

Dec. 17, 1968

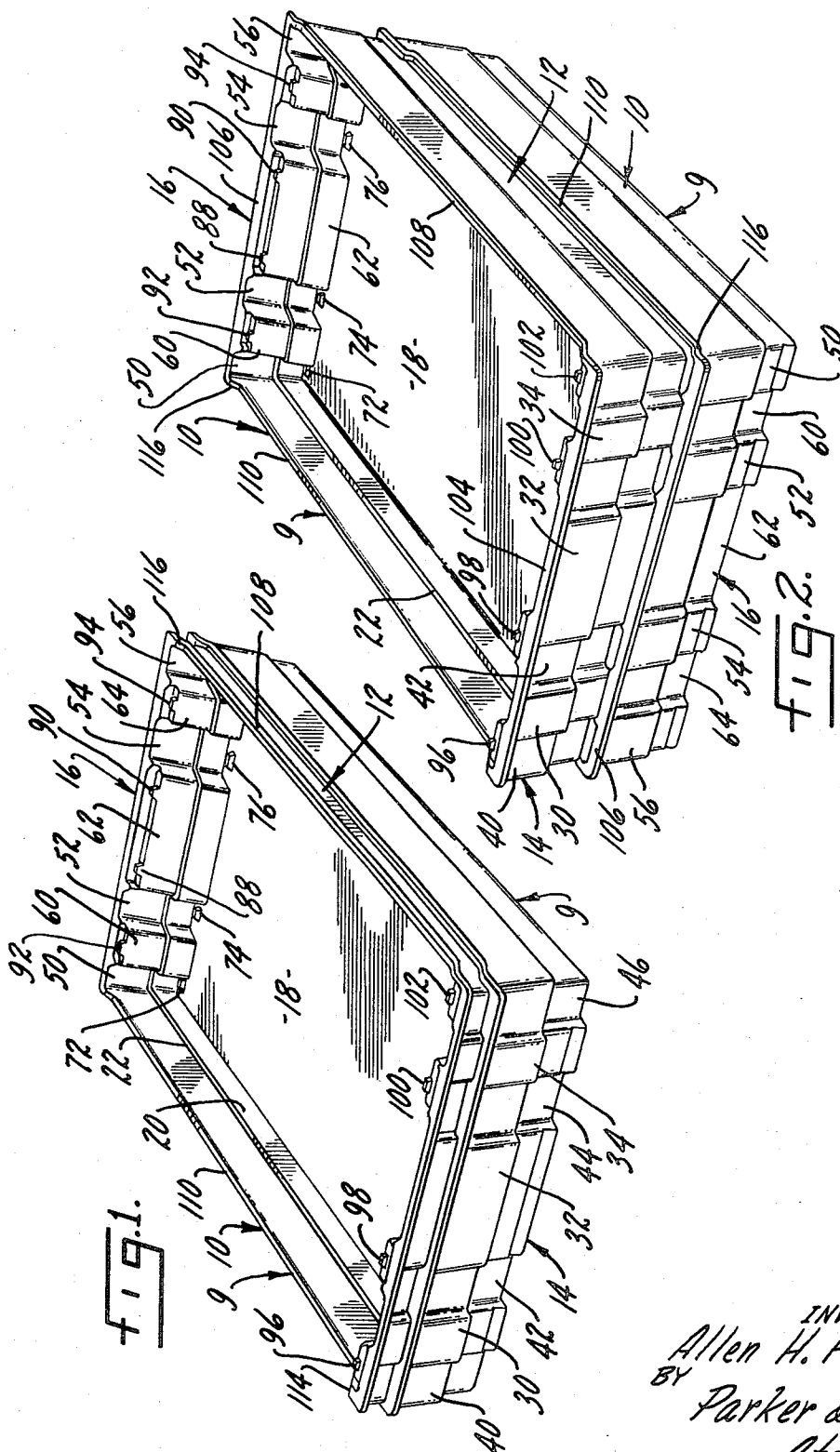
A. H. FRATER

3,416,704

CONTAINER

Filed Sept. 29, 1966

4 Sheets-Sheet 1



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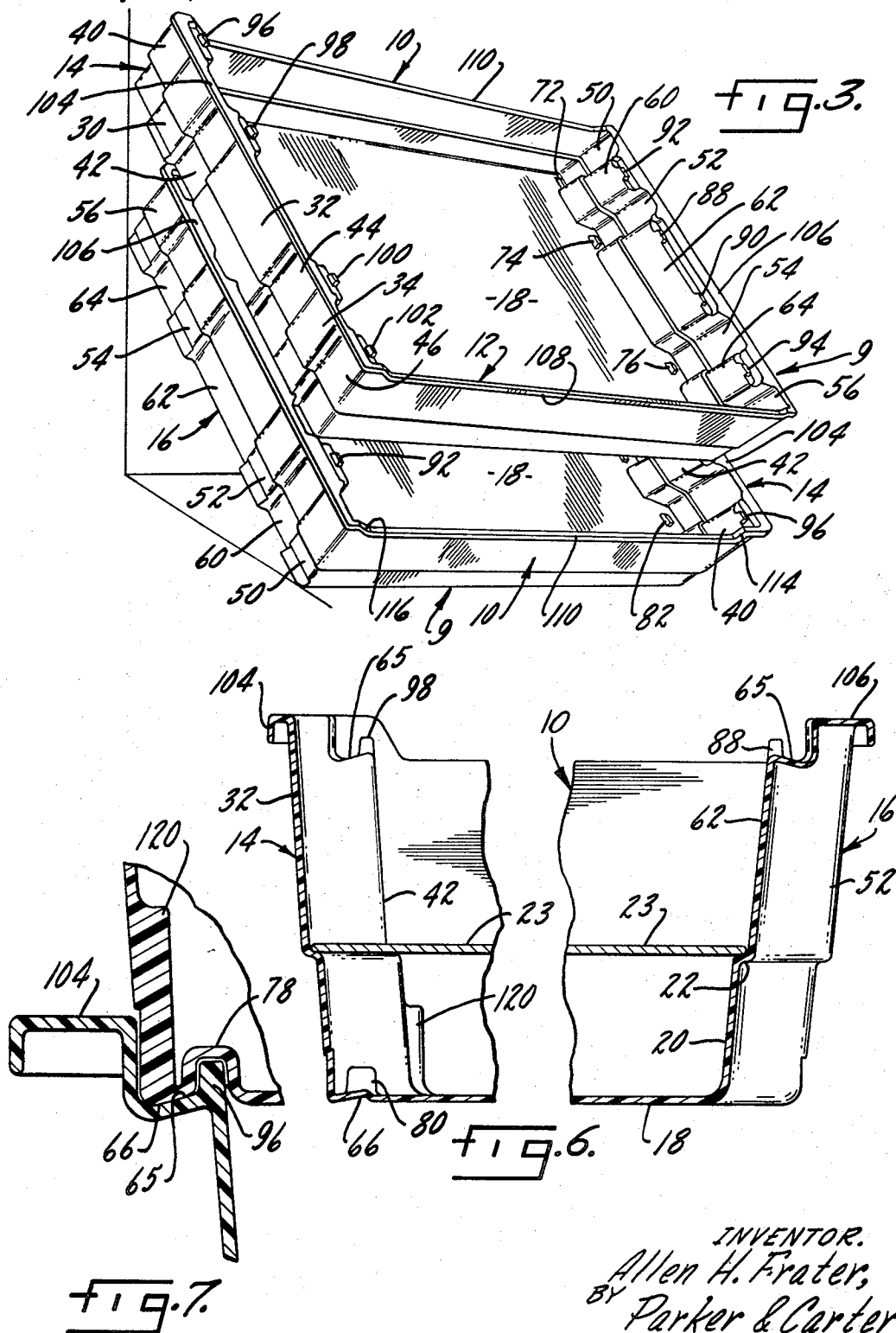
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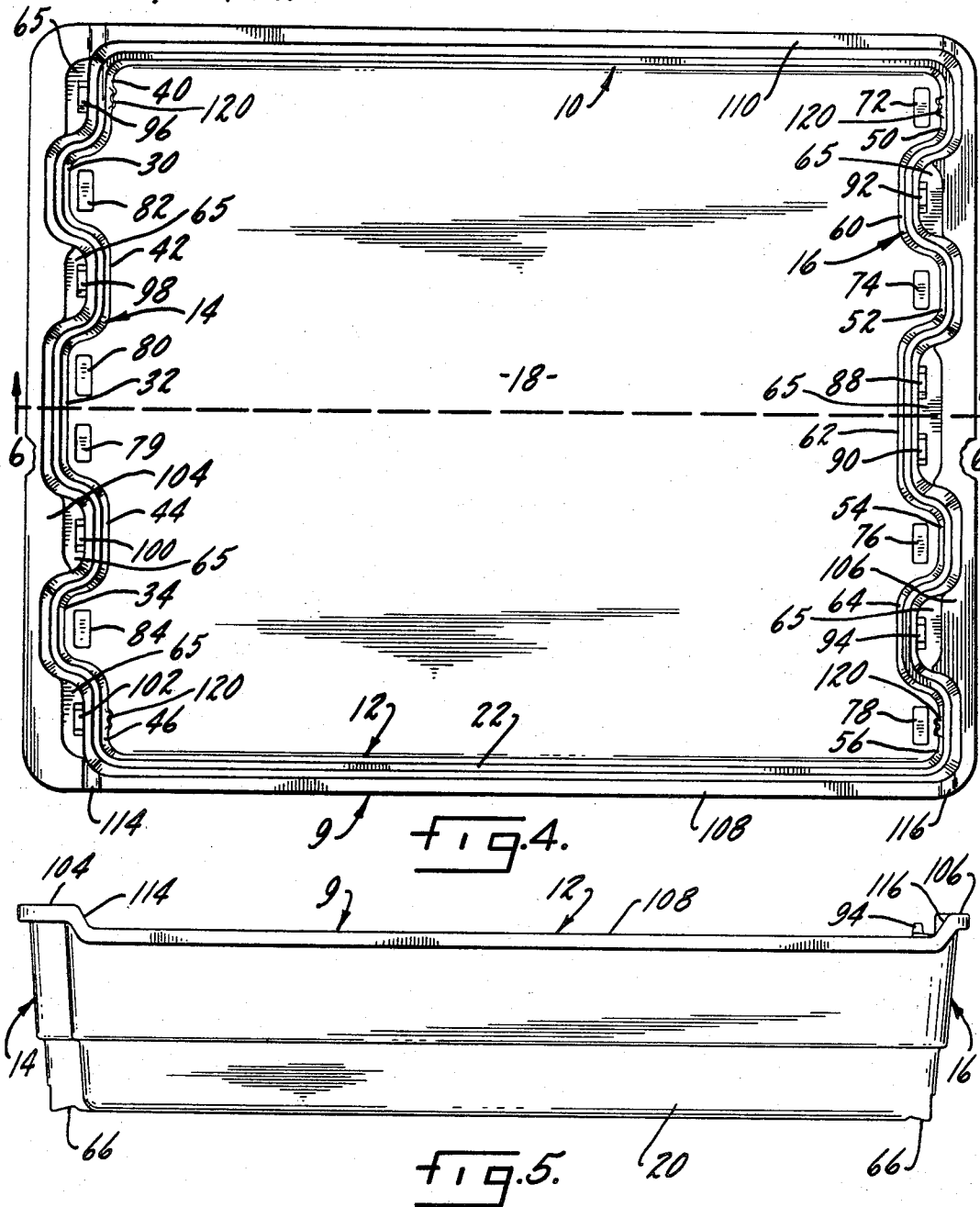
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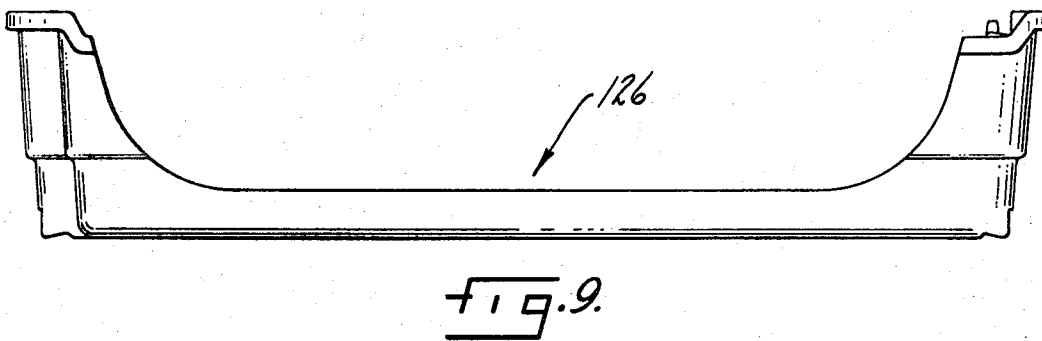
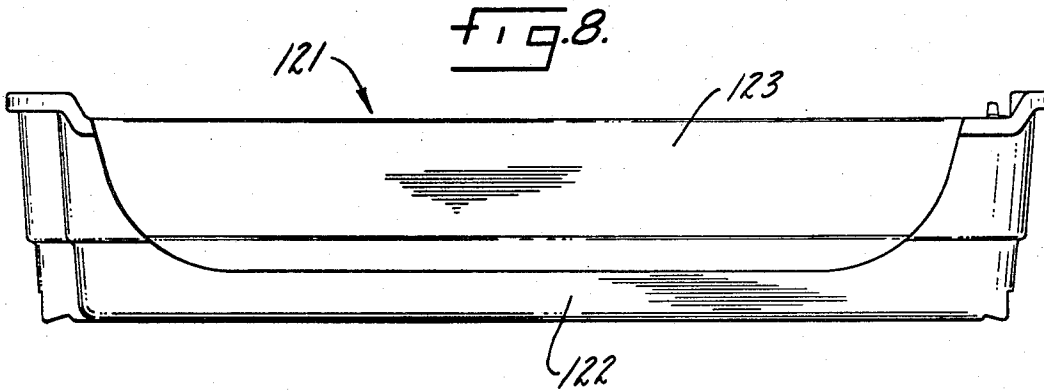
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4 Sheets-Sheet 4



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3,416,704 CONTAINER

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10 Claims. (Cl. 220-97)

ABSTRACT OF THE DISCLOSURE

A container for nesting and stacking both in line and offset relative to other similar containers. The container has convolutions in its end walls with saddles formed on the tops of the inward convolutions and seats formed on the bottoms of the outward convolutions which saddles and seats of similar containers fit into one another for stacking of the containers. The saddles are positioned at least as high as the top surfaces of the side walls, if side walls are provided, so that similar containers can be stacked offset to one another and at an angle to a supporting surface. For interlocking of the stacked containers, complementary projections and recesses are formed on the saddles and adjacent the seats.

This invention relates to containers and particularly to containers which may be nested and stacked with similar containers.

An object of this invention is a container which may be nested with like containers and also stacked in various arrangements with like containers.

Another object is a container with interlocking means which permit a like container to be securely stacked on a lower container.

Another object is a container which may be stacked off-center to another container and inclined at an angle to a supporting surface.

Another object is a container which may be stacked on a similar container in a variety of off-center positions.

Another object is a container having at least one side wall of reduced height to permit better access to the contents when said container is stacked in an inclined position.

Other objects may be found in the following specification, claims and drawings.

The invention is illustrated more or less diagrammatically in the following drawings wherein:

FIGURE 1 is a perspective view of a pair of nested containers embodying the features of this invention;

FIGURE 2 is a perspective view of a pair of similar containers in a stacked position;

FIGURE 3 is a perspective view of a pair of similar containers with one stacked on the other in an off-center position and inclined at an angle to a supporting surface;

FIGURE 4 is a top plan view of a container embodying the features of this invention;

FIGURE 5 is a side elevational view of the container of FIGURE 4;

FIGURE 6 is a fragmentary view of an enlarged scale of a container taken along line 6-6 of FIGURE 4;

FIGURE 7 is a fragmentary vertical sectional view showing the interlocking and seating means of the containers with the containers arranged in a stacked position;

FIGURE 8 is a side elevational view of a modified form of a container; and

FIGURE 9 is a side elevational view of another modified form of a container.

The containers 9 of this invention are of the open box type having spaced longitudinally extending side walls 10 and 12 and spaced transversely extending end walls 14 and 16. A bottom wall or floor portion 18 connects

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to the end and side walls. The walls slope outwardly from the floor to the top of each wall so that containers 9 may be nested inside one another. The lower portions of the walls are inset at 20 to form a continuous supporting shoulder or ledge 22 on which a divider shelf 23, as shown in FIGURE 6, may be supported.

The transversely extending end walls 14 and 16 are each provided with a plurality of convolutions. Since the containers are preferably made in integral units of substantially rigid plastic, the convolutions are formed on both the inside and outside of the transverse end walls. For example, end wall 14 is formed with alternating outwardly extending convolutions 30, 32 and 34 and inwardly extending convolutions 40, 42, 44 and 46. The other transversely extending end wall 16 is formed with a similar number of alternating inwardly and outwardly extending convolutions, namely, outwardly extending convolutions 50, 52, 54 and 56 and inwardly extending convolutions 60, 62 and 64. The convolutions on opposed transverse end walls are arranged with an outwardly extending convolution on one wall aligned with an inwardly extending convolution on the other wall so that when similar containers are rotated 180° relative to one another, the respective convolutions will be aligned with one another to permit stacking of the containers.

In the form of the invention shown in the drawings, an odd number of convolutions are formed on each end wall, that is the total number of inwardly extending and outwardly extending convolutions on each transverse end wall always equal an odd number. For example, walls 14 and 16 are each provided with seven convolutions. Also the convolutions at diagonally opposite corners of the container project in opposite directions. For example, convolution 46 on wall 14 is an inwardly projecting convolution and convolution 50 on wall 16 is an outwardly extending convolution. This arrangement of convolutions, while not required to permit off-center stacking, is advantageous in that it permits similar containers to be stacked on one another upon rotation of one container 180° relative to the other. As can be best seen in FIGURE 4, the container may be constructed with the center outward convolution 32 on wall 14 having a length equal to twice that of the other convolutions of its wall and the similar convolution 62 of wall 16 having the same length.

The stacking of similar containers 9 may be accomplished by means of support saddles 65, which are formed in the tops of the inward convolutions, and seating surfaces 66, which are formed at the bottoms of the outwardly extending convolutions. Although the containers shown in the drawings are formed with a saddle for each inward convolution and a seating surface for each outward convolution, it may be desirable in some forms of container to provide saddles and seating surfaces for only some of the convolutions. As can be seen most readily in FIGURE 7, when similar containers are stacked on one another, a seating surface 66 contacts and is supported by a saddle 65. Interlocking means which may consist of projections and recesses are provided to prevent lateral and longitudinal movement of the containers relative to each other, especially when the containers are stacked in an off-center position and inclined at an angle to a supporting surface. The projections which extend generally upwardly are located on the supporting saddles 65 of the inward convolutions. The sockets or recesses are located adjacent the bottoms of the outward convolutions and are aligned transversely with the projections. Wall 16 has upstanding projections 88, 90, 92 and 94 while wall 14 has projections 96, 98, 100 and 102. Sockets or recesses 72, 74, 76 and 78 are formed in bottom portion 18 adjacent to wall 16 and sockets 79, 80, 82 and 84 are

formed in bottom portion 18 adjacent wall 14. One projection or recess is provided for each convolution, except that convolutions 32 and 62, which are each twice as long as the other convolutions, are each provided with two projections or recesses. This arrangement provides an even number of locking means along each wall although an odd number of convolutions are provided. It should be understood that it is not essential to the practice of this invention that sockets and recesses be provided for all convolutions and some convolutions may be formed without sockets or recesses.

The top surfaces 104 and 106 respectively of the transverse end walls 14 and 16 are higher than the top surfaces 108 and 110 respectively of the longitudinally extending side walls 12 and 10. Inclined top surfaces 114 and 116 connect the top surfaces 108 and 110 of the side walls with the top surfaces 104 and 106 of the transverse end walls. The top surfaces 108 and 110 are formed so that they do not extend above the saddles 65 to permit like containers to be stacked off-center relative to one another without interference between the bottom portion 18 and the tops of the side walls.

The supporting saddles 65 may slope downwardly and outwardly relative to the transverse end walls 14 and 16 as is most clearly shown in FIGURES 6 and 7. The seating surfaces 66 of the outward convolutions slope in the same manner so as to seat on surfaces 65. The purpose of this saddle and seat design is to provide a more positive stacking support between the containers. Inwardly extending nesting lugs 120, shown most clearly in FIGURES 6 and 7, are provided in the end transverse walls 14 and 16 to contact the seats 66 when similar containers are nested. The nesting lugs may be formed in many shapes in addition to the shape shown and may be formed at other convenient locations for example, on the underside of the top surface 104 adjacent the wall 32.

A modified container 121 is shown in FIGURE 8. This container has one of its side walls, side wall 122 reduced in height relative to the other side wall 123. Another modified container 126 is shown in FIGURE 9. In this embodiment, both longitudinally extending side walls 127 and 128 are reduced in height relative to the walls 10 and 12 of container 9.

The use, operation and function of the invention are as follows:

The containers of this invention may be made from rigid plastics such as polyethylene or, if stronger structures are desired, they may be molded from fiberglass. The containers are preferably molded as integral units.

A container 9 of this invention may be nested with a similar container 9 as shown in FIGURE 1. In such nesting, the seating means 66 located adjacent the bottoms of the outwardly projecting convolutions of each transverse wall will engage the nesting lugs 120 to prevent the containers from sticking together. When an upper container 9 is rotated 180° relative to a lower container 9, the containers may be stacked in line with one another, as is shown in FIGURE 2. When the containers are stacked in this manner, the outwardly extending convolutions of one container will rest on the inwardly extending convolutions of the other container with the seats 66 engaging the saddles 65. Additional stability is provided by the upward projections on the lower container which engage the sockets or recesses formed in the bottom portion of the upper container and lock the containers against both lateral and longitudinal movement relative to one another.

The off-center stacking of containers inclined at an angle to supporting surfaces is accomplished by placing an upper container 9 on a lower container 9 with the upper container offset laterally relative to the lower container. For example, as shown in FIGURE 3, where the top container is first rotated 180° from its nesting position relative to the lower container and then is offset laterally so that the outwardly extending convolution 34 of the end wall 14

of this container, which is the closest outwardly extending convolution on this end wall to the side wall 12, engages the middle inwardly extending convolution 62 of the transverse end wall 16 of the lower container. Also, the outwardly projecting convolution 56 of transverse end wall 16 of the top container will rest on inwardly extending convolution 42 of the transverse end wall 14 of the bottom container. The convolution 56 is adjacent the side wall 12 of the top container while the inwardly convolution 42 is the second inwardly located convolution of the bottom container from the side wall 10. Thus, it can be seen that the top container will be offset laterally relative to the bottom container. Since the side walls 10 and 12 of the container are not as high as the transverse end walls 14 and 16 and, in fact, are level with the top surface of the saddles 65, the bottom panel 18 will clear these top walls to permit this off-center stacking.

Whereas in the stacking arrangement shown in FIGURE 3, the upper and lower containers have been rotated 180° relative to each other, another stacking arrangement is possible. In this alternate arrangement, the containers are removed from the nesting arrangement shown in FIGURE 1 by simply offsetting the upper container laterally relative to the bottom container without rotating the upper container 180°. Thus, the outwardly extending convolution 34 of the wall 14 of the upper container, which is the second convolution on this end wall from the side wall 12, engages the inwardly extending convolution 44 of the wall 14 of the lower container, which is the third convolution on this wall from the side wall 12. Also, the outwardly projecting convolution 56 of the transverse end wall 16 of the upper container, which is the first convolution on this end wall from the side wall 12, rests on the inwardly extending convolution 64 of the end wall 16 of the bottom container, which is the second convolution on this wall from the side wall 12. The top container will thus be supported on the bottom container in a position offset laterally relative thereto.

When the containers are stacked on top of one another in an off-center manner, they may be supported against a dihedral as shown in FIGURE 3. With the containers stacked in this manner, interlocking projections and sockets will engage with one another to prevent the upper container from sliding downwardly relative to the lower container.

The modified containers 121 and 126 shown in FIGURES 8 and 9 are particularly useful when stacked off-center and inclined at an angle to supporting surfaces because the side walls of reduced height will permit access into the lower containers. A container with only one side wall of reduced height as in FIGURE 8, or with both side walls reduced in height as shown in FIGURE 9, may be used to advantage in providing access to the lower containers.

While the preferred form and several variations of the invention have been described, it should be understood that suitable other additions, alterations and variations may be made without departing from the invention's fundamental theme.

I claim:

1. An integral upwardly open container adapted to stack on a similar container both in line and offset relative thereto and to nest therein:

a generally flat bottom panel,

two transverse walls each rising upwardly from an opposite end of said bottom panel and inclined away from each other from bottom to top,

inwardly and outwardly projecting convolutions formed in said transverse walls with an inward convolution in one transverse wall being located oppositely to an outward convolution in the other transverse wall and with an odd number of convolutions provided in each transverse wall,

one of said convolutions in each transverse wall having twice the lateral length of any other convolution in

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its wall with said longer convolutions on said transverse walls being located longitudinally opposite one another, and

a plurality of stacking means formed on said convolutions comprising:

saddles formed on said inwardly projecting convolutions below the tops of the transverse walls and seats formed on said outwardly extending convolutions adjacent the bottoms of the transverse walls with said seats adapted to fit into said saddles to stack said containers, and

a sufficient number of said convolutions being formed with stacking means so that each transverse wall has at least two saddles and two seats located on each side of a vertical longitudinal plane extending through the center of the container.

2. The structure of claim 1 further characterized in that interlocking means are formed on said convolutions with each interlocking means including a projection and a recess adapted to receive a projection,

said projections and said recesses being located between the bottoms and the tops of said transverse walls.

3. The structure of claim 2 further characterized in that said interlocking means are formed on said saddles and adjacent said seats.

4. The structure of claim 3 further characterized in that the projections are located on said saddles and the recesses are located adjacent said seats.

5. The structure of claim 2 further characterized in that an even number of projections and recesses are formed on each transverse wall with each regular length convolution having a single recess or projection and each double length convolution having two recesses or projections.

6. An integral open container adapted to stack on a similar container both in line and offset relative thereto and to nest therein including:

a generally flat bottom panel,

two transverse walls each rising upwardly from an opposite end of said panel and inclined away from each other from bottom to top,

at least one longitudinal wall rising upwardly from a side of said bottom panel,

inwardly and outwardly projecting convolutions formed in said transverse walls with an inward convolution in one transverse wall being located oppositely to an outward convolution in the other transverse wall and

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with an odd number of convolutions formed in each transverse wall,

one of said convolutions in each transverse wall having twice the lateral length of any other convolution in its wall with said longer convolutions in each wall being located longitudinally opposite one another, and

a plurality of stacking means formed on said convolutions comprising,

saddles formed on said inwardly projecting convolutions and located below the tops of the transverse walls and at least as high as the top of said longitudinally extending wall and seats formed on said outwardly extending convolutions adjacent the bottoms of the transverse walls with said seats adapted to fit into said saddles to stack said containers, and

a sufficient number of said convolutions being formed with said stacking means so that each transverse wall has at least two saddles and two seats located on each side of a vertical longitudinal plane extending through the center of the container.

7. The structure of claim 6 further characterized in that interlocking means are formed on said convolutions with each interlocking means including a projection and a recess adapted to receive a projection.

8. The structure of claim 7 further characterized in that said interlocking means are formed on said saddles and adjacent said seats.

9. The structure of claim 8 further characterized in that the projections are located on said saddles and the recesses are located adjacent said seats.

10. The structure of claim 7 further characterized in that an even number of projections and recesses are formed on each transverse wall with each regular length convolution having a single recess or projection and each double length convolution having two recesses or projections.

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