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INDUSTRIAL MODULAR CONTAINER

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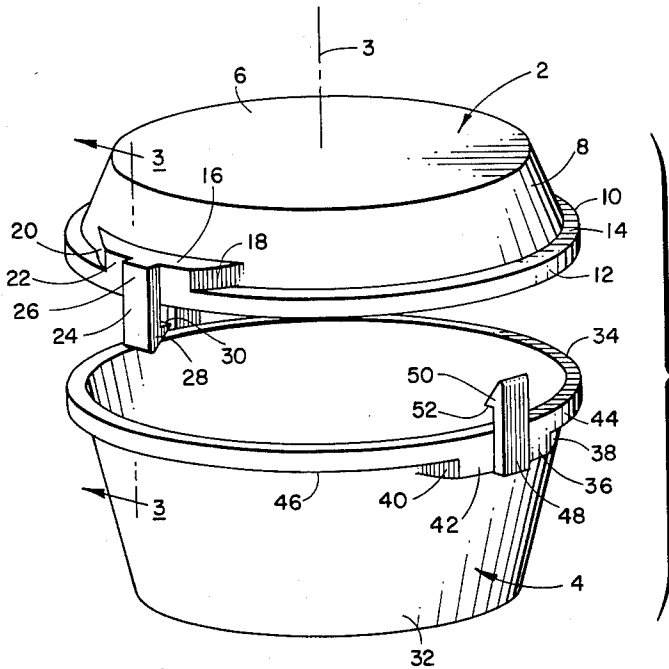


FIG. 1

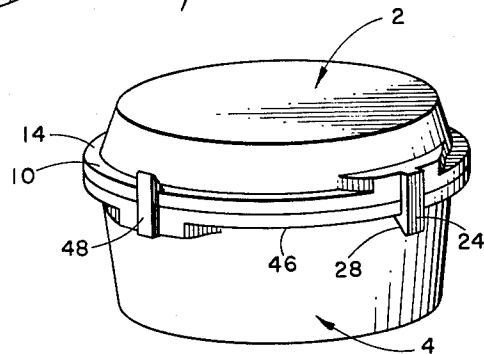


FIG. 2

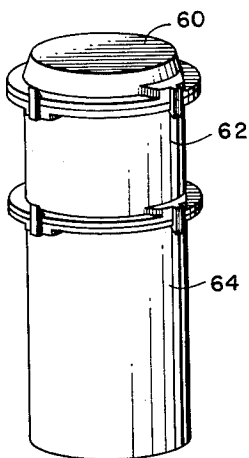


FIG. 4

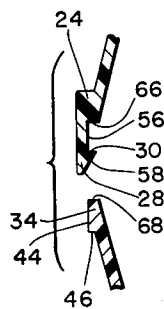


FIG. 3

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INDUSTRIAL MODULAR CONTAINER

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9 Claims. (Cl. 220-4)

This invention relates to containers.

More particularly, this invention relates to modular containers.

In the art of packaging containers for industrial products, many approaches have been made to alleviate the problems of convenience or lack thereof, cost and material selection. In the past, it has been common practice to provide crates consisting of side panels, end panels and a cover into which the industrial article is placed. The portions making up the crate are commonly nailed, bolted or otherwise secured together. As a result, the use of such crates is limited to one application since destruction of the materials that make up the crate results when the article is removed. In addition, cardboard boxes or metal boxes have been used, but have the disadvantage of containing only a specified volume or shape. When different size articles are to be packaged, another approach has been to utilize such materials as wood and assemble the container from individual boards. This suffers the same disadvantage as crates in that the container is most likely not reusable.

There are many applications in industrial packaging of different size articles where it is desirable to have an inexpensive, convenient, reusable container which is adapted to accommodate various sized articles. For example, a valve manufacturer might wish to transport a large number of valves of different sizes to a purchaser. Since many valves are rather delicate assemblies, it is necessary to package these valves so as to protect them from handling as well as to prevent dirt and other contaminants from entering the container. Since it is obviously very expensive to maintain a large stock of containers of different sizes, it would be desirable to maintain a minimum stock of container sections which are reusable and yet can be adapted by mere addition of other sections to accommodate larger articles than the basic modular container. It is to this problem which this invention is directed.

As an example of a container which can be adapted to contain articles of different sizes, reference is made to U.S. Patent No. 3,101,154 assigned to the assignee of this invention. In that patent, a modular container with convenient means for securing modules together is disclosed and claimed. The invention, according to this application, is considered to represent an expeditious way to provide containers for various articles.

In a more basic form, this invention provides container sections, each of which has on at least one end thereof edge means, ramp means and clip means which are adapted to secure a like container section having like edge means, ramp means and clip means. These elements are assembled easily and removal or separation of container elements is accomplished by a rotation of the elements relative to each other. During handling, rotation is resisted by the bias of the clips. If the clips are accidentally rotated enough, further accidental rotation is prevented by the ramp means. The sections are therefore securely locked together while a good sealing surface is maintained between the sections.

An object of this invention is to provide securing means for mating sections.

A more particular object of this invention is to provide a modular container having sections with securing means thereon for maintaining the sections together.

Other objects and advantages of this invention will be-

come apparent as this description proceeds, taken in conjunction with the drawings in which:

FIG. 1 is an exploded view of a top section and a container section according to one embodiment of this invention,

FIG. 2 is a view similar to that shown in FIG. 1 wherein the sections are in assembled relationship,

FIG. 3 is a cross-sectional view taken along the lines 3-3 of FIG. 1, and,

FIG. 4 is a view showing several container sections and illustrates another embodiment of this invention.

Referring now to FIG. 1, there is shown one embodiment of this invention in detail with two sections shown in a separated position. Designated generally at 2, is a top of a container assembly. Shown at 4 is the bottom half of the container assembly. The top section 2 is preferably constructed of a plastic material such as polypropylene although other materials such as the more commonly used metals and other plastics may be employed. Section 2 has a top 6 and side wall 8. Along the bottom of side wall 8 is an edge member 10 which constitutes one feature of this invention. This edge member is circular and as shown includes a peripheral sub-side wall 12 which is parallel to the axis 3 of container 2 and a surface 14 which is normal to axis 3. This surface and side wall 12 may be at an angle to axis 3. Shown at 16 is a ramp member which includes ramp surfaces 18 and 20 and a flat portion or cylindrical segment 22 which is shown as being coplanar with the surface 11 of edge member 10 with the width of surface 22 extending circumferentially. Preferably the top member 2 is an integral assembly which may be molded so that ramp member 16, side wall 8, top 6 and edge member 10 are integrally formed. Formed integrally with or otherwise placed on ramp member 16 and edge member 10 is clip member 24. The clip member includes a portion 26 which is parallel to the axis of top member 2. Also formed as part of the clip member 24 is a projection 28 including a radially directed surface 30 for a purpose to be described later.

The bottom section of the container assembly is shown at 4 and includes a side wall 32. At the open end of side wall 32 is an edge member 34 similar to that described with reference to top member 2. Also associated with edge member 34 is ramp member 36 having ramp surfaces 38 and 40. Surface 42 of ramp member 36 is coplanar with surface 44 of edge member 34. Designated generally at 46 (see FIG. 3) is a surface on edge member 34 which is normal to the longitudinal axis of section 4 although this surface may incline inwardly and upwardly as viewed in FIG. 3. This corresponds to and is constructed similarly to edge member 10 of top member 2. Clip member 48 is provided which is similar to the clip shown in section 2 and has a projection member 50 and surface 52. Surface 52 and surface 30 of clip member 48 and 24 respectively may incline to conform with the surface 14 and 46 respectively.

Referring now to FIG. 2, a container assembly is shown in assembled position and includes top member 2 and bottom section 4. When assembled, clip member 48, due to surface 52, engages surface 14 of edge member 10 so as to prevent the sections from separating. Likewise, clip member 24 engages surface 46 by means of surface 30 on projection 28 in a like manner.

A detail of the clip member 24 and the edge member 34 is shown in FIG. 3 prior to assembly. Preferably, these sections are constructed so that surface 56 of clip member 24 lies substantially in the plane of surface 44 of edge member 34. Surface 58 is shown at an angle to the longitudinal axis of the container sections, so that as top member 2 is forced down on bottom member 4, the surface 58 will slide over the edge 68 and surface

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44 of edge member 34. Due to the resiliency of clip member 24, projection 28 will be sprung outwardly and allowed to slide over surface 44 until the surface 30 is radially aligned with surface 46 at which time due to the bias of member 24 will spring inwardly and engage surface 46. Surface 66 on edge member 10 will then closely abut surface 68 of edge member 34 to effectuate a seal. Although not shown, it is within the scope of this invention to provide a gasket or O-ring between the sections as at 56 and 68 to act as a seal.

To disassemble the sections from each other, it is only necessary that top member 2 be rotated relatively to bottom member 4 so that the projection 28 on top member 2 will be engaged by ramp surface 40 or 38 depending on the direction of rotation so as to ride up the ramp and on to surface 42. Since surface 42 is in the same plane as surface 44 of edge member 34, it is a simple matter to separate the section in an axial direction since projection 28 will merely ride over the coplanar surfaces 42 and 44. At the same time, projection 50 on clip member 48 will ride on ramp member 16 by means of surfaces 18 or 20 so as to likewise ride on surface 22 which is coplanar with surface 12 of edge member 10. It may be noted that at the moment that clip member 24 is riding on surface 42 of ramp member 36, clip member 48 will be riding on surface 22 of ramp member 16. In such a position, the clips will abut each other to act as mutual stops. It can also be seen that a plurality of clip member and ramp sections can be provided on each container. It is desirable that the number of ramps and clip members on each section correspond to a similar number on its adjoining section. It is important that the angular distance or angle between each clip member be selected so that the distance between any two clip members and ramp sections be equal to the distance between any other clip member and its adjacent ramp section. Although not shown, the top member 2 would have two such clip members 24 and ramps 16 while bottom section 4 would have a similar number of ramps and clips. Accordingly, the clips on each section would be separately by 180 degrees. Should four of these clips be used, the angular distance would be 90 degrees. Thus, 6 clips would be 60 degrees apart while 10 clips would be 36 degrees apart. In other words, the clips and ramps would be selected so as to provide a circular, symmetrical arrangement.

The structure shown in FIG. 1 is illustrated as having two container sections, namely, a top and a bottom. Also, these sections are shown as being slightly tapered since during storage it may be desirable to have a large number of, for example, bottom sections 4, stacked within each other in a manner well known in the art. However, as shown in FIG. 4, it is also within the scope of the invention to provide, for example, cylindrical sections for elements 60, 62 and 64, each of which contains the fastening structure as described with reference to FIG. 1, FIG. 2 and FIG. 3. It can, therefore, be seen that by utilizing a basic module assembly such as shown in FIG. 1, certain size articles can be conveniently placed therein with the top member 2 forced down on bottom member 4 to make a convenient package. Should it be desirable to transport, for example, a longer article, it is only necessary to provide an intermediate section such as 62 shown in FIG. 4 between a top member 60 and bottom member 64. Increasing length of articles can be accommodated by adding additional sections such as 62. It should also be noted that in the event a much smaller pancake-like container is desired, two top members 60 can be assembled together since the securing structure on each element is identical to the securing section on another element.

In the operation of the device, top member 2 is placed on bottom member 4 by merely axially aligning the two members and forcing the two together with projection 28 and projection 50 preferably offset from the ramp

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member of its adjoining section. At this time the inward bias allows the clip members to engage or snap over the lip or surface such as 46 or 14 to secure the sections together. To disassemble, it is only necessary that the sections be rotated relative to each other so that the projections 28 and 50 ride up the ramps of the adjoining section. The sections are then moved axially relative to each other so that the clip members will slide along the outer edges of the adjoining section until the sections are separated. The clips also function as a stop means. During disassembly, the sections can be rotated without any attempt to align the clips and ramps since clip members 24 and 48 will abut one another. When this occurs, the sections are in position for separation. Preferably, surfaces 22 and 42 have a width on each side of the clip equal to the width of the clip on the other section.

Although the above described structure has been discussed with relation to container sections, it is also within the scope of this invention to utilize this structure in such assemblies as pipe lines. Thus, pipe sections can be formed with the securing structure on each end thereof and many sections joined in a manner similar to the container structure.

Although the securing features of the invention have been described as being integral with the side members so that each container section is an integral construction, it is within the scope of this invention to provide that the clip members, ramp members, edge members and side walls be formed separately and joined prior to assembly. This would facilitate the use of different materials. For example, the edge members may be separately formed and attached to the container by screws and the like.

As it can be seen by this invention, modular containers for industrial applications and other uses can be expeditiously fabricated and assembled in any desired manner by a simple movement. To separate the sections, it is only necessary to rotate the members relative to each other so that the contents of the container sections can be removed. It can be further noted that the containers can be used over and over again without fear of destruction of any of the parts since there are no nails or other destructive securing devices utilized. In addition, there is no need for separate clip elements which can be lost since all of the fastening structure preferably is formed as an integral part of the assembly. Indentations, protrusions or finger grips may be molded or otherwise provided on the sections to facilitate rotating the sections relative to each other.

Although the invention has been described and illustrated in detail, it is to be clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and scope of this invention being limited only by the terms of the appended claims.

I claim:

1. An assembly comprising; a plurality of sections, each of said sections adjoining and being secured to at least one other section, each of said sections having an edge means, ramp means and clip means, said clip means on one section being engaged with the edge means on the other section, said clip means on said other section being engaged with the edge means on said one section, said ramp means on each section being adapted upon rotation of one section relative to the other section to disengage said clip means on the other of said sections from the edge means on the adjoining section.

2. An assembly according to claim 1 in which the edge means, clip means and ramp means on each of said sections are integral.

3. An assembly according to claim 1 in which there are a plurality of clip means and ramp means on each of said sections.

4. An assembly according to claim 3 in which each of

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said clips and ramps are equally spaced from adjacent clips and ramps.

5. An assembly comprising; a plurality of sections, each of said sections adjoining and being secured to at least one other section, each of said adjoining sections having edge means and ramp means, said ramp means having at least two ramp surfaces, each of said ramp surfaces terminating in a surface coplanar with a surface on said edge means, each of said sections having clip means, said clip means engaging the edge means on an adjoining section whereby said sections are secured together, each of said clip means being adapted upon rotation of one adjoining section relative to another adjoining section to be forced out of engagement with said edge means by one of said ramp surfaces whereby said sections may be separated.

6. An assembly according to claim 5 wherein said coplanar surface on at least one section has associated therewith stop means adapted to be engaged by at least one clip means, whereby rotation of said sections is prevented when said clip means engages said stop means.

7. An assembly according to claim 6 in which said stop means comprises clip means, an adjoining section having edge means and ramp means, said clip means on one adjoining section being engaged with edge means on another adjoining section, said ramp means on the other section being adapted to disengage said clip means on said one adjoining section when said sections are rotated relative to each other.

8. An assembly according to claim 7 in which said coplanar surface which terminates each of said ramp surfaces is substantially equal in width to the width of said clip means on an adjoining section.

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9. In combination, first and second container sections, each of said sections including;

peripheral edge means on each of said container sections, said edge means being circular and forming a shoulder peripherally outward from said sections, a plurality of ramp means adjacent each of said edge means, said ramp means having at least one sloping surface extending from said container section to the outer periphery of said edge means and terminating in a portion coplanar with a portion of said edge means,

a plurality of clip means adjacent each of said edge means, said clip means each having a protruding portion engaging the shoulder on the edge means of the other of said sections whereby to secure said sections together, said portion of said clip means being adapted to be engaged by a ramp means on the other of said sections whereby when said sections are rotated relative to each other the sloping surface of each ramp means is adapted to engage clip means on the other of said sections to disengage the clip means from the edge means to allow separation of the sections from each other.

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