March 10, 1959 H. SCHMIDT 2,876,898

PROTECTIVE SEPARATOR FOR CONE-BOBBINS

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FIG. 1

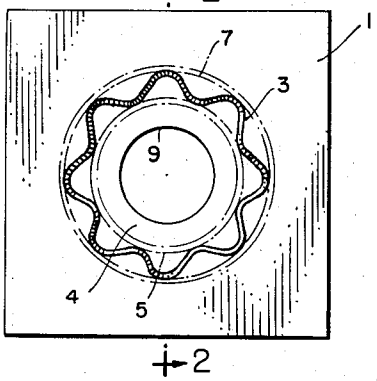


FIG. 3

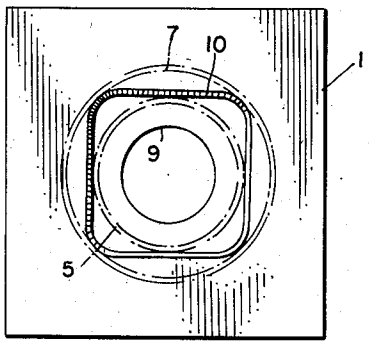


FIG. 2

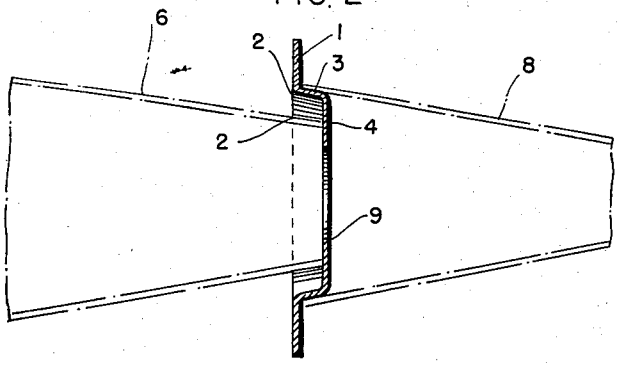


FIG. 4

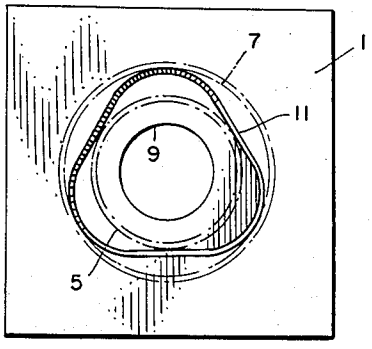
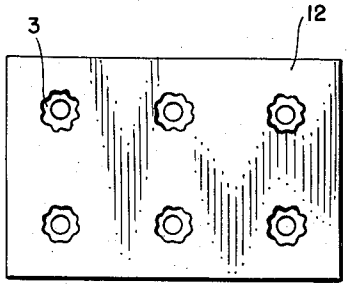


FIG. 5



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PROTECTIVE SEPARATOR FOR CONE-BOBBINS

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1 Claim. (Cl. 206—65)

This invention relates to a protective separator for insertion between cone-bobbins stacked end to end for shipping purposes.

Threads and yarns intended for further processing, such as weaving, are commonly wound on cone-bobbins which are spools of hollow frusto-conical form. The cone-bobbins are packed for shipment in containers provided with bottom, cover or separator plates having openings through which the ends of the cone-bobbins are inserted. In another method of packing, the cone-bobbins are placed on mandrels. Both of these packing methods are intended to prevent dislocation of the bobbins during their transportation with consequent damage to the wound thread or yarn due to pressure, impact or friction between dislocated spools.

When a large number of cone-bobbins are to be shipped, the bobbins are packed in a container in two or more layers. Plates of cardboard, light metal, or similar material having a number of punched holes are inserted between the layers to hold the cones. It is apparent that these holes must be slightly larger than the larger ends of the bobbins, and since the bobbins are of frusto-conical form, it is unavoidable that the separating plates will not be supported by the smaller ends of the adjoining cone-bobbins, and therefore the plates will tend to slide onto the wound thread or yarn with consequent damage. In order to overcome this, separator plates have been employed which instead of having holes are provided with a recess on one side of the plate and a mandrel on the other side. Such separator plates are effective in preventing dislocation of both top and bottom cone-bobbins but are disadvantageous in that the plates must have a considerable thickness so that the recesses may be of sufficient depth. Consequently, such plates are undesirable in that the relatively thick plates plus the added weight of the mandrels contribute considerable weight to the transportation containers.

One of the objects of the invention is to provide a protective separator for stacked cone-bobbins which will be effective in preventing dislocation of the bobbins and the consequent damage to the wound thread.

Another object of the invention is to provide a protective separator for securing insertion between stacked cone-bobbins which may be easily fabricated from a thin light-weight material.

The invention is illustrated but not limited in the accompanying drawing in which:

Fig. 1 is a plan view of a separator plate according to the invention;

Fig. 2 is an elevational sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a plan view of another embodiment of the invention;

Fig. 4 is a plan view of a further embodiment of the invention; and

Fig. 5 is a plan view of an embodiment of the invention including a plurality of elements similar to that illustrated in Fig. 1.

In accordance with the invention, the aforementioned objects are accomplished by a protective separator in the form of a plate which is provided with an aperture and a flange extending outwardly from the plate along the periphery of the aperture to form a rim and further extending across the aperture to form a cap. The peripheries of the aperture and the rim define a symmetrical figure. The inner periphery of the rim is circumscribable on a circle slightly larger than the outer periphery of the smaller end of one of the cone-bobbins. The outer periphery of the rim is inscribable in a circle slightly smaller than the inner periphery of the larger end of one of the cone-bobbins.

The accompanying drawing illustrates various embodiments of the invention. In Figs. 1 and 2 the separator plate 1 is a square piece of cardboard. A flange extends outwardly from the plate 1 along the periphery of an aperture 2 to form a rim 3 and then extending across the aperture to form a cap 4. The cap 4 lies in a plane substantially parallel with the plane of the plate 1. The periphery of the aperture 2 and the peripheries of the rim 3 are convoluted so as to have the appearance of a symmetrical gear wheel with rounded teeth and rounded gaps between the teeth. The inside periphery of the rim 3 is circumscribable on a circle 5 which is slightly larger than the outer periphery of the smaller end of a cone-bobbin 6, so that that end of the cone-bobbin 6 may fit securely within the rim 3 against the innermost convoluted portions. The outside periphery of the rim 3 is inscribable in a circle 7 slightly smaller than the inner periphery of the larger end of a cone-bobbin 8 similar to cone-bobbin 6, so that the large end of cone-bobbin 8 may be fitted securely over the rim 3. The cap 4 preferably has an aperture 9 to permit escape of air between plates, particularly when the periphery of the plate fits closely within the packing container.

Stated another way, the protective separator illustrated in Figs. 1 and 2 comprises a separator plate 1 of light-weight material having a wall 3 in the form of a hollow, sinuously convoluted, truncated cone protruding from one side of the plate 1, with the sinuous convolutions being of substantially equal magnitude and providing rounded valleys and ridges running longitudinally of the tapered side wall of the truncated cone. The plate 1 is open at the base of the truncated cone to provide an aperture 2, and the iner wall of the truncated cone forms a convoluted recess in the plate 1 for receiving the smaller end of a cone-bobbin 6. The rounded crests of the ridges of the convolutions on the outer side of the truncated cone lie in a common tangential plane in the form of a truncated cone, and the rounded crests of said ridges form spaced surfaces adapted to receive the larger end of the hollow cone-bobbin 6.

In Fig. 3 a similar embodiment of the invention is shown with the exception that the symmetrical figure defined is a square 10 having rounded corners. In Fig. 4 a similar embodiment of the invention is shown with the exception that the symmetrical figure is an equilateral triangle 11 with rounded corners.

In the embodiment shown in Fig. 1 in which the symmetrical figure has a convoluted periphery, the symmetrical figure is easily altered to fit cone-bobbins of any proportions simply by extending or contracting the convolutions radially of the symmetrical figure or, in other words, by increasing or decreasing the size of the teeth. However, in the embodiments illustrated in Figs. 3 and 4 in which the symmetrical figures 10 and 11 are respectively a square and a triangle, there are proportional limitations on the bobbins which may be used. The proportionate circumference of the small end and the large end of the cone-bobbins employed is limited to the proportions determined by the circumscribed and in-

scribed circles defined by the geometrical figures 10 and 11. Slight variations from these proportions can be compensated for by rounding off the corners of these particular geometrical figures.

The separator plates illustrated in Figs. 1–4 may be employed in square container packages having an inner periphery slightly larger than the periphery of the plate 1 so that the cone-bobbins and interposed plates form a column or stack. However, in another embodiment of the invention illustrated in Fig. 5, a separator plate 12 of rectangular periphery may be employed having a plurality of apertures with peripheral flanges similar to those illustrated in Figs. 1–4. In this embodiment, the bobbins may be packed in several stacks within the same container.

The material employed for the separator plates may be cardboard, light metal, plastic, or the like. When such materials are employed, the aperture, rim and cap may be formed in a single punching and pressing operation on the plate or by molding these forms when the plates are poured from a molten material. The rim and cap may also be individually fabricated from the same or different material from that of the plate and then fastened over apertures provided in the plate.

By means of the invention, a shipping unit is obtained which comprises stacked cone-bobbins, rectangular separator plates as described, interposed between the ends of the cone-bobbins, and a surrounding container package conforming to the rectangular periphery of the separator plates. By means of the invention, cone-bobbins wound with fine spun synthetic threads may be transported without damage to the valuable threads. The invention prevents dislocation of the bobbins in the container package and thus avoids damage to the threads. Because the separator plates may be fabricated from a thin light material, shipping weights may be kept to a minimum with a saving in shipping cost. Since the separator plates are of a form which permits telescoping of the plates when the bobbins are omitted, the plates may be conveniently packed for return to the shipper after they have served their purpose as protective separators for the wound cone-bobbins.

The invention is hereby claimed as follows:

A protective separator for insertion between stacked cone-bobbins which comprises a plate of lightweight material having a wall in the form of a hollow, sinuously convoluted, truncated cone protruding from one side thereof with the sinuous convolutions being of substantially equal magnitude and providing rounded valleys and ridges running longitudinally of the truncated cone, said plate being open at the base of said truncated cone whereby the inner wall of said truncated cone forms a convoluted recess in said plate for receiving the smaller end of a cone-bobbin, the rounded crests of the ridges of the convolutions on the outer side of said truncated cone having a common tangential plane in the form of a truncated cone whereby the rounded crests of the ridges of said convoluted wall form spaced surfaces adapted to receive the larger end of a hollow cone-bobbin, and an apertured cap, lying in a plane substantially parallel with the plane of said plate, and integral with the smaller end of said truncated cone.

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