Dec. 8, 1931. G. D. ATWOOD 1,835,366

SPOOL

Filed June 14, 1929

Fig. 1.

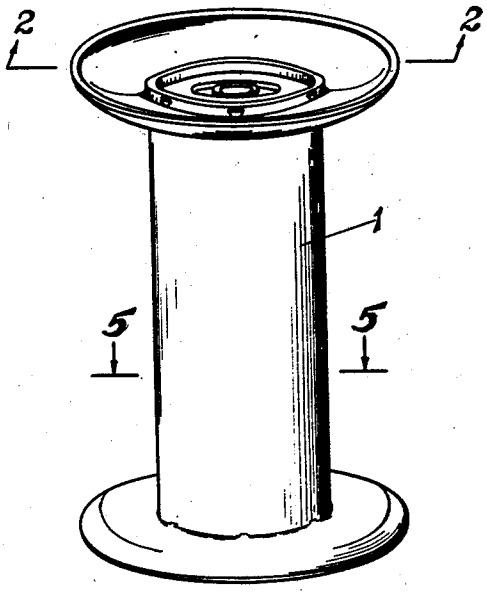


Fig. 2.

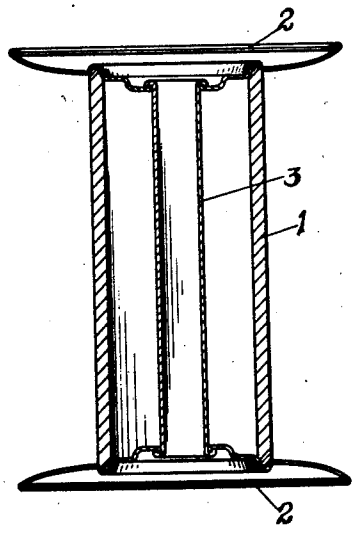


Fig. 5.

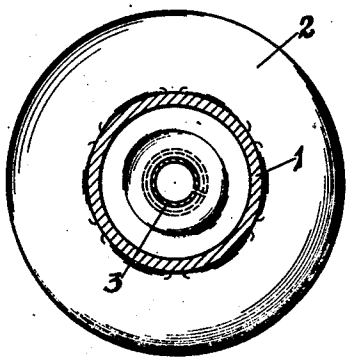


Fig. 3.

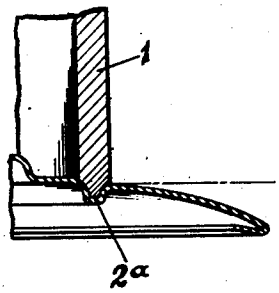
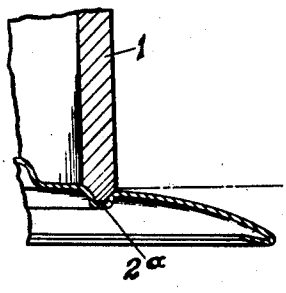


Fig. 4.



Inventor

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Philipp, Lawyer, Rice & Kennedy

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UNITED STATES PATENT OFFICE

GEORGE D. ATWOOD, OF BROOKLYN, NEW YORK

SPOOL

Application filed June 14, 1929. Serial No. 370,793.

This invention relates to improvements in spools or bobbins and particularly such spools or bobbins as are used for receiving and carrying fine silk, rayon, yarn, etc. For convenience the term "spool" will be hereinafter used and as used will include bobbins.

One form of spool heretofore used for the purposes for which my improved spool is designed has consisted of wood with the barrel and flanges thereof in one piece. Such spools are very expensive to manufacture, so much so that they have to be sold to users of silk, rayon, etc. hereinafter called thread, with the agreement on the part of the manufacturer of such thread that he will redeem them, when called upon by the user thereof to do so, at certain stipulated redemption prices.

Later forms of spools with hard wood barrels and heavy fibre ends and designed for the same purposes as these solid wooden spools, have been suggested and used commercially. These spools have the advantage over the solid wooden spools in that they are cheaper to manufacture but great care and skill has to be exercised in their manufacture, particularly to secure a close fit between the barrel and its flanges so as to avoid gaps between them in which the thread might be caught while being wound upon the spool, with the result that it would be broken when unwound. As a matter of fact, according to ordinary practical manufacturing methods it has not been possible to secure such a close contact or fit between the barrel and its flanges as will avoid the presence of such thread-catching gaps and, because of this, it has been necessary to interpose a washer of soft, yielding material between the barrel ends and flanges. Because of the character of the materials used (hard wood for the barrel and heavy fibre for the flanges) and because of the need for this washer between the barrel and its flanges the manufacturing cost of such spools has been very high, although considerably less than that of manufacturing the solid spools referred to, and this high manufacturing cost has been objectionable, not only for the ordinary reasons concerned with manufacturing costs, but for the following additional reasons.

Because of their high cost such spools, like the solid wooden spools referred to, must be and are supplied by the thread manufacturer to users thereof with an agreement for the redemption thereof by such manufacturer after the user has finished with them. Such redemption agreement requires the thread manufacturer to invest a large amount of capital in such spools and to keep a fund constantly on hand for their prompt redemption as and when called upon to redeem them by the user. In addition to this these spools are frequently used over and over again by the user with the result that when returned by him to the thread manufacturer they are practically worn out and useless.

The high manufacturing cost thereof also presents a serious and really insurmountable obstacle to the export of finished thread by manufacturers thereof wound on such spools because of the expense involved in the shipment of such spools back to this country for redemption.

It is the object of the present invention to provide a spool having the necessary accuracy in fit between the barrel and flanges to avoid the thread-catching gaps before referred to and the manufacturing cost of which will be so low that they may be thrown away by the user, thus doing away with the requirement of redemption existing in the case of the solid wooden spools and the hard wood spools with heavy fibre ends.

These ends are attained by the provision of a spool having a barrel of yielding material, such as cardboard, for example, and sheet metal flanges having annular recesses on their inner faces into which the ends of the barrel are forced, the width of these recesses being much less than the thickness of the barrel material so that when the flanges are forced onto the barrel the material of the latter will be considerably compressed by the walls or shoulders of the recesses and such a tight or close fit and intimate contact secured between the two that no thread-catching gaps will appear or occur in use between the barrel and flanges.

This is true whether or not the ends of the barrel are true or even, as, even if they are not, all portions of the ends are so compressed, the only difference being that what may be called the high portions are more compressed than the low portions.

This is also true even if, in the course of manufacture or subsequently, the flanges should be slightly tilted out of true parallelism with each other or true right-angular relation to the barrel, so long as pressing contact continues between the flanges and the barrel ends, all portions of the barrel ends being suitably compressed although some may be more compressed than others.

To this I may add that a spool with flanges so tilted out of such parallel or right-angular position will, under the outward pressure exerted by the wound thread on the inwardly tilted parts of the flanges, have such parts moved outwardly and the other parts moved correspondingly inwardly and thus have such flanges moved or returned to their true parallel or right-angular position. And this will be done without disturbing the desired gap-avoiding contact between the flanges and the barrel ends because those parts of the compressed ends thereof bearing against the inwardly tilted parts of the flanges will expand sufficiently to continue in intimate, gap-avoiding contact with the inner faces of the flanges.

A spool such as this is not only improved in construction but its cost of manufacture, relatively to that of the spools before referred to with hard wood barrels, is so materially reduced as to do away with the necessity of the redemption agreement before referred to, its cost of manufacture being so low that such spools may be thrown away after use without any appreciable loss to the user. This is particularly true if sheet metal flanges be used, as I prefer to do, although the present invention, broadly considered, is not to be so limited.

The material of the barrel will also preferably have a soft surface in which fingers with which the spool flanges are provided may embed themselves, such fingers being provided as a safeguard in spools generally having barrels with attached flanges against thread being caught in gaps between the barrel and flanges and as an additional safeguard in spools like that of the present invention for the same purpose in case, after manufacture thereof, or during shipment or use thereof, the spools should develop wide gaps actually taking the inner faces of the flanges out of contact with the barrel ends.

In the accompanying drawings:

Figure 1 is a perspective view of a spool (full size, for certain purposes) embodying the present improvements;

Figure 2 is a vertical section of the same on the line 2—2;

Figures 3 and 4 are enlarged longitudinal sections of one end of the spool. Figure 4 showing the spool flange tilted out of true parallelism with the other flange or true right-angular relation to the spool barrel; and

Figure 5 is a cross section on the line 5—5 of Figure 1.

In said drawings 1 represents the barrel and 2 the flanges of the spool, while 3 represents a tubular rivet through which the barrel and flanges are connected together. The barrel is made of yielding material, preferably cardboard or other cheap fibre, so that it will yield lengthwise or be compressible lengthwise at its ends, but, at the same time, be sufficiently rigid or stiff crosswise to properly receive and support the thread wound thereon. The flanges 2 are of sheet metal, for economy in the manufacture of the spool. The flanges 2 are provided on their inner faces with recesses 2^a for the ends of the barrel and these recesses are, as will be observed, of very much less width than the thickness of the barrel material.

In assembling the barrel 1, flanges 2 and tubular rivet 3, the barrel ends rest against the inner faces of the flanges in line with recesses 2^a and the rivet 3 is then passed through the barrel with its ends projecting beyond the outer faces of the flanges. The flanges are then forced with considerable pressure against the barrel ends which are thereby forced into and compressed endwise by the walls of the recess and distorted or bent laterally, inwardly and outwardly. The ends of the rivet 3 are then turned downward against the outer faces of the flanges and the recessed ends of the flanges held in intimate contact with the compressed ends of the barrel, which make a close, yielding fit therewith, without any thread-catching gaps between them and the flanges.

In the cutting of the spool barrels and their flanges one cannot depend upon securing perfect barrel ends and flanges which will accurately fit, as, for example, in the case of the spools with hard wood barrels and heavy fibre ends before referred to, where, for this reason, it has been necessary to interpose soft washers between the barrel and flanges. Such unevenness, however, is of no importance in a spool embodying my invention because, as before pointed out, even if it is present, the barrel ends are compressed at all points sufficiently to secure the tight fit between the barrel and flanges necessary for the avoidance of any thread-catching gaps between them.

Also, if in the course of manufacture, or otherwise, a flange should be tilted out of proper position, as shown, for example, in Figure 4, it will be restored to proper position by the thread as wound upon the spool, the outward pressure of the thread against

the inwardly tilted part of the flange moving that part outwardly and the other part inwardly from the position in which the flange is shown in Figure 4 to that in which it is shown in Figure 3. Such restoration of the flange to proper position will not disturb the necessary fit or contact between it and the barrel ends because the heavily compressed part of the barrel end in line with the inwardly tilted part of the flange will expand and continue such contact with it as it is forced outwardly.

What I claim is:

A spool comprising a barrel, sheet metal flanges, and means extending through the barrel and uniting it to the flanges, the barrel being of yieldable material and the flanges provided with annular recesses for receiving the ends of the barrel, said recesses being substantially narrower than the ends of the barrel and compressing said ends inwardly and outwardly to a substantial extent.

In testimony whereof, I have hereunto set my hand.

GEORGE D. ATWOOD.