Jan. 4, 1966 W. E. CRITZER 3,227,272

ARTICLE STACKING ARRANGEMENT

Filed Dec. 17, 1963 3 Sheets-Sheet 1

FIG. 1

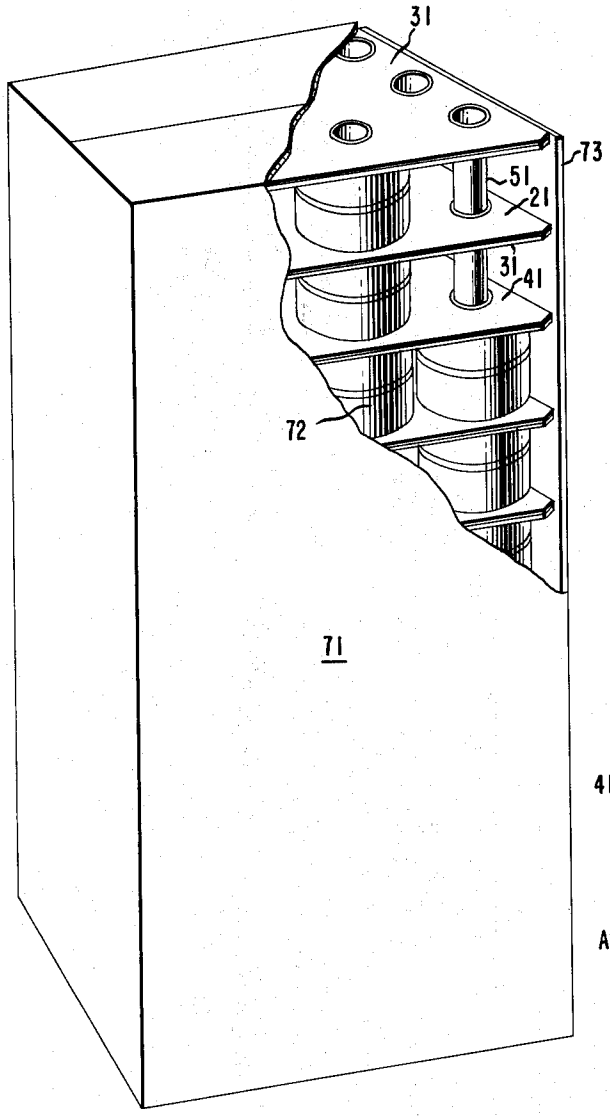


FIG. 2

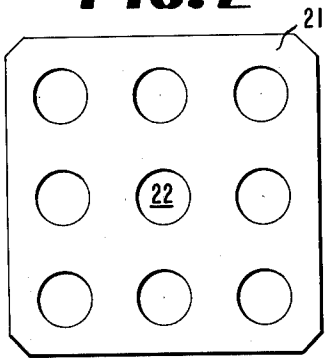


FIG. 3

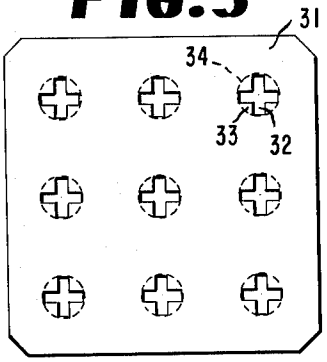


FIG. 4

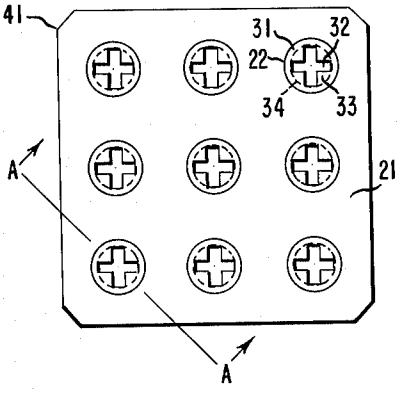
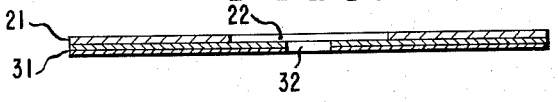


FIG. 5



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FIG. 7

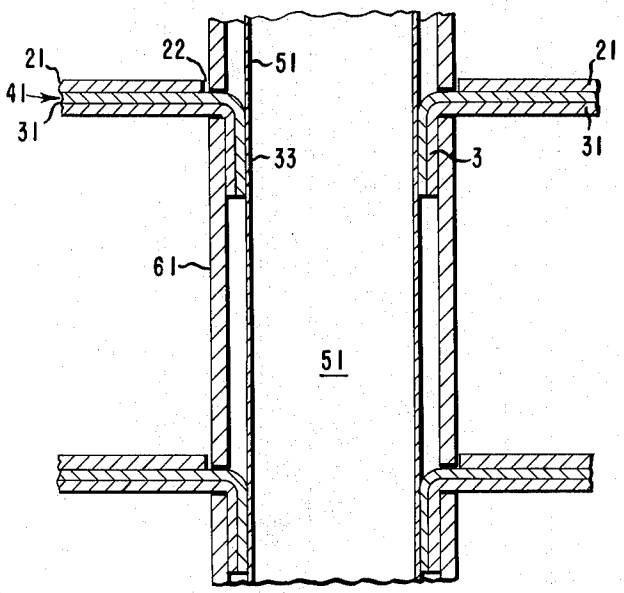


FIG. 8

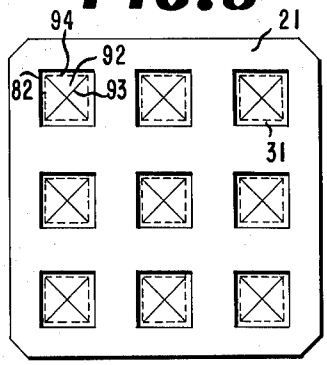


FIG. 9

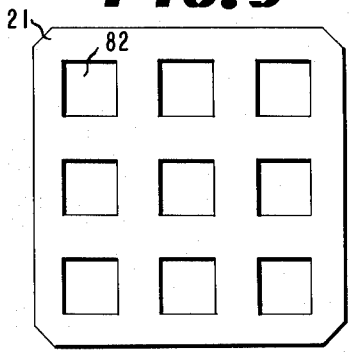


FIG. 10

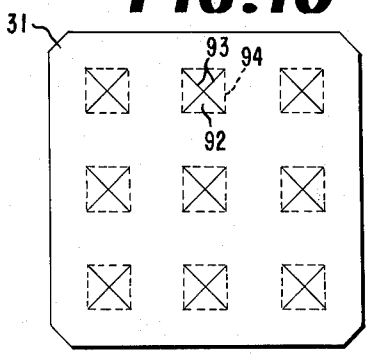
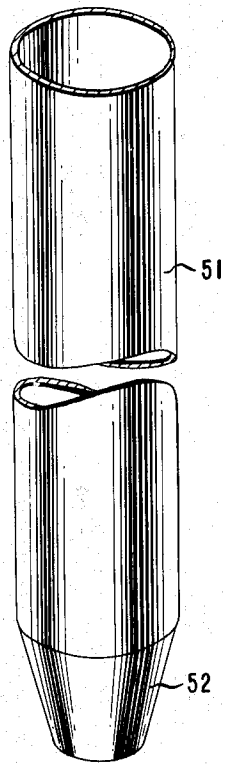


FIG. 6



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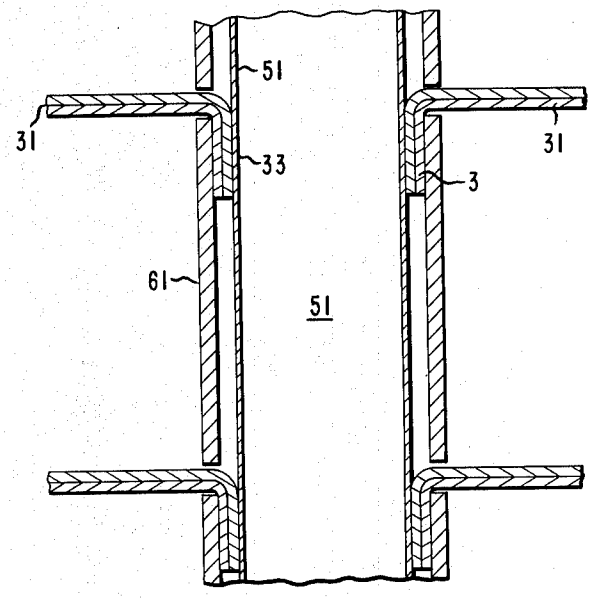
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FIG. 11



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ARTICLE STACKING ARRANGEMENT

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6 Claims. (Cl. 206—65)

This invention relates to shipping or storage assemblies and particularly to those assemblies wherein a plurality of like objects are arranged in layers.

For reasons of economy in storing and shipping, it is often desirable to collect a large number of like objects of relatively small size in a large carton, frequently in a layered arrangement. Typical of the objects commonly packed in this way are packages of textile yarn, such as bobbins, cones, cheeses, pirns and the like comprising core portions having a passageway extending therethrough and a winding of yarn thereon. It is also usually desirable that the objects be held firmly in place to prevent damage from their contact with each other or with the sides or inserts of the shipping container.

It is an object of this invention to provide an assembly for storing and/or shipping a plurality of objects, each object having a passageway extending therethrough, and wherein said objects are engaged so as to avoid relative movement thereof and damage thereto, such assembly being simple and inexpensive to construct and use. Other objects will be apparent from the description that follows.

According to the invention, there is provided an assembly which may include a carton for storing and/or shipping a plurality of like objects with hollow cores, in which assembly the objects are arranged in one or more superposed layers, and wherein a continuous locking post cooperates with tabs and separator pads of special design to lock the objects firmly in position so as to prevent them from rubbing against each other and against the walls or inserts of the assembly.

A preferred embodiment of the invention is shown in the accompanying drawings, wherein:

FIGURE 1 is a fragmentary perspective view of a carton with a portion of the walls cut away to show the interior thereof;

FIGURE 2 is a plan view of one element of a separator pad;

FIGURE 3 is a plan view of another element of a separator pad;

FIGURE 4 is a plan view of a separator pad combining the elements of FIGURES 2 and 3;

FIGURE 5 is a cross-sectional view AA, of the separator pad of FIGURE 4;

FIGURE 6 is a perspective view of a continuous locking post;

FIGURE 7 is a cross-sectional view of a portion of a shipping carton showing the cooperation of the elements in accordance with one embodiment of this invention;

FIGURE 8 shows an alternate form of a separator pad;

FIGURE 9 shows one element of the separator pad of FIGURE 8;

FIGURE 10 shows another element of the separator pad of FIGURE 8; and

FIGURE 11 is a cross-sectional view of a portion of a shipping carton showing the cooperation of the elements in accordance with a further embodiment of this invention.

The invention will now be described as applied to packing cylindrical bobbins of textile yarns. Reference will be made to the drawings, wherein like elements are uniformly numbered. In FIGURE 1, carton **71** consists fundamentally of protective cover **73**, which may be made of corrugated board, cardboard or other suitable material.

The carton will, of course, be of suitable dimensions for packing the articles desired. The materials and details of construction of the outer carton shell are not a part of this invention. The invention may be employed with any of a number of carton constructions. By way of example, suitable cartons are illustrated in United States Patents 2,567,786 and 2,706,593, but the application of the invention is not restricted to the use of a carton or to any particular carton type or construction.

FIGURE 1 shows a plurality of yarn packages **72** in a layered or tiered arrangement commonly employed in the textile industry today. The yarn packages **72** are stacked in columns with the cores of each package vertically aligned. Packages within a column are spaced by separator pad structure **41**, which is preferably a corrugated board assembly. Figure 1 further illustrates the manner in which continuous locking post **51** cooperates with separator pad structure **41** to hold yarn packages **72** firmly in place according to this invention.

Separator pad structure **41** is shown in FIGURES 4 and 5 and comprises elements **21** and **31**. Element **21** shown in detail in FIGURES 2 and 7 constitutes one surface of the separator pad structure **41**, and is formed from a sheet of corrugated board, cardboard or other suitable material. In element **21**, holes **22** are spaced apertures having a diameter slightly greater than the outside diameter of the yarn bobbin cores **61** as shown in FIGURE 7. The spacing and arrangement of holes **22** will be governed by the dimensions of the yarn packages and by the number of packages it is desired to pack in a given layer in a carton since each hole or other engaging means is designed to receive one end of each yarn bobbin and position it in said layer.

Element **31** shown in detail in FIGURES 3 and 7 and presenting the other surface of the separator pad **41** may also be made from a sheet corrugated board, cardboard or other suitable material. The sheet is scored at a plurality of spaced areas by score-line **34**. As illustrated, the scoring may be a circular pattern of smaller diameter than the holes **22** in element **21**. Cruciform holes **32**, bounded by score-line **34**, are cut from the sheet to provide deflectable tabs **33** integral with the sheet and along the periphery of the hole. These tabes are hinged because of the scoring and are designed to admit and to frictionally grip the exterior of the locking post and to frictionally engage the interior of one end of the hollow core of the yarn package. Holes **32** are so spaced and arranged in element **31** that their centers will be in registry with the centers of holes **22** in element **21** when the two elements are glued or otherwise adhered together to form separator pad **41** as seen in FIGURES 4 and 5. The diameter of the generally circular pattern formed by score-line **34** and hole **32** is chosen to be the same as or only slightly less than the inside diameter of bobbin core **61**.

If desired, the separator pad may consist solely of element **31** as shown in FIGURES 3 and 11. In such an embodiment, there are no engaging means provided to receive one end of each yarn bobbin and to position it in a layer when the bobbins are initially placed in the layer. However, as the locking post is inserted into proper position, the tabs of the separator pad are deflected and frictionally engage the bobbin at one end thus permitting only minimum bobbin movement at the other end. This embodiment, i.e., the single layer separator pad, is far less preferred when dealing with yarn packages. To begin with, even slight bobbin movement may permit contact between adjacent yarn packages and cause damage to the external windings. There is also the possibility the yarn packages of the various layers may be out of line in any column. In this event, the locking post on insertion may contact yarn rather than find its way into the bobbin cores.

Locking post **51** illustrated in FIGURE 6 may be a solid rod or mandrel of wood, metal or other material, but, for economy, light weight, and ease of handling, it is preferably a hollow cylinder of molded fibrous material such as pulpboard or cardboard. The length of locking post **51** will depend on the height of shipping case **71**. Its diameter will depend on the inside diameter of the bobbin cores **61** to be packaged and on the thickness of element **31**. As will be apparent from FIGURES 7 and 11, to achieve the positive locking that is the object of the invention, the diameter of locking post **51** should be equal to the inside diameter of bobbin core **61** reduced by twice the thickness of element **31**, the tabs of which will exteriorly engage the locking post. One end of locking post **51** may be tapered as shown generally at **52** in FIGURE 6, and the other end may be flared if desired.

The manner in which the various elements of the preferred embodiment of the invention cooperate to provide positive locking of yarn bobbins **72** in shipping carton **71** will now be described with particular reference to FIGURES 1 and 7. In the bottom of the empty shipping case **71**, may be placed one or more blank sheets of cardboard or other similar material cut to the same overall dimensions as separator pads **41**. To these layers may be added a bottom pad equivalent to element **21** and likewise containing holes **22**. Yarn packages **72** are then placed on the bottom pads so that the bobbin cores **61** are centered in holes **22**. When the bottom layer of bobbins is complete, a separator pad **41** is placed over the layer of bobbins in such a way that element **31** is on the under side. Thus a new element **21** is provided on the upper side for seating the next layer of bobbins. This procedure is repeated until the carton is full, whereupon a top pad, which may be equivalent to element **31**, is set in place over the top layer of bobbins.

A continuous locking post **51** is then inserted downward through each column of bobbins. As the locking post **51** passes downward, it bends locking tabs **33** on element **31** of separator pads **41** at the score-line **34**, wedging tabs **33** securely in place between locking post **51** and the inside walls of bobbin cores **61**. This wedging action coupled with the seating of bobbin cores **61** in holes **22** in element **21** of separator pad **41** firmly locks the yarn bobbins in place and prevents any damage that would otherwise result from the yarn packages rubbing against each other or against the walls of the shipping carton. When the locking posts **51** are all in place, additional blanks of the same over-all dimensions as before may be added for protection before the carton is closed and sealed.

FIGURE 11 is illustrative of an arrangement of the various components wherein the separator pad has no defined seating means for an end of each yarn bobbin. The components are identified as in FIGURE 7. In the operation of a shipping assembly that employs the arrangement of FIGURE 11, blank sheets are placed in the bottom of the shipping case as described above. Yarn packages are placed on the bottom pad. A separator pad consisting of element **31** is placed over the layer of bobbins and the procedure is repeated until the carton is full. Locking post **51** is then inserted downward through each column of bobbins, bending locking tabs **33** at the score-line **34**. Tabs **33** are thus wedged securely in place between locking post **51** and the inside walls of bobbin cores **61**. Additional blanks of the same over-all dimensions as before may then be added and the carton sealed.

The invention has been illustrated in connection with cylindrical yarn bobbins, that is, objects having a circular cross section and a parallel wall structure. It will be apparent that the principle of locking posts and locking tabs on separator pads can be employed with objects of other shapes. For example, FIGURES 8, 9, and 10 illustrate elements **21** and **31** and separator pad **41** for use with articles of square cross section. Square holes **82** are provided in element **21**. Sore-line **94** in a square pattern are provided on element **31**, which is also die-cut with diagonal lines **93** to form locking tabs **92**, all centered in registry with the square holes **82** in element **21**. The arrangement shown in FIGURES 8, 9, and 10 can be used with a locking post **51** of either circular or square cross section.

The objects to be packed need not have an actual defined tubular or equivalent core structure, and the opposite ends of the objects may be of different dimensions and cross section. It is required only that they have openings oppositely placed with sufficient clearance to allow passage of the continuous locking post **51** and room to admit the locking tabs **33** as they are forced downward by the passage of locking post **51**.

The over-all dimensions of the shipping case and the spacing, arrangement and specific dimensions of the locking post, separator pads, and other elements will all be dictated by the nature, shape and size of the objects to be packed and the number it is desired to pack in a single carton.

The invention is not intended to be limited to the specific embodiments thereof described herein. As many widely different embodiments and variations may be employed without departing from the spirit of the invention, it is to be limited only as defined in the appended claims.

What is claimed is:

1. In combination, a plurality of tubular objects arranged in layers, each object having a passageway extending therethrough, said objects being further arranged in at least one column with the passageways aligned, a separator pad structure between layers, said pad structure having means for positioning one end of an object in one layer of a column, said pad structure also having holes therethrough and deflectable hinged tabs along the periphery of the holes, and a locking post extending continuously through the passageways of the objects in said column and through holes in the separator pad structure, the tabs of said separator pad structure being deflected out of the plane of the structure in a position substantially perpendicular thereto, cooperating with the adjacent end of the object in the next layer and being in interior frictional engagement with the passageway of the object at such end, and in exterior frictional engagement with the locking post vicinal to that part of the passageway.

2. The combination of claim **1** wherein the objects are yarn packages comprising a bobbin core and a winding of yarn on said core.

3. In combination a plurality of tubular objects arranged in layers, each object having a passageway extending therethrough, said objects being further arranged in at least one column with the passageways aligned, a separator pad structure between layers, said pad structure having holes therethrough which are smaller than the ends of the objects and deflectable hinged tabs along the periphery of the holes, and a locking post extending continuously through the passageways of the objects in said column and through holes in the separator pad structure, the tabs of said separator pad structure being deflected out of the plane of the structure in a position substantially perpendicular thereto, cooperating with the adjacent end of the object in the next layer and being in interior frictional engagement with the passageway of the object at such end, and in exterior frictional engagement with the locking post vicinal to that part of the passageway.

4. The combination of claim **3** wherein the objects are yarn packages comprising a bobbin core and a winding of yarn on said core.

5. An improved shipping or storage assembly comprising in combination, a container and a plurality of tiers of yarn packages therein, each package comprising a bobbin core having a passageway extending therethrough and a winding of yarn on said core, said packages being stacked

in columns with the cores of the packages in each column being aligned, a corrugated board structure separating the tiers, said structure comprising first and second layers, said first layer having spaced apertures adapted to and engaging a first end of each core in the tier, said apertures being of slightly greater diameter than such bobbin core ends, and said second layer having a plurality of spaced areas, round holes in concentric alignment with the apertures of said first layer, the holes in said second layer being smaller than said bobbin core first ends, said second layer having integrally hinged tabs along the periphery of each hole and a locking post extending continuously from the top to the bottom of the interior of the container through the cores in a column, and through holes in the corrugated board structure, the tabs of said structure being deflected out of the plane of the structure in a position substantially perpendicular thereto and interiorly frictionally engaging the adjacent end of the core of the yarn package in the next tier and exteriorly engaging and gripping the locking post vicinal to that end of the core.

6. An improved shipping or storage assembly comprising in combination, a container and plurality of tiers of yarn packages, each package comprising a bobbin core having a passageway extending therethrough and a winding of yarn on said core, said packages being stacked

in columns with the cores of the packages in each column being aligned, a corrugated board structure separating the tiers, said structure comprising a layer having round holes that are smaller than the bobbin core ends located at a plurality of spaced areas and integrally hinged tabs along the periphery of each hole and a locking post extending continuously from the top to the bottom of the interior of the container through the cores in a column, and through holes in the corrugated board structure, the tabs of said structure being deflected out of the plane of the structure in a position substantially perpendicular thereto and interiorly frictionally engaging the adjacent end of the core of the yarn package in the next tier and exteriorly engaging and gripping the locking post vicinal to that end of the core.

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THERON E. CONDON, *Primary Examiner.*