

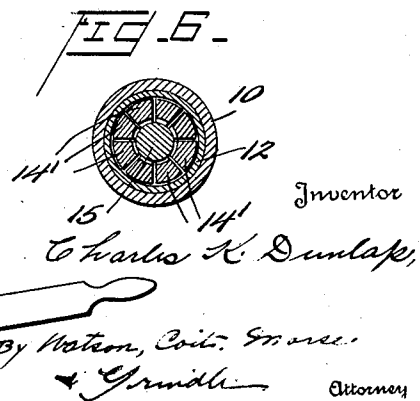
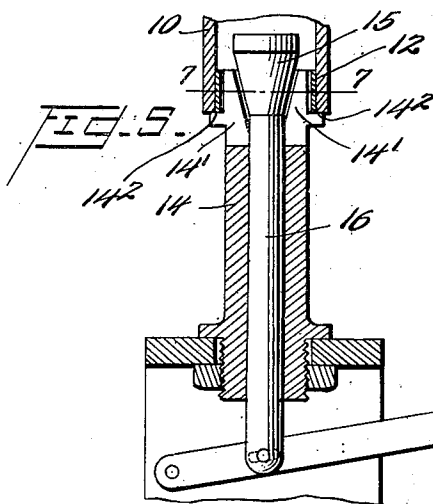
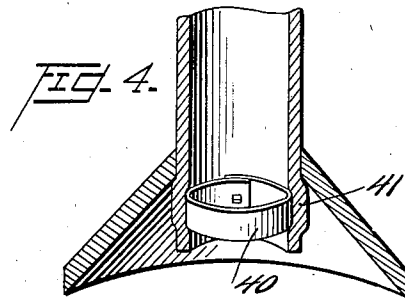
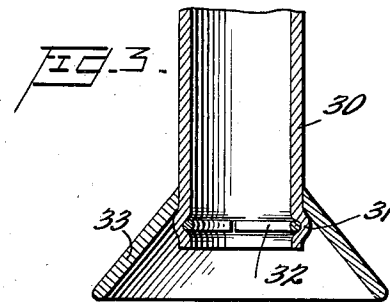
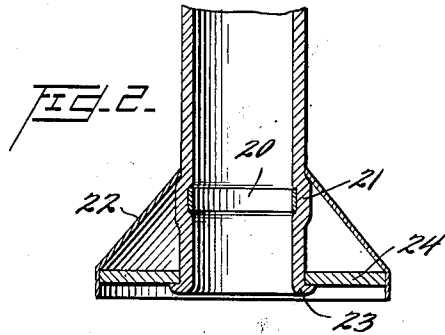
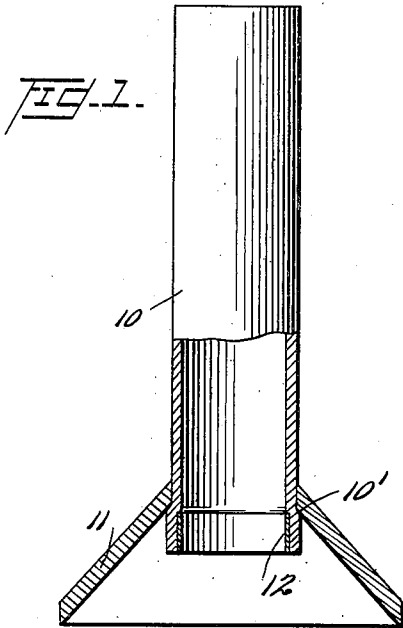
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SPOOL

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SPOOL

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1 Claim. (Cl. 242—122)

The present invention relates to spools or bobbins.

The simplest form of bobbin which is used in the textile industry comprises a cylindrical core or barrel and a frusto conical base encircling the barrel at one end and secured thereto by suitable means. A conventional type of spool includes a cylindrical barrel and members comprising heads secured to the barrel at its ends. One problem involved in the manufacture of both spools and bobbins from cheap, light-weight material, such as paper, is to provide a suitable means for securing the bobbin base to the bobbin barrel, and the spool heads to the spool barrel in such a way that the base, in the case of the bobbin, and the heads, in the case of the spool, cannot be dislodged by reason of the pressure of a winding of thread formed upon the cylindrical core or barrel. With bobbins or spools of ordinary types this sometimes occurs, thus permitting the winding at the ends of the thread package to move freely and become entangled, thus rendering the package unusable.

In accordance with the present invention, a novel type of bobbin or spool is provided in which it is practically impossible for the base of the bobbin or head of the spool to move axially of the barrel thereof under thread pressure. It will be appreciated that, while I refer particularly to bobbins and spools, and illustrate in the accompanying drawing articles of this type, the invention may be embodied in paper thread cores of other types.

In the drawing:

Figure 1 is a side elevation, partly broken away, of a bobbin constructed in accordance with the novel method;

Figures 2 and 3 are partial axial sections through spools or bobbins showing two additional types of the completed article;

Figure 4 is a view partially in perspective and partially broken away at the lower end of a bobbin or spool, showing an improved form of base and barrel securing means;

Figure 5 is an axial section through a mechanism employed in the fabrication of the spools or bobbins illustrated in the preceding views;

Figure 6 is a section on line 6—6 of Figure 5.

A large proportion of the spools and bobbins now utilized in the textile industry are fabricated of paper, it having been found that articles of this type fabricated of this material are not only light in weight and inexpensive, but are very durable and qualified in every way to function as cores for thread packages. Spools and bobbins

are generally similar in construction and, for the purpose of the present description, and in the appended claim, the term "spool" will be used in describing the several forms of the invention although it will be perceived that, strictly speaking, certain forms of the invention may more accurately be termed bobbins.

The usual paper spool comprises a paper cylinder usually formed by convolutely winding a paper sheet on a mandrel and securing the several plys together by a suitable adhesive. To one end of this barrel is secured a frusto conical base, in the case of a bobbin, and in the case of a spool head are generally secured to both ends of the barrel.

Referring now to the form of the invention shown in Figure 1, the multi-ply paper barrel of the spool is indicated at 10 and the frusto conical base thereof is indicated at 11. It will be perceived that the barrel 10 has continuous cylindrical inner and outer surfaces except at the bottom thereof, the bottom section of the cylindrical tube being expanded or outwardly deflected to form a shoulder 10' against which the inner margin of the base 11 seats, a suitable quantity of adhesive being employed, if desired, to permanently maintain the two parts in the relationship in which they are illustrated.

A reinforcing ring is indicated at 12 and this ring comprises, in the case of the spool shown in Figure 1, a continuous sleeve-like metallic member, the inner cylindrical surface of which comprises a continuation of the inner cylindrical surface of the main portion of the tube or barrel 10 and the outer cylindrical surface of which closely engages the inner cylindrical face of the expanded lower portion of the tube 10. The ring 12 comprises a reinforcing ring, being non-contractable, and therefore maintains the expanded lower end of the cylinder 10 in expanded relationship even should there be a very substantial pressure tending to move the base 11 axially of the barrel 10 and off of the end of the same. Pressures of this nature are frequently developed due to the end thrust of large, heavy packages of thread wound upon the surface of the barrel 10, the end of the thread package bearing upon the inside surface of the cone 11.

The apparatus for inserting the ring and expanding the lower end of the barrel to form a shoulder is shown in Figure 5. In this figure a tubular member, indicated at 14, has its upper end slotted at a plurality of points, in radial planes, to provide resilient tongues 14' which may be moved radially outward when desired

by the action of a conical cam 15, each of the tongues 14' having a conical surface against which cam 15 is adapted to abut. Suitable means for downwardly moving cam 15 and simultaneously outwardly thrusting the tongues 14' may be provided, the cam 15 being for instance secured upon the end of a rod 16 which may be drawn downwardly by a hand or foot lever. Each of the tongues 14' has a shoulder 14² and this series of shoulders is adapted to support the annular lower end of a paper barrel 10, as indicated. A ring of ductile metal is indicated at 12, the outer diameter of this ring being substantially the same as the inner diameter of barrel 10 and the inner diameter of ring 12 being substantially the same as the outer diameter of 14.

With the parts positioned as shown in Figure 5, it is only necessary to draw or force downwardly the cam 15 to cause this cam to thrust the various tongues 14' outwardly, thereby simultaneously stretching the ring 12 and expanding the lower end of the tube or barrel 10. This expanding operation may be carried as far as may be desired, but it is only necessarily carried sufficiently far to produce the amount of expansion illustrated in Figure 1 in which the inner cylindrical face of the ring 12 forms a continuation of the cylindrical inner surface of barrel 10. Any expansion less than this will result in partial obstruction of the tube or barrel and any expansion greater than this is really unnecessary, as it is not requisite that a very high shoulder 10' be formed at the barrel end. The metal ring 12 maintains the end of the tube in its expanded condition despite the normal tendency of the paper to return to its original shape after removal of the pressure. So firmly is the shoulder 10' supported by the ring 12 that the head or base 11 cannot be drawn over the end of the barrel without being broken or destroyed in some manner.

In Figure 2, a bobbin or spool end is illustrated in which a ring 20 is applied to the interior of the tube or barrel at a point remote from the end, a shoulder 21 being at the same time raised upon the outer surface of the barrel, for supporting against outward movement the frusto conical metallic base of spool 22. Except for the different locations of the ring 20 and the shoulder 21, however, the process of fabrication is the same as that just described in connection with the form of the invention shown in Figure 1. In the form shown in Figure 2, the end of the barrel is headed or crimped over at 23 and the annular spacing disc 24 is provided to support the outer edge of the frusto conical base or end member 22.

In the form of the invention shown in Figure 3, a shoulder 31 is formed upon the lower end of the barrel 30 by the aforescribed method of expansion but, in this case, the metallic ring 32 is not a continuous ring of ductile metal but is a split ring, the ends of which abut each other after the expansion has been effected to prevent the outwardly expanded or stretched paper material 31 from moving inwardly and destroying the seating shoulder. The base is indicated at 33.

In the form of the invention illustrated in Figure 4, a split ring or sleeve 40 is utilized to support the expanded paper shoulder 41, in this particular case the overlapping ends of the sleeve-like member 40 being connected together by a punching operation, after the ring has been fully expanded and the shoulder 41 formed, the punching operation causing a portion of the metal comprising one overlapping end to be thrust radially into an aperture formed in the other end of the ring, thereby locking the ends.

Naturally, in forming various types of spools, bobbins, or other thread cores, the details of the method of application of the reinforcing ring may be considerably modified and, likewise, rings of various materials and shapes may be employed without departure from the invention. The resulting bobbin or spool is particularly durable and it is found that the cost of fabrication is only slightly increased.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

A spool comprising a head and barrel, the head having a cylindrical aperture formed therein, the barrel having a cylindrical outer surface closely fitting the cylindrical aperture in the head and portions projecting axially thereof in both directions from the area of contact of the barrel and head, one such portion being a thread receiving portion and the other a head locking portion, the barrel being a truly cylindrical laminated paper tube save in that the locking portion thereof has an annular diametrically enlarged but circumferentially continuous section intermediate the area of contact of the head and barrel and the end of the tube providing a head retaining shoulder upon the outside of the barrel and an annular groove interiorly thereof, and an annular reinforcing ring within the groove to brace the enlarged section of the barrel against contraction, the inner diameter of the ring being substantially the same as the inner diameter of the barrel.

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