Jan. 20, 1970 J. L. WENTZEL 3,490,602

DISPOSABLE TRAY

Filed June 14, 1968 4 Sheets-Sheet 1

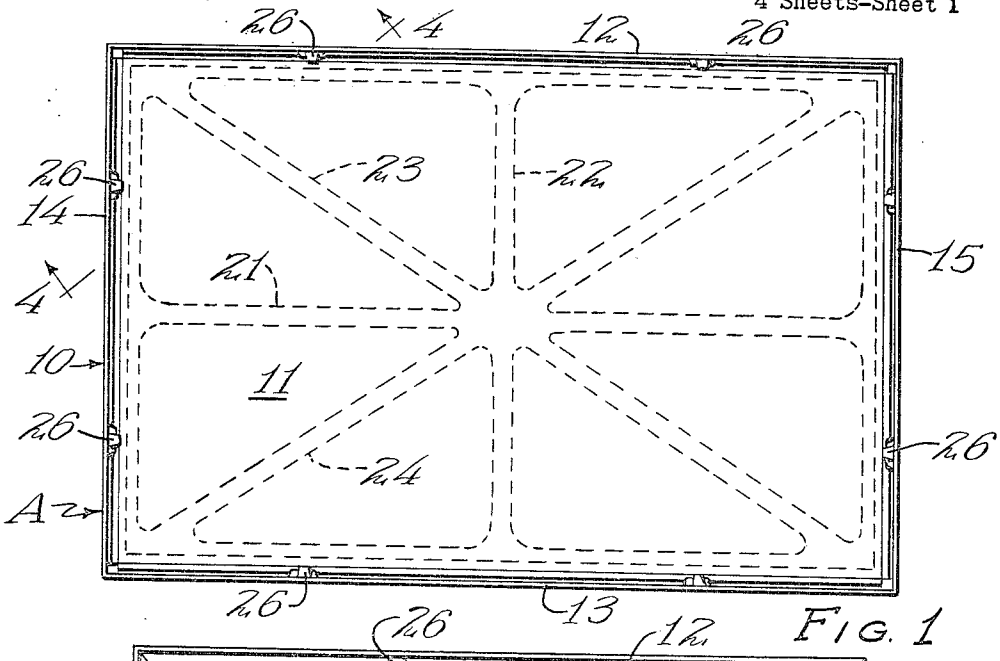


FIG. 1

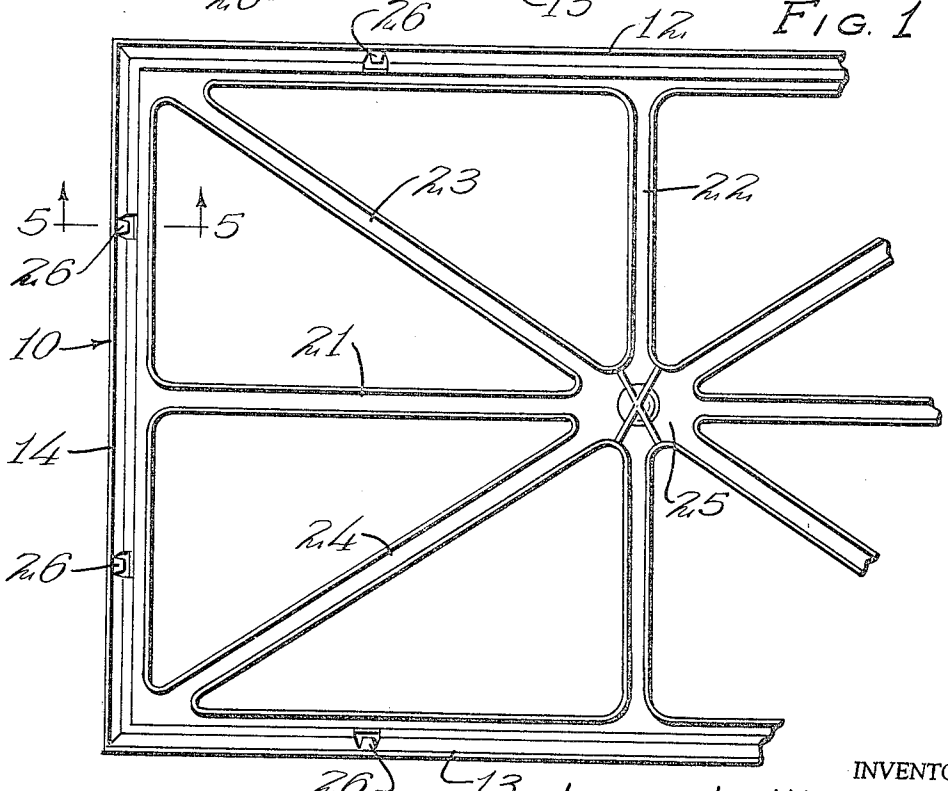


FIG. 2

INVENTOR
JAMES L. WENTZEL

BY Robert M. Dunning

ATTORNEY

Jan. 20, 1970 J. L. WENTZEL 3,490,602

DISPOSABLE TRAY

Filed June 14, 1968 4 Sheets-Sheet 2

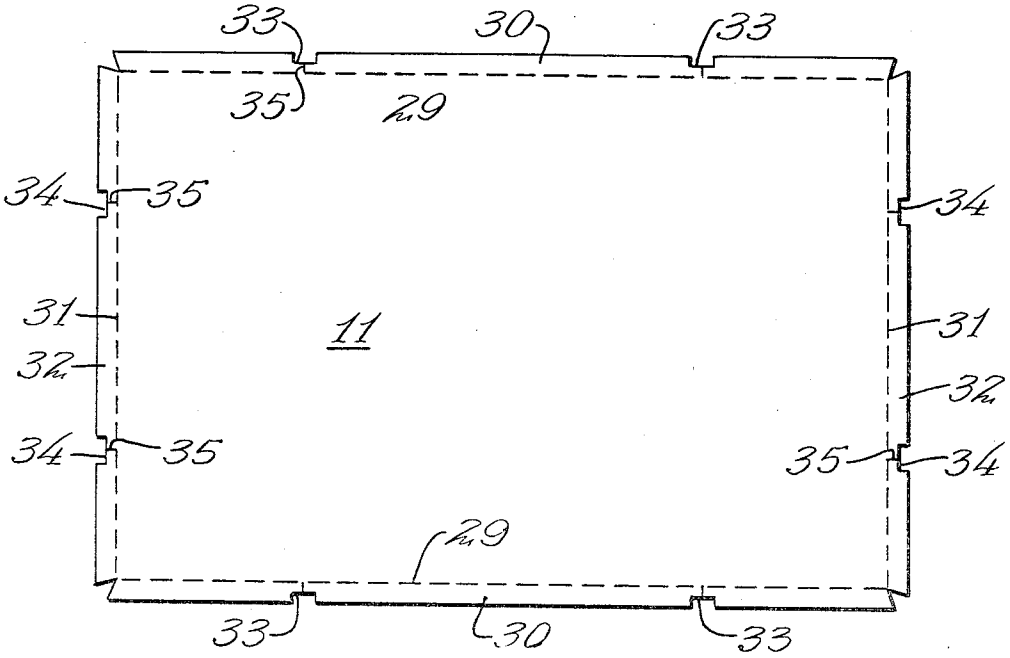


FIG. 3

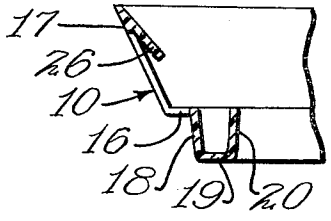


FIG. 5

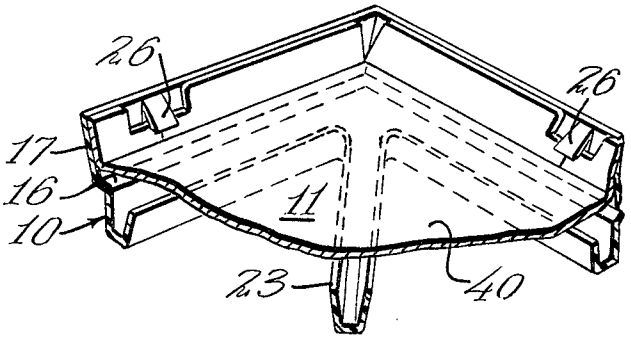


FIG. 4

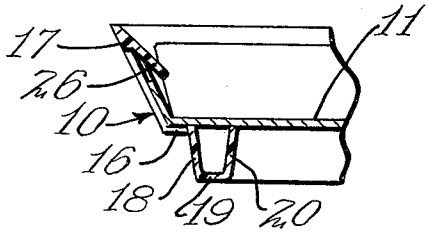


FIG. 6

INVENTOR

JAMES L. WENTZEL

BY Robert M. Dunning

ATTORNEY

Jan. 20, 1970 J. L. WENTZEL 3,490,602

DISPOSABLE TRAY

Filed June 14, 1968 4 Sheets-Sheet 3

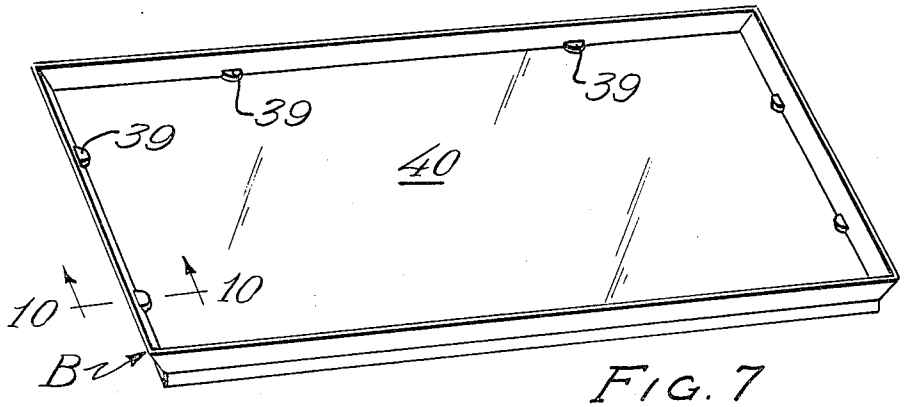


FIG. 7

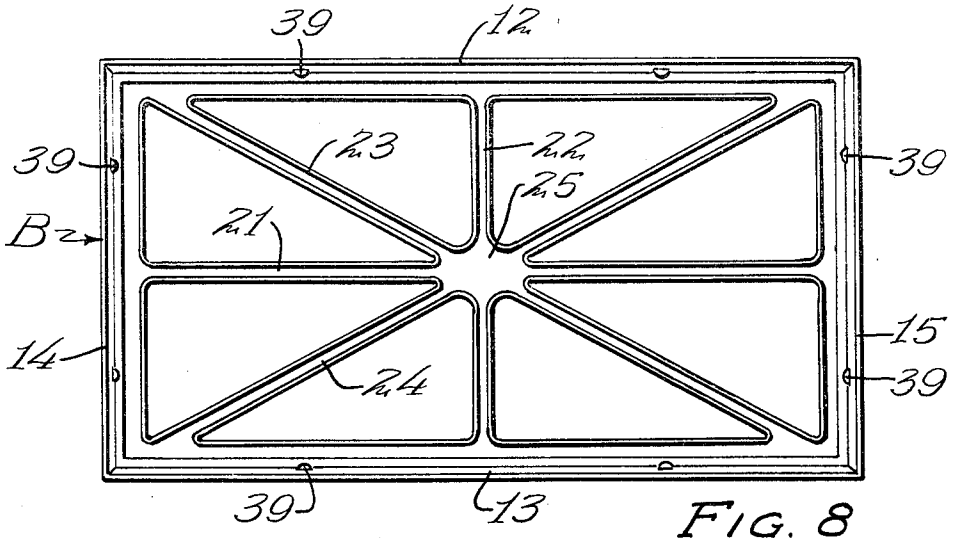


FIG. 8

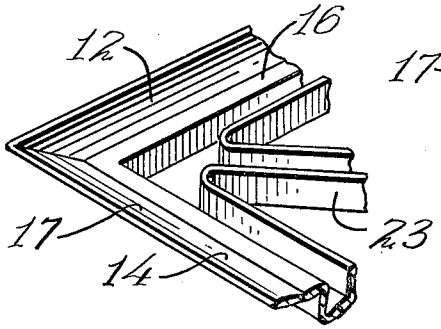


FIG. 9

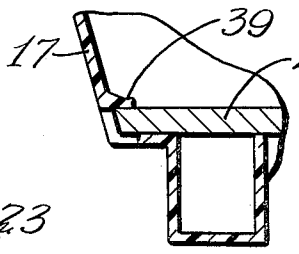


FIG. 10

INVENTOR

JAMES L. WENTZEL

BY Robert M. Dunning

ATTORNEY

Jan. 20, 1970 J. L. WENTZEL 3,490,602

DISPOSABLE TRAY

Filed June 14, 1968 4 Sheets-Sheet 4

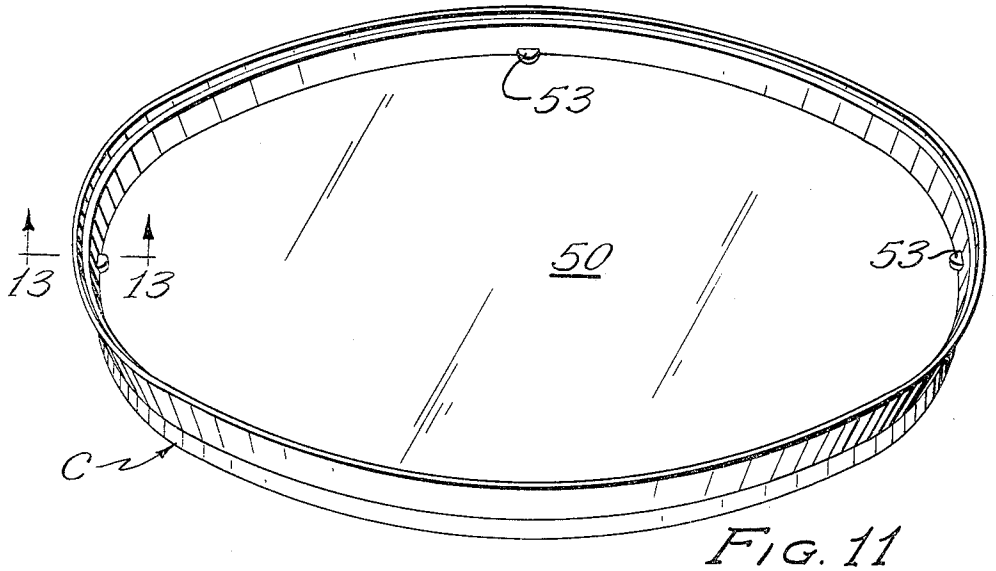


FIG. 11

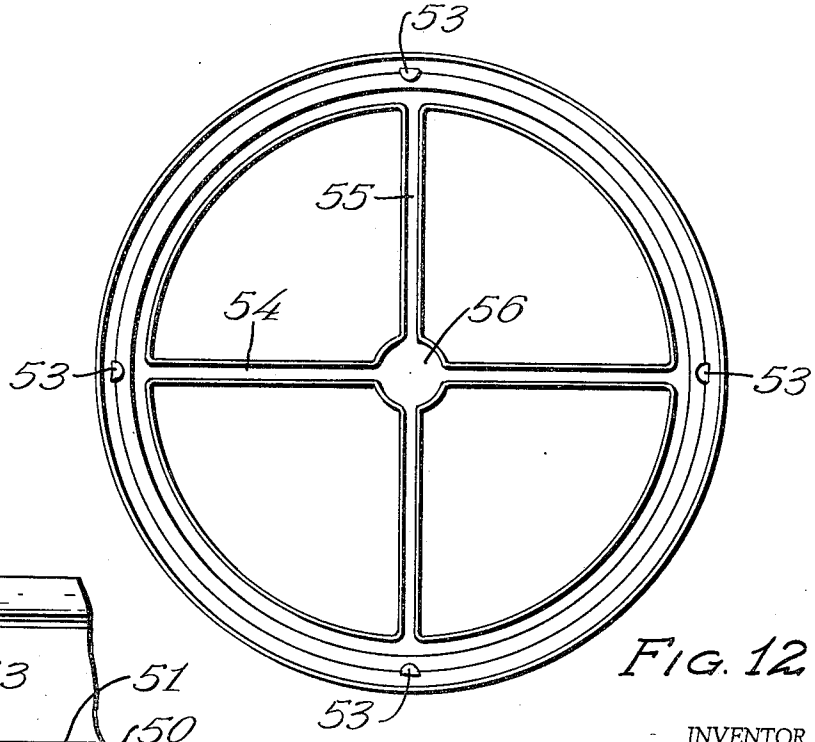


FIG. 12

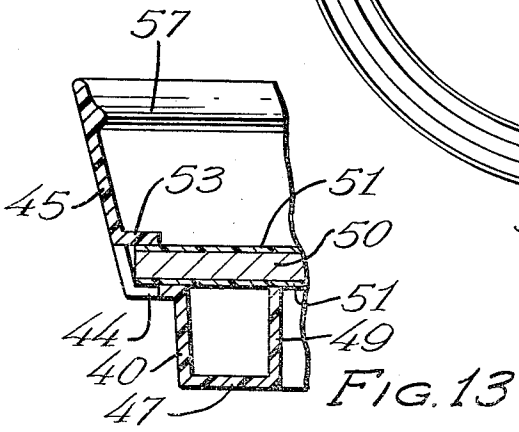


FIG. 13

INVENTOR

JAMES L. WENTZEL

BY Robert M. Dunning

ATTORNEY

United States Patent Office 3,490,602 Patented Jan. 20, 1970

3,490,602

DISPOSABLE TRAY

James L. Wentzel, Cottage Grove, Minn., assignor to Plastics, Inc., Ramsey County, Minn., a corporation of Delaware

Filed June 14, 1968, Ser. No. 740,430
Int. Cl. A47f 3/14
U.S. Cl. 211—126 10 Claims

ABSTRACT OF THE DISCLOSURE

The disclosure illustrates a disposable tray including a frame made of thin walled plastic and a tray bottom panel made of paperboard. Means are provided on the frame for holding the panel in place. The panel is usually reinforced by cross-braces beneath the panel.

This invention relates to an improvement in disposable trays and deals particularly with a plastic serving tray which may be either partially or entirely disposable.

With the increase in size and rate of speed of airplanes, the problem of serving meals while aloft has greatly increased. Furthermore, the cost of operating high speed planes has made it necessary to cut down the weight of necessary items carried so that a greater pay load may be accommodated. For example, in many instances, thick walled glass tumblers have been replaced by very thin walled disposable tumblers, and relatively thick and heavy dishware has been replaced, by thinner walled plastic dishware. However, one of the heavier items used in the serving of meals on airplanes are the serving trays which support the various dishes, glasses, and the like used for the meal.

It has been found that the weight of the serving trays may be very materially decreased by providing a thin walled plastic framework supporting a panel of paperboard. The plastic framework may be shaped in such a manner as to provide the necessary strength, while still being very light in weight. The bottom panel of the tray may be made of paperboard which is also very light in weight. The plastic frames may be produced for a cost which is much less than the cost of the serving trays normally used. The paperboard sheets may also be produced at a fraction of the cost of the trays previously used. As a matter of fact, the trays may be considered disposable and discarded after use if it is so desired. On the other hand, if preferred, the frames of the trays may be retained for reuse, and the paperboard panels may be discarded.

As with any type of tray made with two separate parts, there is always a chance of leakage in the event liquid is spilled or tipped over unto the tray. For this reason, the plastic frame is preferably made of a series of U-shaped members capable of containing a considerable quantity of liquid. The structure is so arranged that if liquid should leak about the edge of the paperboard pan or panel, it will drain into the U-shaped members forming the plastic frame, and will not drain through the tray unto the table of another supporting surface.

A further feature of the present invention resides in the fact that the serving tray comprises a framework of thin walled plastic material, and the base of the tray comprises a sheet of paperboard or other material which is somewhat absorbtive, but which will tend to direct liquid about the edges of the tray and into the grooves forming the frame. Means are provided for holding the paperboard panel in position in the plastic frame until the paperboard is distorted sufficiently to disengage the same from the retaining means.

A further feature of the present invention resides in the

provision of a paperboard panel which is engageable into the plastic frame, and which is provided with marginally extending flanges designed to border the flat panel. As a result, the portion of the plastic frame which would normally come into contact with food is covered, and the plastic frame may be reused without sterilization due to the fact that the frame itself has not come into contact with the food being consumed. The tray accordingly may be reused without being washed and sterilized, resulting in a very material cost to the airline or other organizations using the trays.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings showing part of the specification.

FIGURE 1 is a top plan of a composite tray, showing the general arrangement thereof.

FIGURE 2 is a bottom plan view of a portion of the tray illustrated in FIGURE 1 in somewhat enlarged form.

FIGURE 3 is a top plan view of the paperboard member used to form the bottom of the tray.

FIGURE 4 is a perspective detail of a corner of the tray, the view being partly in section and the position of the view being indicated in general by the line **4—4** of FIGURE 1.

FIGURE 5 is a sectional view through a portion of the frame, the position of the section being indicated by the line **5—5** of FIGURE 2.

FIGURE 6 is a view similar to FIGURE 5 but showing the paperboard tray member used in conjunction therewith.

FIGURE 7 is a perspective view of a slightly modified tray.

FIGURE 8 is a bottom plan view of the tray indicated in FIGURE 7.

FIGURE 9 is a perspective view of a corner of the tray frame illustrated in FIGURE 8.

FIGURE 10 is a vertical sectional view through a portion of the frame, the position of the section being indicated by the line **10—10** of FIGURE 7.

FIGURE 11 is a perspective view of another modified form of tray construction.

FIGURE 12 is a model plan view of the tray illustrated in FIGURE 11.

FIGURE 13 is an enlarged sectional view of the tray illustrated in FIGURE 11, the position of the section being indicated by the line **13—13** of FIGURE 11.

The serving tray A which is indicated in FIGURES 1 through 6 of the drawings includes two major separate parts, one comprising the plastic frame **10**, and the other comprising the tray base **11**. In the particular arrangement illustrated, the tray frame is made of plastic material, while the tray base is made of paperboard. While other material could similarly be used for the tray bottom, paper is at present preferred because of its low cost.

The tray A is rectangular in shape, and includes parallel side members **12** and **13** extending longitudinally of the tray, and end members **14** and **15** extending transversely of the frame at the ends thereof. The side members **12** and **13**, as well as the end members **14** and **15** are of substantially the same cross-section.

The cross-sectional shape of the peripheral members **12, 13, 14,** and **15** of the drawings is indicated in FIGURES 5 and 6 of the drawings, and shown in perspective in FIGURE 4 thereof. The tray includes a bottom flange **16** upon which the paperboard tray bottom **11** may rest. The outer edge of the horizontal flange **16** is connected to an outwardly and upwardly inclined wall **17** which forms the outer peripheral wall of the tray. Along the inner edge of the horizontal flange **16**, a channel-shaped structure is provided including a downwardly and inwardly inclined flange **18**, a bottom flange **19** extending in-

wardly from the lower edge of the flange **17**, and an upwardly and inwardly inclined flange **20** extending upwardly to the level of the bottom flange **16**. As is clearly evident in FIGURES 5 and 6 of the drawings, this arrangement provides a peripheral channel which extends entirely about the frame, and which is capable of accommodating a considerable quantity of liquid. As the result, if liquid is spilled on the paperboard bottom panel of the tray, and drains downwardly through the corners thereof, it will drain into the channel extending just inwardly of the periphery of the tray, and the channel will prevent the liquid from draining completely out of the tray.

As indicated in FIGURES 1 and 2 of the drawings, supports are provided for the paperboard portion **11** of the tray to prevent the paper from sagging intermediate its edges. With reference to these figures, a longitudinally extending central strut **21** is provided parallel to the longitudinal edges **12** and **13** of the frame and midway therebetween. A central transverse strut **22** is also provided extending parallel to the ends **14** and **15** of the tray frame and positioned intermediate therebetween. Struts **23** and **24** extend diagonally across between the corners of the frame to form an additional support and a means limiting the warping or twisting of the tray frame.

As is indicated in FIGURE 2 of the drawings, the longitudinal strut **21**, the transverse strut **22**, and the diagonal struts **23** and **24** are channel-shaped in cross-section, and communicate with the peripheral channels which have been described in such a manner that if liquid drains into any of the peripheral channels, it may also drain into the longitudinally extending strut, the transversely extending strut, and the diagonally extending struts **23** and **24**. All of the struts are connected at the center of the tray by a central upwardly concave strut connecting member **25** as indicated.

Each of the frame members **12**, **13**, **14**, and **15** are provided with means for retaining the paperboard tray bottom **11** in position. As indicated in FIGURES 4, 5, and 6 of the drawings, ears **26** forming a part of the peripheral walls **17** of the tray frame extend downwardly and inwardly from the side walls **17** to terminate well above the horizontal flanges **16**. These lugs or ears **26** provide a means for retaining the paperboard tray bottom in position in its frame as will be described.

The paperboard tray bottom **11** is best indicated in FIGURE 3 of the drawings. The tray bottom comprises a rectangular panel which is hingedly connected along parallel fold line **29** to longitudinally extending side flanges **30**, and which is connected along right angularly extending fold lines **31** to and flanges **32**. The side flanges **30** include a pair of rectangular notches **33** which are spaced apart a distance equal to the spacing of the ears **26** connected to the longitudinal side wall members **17** of the tray frame. In a similar manner, the end wall flanges **32** of the tray bottom **11** are notched as indicated at **34**, the notches **34** being spaced apart a distance equal to the spacing of the ears **26** in the peripheral walls **17** of the ends **14** and **15** of the frame. Slits **35** extend from the base of each of the notches **33** and **34** to the adjoining fold line **29** or **31** to simplify the engagement of the flanges **30** and **32** with the ears **26** spaced about the periphery of the frame **10**, and to permit independent flexing of the portions of the flanges **30** and **32** on either side of the slits **35**.

As will be understood, the paperboard tray bottom portions **11** are normally flat and coplanar with the flanges **30** and **32**. However, by pushing the paperboard panels downwardly into the frame **10**, the marginal flanges **30** and **32** readily flex upwardly to lie in contact with the outwardly inclined walls **16** of the frame. When forced downwardly sufficiently, the bases of the notches **33** and **32** clear the lower ends of the inclined ears **26** on the peripheral walls **17** of the frame, and the interengagement between the ears **26** and the walls of the paperboard tray bottom **11** lock the tray bottom into place within the frame and is retained therein. The normal tendency of the paperboard tray bottom to return to its normal flat form urges the flanges **30** and **32** against the frame sides **17**, and may hold the tray bottom **11** elevated as in FIGURE 4 until weight is placed upon the tray bottom **40**. The modified form of tray illustrated in FIGURES 7 through 10 of the drawings is very similar to the structure described insofar as the tray frame is described. Accordingly, the same identifying numerals have been used. The main area of difference lies in the fact that the side walls **17** of the outer members of the frame are provided with inwardly extending ears **39**, one of which is perhaps best illustrated in FIGURE 10 of the drawings. The paperboard tray bottom **40** is merely a rectangular sheet of paperboard which fits within the side walls **17** of the tray. The edges of the paperboard sheet **40** snap below the ears **39** and are retained in place by the ears. As will be seen, the tray B is very similar to the tray A with the main exception of the fact that the paperboard portion of the tray does not include marginal flanges extending along the upwardly inclined walls **17** of the tray, and the tray bottom retaining means are merely lugs or projections **39** which extend inwardly from the sides of the tray and engage over the edges of the sheet.

The structure shown in FIGURES 11, 12, and 13 of the drawings is virtually identical with that indicated in FIGURES 7 through 10 of the drawings with the exception of the shape of the tray. The tray C indicated in FIGURE 11 through 13 is circular in outline, and is provided with a cross-sectional structure best indicated in FIGURE 13 of the drawings. As indicated in this figure, the frame includes a bottom flange **44** having integrally secured to its outer edge an upwardly and outwardly inclined wall **45**. A trough-shaped portion underlies the marginal edge of the bottom portion of the tray and includes a downwardly extending generally cylindrical flange **46** extending downwardly and inwardly from the inner edge of the flange **46**, a horizontally extending ring-shaped bottom flange **47** extending inwardly from the lower edge of the flange **46**, and an upwardly generally cylindrical flange **49** extending up from the inner edge of the flange **47**. The upper end of the flange **49** is coplanar with the upper surface of the horizontal flange **44**, as will be seen in FIGURE 13.

A paperboard disc **50**, preferably coated with a moisture resistant coating such as cellulose acetate or other plastic material **51** rests upon the flange **44** and is held in place by a series of angularly spaced ears **53** beneath which the marginal edge of the disc **50** is pressed. Obviously, the disk **50** is made of material such as flexible paperboard which may be readily inserted or forced beneath the ears **53**.

As is indicated in FIGURE 12 of the drawings, the tray bottom **50** is further supported by a pair of diametrically extending channels **54** which intersect at the center of the tray in a generally cup-shaped connecting area **56** at the point of intersection of the cross-members. The diametrically extending ribs **54** and **55** serve not only to assist in supporting the paperboard panel **50**, but also act as a means of, communication between opposite sides of the tray frame. In other words, in the event liquid drains about the edge of the tray bottom **50** and into the channel-shaped circular drain member illustrated in FIGURE 13 of the drawings, the liquid may flow around the tray frame or transversely across the sides of the frame through the upwardly facing channels **54** and **55**. Thus these channels serve not only as a support for the tray bottom, but also as a means of communicating the flow of fluid from one side of the tray to the other. A stiffening rib **57** may be provided near the top of the outer tray flange **45**.

In accordance with the patent statutes, I have described the principles of construction and operation of my improvement in disposable tray, and while I have endeavored to set forth the best embodiment thereof, I

desire to have it understood that changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A disposable serving tray including:
a peripheral rim of thin walled plastic material,
said rim including a substantially horizontal tray panel supporting flange thereupon,
a panel of flexible material resting upon, and supported by, said supporting flange,
panel retaining ears supported by said rim above the level of said supporting flange and engageable over a panel supported by said flange.

2. The structure of claim 1 and in which said rim includes a peripheral wall extending upwardly and outwardly from said panel supporting flange.

3. The structure of claim 1 and in which said rim includes a continuous channel secured to the inner edge of said panel supporting flange.

4. The structure of claim 1 and including reinforcing members extending across said peripheral rim, having the upper surfaces thereof substantially coplanar with said tray panel supporting flange.

5. The structure of claim 1 and in which said peripheral rim is generally circular.

6. The structure of claim 1 and in which said peripheral rim is generally rectangular.

7. A tray including a peripheral frame member including;
a ring shaped horizontal flange on a common plane, having inner and outer edges,

a upwardly and outwardly extending flange secured to the outer edge of said horizontal flange,
a trough of generally U-shaped cross-section secured along its outer and upper edge to the inner edge of said horizontal flange,
a panel of flexible material resting upon, and supported by said horizontal flange, and
panel retaining ears secured to said upwardly and outwardly extending flanges and overlying said panel.

8. The structure of claim 7 and including marginal flanges on said panel adapted to extend upwardly and outwardly from the periphery of said panel to engage the upwardly and outwardly inclined flanges.

9. The structure of claim 7 and including reinforcing members extending between opposite sides of said trough beneath said panel.

10. The structure of claim 9 and in which said reinforcing members are channel-shaped in cross-section.

References Cited

UNITED STATES PATENTS

1,949,285	2/1934	Porter	108—27 X
2,344,937	3/1944	Brazier	211—126 X
2,986,438	5/1961	Smathers	108—26 X
2,652,702	9/1953	Hintze	211—126 X
3,381,825	5/1968	Bessett	211—126 X

NILE C. BYERS, JR., Primary Examiner

U.S. Cl. X.R.

108—27