United States Patent

Seiler

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[54] APPARATUS FOR SHIPMENT AND STORAGE OF MAGNETIC MEMORY DISCS AND THE LIKE

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[21] Appl. No.: **36,248**

[52] **U.S. Cl.** .....**206/62 P,** 206/65 R

[51] **Int. Cl.** **B65d 71/00,** B65d 85/30

[58] **Field of Search**.....206/65 R, 65 K, 62 P, 52 F, 206/46 FR; 229/23 BT; 217/53

[56] **References Cited**

UNITED STATES PATENTS

3,524,540	8/1970	Brown et al.	206/62 P
3,465,875	9/1969	McKelvey, Jr.	206/52 F
2,761,610	7/1956	Welshenbach	229/23 BT
409,318	8/1889	Crittenden	217/53
2,444,326	6/1948	Baker et al.	206/65 R
2,424,553	7/1947	Conti	206/52 R
2,181,198	11/1939	Moskowitz	206/65 K

Primary Examiner—William T. Dixson, Jr.

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[57] **ABSTRACT**

The apparatus has a tube anchor ring at each end, with each ring providing a radially directed and an axially directed surface. A tube is positioned between the rings and is engaged upon the surfaces to anchor the tube in position. Magnetic memory discs, or other similar devices, are stacked upon the tube with suitable spacers therebetween and are located between the rings. Clamping means clamps the rings together to hold the discs in place. This assembly can be employed for storage of the discs and can be packed in a carton for shipment thereof. When employed in a carton, the tube anchor rings are preferably secured to ends which are of such dimension as to engage the sides of the carton. Rubberized hair felt or similar shock-absorbing material can be packed within the carton against the ends.

15 Claims, 11 Drawing Figures

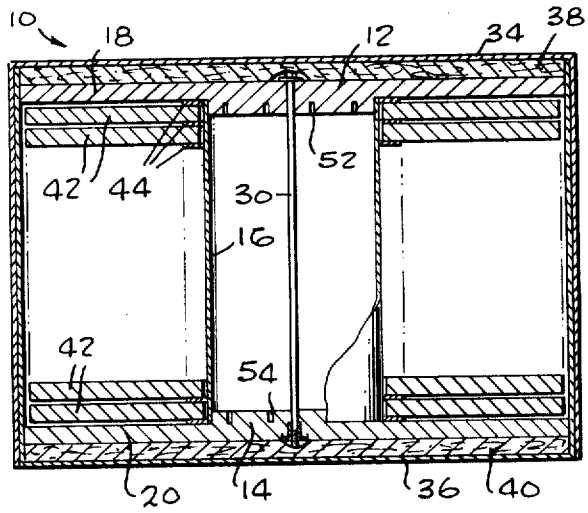


Fig. 1

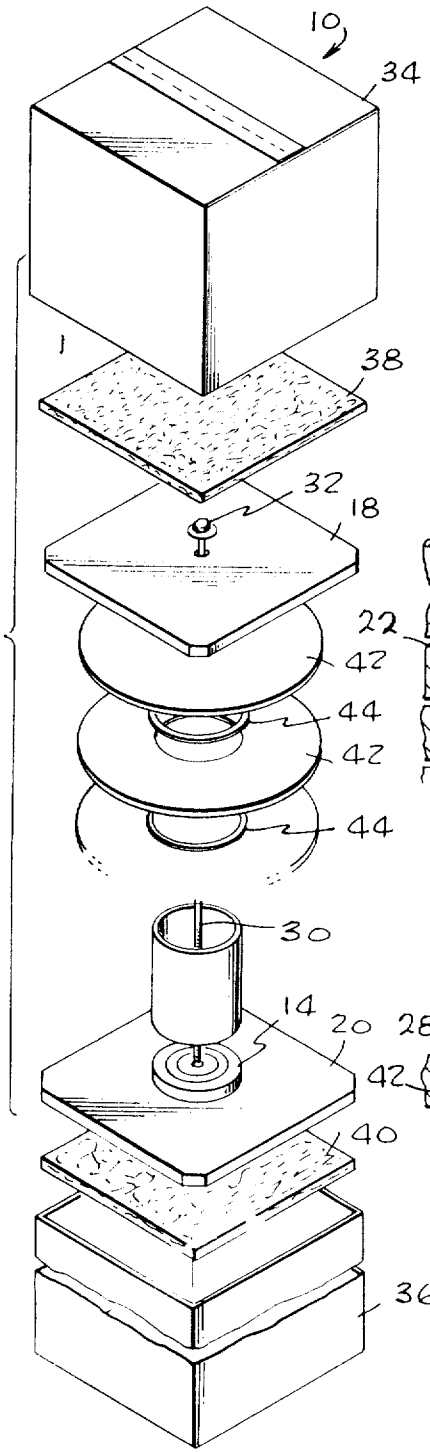


Fig. 2

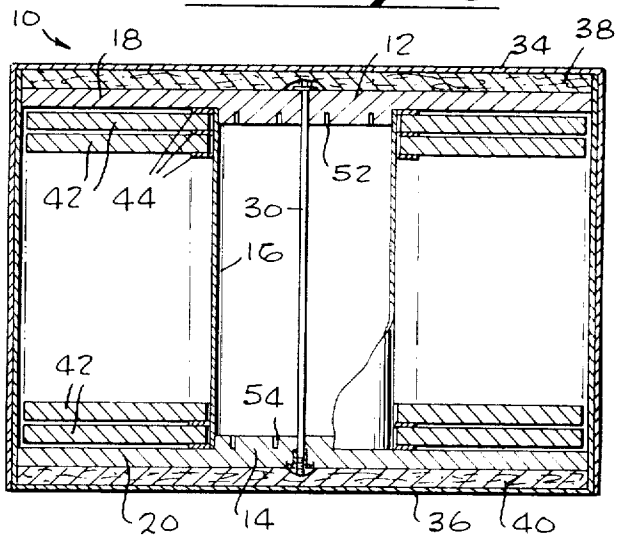
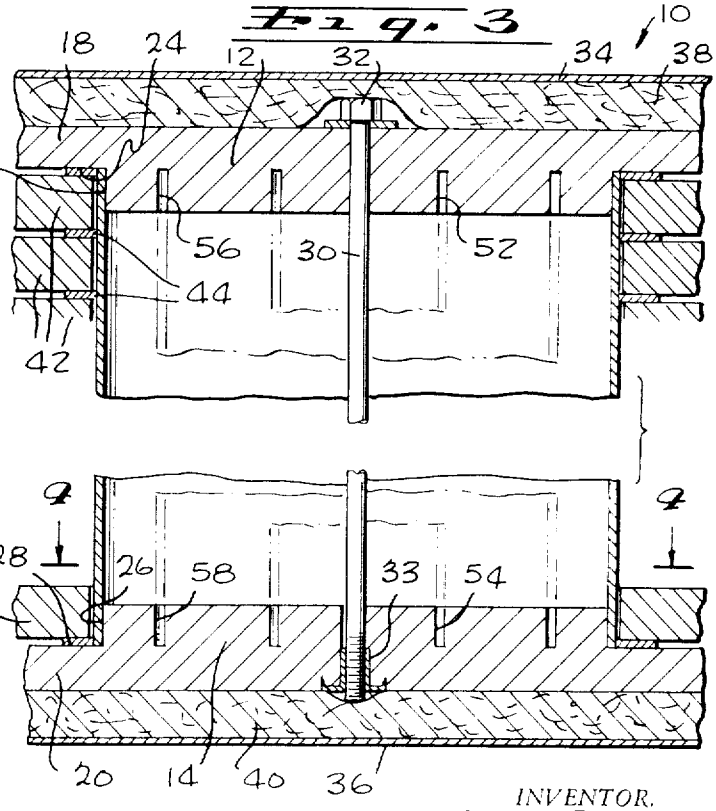


Fig. 3



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Fig. 4

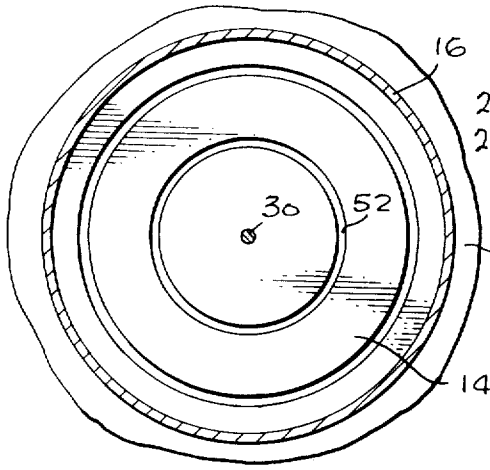


Fig. 5

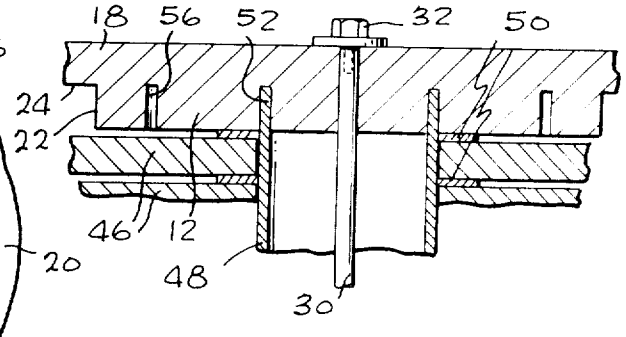


Fig. 7

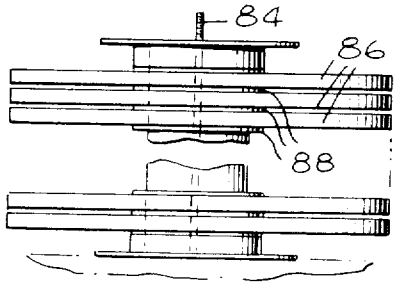


Fig. 6

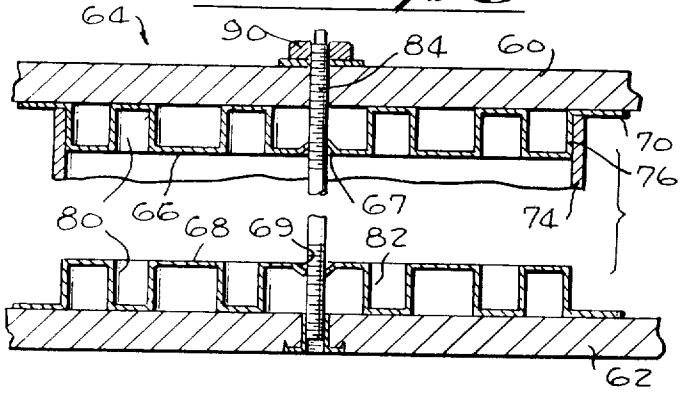


Fig. 9

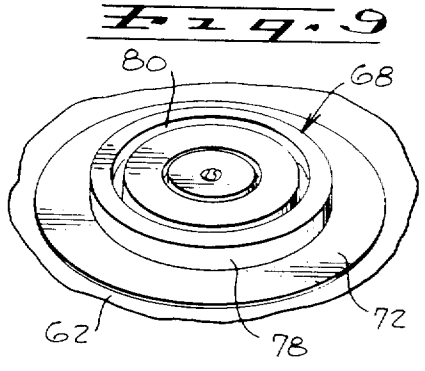
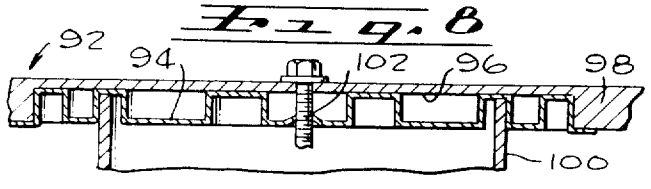


Fig. 8



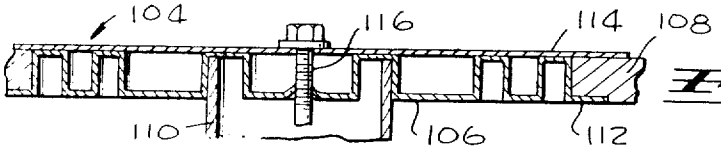


Fig. 10

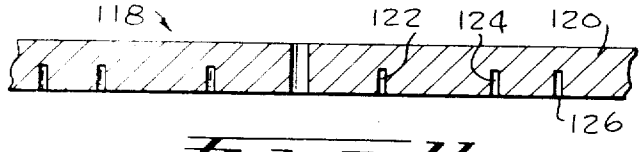


Fig. 11

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APPARATUS FOR SHIPMENT AND STORAGE OF MAGNETIC MEMORY DISCS AND THE LIKE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention is directed to a packaging apparatus of particular utility for receiving, protectively storing and protectively shipping magnetic memory discs and the like.

2. Description of the Prior Art

Magnetic memory discs have surfaces which must be protected from contact. These surfaces are the active surfaces of the discs so that injury thereto causes inefficient or inoperative employment of the discs as a memory unit. The opposite axial faces of the discs are of this nature, while the inner circumferential surface of the center hole of the discs and the axial faces of the disc adjacent the inner circumferential surface, are not employed for memory purposes. Thus, the only manner in which a disc can be safely engaged is on the inner circumferential surface and the axial faces closely adjacent thereto.

Since such memory discs have such large areas which cannot be touched and such small areas which can be engaged, they are difficult to store between steps in the manufacturing process, difficult to store in finished inventory, and even more difficult to ship. Furthermore, since such discs are used in increasing quantities with increasing employment of computers, such discs must be manufactured, inventoried and shipped in greater quantity, together with protection of the discs during the manufacture, storage and shipping operations for most economic supply of such discs to the user.

SUMMARY OF THE INVENTION

In order to aid in the understanding of this invention, it can be stated in essentially summary form that it is directed to an apparatus for shipment and storage of magnetic memory discs and the like. The apparatus comprises first and second tube anchor rings having both radial and axial surfaces, with a tube mounted on the surfaces. Clamp means pulls the tube anchor rings together to hold the tube in place. Magnetic memory discs can be mounted on the tube, with suitable spacers between the discs so that a plurality of them can be stacked together.

In shipment, ends are secured to the tube anchor rings, and the structure inserted in a carton, with the ends extending past the magnetic memory discs to hold the discs away from the carton walls. Shock-absorbing means can be placed in the carton between the ends and the carton.

Accordingly, it is an object of this invention to provide an apparatus for shipment and storage of magnetic memory discs and the like, which apparatus is easy to use, is of economic construction and provides proper protection of magnetic memory discs thereon when in storage or in shipment. It is a further object to provide tube anchor rings which engage a tube, with magnetic memory discs on the tube and clamped between the rings so that a plurality of magnetic memory discs are supported. It is still another object to provide anchor rings which have a plurality of grooves therein to provide different radial and axial surfaces therein so that tubes of different diameters can be mounted on the rings to support magnetic memory discs having different inside diameters. It is another object to permit the employment of tubes of different lengths, so that different numbers of magnetic memory discs may be stacked thereon, thus to assure versatility both as to interior diameter size and number of magnetic memory discs which can be stored. It is a further object of this invention to provide a structure which can be mounted in a carton, so that a plurality of magnetic memory discs can be safely shipped.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may be understood best by reference to the following description, taken in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view of a first embodiment of the apparatus for shipment and storage of magnetic memory discs and the like of this invention.

FIG. 2 is an enlarged central vertical section of the embodiment of FIG. 1, in assembled relationship and partly in elevation.

FIG. 3 is a further enlarged fragmentary detailed view of a portion of the structure of FIG. 2.

FIG. 4 is a reduced size fragmentary plan view taken generally along the line 4—4 of FIG. 3.

FIG. 5 is a fragmentary section, similar to FIG. 3, but employing a different size of tube.

FIG. 6 is a partial longitudinal section, with parts broken away, on a scale similar to FIG. 3, of a second embodiment of the apparatus of this invention.

FIG. 7 is an elevational view on a reduced scale of the apparatus of FIG. 6, showing magnetic discs in assembled relationship for storage and shown with a central tube of intermediate size.

FIG. 8 is a view similar to FIG. 6, showing a third embodiment of the invention.

FIG. 9 is a perspective view of the ring of the embodiment of FIG. 6.

FIG. 10 is a view similar to FIG. 6, showing a fourth embodiment of the apparatus of this invention.

FIG. 11 is a fragmentary sectional view, similar to FIG. 6, showing a fifth embodiment of the apparatus of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiment of the apparatus for shipment and storage of magnetic memory discs and the like is generally indicated at 10 and is illustrated in FIGS. 1 through 5. The apparatus 10 comprises upper and lower tube anchor rings 12 and 14, upon which tube 16 is mounted. Upper and lower tube anchor rings 12 and 14 are shown formed as bosses upon upper and lower ends 18 and 20, respectively. However, the upper and lower anchor rings may be formed separately from the ends and simply be secured thereto. Upper anchor ring 12 has radial surface 22 and axial surface 24 against which tube 16 engages to provide both axial and lateral or radial positioning. Similarly, lower anchor ring 14 has radial surface 26 and axial surface 28 for engagement by the lower end of tube 16.

When the tube is engaged upon the surfaces, clamping of the anchor rings together by means of bolt 30 secures the anchor rings and tube in place. In the present instance, since the rings are formed integrally with the ends, the ends are also secured into a rigid structure. The rigid structure comprises the ends being spaced apart by the tube and clamped together by means of bolt 30. Bolt 30 has a head 32 which engages upon upper end 18, through the intermediacy of a conventional washer. For convenience in assembly, head 32 can be the head of a short bolt threaded into the top end of bolt shank 30, as seen in FIG. 5. The lower end of bolt 30 is threaded and is threadedly engaged into a nut 33 pressed into a central opening in lower end 20.

Upper carton half 34 telescopes into lower carton half 36. Upper and lower ends 18 and 20 are of such dimension as to fairly closely fit within the carton to prevent lateral displacement of the ends with respect to the carton, once they are installed. In order to provide shock-resistance in the axial direction, upper and lower pads 38 and 40 of rubberized hair felt are installed between the ends and the top and bottom of the carton.

To provide economic construction, in the preferred embodiment, tube 16 is of fiberboard construction, anchor rings 12 and 14 are preferably of chipboard material, while the ends 18 and 20 are also preferably of chipboard material. The top and bottom of the carton are preferably of conventional corrugated kraft construction. Other materials can be employed, as is especially pointed out hereinbelow, with respect to the other embodiments shown in the drawings.

FIG. 2 illustrates the closed carton as a shipping apparatus which has a plurality of magnetic discs 42 therein. The magnetic discs each have an interior opening which fairly closely embraces the exterior surface of tube 16. The magnetic discs are separated by spacer rings 44. When a full complement of magnetic discs 42 and spacer rings 44 are stacked upon tube 16, upper anchor ring and upper end 12 and 18 are put in place, followed by the installation and tightening of bolt 30, and the magnetic discs 42 are firmly supported upon their inner circumferential surfaces and the faces closely adjacent those surfaces. They are clamped between thrust surfaces radially outward from the tube. The thrust surface can be on the tube anchor ring or on the end. Thus, the outer edges and the outer portions of the faces are protected from contact. This, of course, provides excellent storage for the memory discs.

In cases where the discs are in process, rather than in inventory or shipment, the short bolt having head 32 screwed into the bolt shank 30 may be left out so that the discs may be reached for ready access. With the bolt in place, the structure is rigid and can be moved about the shop and into inventory. For more extensive shipment, the interior assembly of discs and ends, secured by the bolt, can be inserted into the carton with the pads for safe shipment.

Different numbers of magnetic discs 42 can be securely packed in the apparatus by control of the length of central tube 16. Magnetic discs having a smaller interior diameter can be accommodated in the apparatus 10 by employment of a central tube having an exterior diameter suitable for the diameter of that size of magnetic disc. For example, FIG. 5 illustrates magnetic discs 46, which have a smaller interior hole size than the magnetic discs 42, supported upon tube 48. Again, spacer rings 50 space the discs from each other and from the upper and lower anchor rings 12 and 14. They are clamped between thrust surfaces on the anchor rings. In order to accommodate the smaller sized tube 48, anchor rings 12 and 14 have annular grooves 52 and 54 in the surface thereof of such diameter as to provide both axial and radial surfaces for proper support of the tube 48.

Other than the employment of smaller diameter tube 48 within smaller diameter annular grooves 52 and 54, which provide smaller diameter radial support surfaces, the structure is the same as previously described. Additionally to annular grooves 52 and 54, annular grooves 56 and 58 (see FIG. 3) are provided to furnish radial and axial support for a central support tube of that diameter. Thus, the apparatus 10 can be employed to store and ship magnetic discs of several different interior diameter sizes.

Referring to FIGS. 6 and 7, ends 60 and 62 are shown therein. The ends 60 and 62 are preferably identical to the ends 18 and 20, without the anchor rings or bosses 12 or 14 thereon. Thus, they furnish the end structure for employment in a finished shipment apparatus. However, the apparatus 64 employs rings 66 and 68 which are of thin wall construction. They may be of stamped metal, or may be of vacuum-formed sheet synthetic polymer composition material. They are preferably of stamped metal, to provide the desired rigidity. Axial surfaces 70 and 72 are provided for axial support of a central stacking tube 74 and extend radially outward therefrom to act as thrust surfaces. Similarly, radially directed surfaces 76 and 78 radially position the stacking tube 74.

Furthermore, anchor rings 66 and 68, which serve as a stacking tube anchor, have annular grooves 80 and 82 therein. These grooves also provide radial and axial support surfaces for stacking tubes of smaller diameter than the stacking tube 74. For example, each of grooves 80 and 82 can alternatively support a stacking tube on the interior or exterior radial support surface of the groove. By this means the rings 66 and 68 can provide proper support for five different sizes of stacking tubes. Thus, this construction can be used with several different tube diameters.

As a storage device, the lower anchor ring, or stacking tube anchor 68, can be placed upon bottom end 62 for physical support. Bolt 84 is put in place to radially locate anchor ring 68 upon the base. Next, a stacking tube 74 of suitable diameter is placed upon the lower anchor ring. Now, the structure is ready to receive magnetic discs 86 suitably spaced by spacers 88, see FIG. 7. When a number of magnetic discs have been assembled onto the stacking tube, a top ring 66 can be laid thereon. The structure is, thus, such as to act as a storage device, as illustrated in FIG. 7. The bottom end 62 may be eliminated in the storage configuration by merely backing bolt 84 upwardly so that the bottom surface of anchor ring 68 is flush. It will be noted that anchor rings 66 and 68 are preferably provided with stamped tabs 67 and 69 for threaded reception of bolt 84, thus providing greater versatility in assembly operations. As long as the structure is carried by support on its bottom end 62 or by lifting of the top of bolt 84, no further assembly is required. However, for shipping, top end 60 is put in place and is secured down by nut 90 engaged on the threaded top end of bolt 84. The nut and bolt must pull the structure together to clamp the ends upon tube 74 to provide stable end surfaces for retaining tube 74. The entire structure is then placed in the carton, as previously described with respect to the apparatus 10.

FIG. 8 illustrates a portion of apparatus 92 for the shipment and storage of magnetic memory discs, as previously described. In the case of apparatus 92, anchor rings similar to anchor rings 66 and 68 are employed. Only the upper anchor ring 94 is illustrated. It is designed to fit within a recess 96 in top end 98. STacking tube 100 fits within one of the annular grooves in ring 94. The grooves provide axial and radial support surfaces for the stacking tube of the desired diameter. The lower end and anchor ring of apparatus 92 are symmetrically identical to the upper portion shown, except for the manner of securement of bolt 102 in a conventional nut.

The apparatus 104, shown in FIG. 10, comprises anchor ring 106, which is or can be identical to ring 94. However, as illustrated in FIG. 10, anchor ring 106 is of greater depth, so that it extends all the way through an opening in top end 108. Ring 106 has annular grooves therein for the axial and radial support of a stacking tube, for example a stacking tube 110 shown in its innermost annular groove. Ring 106 has an outwardly extending flange 112 which extends outward on the bottom of top end 108 to provide axial securement. Similarly, large washer or plate 114 engages over the top of top end 108. Bolt 116 engages through plate 114 and ring 106 down into similar structure at the bottom. Thus, apparatus 104 can be employed in the same manner as the apparatuses 10, 64 and 92. Anchor rings 94 and 106 of FIGS. 8 and 10 can be of the same material as anchor ring 66 of FIG. 6. All anchor rings of FIGS. 6, 8 and 10 have a bolt guide cone around the bolt hole to aid assembly. Furthermore, when the anchor rings are formed of stamped metal, they can include resilient bolt thread engaging fingers around the bolt hole to serve as built-in nut structures, as previously described in connection with FIG. 6.

FIG. 11 illustrates an apparatus 118, wherein the top end 120 has annular tube anchor grooves 122, 124 and 126 therein, each being for the reception and axial and radial support of a stacking tube of selected diameter. In this respect, the apparatus 118 is very similar to the apparatus 10 but, in the apparatus 118, the top end 120 itself has the annular grooves cut therein rather than having them cut into a boss or separate tube anchor ring 12, as illustrated in FIGS. 2 and 3.

Any one of the apparatuses thus is capable of supporting magnetic discs in a manner in which they are separated from each other, but yet are packed in high-density storage. Furthermore, each convenient the apparatuses is capable of being used as a temporary storage facility wherein the disc can be readily installed and removed and can be employed as a secure inventory storage and shipment package. Thus, a convenient and economic storage and shipping apparatus is produced.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in

the art that changes and modifications may be made without departing from this invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

What is claimed is:

1. An apparatus for the shipment and storage of a plurality of discs each having an interior opening therein, such as magnetic memory discs and the like, comprising:

a lower tube anchor comprising a ring having a radial surface and an axial surface;

a lower thrust surface positioned radially exteriorly of said radial surface;

an upper tube anchor comprising a ring having a radial surface and an axial surface;

an upper thrust surface extending radially exteriorly of said radial surface on said upper tube anchor ring;

tube means engaged directly on said radial surfaces and extending between said axial surfaces on said upper and lower tube anchor rings so that said tube means is positioned between said tube anchor rings for stacking a plurality of discs on said tube means with the openings in the discs engaging and embracing said tube means for engaging the discs between said thrust surfaces for axial clamping of the discs between said thrust surfaces for firm retention of the discs.

2. An apparatus for the shipment and storage of a plurality of discs each having an interior opening therein, such as magnetic memory discs and the like, comprising:

a lower tube anchor comprising a ring having a radial surface and an axial surface, a lower thrust surface secured to said ring and positioned exteriorly of said radial surface on said ring;

an upper tube anchor comprising a ring having a radial surface and an axial surface, with said axial surface being in substantial alignment with said axial surface on said lower tube anchor, an upper thrust surface secured to said upper tube anchor ring, said upper thrust surface extending radially exteriorly of said radial surface on said upper tube anchor ring;

a tube engaged directly on said radial surfaces and positioned between said axial surfaces on said upper and lower tube anchor rings, with said thrust surfaces secured to said upper and lower tube anchor rings extending radially outward from said tube so that said tube is positioned between said tube anchor rings for stacking a plurality of discs on said tube with the openings in the discs engaging and embracing said tube and with the discs being engaged between said thrust surfaces for axially clamping of the discs between the thrust surfaces for firm retention of the discs, clamping means engaged between said upper and lower thrust surfaces to clamp said upper and lower thrust surfaces against the discs, said clamping means comprising a bolt having a head engaging one of said tube anchor rings and threadedly engaged in a nut engaging the other of said tube anchor rings so that tightening of said bolt tightens said thrust surfaces against discs positioned on said tube.

3. The apparatus of claim 2 wherein upper and lower ends respectively carry said upper and lower thrust surfaces, and said upper and lower tube anchor rings are respectively carried on said upper and lower ends so that clamping of said ends clamps said tube between said axial surfaces.

4. The apparatus of claim 3 wherein said radial surfaces and said tube are right cylinders.

5. The apparatus of claim 4 wherein said apparatus is positioned within a carton having an upper carton half and a lower carton half, said ends laterally engaging said carton halves to minimize lateral shifting of said tube within said carton.

6. The apparatus of claim 4 wherein resilient means is positioned within said carton between said ends and said carton.

7. An apparatus for the shipment and storage of a plurality of discs each having an interior opening therein, such as magnetic memory discs and the like, comprising:

a lower end, a lower tube anchor carried by said lower end, said lower tube anchor comprising a right cylindrical radial surface and an axial surface, a lower thrust surface on said lower end, said lower thrust surface positioned radially exteriorly of said radial surface;

an upper end, an upper tube anchor carried by said upper end, said upper tube anchor comprising a plurality of concentric right cylindrical radial surfaces and an axial surface, an upper thrust surface extending radially exteriorly of the largest of said radial surfaces;

right cylindrical tube means positioned on and extending between one of said radial surfaces on said lower tube anchor and one of said radial surfaces on said upper tube anchor and positioned between said axial surfaces on said upper and lower tube anchors so that said tube means is positioned between said tube anchors for stacking a plurality of discs on said tube means with the openings in the discs embracing said tube means for engaging the discs between said thrust surfaces for firm retention of the discs; and

clamping means engaged between said upper and lower ends to clamp said upper and lower thrust surfaces against the discs.

8. The apparatus of claim 7 wherein said tube anchor ring is integrally formed with one of said ends.

9. The apparatus of claim 4 wherein said tube anchor ring is formed of sheet material and has a plurality of annular grooves therein for selective retention of a stacking tube.

10. The apparatus of claim 9 wherein said tube anchor ring is positioned against said end.

11. The apparatus of claim 9 wherein said tube anchor ring is positioned within a recess in said end.

12. The apparatus of claim 9 wherein said tube anchor ring is positioned within an opening in said end and a plate is positioned over said opening and said clamping means engages said plate.

13. The apparatus of claim 9 wherein said apparatus is positioned within a carton having an upper carton half and a lower carton half, said ends laterally engaging said carton halves to minimize lateral shifting of said tube within said carton.

14. The apparatus of claim 13 wherein resilient means is positioned within said carton between said ends and said carton.

15. An apparatus for the shipment and storage of a plurality of discs each having an interior opening therein, such as magnetic memory discs and the like, comprising:

a lower end, a lower tube anchor secured to said lower end and formed of the same material thereof, said lower tube anchor comprising a right cylindrical radial surface and an axial surface, said lower end having a lower thrust surface thereon positioned radially exteriorly of said radial right cylindrical radial surface;

an upper end, an upper tube anchor secured to said upper end and formed of the same material thereof, said upper tube anchor comprising a right cylindrical radial surface and an axial surface, an upper thrust surface on said upper end extending radially exteriorly of said right cylindrical radial surface;

a right cylindrical tube engaged on said upper and lower radial cylindrical surfaces and axially limited by said axial surfaces on said upper and lower ends so that said cylindrical tube is positioned between said tube anchor rings for stacking a plurality of discs on said tube with the openings in the discs engaging and embracing said tube; and

a clamping bolt having a head engaging one of said ends and threadedly engaged in a nut engaging the other of said ends so that said ends can be clamped together, and so that said thrust surfaces on said ends can clamp the plurality of discs stacked on said tube for the axial clamping of the discs between said thrust surfaces for firm retention of the discs.

* * * * *