal bore liner on the inner side of said barrel and a metal facing jacket on the outer side of said barrel, a head applied to an end of said barrel at right angles thereto, and metal drive screws of substantially one-third the thickness of the wall of the wooden barrel extended through said head into the wooden part of the barrel between the said inner and outer metal parts with an expansion of the surrounding material compressibly between the said inner and outer metal facing parts resulting in a wedge-like bind of the several parts tightly against each other; said screws constituting the sole means for securing the head to the barrel.

2. A spool or bobbin comprising a wooden barrel of cylindrical form, a metal tube on the inner side of said barrel constituting the central bore thereof, a metal tube on the outer side of said barrel constituting an outer jacket therefor, a head applied at right angles to one end of the barrel against the edge thereof and against the ends of said inner and outer tubes, and metal drive screws of substantially one-third the thickness of the wall of the wooden barrel extended through said head and into the barrel between the said inner and outer metal tube parts thereof so as to expand the wood of said barrel thereabout compressibly between and within the said metal tubular parts with a resultant tension or wedge-like bind of the parts drawing them tightly and securely together; said screws constituting the sole means for securing the head to the barrel.

3. A spool or bobbin comprising a cylindrical barrel of an expansible fibrous material, a tubular fitting of a harder rigidified material on the inner side thereof constituting an inner bore part, a tubular fitting of a like harder rigidified material on the outer side thereof constituting an outer jacket part, a head applied at right angles to one end of the barrel against the edge thereof and against the edges of said inner and outer tubular parts with a central aperture therein registering with the inner bore of the barrel, and screws of substantially one-third the thickness of the wall of the barrel extended through and countersunk in holes in said head around the central aperture thereof into the barrel and between the said inner and outer tubular parts thereof so as to expand the material of the barrel therearound compressively against the walls of said tubular parts with a resultant wedge-like bind of the parts drawing and holding the parts securely together; said screws constituting the sole means for securing the head to the barrel.

4. In a spool or bobbin, a barrel of an expansible fibrous material having an inner bore liner and an outer face jacketing of a much harder rigidified material, and a head applied to one end, said head being secured by metal drive screws of substantially one-third the thickness of the wall of the barrel extended through the head and into the end of the fibrous barrel between the inner and outer facing parts thereof so as to expand or compress said fibrous material against the walls of said jacketing parts; said screws constituting the sole means for securing the head to the barrel.

5. In a spool or bobbin, a wooden cylindrical barrel having an inner bore liner and an outer face jacketing of metal, and a metal head applied to one end, said head being secured by metal drive screws of substantially one-third the thickness of the wall of the barrel extended through the head and into the end of the wooden barrel between the inner and outer metal facing parts thereof with an expansion of said wood compressibly against the walls of said facing parts so as to bind and tensionally hold the head in place against the barrel end; said screws constituting the sole means for securing the head to the barrel.

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