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Bockenstette

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[54] **CONTAINER COOPERABLE WITH A LIKE CONTAINER IN AN EMPTY NESTING RELATION AND A PLURALITY OF ARTICLE CONTAINING STACKING RELATIONS**

[75] Inventor: **Kenneth R. Bockenstette,** Cincinnati, Ohio

[73] Assignee: **Vanguard Industries, Inc.,** Cincinnati, Ohio

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[21] Appl. No.: **193,808**

[52] **U.S. Cl.** **206/507,** 206/509, 206/520

[51] **Int. Cl.** **B65d 21/04,** B65d 1/22, A47f 3/14

[58] **Field of Search** ..... 220/97 R, 97 D, 97 F; 211/126

[56] **References Cited**

UNITED STATES PATENTS

3,145,870	8/1964	Lockwood	220/97 F
3,401,828	9/1968	Bockenstette	220/97 F
3,425,594	2/1969	Bridenstine	220/97 D
3,675,815	7/1972	Rehrig	220/97 D

FOREIGN PATENTS OR APPLICATIONS

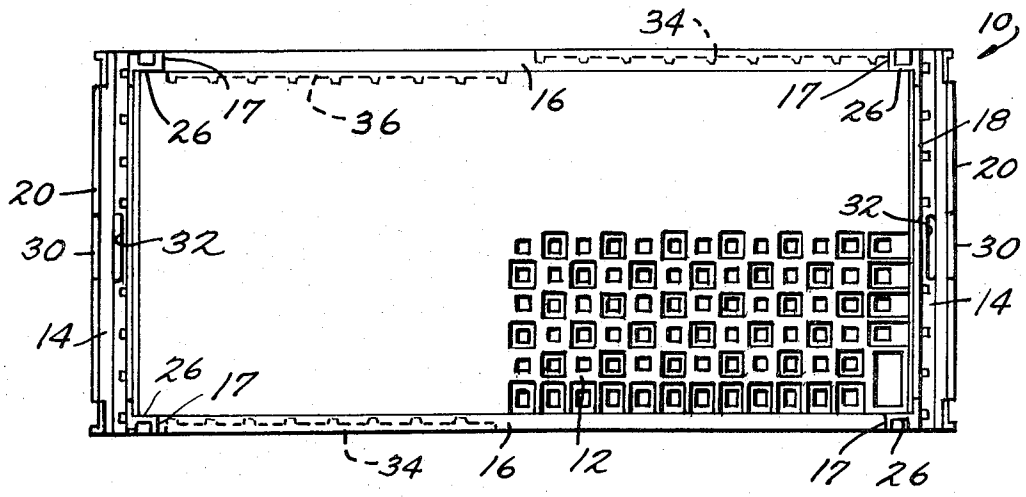
1,177,039	4/1959	France	220/97 D

Primary Examiner—George E. Lowrance
Attorney, Agent, or Firm—Cushman, Darby & Cushman

[57] **ABSTRACT**

A container of unitary structure molded of plastic material including a foraminous horizontal wall, a pair of end walls and a pair of side walls, the end and side walls being integrally connected with the periphery of the horizontal wall and extending vertically therefrom. The container is operable to be disposed in a plurality of different vertically stacked relations with containers of like or similar construction and to be disposed in nested relation with respect to a plurality of like or similar containers. The stacked relationships include two cooperating functional relationships, one in which the container, disposed in a first article-containing position with the end and side walls extending upwardly from the horizontal wall, is mounted in stacked relation on a like container therebelow disposed in the first position thereof so that the horizontal wall of the container structure serves as a top closure for the container therebelow defining a container space having a vertical height generally equal to the height of the end walls and a second in which the container, disposed in a second closure defining position with the end and side walls extending downwardly from the horizontal wall, is mounted on a like container in vertically stacked relation therebelow disposed in the first position thereof so that the walls of the container structure serve as a top closure for the like container therebelow defining a container space having a vertical dimension substantially double that of the vertical dimension of the first mentioned container space.

6 Claims, 8 Drawing Figures



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SHEET 1 OF 2

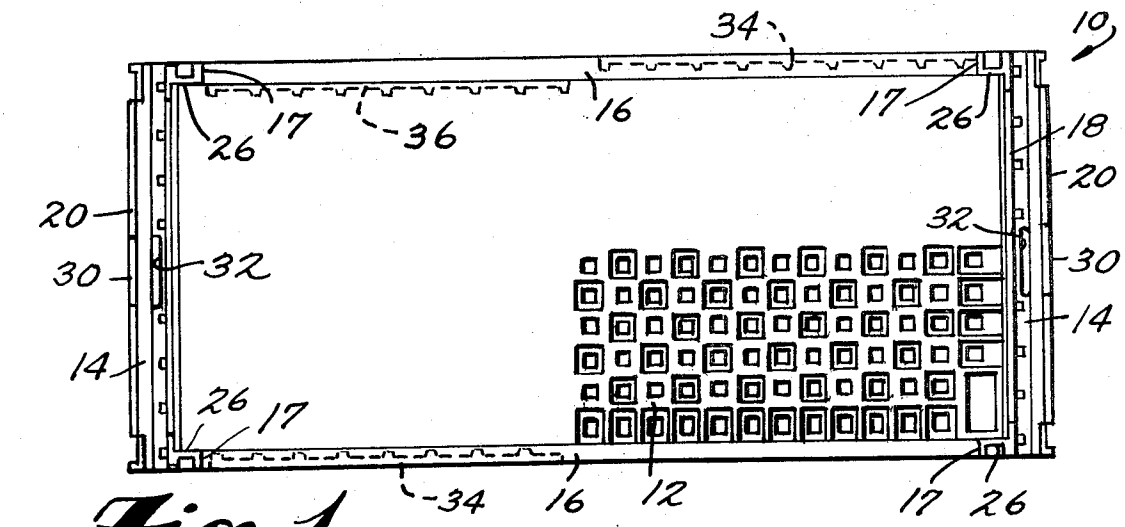


Fig. 1.

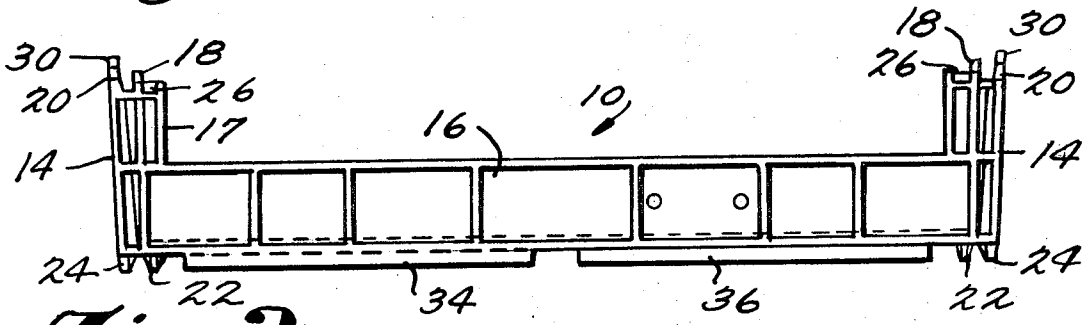


Fig. 2.

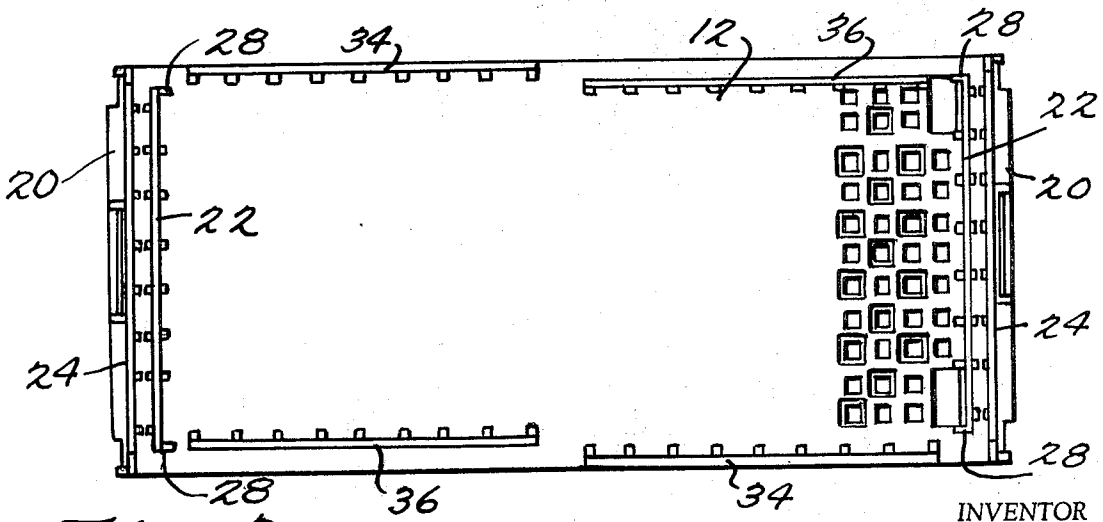


Fig. 3.

INVENTOR

KENNETH R. BOCKENSTETTE

BY Cushman, Darby & Cushman

ATTORNEYS

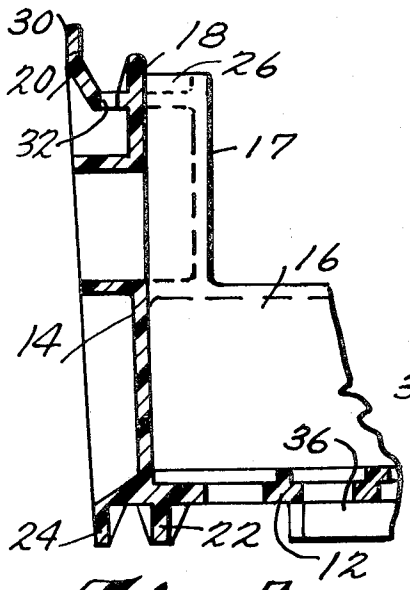


Fig. 4.

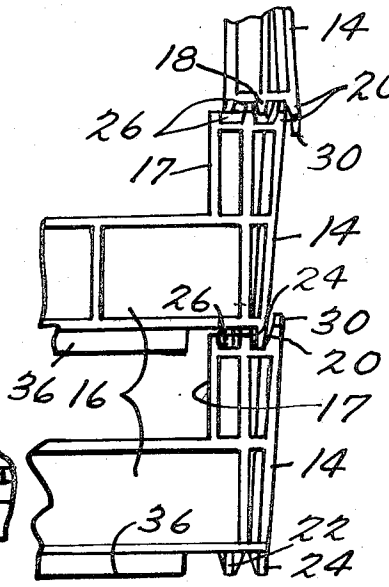


Fig. 5.

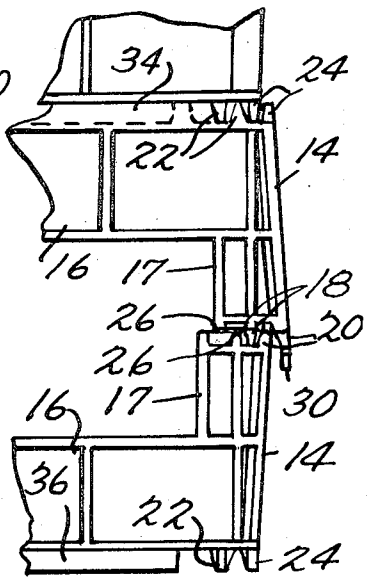


Fig. 6.

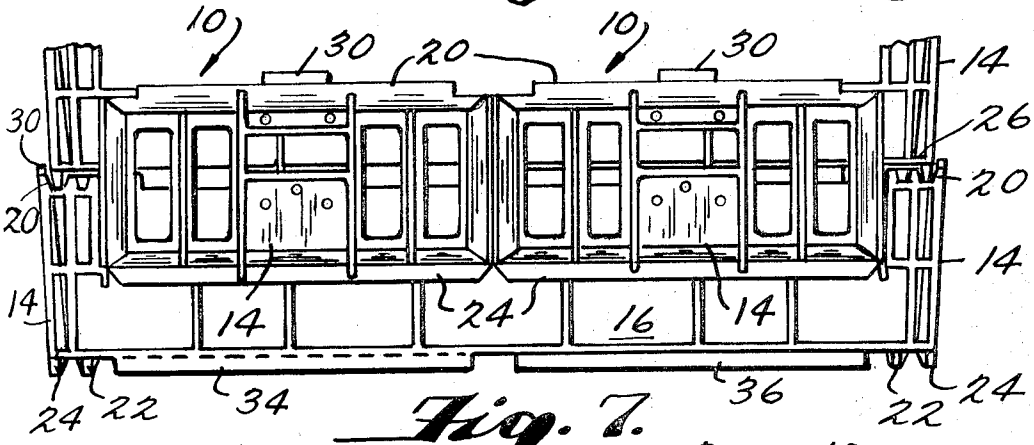


Fig. 7.

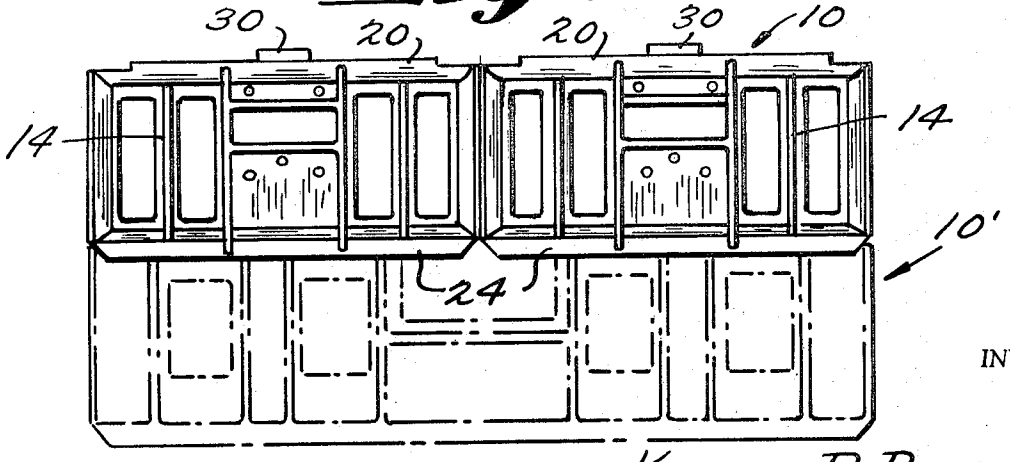


Fig. 8.

INVENTOR

KENNETH R. BOCKENSTETTE

BY Cushman, Darby & Cushman

ATTORNEYS

CONTAINER COOPERABLE WITH A LIKE CONTAINER IN AN EMPTY NESTING RELATION AND A PLURALITY OF ARTICLE CONTAINING STACKING RELATIONS

This invention relates to containers and more particularly to nestable and stackable containers of unitary structure molded of plastic material.

Nestable and stackable containers of unitary structure molded of plastic material are known in the art. An example of a known construction of this type is disclosed in my Pat. No. 3,387,740 dated June 11, 1968. A container structure such as disclosed in my aforesaid patent is generally of open top construction. In use, the container is adapted to cooperate with other containers of similar or like construction in handling articles. For example, in my aforesaid patent the containers are particularly suited for handling bread and other bakery products as, for example, in a supermarket operation. The construction permits the articles to be handled in small groups within individual containers and in relatively large groups as, for example, in a pallet arrangement. In this regard, the containers are provided with means for enabling a plurality of such containers to be disposed in a stable stacked relation. In such stacked relation, each container serves not only as an article support but as a top closure for the container therebelow. Containers of this type also provide the desirable function of being able to be nested one within the other when empty so as to be stored or transported to a loading station in a relatively small space. The particular nesting relationship employed in the container of my aforesaid patent is highly desirable, namely, a nesting relationship which is accomplished by displacing alternate containers 90° with respect to each other.

While containers of the known type such as indicated above have proven satisfactory in use, such containers do not provide a wide range of versatility in handling articles which may differ in size. For example, the handling of meat in a supermarket operation presents problems of size variation which are not presented with respect to articles of like size such as bread and other bakery products.

Accordingly, it is an object of the present invention to provide a nestable and stackable unitary plastic structure capable of cooperating with like structures in a plurality of article-containing stacked relationships so that a plurality of such structures can be used in handling articles of different vertical size, such as meat or the like.

Still another object of the present invention is the provision of a container of the type described having improved means for accomplishing the stable stacked relationships.

Still another object of the present invention is the provision of a container of the type described having side walls of a horizontal dimension generally equal to or slightly greater than twice the horizontal dimension of the end walls so as to permit a plurality of containers to be stacked or nested in side-by-side pairs.

Still another object of the present invention is the provision of a container of the type described which is of simple unitary construction, efficient in operation, requiring virtually no maintenance.

These and other objects of the present invention will become more apparent during the course of the following detailed description and appended claims.

The invention may best be understood with reference to the accompanying drawings wherein an illustrative embodiment is shown.

In the drawings:

FIG. 1 is a plan view of a preferred rectangularly shaped container embodying the principles of the present invention, the container being disposed in its first position of operation;

FIG. 2 is a side elevational view of the container shown in FIG. 1;

FIG. 3 is a plan view of the container disposed in its second position of operation;

FIG. 4 is an enlarged fragmentary sectional view taken along the line 4—4 of FIG. 1;

FIG. 5 is a fragmentary elevational view showing the container in its first position stacked in supported relation upon a like container in a like position and having a like container disposed in its second position supported in stacked relation thereon;

FIG. 6 is a view similar to FIG. 5 but showing the container in its second position stacked in supported relation on a like container in its first position and having a like container disposed in its first position supported in stacked relation thereon;

FIG. 7 is an elevational view showing two regular size containers nested in either a double-size container or two regular size containers in side-by-side abutting relation and showing a third layer which may be a regular size or double size container nested in the two intermediate containers; and

FIG. 8 is an elevational view showing two regular size containers stacked on a double size container.

Referring now more particularly to the drawings, there is shown in FIGS. 1–4 thereof a container, generally indicated at **10**, embodying the principles of the present invention. The container is in the form of a unitary structure molded of a plastic material. Any of the well-known plastic materials may be utilized such as polyethylene, polypropylene or the like.

In general, the structure **10** includes a horizontally extending wall **12** of generally rectangular shape, a pair of opposed end walls **14** and a pair of opposed side walls of greater horizontal dimension than the end walls integrally connected between the end walls. As shown, the end and side walls are integrally connected with the periphery of the horizontal wall and extend vertically therefrom and terminate in a free edge construction.

It will be understood that the walls of the container structure may be of any suitable construction. In order to conserve material the horizontal wall **12** is preferably foraminous. The preferred configuration shown is in accordance with the teachings of my Pat. No. 3,392,875, dated July 16, 1968. The end walls **14** as well as the side walls **16** are, as shown, preferably of ribbed panel construction, the panels of the end walls **14** being apertured.

The container structure **10** is operable to be disposed in nested relation with respect to a plurality of like containers. This nesting function renders the container capable of being stored or returned empty to a loading station within a space substantially less than the space occupied by the containers when performing an article-handling function. The nested relation consists essentially of a stack of containers in which alternate containers of the stack are displaced 90° with respect to the adjacent containers of the nested stack. In the preferred embodiment shown in FIGS. 1–3, the end and

side walls of the container structure **10** are so configured and dimensioned with respect to each other as to permit a nested stack to be formed in which a pair of containers disposed in side-by-side relation is within each horizontal layer of the nested stack. In order to accomplish this function, each side wall **16** is formed with a main central portion of a vertical dimension which is substantially equal to one-half the vertical dimension of the end walls **14** and a horizontal dimension which is substantially equal to twice the horizontal dimension of the end walls **14.** With this configuration and dimensioning, a pair of container structures **10** disposed in side-by-side relation is capable of receiving thereon a second pair of containers **10** disposed in side-by-side relation with respect to each other and displaced in end-to-end orientation 90° with respect to the end-to-end orientation of the first pair of containers. The horizontal surfaces of the side walls provide nesting surface means serving to support the containers in the nested stacked formation. Each side wall includes an end portion at each end of the main central portion having a vertical dimension equal to the vertical dimension of the associated end wall and a relatively small horizontal dimension. Each end portion provides an inwardly facing vertical nesting surface **17** operable to engage the adjacent exterior surface of the side wall of a like container disposed in nested relation therewith to prevent any substantial horizontal movement of the nested container in a direction along the extent of the end wall thereof. Horizontal movement in a direction normal thereto is prevented in a manner hereinafter to be explained.

The structure **10** is capable of functioning by itself as an open top container for holding articles and as a means by which the articles held therein can be conveniently moved from one place to another. However, the container **10** is particularly constructed so that it will cooperate with other containers of like or similar construction to accomplish not only the individual handling function noted above, but the function of handling articles in substantially larger groupings, as for example, articles contained within a multiplicity of container structures **10** arranged in stacked relation on a pallet to be handled as a unit. The container **10** is particularly versatile in this contemplated use, and to this end is provided with stacking surface means enabling the container to be disposed in vertically stacked relation in stable fashion against substantial relative horizontal movement in any direction with respect to a container of like or similar construction in either one of two operative positions.

Viewed in terms of the articles associated or contained within the structure **10,** these two positions include a first or upright position wherein the end and side walls extend upwardly from the horizontal wall and the structure functions as a container for the articles. In the second or inverted position, the end and side walls extend downwardly from the horizontal wall and the structure serves as a top closure with respect to articles supported therebelow. In each of these two positions the container structure provides cooperating functions with respect to the containers utilized therewith.

These cooperating functions include the following four functions when the container is disposed in its first position: (1) it is operable to support a like container disposed in its first position in vertically stacked relation thereon regardless of end-to-end orientation in a stable fashion against substantial horizontal movement in any direction relative thereto so that the horizontal wall of the like container provides a top closure defining with the walls of the structure **10** a container space of a height generally equal to the height of the end walls **14**; (2) it is operable to support a like container disposed in its second position in vertically stacked relation thereon regardless of end-to-end orientation in a stable fashion against substantial horizontal movement in any direction relative thereto so that the walls of the like container provide a top closure defining with the walls of the structure **10** a container space of a height generally equal to twice the height of the end walls **14**; (3) it is operable to be supported on a like container disposed in its first position in vertically stacked relation therebelow regardless of end-to-end orientation in a stable fashion against substantial horizontal movement in any direction relative thereto so that the horizontal wall of the structure **10** provides a top closure for the like container therebelow; and (4) it is operable to be supported on a like container disposed in its second position in vertically stacked relation therebelow regardless of end-to-end orientation in a stable fashion against substantial horizontal movement in any direction relative thereto.

The cooperating functions also include the following two functions when the container is disposed in its second position: (5) it is operable to be supported on a like container disposed in its first position in vertically stacked relation therebelow regardless of end-to-end orientation in a stable fashion against substantial horizontal movement in any direction relative thereto so as to provide a top closure for the like container therebelow; and (6) it is operable to support a like container disposed in its first position in vertically stacked relation thereon regardless of end-to-end orientation in a stable fashion against substantial horizontal movement in any direction relative thereto.

The stacking surface means for accomplishing cooperating function 1 stated above can assume different configurations. The embodiment shown is preferred in that it provides the additional function of enabling a like container to be moved into vertically stacked relation to the container structure **10** by initially positioning the like container in laterally offset relation on the container **10** and then sliding the like container laterally until it reaches the proper position of lateral alignment, at which position the stacking surface means is adapted to cause the like container to drop down into proper stacked relation. To this end, there is provided adjacent the free edge construction of each end wall **14** an upper or top inner stacking rail **18** and a parallel upper or top outer stacking rail **20.** As shown, the inner stacking rail extends substantially throughout the horizontal dimension of the associated end wall **14** and upwardly from the inner edge of the free end construction of the associated end wall. The particular construction shown includes a series of spaced triangular reinforcing ribs. Each outer stacking rail **20** has a horizontal extent similar to the associated inner stacking rail **18** and extends upwardly and outwardly from the outer edge of the free edge construction of the associated end wall **14.**

The stacking surface means also includes a lower or bottom inner stacking rail **22** and a parallel lower or bottom outer stacking rail **24** along each end wall **14** at

its position of juncture with the horizontal wall **12.** As shown, the stacking rails **22** and **24** are of a triangularly ribbed reinforced configuration similar to the stacking rail **18** previously described. It will be noted that each inner upper stacking rail **18** is disposed in a vertical plane which extends between the associated lower stacking rails **22** and **24.** In a like manner, each outer lower stacking rail **24** is disposed within a vertical plane which extends between the associated upper stacking rails **18** and **20.** With this construction, it can be seen that when a like container is moved into vertically stacked relation with respect to the container structure **10,** the outer lower stacking rail **24** of the like container will engage between the upper stacking rails **18** and **20** of the structure **10.**

This engagement prevents substantial relative horizontal movement between the two containers in a horizontal direction transverse to the extent of the end walls. In order to provide for the limiting of relative horizontal movement in a direction along the extent of the end walls and to permit the aforesaid sliding function, the free edge construction of each side wall adjacent each end of each end wall has a stacking portion **26** extending upwardly therefrom. Each stacking portion **26** includes a rail engaging upper surface disposed intermediate the vertical extent of the associated rail **18** and an inner stop surface.

As best shown in FIG. **3,** it will be noted that each of the inner lower stacking rails **22** is formed with a stop surface **28** at each end thereof spaced inwardly from the outer edge of the associated side wall. The stacking portions **26** cooperate with the lower inner rails **22** to achieve the aforesaid sliding function when the like container is placed in laterally offset relation on the container structure **10.** In this offset relation, the lower surfaces of the lower inner stacking rails of the like container will engage the rail engaging surfaces of the stacking portions **26** so as to provide one position of support for the like container on the container structure **10.** A second position of support is provided by the engagement of the leading edges of the outer lower rails **24** with the adjacent surface of the free edge construction of the end wall **14,** or alternatively, the upper surfaces of the upper inner rails will engage the leading lower surfaces of the end walls **14** extending between the lower stacking rails **22** and **24.** These two positions of engagement will serve to permit the aforesaid sliding supported movement of the like container laterally toward a position of vertical alignment. In this regard, it will be noted that the leading stop surfaces **28** of the like container are disposed in a position to engage the stop surfaces of the remote stacking portions **26** of the container structure **10** when the like container reaches the position of vertical alignment. Likewise, the trailing stop surfaces **28** will have passed the engaged stacking portions **26** permitting the trailing portion of the like container to drop down into vertically stacked relation. Thus, in this relationship the stop surfaces **28** of the inner lower rails **22** of the container **10** will engage the inner stop surfaces of the stacking portions **26** of the container structure **10** to provide for the limiting of relative horizontal movement between the containers in a direction along the extent of the end walls. It will be understood that cooperating function 3 constitutes a simple reversal of the cooperating relationship 1.

The stacking surface means for accomplishing cooperating function 3 stated above can likewise assume different configurations. The preferred embodiment shown, like the embodiment previously described, obtains the additional function of enabling a like container to be moved into vertically stacked relation therewith by a sliding action. As shown, a stacking tongue **30** extends upwardly from the central portion of each upper outer stacking rail **20.** The adjacent free edge construction of each end wall **14** between the stacking rails **18** and **20** thereof is provided with an opening **32** of a size and shape corresponding with the stacking tongue **30.**

With this construction, a like container disposed in its second position can be initially disposed in offset relation on the container structure **10.** In this offset relationship, one of the locking tongues of the container structure **10** will engage the free edge construction of the like container between the stacking rails **18** and **20** thereof while the free edge construction of the other end wall receives the other stacking tongue of the like container. These two positions of sliding support are spaced apart not only in the direction of extent of the side walls but in the direction of extent of the end walls as well. As the like container is moved laterally toward a position of vertical alignment, the stacking tongues of the respective containers move relatively toward the cooperating openings until the position of alignment is reached, at which position the like container can drop down into vertically stacked relation and the stacking tongues enter the respective openings. The engagement of the stacking tongues within the openings prevents any substantial movement of the like container out of its stacked relation in any horizontal direction. Again, it will be understood that cooperating function 5 constitutes nothing more than a reversal of the cooperating function 2.

The lower stacking rails **22** and **24** also provide stacking surface means for accomplishing a part of the cooperating function 4. In this regard, it will be noted that when a like container is disposed in its second position, the container structure **12** can be placed thereon in vertically stacked relation, so that the outer stacking rail **24** adjacent the one end wall of the container structure **10** engages between the stacking rails **22** and **24** of the associated end wall of the like container and the inner stacking rail **22** adjacent the other end wall of the container structure **10** engages between the stacking rails **22** and **24** adjacent the opposite end wall of the like container. The inner engagement of the stacking rails **22** and **24** serves to limit the horizontal movement of the container structure **10** out of stacked relation on the like container in a direction along the extent of the side walls. Horizontal movement in a direction along the extent of the end walls is prevented by stacking surface means provided by an outer stacking rail **34** extending downwardly along the outer edge of each side wall within one-half of the horizontal dimension thereof and an inner stacking rail **36** extending downwardly along the inner edge of each side rail within the other half of the horizontal dimension thereof and in opposed parallel relation to the outer stacking rail of the other side wall. As shown, the stacking rails **34** and **36** are constructed with spaced triangularly shaped reinforcing ribs in a manner similar to the stacking rails **18** and **24.**

With this construction it will be noted that when the container structure **10** is placed in vertically stacked relation on a like container disposed in its second posi-

tion, the stacking rails **34** and **36** of the container structure **10** will be disposed in adjacent relation to the associated stacking rails **36** and **34** of the like container, thus limiting the horizontal movement of the container structure **10** out of stacked relation in a direction along the extent of the end walls thereof. Again, it will be understood that cooperating function 6 constitutes a reversal of function 4.

It will also be noted that the vertical extent of the stacking rails **34** and **36** is generally equal to the vertical extent of the stacking rails **22** and **24.** The lower surfaces of these stacking rails thus provide for peripheral support of the container structure **10** on the like container or on a horizontal surface, permitting the horizontal wall to maintain articles supported thereabove with a certain amount of resiliency which is inherently built into the horizontal wall.

As best shown in FIG. **7,** the vertical extent of the central portion of the side walls is such that when a nested stack of containers is formed the third layer of side-by-side containers can be positioned in stacked relation above the second layer of side-by-side containers in such a way that the third layer will be stacked upon the first layer and so forth up the line, as the nested stack is formed. As best shown in phantom lines in FIG. **8,** the container structure can be made in an essentially square size, as indicated at **10'**, in which the dimension of the end walls is equal to the dimension between the vertical surfaces **17** of the side walls. Such a container can be utilized both in nested and stacked relation with containers of the preferred rectangular size described above and shown in FIGS. **1–3.**

It thus will be seen that the objects of this invention have been fully and effectively accomplished. It will be realized, however, that the foregoing preferred specific embodiment has been shown and described for the purpose of illustrating the functional and structural principles of this invention and is subject to change without departure from such principles. Therefore, this invention includes all modifications encompassed within the spirt and scope of the following claims.

I claim:

1. A container operable in an article supporting position or an inverted top closure providing position to cooperate with like containers in a plurality of stably stacked relationships of the type described, said container comprising:

a one-piece structure molded of plastic material, said structure including a rectangularly shaped generally horizontally extending wall, a pair of opposed end walls, and a pair of opposed side walls of greater horizontal dimension than said end walls integrally connected between said end walls, said end and side walls being integrally connected with the periphery of said horizontal wall and extending vertically therefrom and terminating in a free edge construction;

said side walls and said horizontal wall having nesting surface means formed thereon for enabling said structure to be disposed in nested relation with a like container in a like position with the end-to-end orientation of said structure displaced 90° in either direction with respect to the end-to-end orientation of the like container so that the horizontal wall of said structure is spaced vertically from the horizontal wall of said like container a distance substantially less than the height of said end walls;

a pair of inner and outer parallel top stacking rails extending upwardly along the free edge construction of each of said end walls;

a pair of inner and outer parallel bottom stacking rails extending downwardly along the juncture between said horizontal wall and each of said end walls, each of said outer bottom stacking rails being disposed in a position of vertical alignment between the associated pair of top stacking rails; and

a single stacking rail extending downwardly along the juncture between said horizontal wall and each of said side walls within each half of the horizontal extent thereof, the single stacking rails of both of said side walls being disposed in parallel inwardly and outwardly offset relation with respect to one another.

2. A container as defined in claim **1** wherein each side wall has a main central portion of a vertical dimension less than half the vertical dimension of said end walls and an upwardly projecting end portion terminating in an inner bottom stacking rail engaging surface extending from the adjacent end of each inner top stacking rail, the height of said surfaces being such as to engage the inner bottom stacking rail of a like container positioned in transversely offset relation thereon so as to permit transverse sliding support thereof toward a position of vertically stacked relation at which position the end of the inner bottom stacking rails drop below said surfaces so that the engagement between the end of said inner bottom stacking rails and said end portions prevents further substantial horizontal transverse movement.

3. A container as defined in claim **2** wherein the horizontal dimension of said end walls is slightly less than one-half the horizontal dimension of the central portions of said side walls so as to permit a pair of like containers to be nested on said structure with a like container disposed in side-by-side relation thereto.

4. A container as defined in claim **3** wherein the horizontal longitudinal extent of each associated pair of single side wall stacking rails is slightly less than the horizontal dimension between the inner surfaces of said side walls so as to permit said associated pair of single side wall stacking rails to engage between the side walls of a like container when disposed in nested relation therewith to thereby prevent substantial relative horizontal longitudinal movement out of said nested relation.

5. A container as defined in claim **4** wherein each of said outer top stacking rails includes a central upwardly projecting stacking tongue, the central portion of the free end construction of each end wall having a tongue-receiving opening formed therein between the pair of top stacking rails thereof.

6. A container as defined in claim **1** wherein each of said outer top stacking rails includes a central upwardly projecting stacking tongue, the central portion of the free end construction of each end wall having a tongue-receiving opening formed therein between the pair of top stacking rails thereof.

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