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3,322,262

MOISTURE-TIGHT CONTAINER

Filed June 1, 1965

2 Sheets-Sheet 1

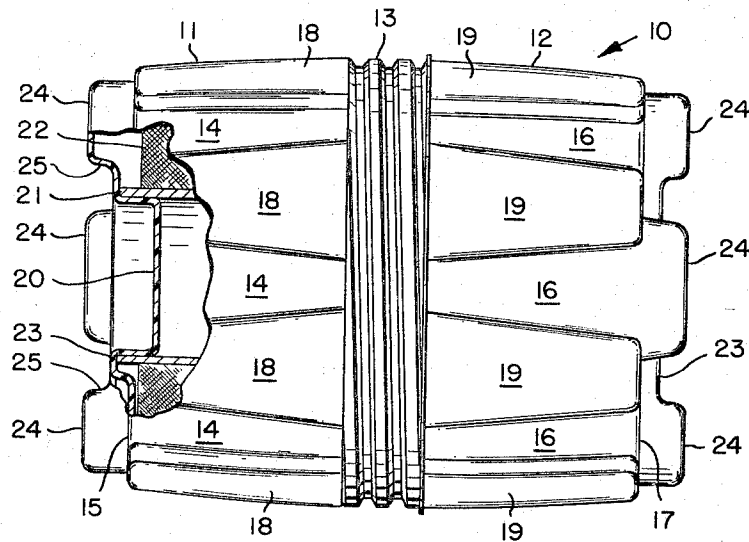


FIG. 1

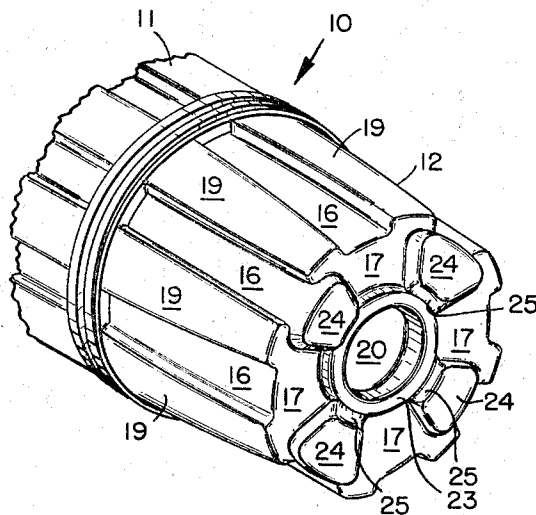


FIG. 2

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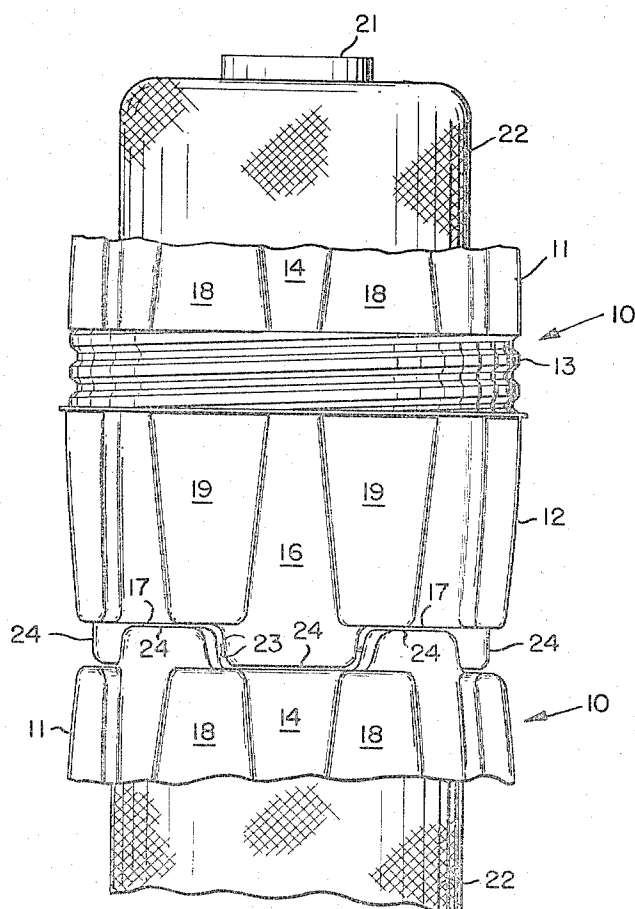


FIG. 3

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MOISTURE-TIGHT CONTAINER

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8 Claims. (Cl. 206—1)

This invention relates to moisture-tight containers and more particularly to moisture-tight containers for enclosing and supporting materials for shipment and handling.

An object of the invention is to ship and store materials such as core-wound fibers in a durable, rugged moisture-tight container that is stackable, easily opened and closed, able to withstand rough handling, and yet economical, easily made, and disposable after use.

Another object of the invention is to make a moisture-tight container of an inexpensive synthetic plastic material such as polyethylene so that the containers can be economically mass produced by vacuum forming.

Another object of the invention is to reduce loss, damage and deterioration to fiber glass in storage and shipment and thus contribute to economy in fiber glass handling.

Other objects of the invention will be apparent hereinafter from the specification and from the recital of the appended claims. To these and other ends, the invention resides in certain improvements, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of this specification.

In the drawings:

FIG. 1 shows a partially cut-away side elevation of a container according to the invention;

FIG. 2 shows a partial perspective view of the container of FIG. 1; and

FIG. 3 shows a partial cut-away side elevation of containers according to the invention in stacked relationship.

Generally, the invention comprises a plastic container two portions of which are screwed together with male and female threads that interfere to provide a moisture-tight seal. The container is preferably provided with inwardly projecting trunnions at its ends for engaging a hollow core on which fibers are wound so as to support the fibers free of contact with the container walls. The container halves are preferably molded as by vacuum forming of relatively thin plastic material, and the container is strengthened by providing ridges in its walls. Also, the container preferably has interlockable projections at its ends to facilitate stacking one container atop another in such a relation that the container portions can neither slide horizontally nor rotate relative to each other. Further, the trunnion support for the cores of the contained fibers is preferably arranged so that when containers are stacked atop one another, the main weight-bearing surfaces are disposed in the area where the core ends of superposed cores are adjacent to each other, whereby the weight of stacked cores is effectively a solid column to reduce the weight-bearing requirements of the outer skin of the container.

Referring to the drawings, throughout which corresponding parts are indicated by the same reference numerals, a preferred embodiment of the container is illustrated. Of course, containers can be made in other forms according to the invention, and can be adapted for purposes other than packaging fiber materials.

The illustrated container 10 is generally barrel-like or cylindrical and is formed of two halves that are screwed together preferably centrally of the container. Thus, a female portion or member 11 is provided with interior threads, and a male member 12 is provided with exterior threads in central thread area 13. The respective threads of members 11 and 12 are configured for mutual interference to produce a moisture-tight seal around the container 10.

Members 11 and 12 are preferably molded as by vacuum forming of an inexpensive synthetic plastic material such as polyethylene. The invention is not limited to any specific material or molding operation, however. Members 11 and 12 are preferably identical except for their threads and are preferably generally cylindrical and formed with closed ends opposite their threaded open ends. This can best be seen from FIG. 1 where member 11 is shown with a generally cylindrical wall represented by surfaces 14, and an end wall 15, and member 12 is shown with a generally cylindrical wall represented by surfaces 16 and an end wall 17.

It is preferred that raised strengthening ridges or ribs be spaced at intervals around the periphery of the cylindrical walls of the halves of the container to strengthen the container axially, circumferentially, and radially. Thus, raised ridge portions 18 are shown on member 11, and corresponding raised rib portions 19 are shown on member 12.

As best shown in FIG. 1, an internally projecting trunnion 20 is formed to extend inwardly from the inside of end wall 15 of member 11. The ends of members 11 and 12 are preferably identical so that a similar trunnion 20 (FIG. 2) extends inwardly from end wall 17 of member 12. Trunnion 20 is disposed for closely engaging the inside surface of core 21 (FIG. 1) on which fibers 22 are wound. Thus, when the two halves of the container are screwed together, trunnions 20 extend into each end of core 21 and support core 21 and fibers 22 axially of the container. By such an arrangement, fibers 22 can be supported free of contact with any of the inside surfaces of the container, and this is preferred to prevent any damage to fibers 22 during handling or shipment.

As best shown in FIGS. 1 and 2, an annular projection 23 extends outward externally beyond the end surfaces 15 or 17 of each half of the container. Annular projection 23, of course, forms a corresponding recess within the container into which core 21 is inserted. It is preferred that when the container halves are screwed together full, the ends of core 21 abut against the inside surface of annular projection 23 so that, when containers are stacked atop one another, annular projections 23 can form a weight-bearing connection between a superposed core of fibers and a subadjacent core. Thus, stress from the weight of stacked containers according to the invention is transmitted axially through annular rings 23 rather than through peripheral surfaces of container 10.

Each of the container members 11 and 12 are preferably formed with identical symmetrical projections 24 extending axially outward beyond end surfaces 15 or 17. In this illustrated embodiment, four such projections 24 extend outwardly from the end of each half of the container, but of course, greater or lesser numbers of projections, or depressions rather than projections can be used within the spirit of the invention.

Projections 24 are preferably formed as partial segments of the ends of the container and are preferably radially spaced around trunnion 20 and annular projection 23 so that projections on any container half may be interlocked with projections on any other container half. The preferred illustrated arrangement of projections 24 prevents not only any lateral sliding motion of two stacked containers relative to each other, but also any rotational motion between any container halves as is best shown in FIG. 3. Stackable containers according to the invention are adapted to be stacked on pallet and taped in place by a tape looped over the topmost container between its projections 24. The tape thus prevents rotation of the topmost container, and other container members in the stack are interlocked and prevented from rotating by their respective projections 24.

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The bottommost container in a stack can rest upon a support ring engaging annular projection 23 for strength, if desired, but it is preferred that the containers be strong enough so that the bottom container is self-supporting upon its projections 24. To this end, it is preferred that projections 24 be connected to annular projection 23 by connecting walls 25 which contribute to the supporting strength of projections 24 relative to a stacked column of fibers. To give further supporting strength to projections 24, it is preferred that a portion of main cylindrical walls 14 and 16 extend directly and evenly substantially to the outer end of respective projections 24. Walls 14 and 16 in straight communication with projections 24 transmit axial forces applied to projections 24 directly to threaded area 13 which is particularly strong because of its configuration and the double walls in mutual agreement in that area.

Such an arrangement of projections 24 allows any given container half to support the bottom of a stack. To insure that the main weight of the fiber stack is borne axially through the interior of the containers as above described, and that peripheral container walls do not interfere with such weight-bearing, annular projections 23 are dimensioned relative to interlocking projections 24 so that with containers in stacked relation, some clearance exists between projections 24 and confronting end wall surfaces 15 or 17, particularly near the periphery of the containers. Thus, projections 24 prevent rocking or toppling of the stacked containers or any relative sliding or rotational motion, but do not extend so far as to relieve annular projections 23 of their weight-bearing function.

Thus, it can be seen that containers according to the invention, because of their identical ends, can be arranged in a stack with either their male or female members bottommost or topmost. Shipping and handling of fibers in the inventive containers thus is expedited since container orientation can be ignored. Also, fibers are quickly and easily loaded into containers 10, it only being necessary to set the fibers within one half of the container and screw the other half down onto it. The container halves are formed so that a core of fibers inserted into a container half seeks its proper position in the recess of projection 23 and over trunnion 20 without guidance effort by the person inserting the core in place. Also, threaded portions 13 of the container halves, although they have interfering threads, are configured to receive each other easily and to be quickly and easily threaded together. Because the fibers are supported within each container without any contact with the container walls, and because the containers are made strong by their ribbed portions 18 and 19, containers according to the invention can withstand rough handling during storage and shipment. Also, the inventive containers can be made cheaply enough to be disposed of after a single use; however, it is possible and sometimes preferred within the scope of the invention to make containers 10 durable enough to withstand many uses before disposal.

For some applications, it is desirable to form containers 10 of translucent or transparent plastic material so that a label on fibers within the container can be read through the container so as to eliminate any labeling externally of the container. Such an arrangement also insures that such an internal label is not damaged or disfigured during shipping so as to become illegible or unattractive.

While the invention has been disclosed herein by reference to the details of a preferred embodiment, it is to be understood that such disclosure is intended in an illustrative, rather than in a limiting, sense, and it is contemplated that various modifications of the combinations, construction, and arrangement of the parts will readily occur to those skilled in the art, within the spirit of the invention and the scope of the appended claims.

I claim:

1. A moisture-tight container adapted for enclosing and supporting a hollow core on which strand material is wound, said container comprising:

- (a) a pair of hollow, generally cylindrical members each of which has an open end and a closed end, and each of which is formed of thermoplastic material;
- (b) a female one of said members being configured to define female threads adjacent its open end;
- (c) a male one of said members being configured to define male threads adjacent its open end;
- (d) said male and female threads being configured to interfere so as to form a moisture-tight seal when said members are screwed together;
- (e) each of said closed ends being configured to define an internally projecting trunnion adapted to fit closely inside the respective ends of said core; and
- (f) each of said closed ends being configured to define a plurality of symmetrically disposed, external projections arranged to interlock rotationally and laterally with corresponding projections on any of said members to facilitate stacking of one of said containers atop another and to prevent relative motion between any of said members of any of said stacked containers.

2. The container of claim 1 wherein said projections comprise partial sectors of said closed ends and are radially disposed about said trunnion.

3. The container of claim 1 wherein each of said members has a generally cylindrical wall portion extending between said closed end and said threads, said wall portion being configured to define raised axial ribs disposed at intervals.

4. The container of claim 3 wherein an unribbed portion of said wall portion extends evenly substantially to the end of each of said projections for transmitting axial force applied to said projections to the area of said threads to strengthen said container axially.

5. The container of claim 1 wherein each of said closed ends is configured to define an annular internal recess and corresponding external annular projection surrounding said trunnion, said recess being adapted to receive a respective end of said core, said external annular projection being adapted to engage a corresponding external annular projection on an adjacent stacked container to form a weight-bearing connection between cores in said stacked containers.

6. The container of claim 5 wherein said interlocking projections comprise partial sectors of said closed ends, and are radially disposed about said external annular projection, said interlocking projections and annular projections being correlated so that relative to said stacked containers, corresponding annular projections are in engagement, and some clearance exists between said interlocking projections and the confronting surface of said adjacent container.

7. The container of claim 5 wherein each of said members has a generally cylindrical wall portion extending between said closed end and said threads, said wall being configured to define raised axial ribs disposed at intervals.

8. The container of claim 1 wherein said thermoplastic material comprises polyethylene.

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