June 6, 1967 D. G. HILLS 3,323,668

STACKABLE CONTAINERS

Filed July 21, 1965

3 Sheets-Sheet 1

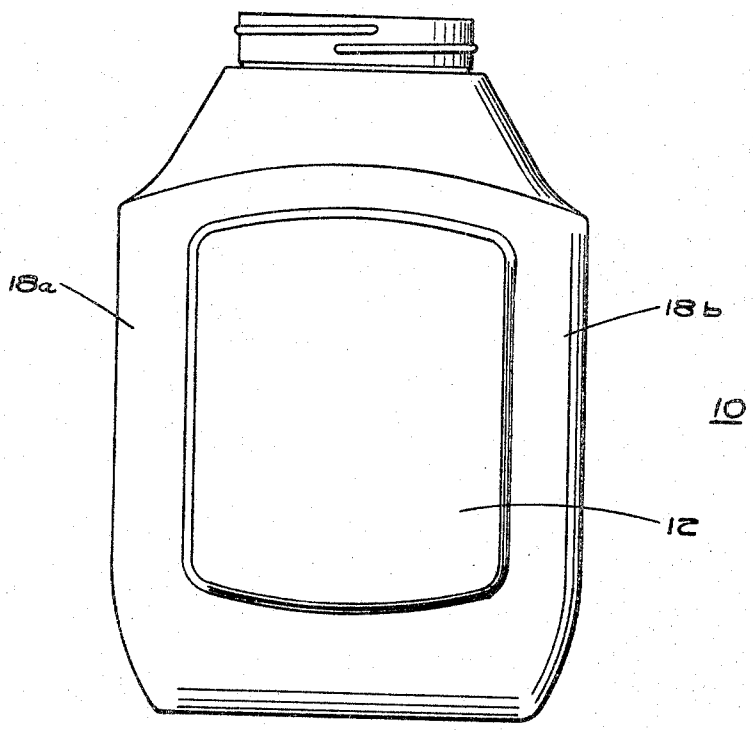


FIG. I

DAVID G. HILLS
INVENTOR

BY James P. Fagnani
ATTORNEY

June 6, 1967 D. G. HILLS 3,323,668

STACKABLE CONTAINERS

Filed July 21, 1965 3 Sheets-Sheet 2

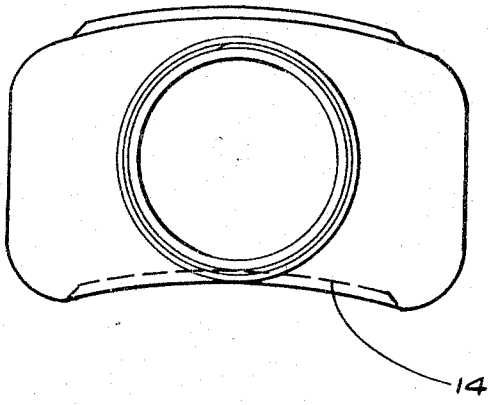


FIG. II

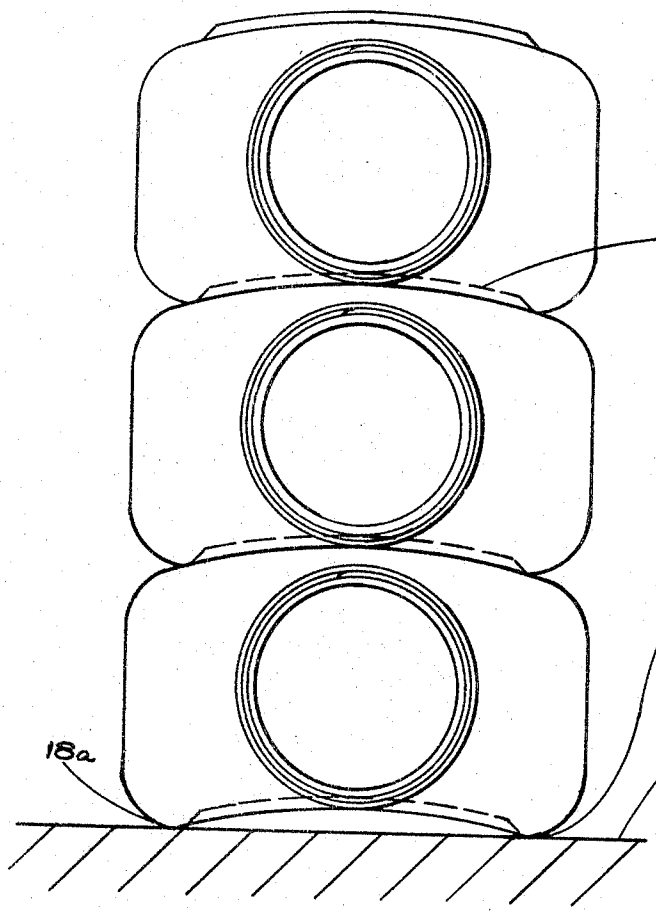


FIG. III

DAVID G. HILLS
INVENTOR

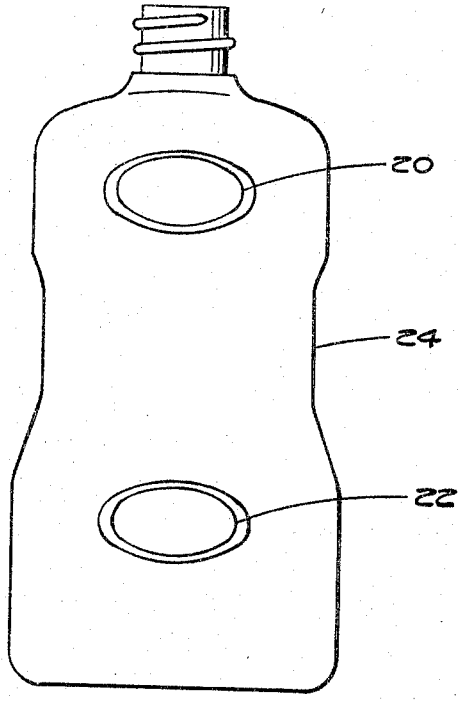
BY James C. Fagnocini
ATTORNEY

June 6, 1967 D. G. HILLS 3,323,668

STACKABLE CONTAINERS

Filed July 21, 1965 3 Sheets-Sheet 3

FIG. IV



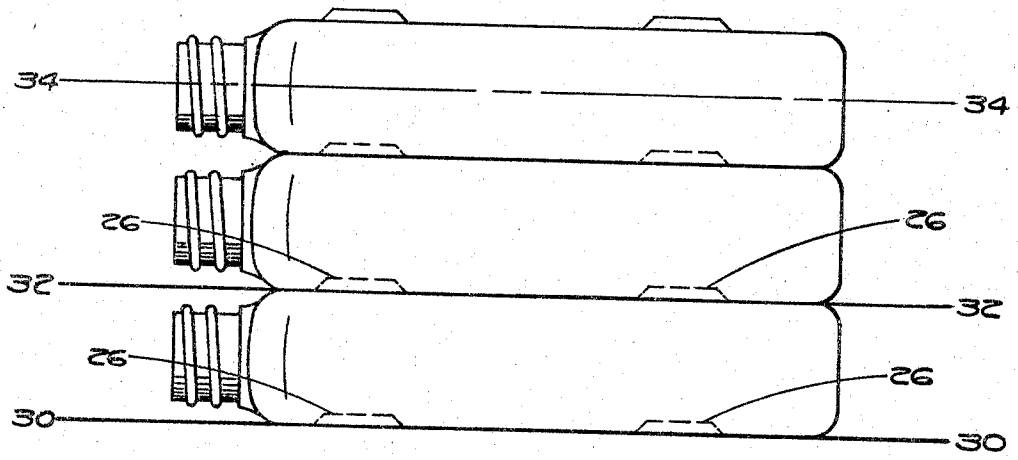


FIG. V

DAVID G. HILLS
INVENTOR

BY James C. Fogiamasini
ATTORNEY

United States Patent Office 3,323,668 Patented June 6, 1967

3,323,668

STACKABLE CONTAINERS

David G. Hills, Collinsville, Conn., assignor to Monsanto Company, St. Louis, Mo., a corporation of Delaware

Filed July 21, 1965, Ser. No. 473,704
3 Claims. (Cl. 215—10)

The present invention relates to a stackable container and more particularly to a container stackable on its side.

In general, the stacking of filled irregular-shaped containers have presented problems due to spacial limitations, overall stack instability and/or pressure damage to the lower containers when in stacked arrangements, etc. General methods for minimizing these problems were to stack the irregular-shaped containers vertically between horizontal panels or arranging the stacks in some sort of pyramid type structure. In some instances, it has been possible to stack the container on its side if the sides were flat but this too has not completely resolved the stability problems since many of the containers tended to lean or shift laterally. Now a new package has been developed having specially designed stacking features to permit stacking of the container on its side in a stabilized manner.

Accordingly, the primary object of the present invention is to provide a container designed to be stacked on its side.

Another object of the present invention is to provide a container which when stacked on its side has lateral stability.

Another object of the present invention is to provide a container having stacking features which will prevent the containers from lateral shifting when stacked on their sides.

Another object of the present invention is to provide method and means by which to attain the preceding objects.

Other objects of this invention will in part be obvious and will in part appear hereinafter.

These and other objects are attained by providing a container having a pair of substantially opposing sides, one of said opposing sides having stacking means and the other of said opposing sides having means for intermeshing with the stacking means of a similarly constructed container.

FIG. I is a side view illustrating a container having stacking means within the scope of this invention.

FIG. II is a top view of the container shown in FIG. I further illustrating the stacking means.

FIG. III is a view of a plurality of the containers such as shown in FIGS. I and II placed in intermeshing relationship.

FIG. IV is a side view illustrating an alternate embodiment of the present invention wherein the stacking means comprises a plurality of nesting means.

FIG. V illustrates another view of the container of FIG. IV.

Referring to the drawings and more specifically FIG. I, there is schematically shown a container **10**, having a raised mid-portion **12**, designed to nest within a depressed portion on the opposite side of an adjacent and similarly constructed container. This depressed portion is illustrated more clearly in FIG. II by the dash line **14**. The raised portion **12** is referred to more broadly in other parts of this specification as the "stacking means" while the depressed portion is referred to as the "means for intermeshing with the stacking means." FIG. III illustrates the relationship that is obtained when a plurality of containers are stacked in nesting relationship. An additional and very unique aspect of the present invention is the capability of the containers to rest firmly on a horizontally-oriented planar support when in laterally stacked relationship. In other words, one side of the present container is designed to both (1) rest firmly on a horizontal support, and (2) to nest or intermesh with a similarly constructed container. Consequently, the lowermost container can be firmly balanced on a horizontal support while each of the upper containers firmly meshed with a lower adjacent container. As illustrated by the embodiment shown in FIGS. I–III and more clearly in FIG. III, the stacked containers rest firmly upon horizontal support **16** along edges **18***a* and **18***b* which run substantially the length or depth of container **10** (also see FIG. I). Additional stability is obtained in the particular embodiment shown in FIGS. I–III by the trough shaped design of the containers which further serves to laterally stabilize the containers particularly in the direction perpendicular to the length of the trough.

FIGS. IV and V illustrate an alternate embodiment of the present invention whereby the stacking means comprises a plurality of nesting means **20** and **22**, respectively, on the side of a container **24**. On the opposite side of this container **24**, an equal number of depressions **26** are provided to mesh with the nesting means of a similarly constructed container. These depressions **26** are illustrated in FIG. V by dash lines.

Referring again to FIG. V, the line of rest of the lowermost container is designated **30—30**. The line of rest of the lowermost container is the line of contact between a planar or flat surface which is generally oriented horizontally and the bottom side of the container which is in contact with the surface. It is not essential that all portions of the bottom side of the container be in contact with the flat surface or line of rest but it is important that there is sufficient contact for any container configuration to insure stability when the containers are in stacked relationship. Generally for maximum stack stability, the line of rest **32—32** of the next upper container is approximately parallel to the line of rest **30—30** of the lowermost container with a divergence, if any, of not more than ten degrees. If more than a ten degree variation is desired, then the stacking means would have to be specially designed to avoid tipping of the stack. A special instance where the containers might be designed with a wide divergence would be for the purpose of counter display or the like. Another line of reference is the so-called centerline **34—34** generally considered to be perpendicular to the container bottom. Again it is preferred that the line of rest of the bottom container be approximately parallel to the centerline of each of the upper containers with a divergence of not more than ten degrees.

The above description and particularly the drawings are set forth for purposes of illustration only. Many variations and modifications thereof will be obvious to those skilled in the art and can be made without departing from the spirit and scope of the invention herein described.

The containers may be of any geometrical configuration as long as there is a stacking means on one side of the container, means designed for intermeshing with the stacking means of a similarly constructed container on the opposite or opposing side and a line of rest on one of the two opposing sides which will permit a stable balance when said side is placed on a substantially flat surface. Otherwise, the container may be round, square, hexagonal, oval, etc., and may have any number of sides.

The side of the container may also vary within wide limits i.e., the container may be designed to contain anywhere from less than one fluid ounce up to containers designed for bulk shipment. In general, however, the present invention is unusually suited for containers of volumetric capacity ranging from one fluid ounce to five gallons or 640 fluid ounces and more preferably from one

fluid ounce up to one gallon or 128 fluid ounces in capacity.

As indicated above, the "stacking means" broadly refers to any one or more up-raised portions on either or both of the opposing sides of a container which cooperate with the "means for intermeshing with the stacking means" of a similarly constructed container for the purpose of stack stability. In addition, the individual up-raised portions are referred to as "nesting means" and it follows that the stacking means can comprise one or more nesting means positioned on either or both of the opopsing sides of a container.

The "means for intermeshing with the stacking means" are one or more depressed portions which serve to hold the stacking means in position. The depressed portion is usually substantially similar but of reversed configuration to the nesting means. However, the depressed portion does not have to reversely match the nesting means since it is obvious that other configurations can be designed that can accomplish the same purpose. For example, the depressed portion could be in the form of a circle while the up-raised portion or nesting means could be in the form of an annular ring or even circumferentially spaced projections.

For optimum stacking,, the height of the raised portion should be at least $\frac{1}{32}$ of an inch. Whether more than one raised portion is required will depend for the most part on the particular configuration of the container. For example, if the container contacts the line of rest or the flat surface at its upper and lower portions only, when it is preferred that the container have a nesting means or raised portion on both upper and lower parts of the container to prevent rotational movement within the stack. The material of construction can be any material useful in the fabrication of containers, for example, plastic, paper, cardboard, glass, metal, wood and the like including any combination of two or more such materials. Any common method of manufacture may be employed which is most suitable to the particular material being processed.

The present invention has wide application in the container industry. For example, containers can now be

stacked which previously could not be effectively or efficiently stacked and furthermore this invention provides the means for obtaining extremely efficient use of storage space. In addition, if the containers are transparent, the contents may be viewed from the top or along their side when in stacked relationship. This can be particularly advantageous where the containers are placed in refrigerator drawers or freezer compartments.

It will be understood that many changes may be made in the design and construction hereof without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A stackable container having a pair of opposing, curved sides, one of said opposing sides being substantially concave inwardly toward the container axis, the other of said opposing sides being substantially convex outwardly away from the container axis and reversely matching the substantially concave side, one of the sides having stacking means within the curvature of said side, and the other side having a depressed portion within the curvature of its side, for intermeshing with the stacking means of a similarly constructed container.

2. The container of claim 1 wherein the depressed portion is within the concave side.

3. The container of claim 2 wherein the depressed portion is a concavity.

References Cited

UNITED STATES PATENTS

Re. 17,204	2/1928	Johnson	220—23.4
353,600	11/1886	Sloan.	
1,765,299	6/1930	Crossmore	215—10 X

FOREIGN PATENTS

1,120,293	4/1956	France.
535,917	4/1941	Great Britain.

JOSEPH R. LECLAIR, *Primary Examiner.*

D. F. NORTON, *Examiner.*