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3,501,044

DISPOSABLE TRAY WITH REMOVABLE INSERTS

Filed July 29, 1968

3 Sheets-Sheet 1

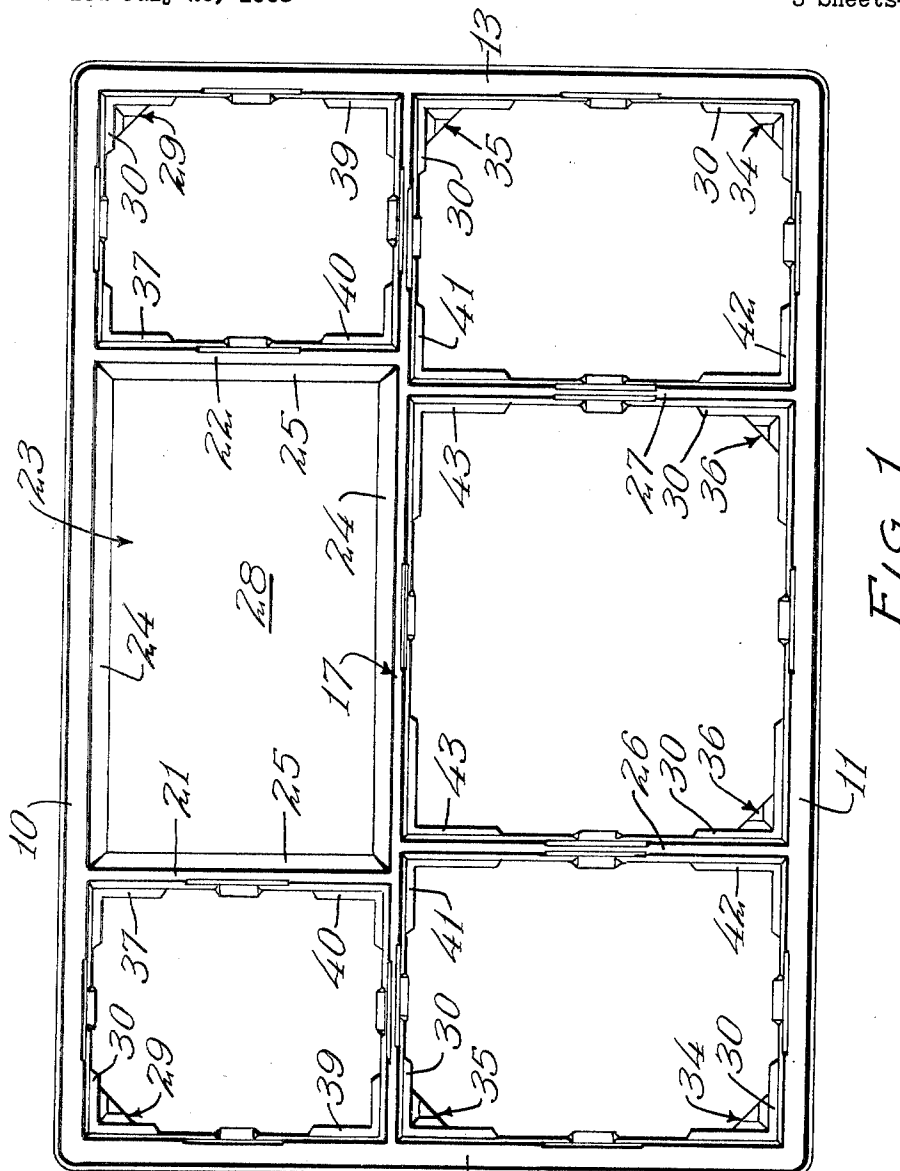


FIG 1

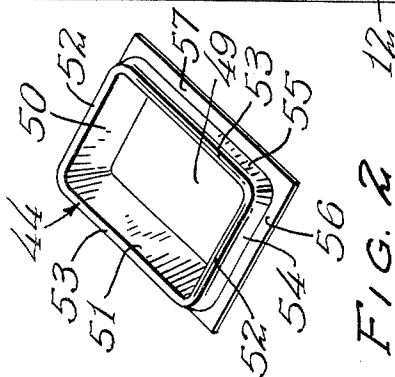


FIG. 2

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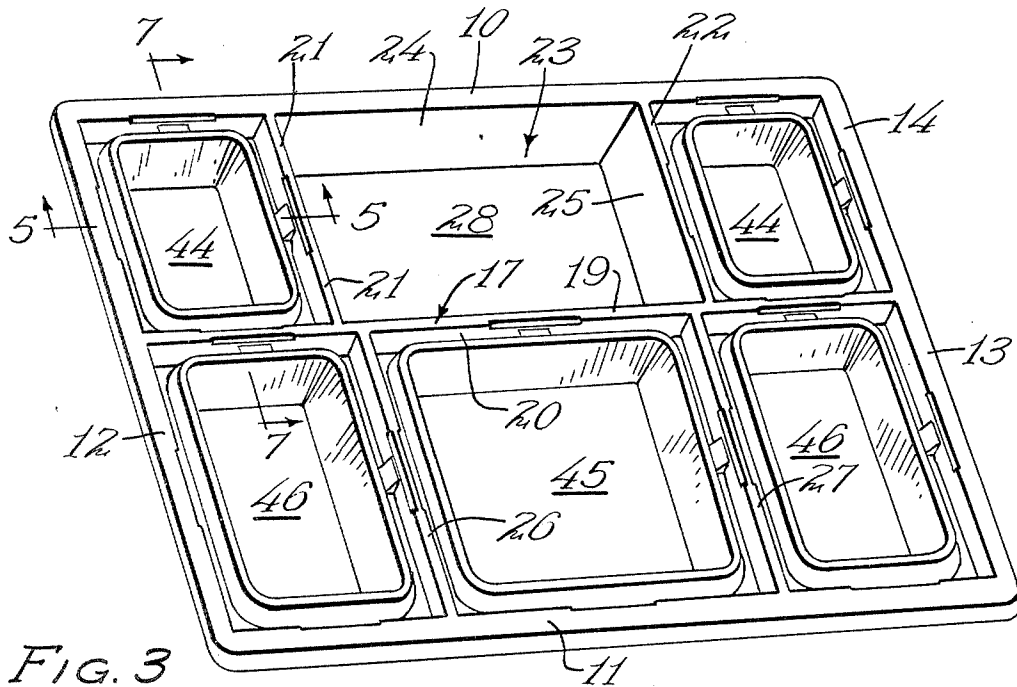
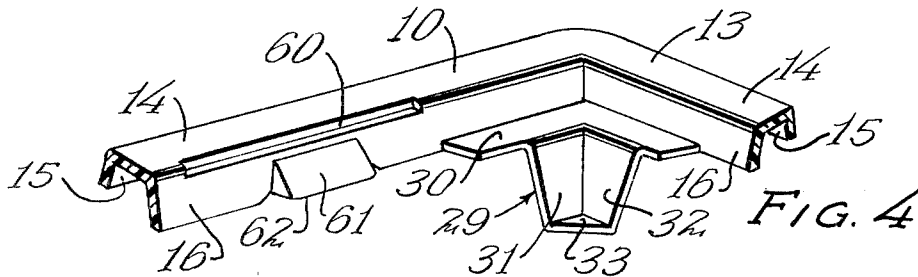
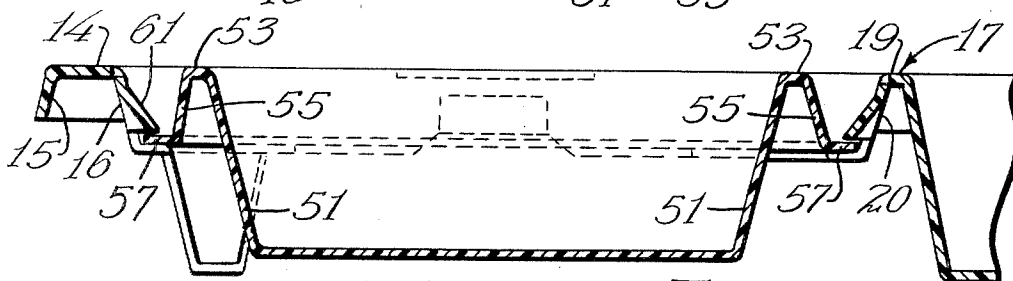
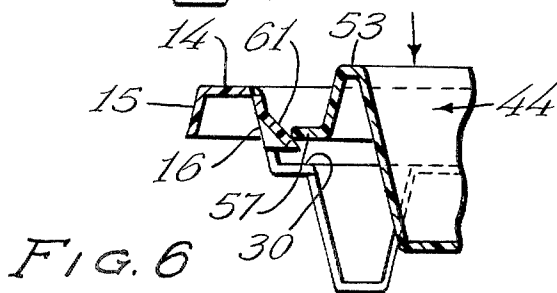
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DISPOSABLE TRAY WITH REMOVABLE INSERTS

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3 Sheets-Sheet 3

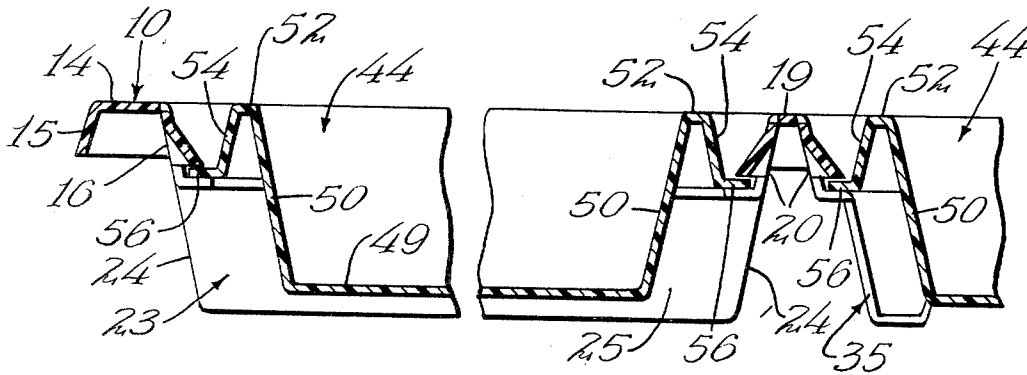


FIG. 7

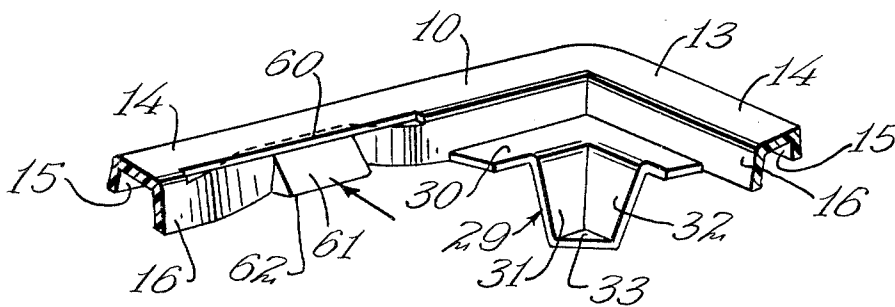


FIG. 8

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DISPOSABLE TRAY WITH REMOVABLE INSERTS
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14 Claims

ABSTRACT OF THE DISCLOSURE

A frame of light weight plastic is provided having a series of partitions designed to divide the frame into a series of open compartments. Legs are provided to support the frame on a flat surface. Dishes or food receptacles are engageable into each of the compartments, to rest on suitable supports. Locks are provided to automatically lock the receptacles in the compartments.

This invention relates to an improvement in disposable trays and deals particularly with a tray frame capable of supporting a series of disposable receptacles for use in containing various meal courses such as those served on airplanes.

With the increase in size and speed of commercial airliners, the problem involved in serving meals has become increasingly difficult. Furthermore, as the number of passengers increases, the weight of the trays, dishes and the like used in serving the meals correspondingly increases. In order to maintain a high pay load on the plane, the weight of the trays and dishes used in serving meals should of necessity be at a minimum.

With the increase in passenger travel, the problem of serving the food onto the trays also increases. It is entirely possible to move serving trays by a series of stations and to insert the entree, the salad, the dessert, and the other side dishes into the tray during such movement. However, the food must be served attractively, and must be arranged more carefully than would be possible if the serving tray were filled on an assembly line. For this reason it has been found preferable for the airline, or the catering company serving the airline, to prepare the food in individual receptacles and to then insert these receptacles into or upon a serving tray in the procedure of preparing the meals for service.

Another of the difficulties involved in the serving of food on airplanes lies in the cost of removing the dishes from the plane, washing and sterilizing the trays and dishes, and sorting them for refilling. With the increasing cost of labor, and with the decreasing cost of plastic items, it has often been found more practical to mold the tray and the dishes from thin-walled plastic material either by a molding process or by a vacuum forming process, and forming individual dishes which may fit into the frame forming the trays. This arrangement has several advantages over previous systems. In the first place, the body of the tray may comprise merely a simple framework of thin plastic material which includes apertures to accommodate the desired number of individual dishes. The individual dishes may be filled in various sections of the restaurant or catering service. For example, the entree of the meal may be inserted in one dish, a vegetable or salad may be inserted in another, a dessert may be inserted in another, and so forth. Each of the dishes may be individually prepared in sections of the restaurant or catering establishment. Accordingly, in order to assemble the entire meal, it is only necessary to pass the frame-like tray past a series of stations, and to insert a disposable dish in the tray at each of such stations. As a result, each portion of the meal may be carefully and attractively

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prepared and added to the trays during the process of assembling the meal.

A further feature of the present invention resides in the provision of a tray, preferably formed of thin-walled plastic material and which generally provides a frame designed to accommodate individual disposable dishes. The tray is preferably provided with one integral solid compartment designed to accommodate utensils, napkin, and the like. This solid integral section serves to greatly stiffen and strengthen the tray, and to simplify the handling of the tray before the disposable dishes are inserted thereinto.

A further feature of the present invention resides in the provision of a device of the type described including a series of disposable dishes which are inserted into the tray frame. These dishes are preferably provided with a peripheral flange extending in a common plane about the disposable dishes. Locking means are provided to lock each of the dishes into a suitable receptacle in the tray so that the dishes become attached to the frame, and once inserted remain in proper position during the handling of the tray. The addition of the dishes to the frame increases the rigidity of the frame so that when the dishes are in place a solid unit is provided.

A feature of the present invention resides in the provision of a simple and effective lock for holding the various disposable dishes into place. The dish supporting frame receptacles are formed of inverted channel-shaped members having at their lower ends horizontally- extending ledges at the corners of the receptacles designed to support the peripheral flanges of the individual dishes. The channel-shaped members are provided on their inner surfaces with wedge-shaped projections intermediate the corners of the receptacles to engage over the peripheral flanges of the dishes. In order to simplify the insertion of the dishes into their proper receptacles, the channel-shaped members are slotted on either side of the channel base, and the wedge shaped projections or locking means are located intermediate the ends of these slots. As the dishes are inserted, the peripheral flanges of the dishes are pressed against the wedge-shaped projections which act as cams to force the sides of the channel-shaped member outwardly of the receptacle cavity into which the dish is being inserted until the dish flange moves below the locking member, at which time the sides of the channel-shaped members flex back into normal position and the bases of the wedges extend over the peripheral flange of the dish to hold the dish from disengagement.

An added feature of the present invention resides in provision of a tray frame provided with a series of spaced legs designed to hold the frame at a proper elevation so that the lower surfaces of the inserted dishes will be slightly above the lower ends of the legs. With this arrangement, the tray is supported by its legs, and not by the undersurfaces of the inserted dishes.

A further feature of the present invention resides in the fact that the built-in integral solid compartment in the tray frame preferably extends on a plane level with the undersurfaces of the legs. As a result, the integral tray combines with the legs to support the tray frame.

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 forming a part of the specification.

FIGURE 1 is a top plan view of the tray frame, showing a typical formation thereof.

FIGURE 2 is a perspective view of one of the disposable dishes used in conjunction with the frame shown in FIGURE 1.

FIGURE 3 is a perspective view of an assembled tray showing the tray frame and the various disposable dishes inserted thereinto.

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FIGURE 4 is a perspective view of a corner of the supporting frame showing the construction thereof.

FIGURE 5 is a vertical sectional view through a portion of the frame and one of the dishes, showing the manner in which the dishes are locked in place in the frame.

FIGURE 6 is a sectional view similar to a portion of FIGURE 5, but showing the dish while being inserted into the supporting frame.

FIGURE 7 is a sectional view on the line 7—7 of FIGURE 3.

FIGURE 8 is a view similar to FIGURE 4 but showing the tray frame deflected to accommodate one of the dishes.

As will be understood, the supporting tray and the removable dishes may be produced in a great number of different forms and combinations. The number of dishes inserted into the tray frame largely depends upon the size of the meal being served. As an example, a luncheon tray is produced which embodies a fixed compartment and three removable dishes. The particular structure illustrated includes a single fixed compartment, and five removable dishes supported thereby. In using the term "removable" it is not intended to imply that the dishes are ordinarily removed from the tray frame once they are inserted. However, it is entirely possible to remove the dishes; and while the trays and dishes are normally disposable, it would be entirely possible for them to be cleaned and reused.

As is perhaps best illustrated in FIGURES 1 and 3 of the drawings, the supporting frame includes a pair of longitudinally extending frame members 10 and 11, and a pair of parallel end members 12 and 13 which are arranged at right angles to the longitudinal frame members 10 and 11 and connect the ends of the same. As illustrated in FIGURES 4 and 5 of the drawings, the four sides of the frame each include a top flange 14 which is in a common plane and encircles the frame member, an outwardly and downwardly inclined outer flange 15 which extends about the periphery of the flanges 14, and a downwardly and inwardly inclined flange 16 extending about the major portion of the frame. A longitudinally extending partition member 17 extends from one end 12 to the other end 13, as indicated in FIGURE 7, and includes a top flange 19 which is coplanar with the top flanges 14, and downwardly inclined flanges such as 20 projecting downwardly from opposite edges of the top partition angle 19.

Right angularly extending partitions 21 and 22 extend between the frame side 10 and the longitudinal partition 17 in parallel spaced relation to the frame ends 12 and 13. The area between the partitions 21 and 22 and the frame side 10 and the partition 17, is filled by an integral receptacle or tray 23 including longitudinal walls such as 24 which extend downwardly and inwardly from the frame side 10 and the partition 17, end walls 25 extending downwardly and inwardly from the partitions 21 and 22, and a bottom plane 28 which forms the bottom of a fixed tray or receptacle forming a part of the frame. The integral tray receptacle 23 substantially stiffens the tray frame, and forms a support for necessary utensils, and other necessary items which need not or cannot be readily included in the inserted dishes.

As is perhaps best illustrated in FIGURE 4 of the drawings, supporting legs 29 are provided at the four corners of the tray frame. Partition members 26 and 27 extend from the partition members 17 to the frame side 11, the partitions 26 and 27 extending parallel to the end wall 12 and 13. The legs 29 are formed as illustrated in FIGURE 4 of the drawings, and in view of the fact that all of the legs are generally similar in construction, only one such leg is illustrated in FIGURE 4. However, the position of the various legs is illustrated in FIGURE 1. Each leg 29 includes a right angular horizontal flange 30 connected to the lower edges of the flanges 16 at the corner junctures thereof to extend inwardly therefrom.

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A pair of right angularly extending leg panels 31 and 32 extend downwardly from the inner edges of the right angular flange 30, and the lower edges thereof are connected by a generally triangular base portion 33. The base 33 of each leg is preferably on the plane of the bottom panel 26 of the receptacle 23 so that the receptacle 23 may serve to assist in supporting the frame.

While the legs shown in detail in FIGURE 4 have been indicated in general by the numeral 29, as indicated in FIGURE 1 of the drawings, these legs 29 are provided at the juncture between the longitudinal frame side 10 and at the ends 12 and 13 of the frame. Identical legs 34 are provided at the juncture between the longitudinal side 11 of the frame and the ends 12 and 13 thereof. Similar legs 35 are shown at the juncture between the ends 12 and 13 of the frame, and the longitudinal partition 17. Additional supporting legs 36 are shown at the juncture between the longitudinal frame side 11 and the partitions 26 and 27. These legs, combined with the under surface of the receptacle 23, form a firm support for the tray frame even when the frame is formed of relatively thin walled plastic material. It should be mentioned that the thickness of the walls of the tray frame and dishes shown in FIGURES 4, 5, and 6 of the drawings is exaggerated, as the frame and the disposable dishes supported thereby are of a thickness of perhaps 0.045 inch.

Lateral horizontal angular flanges 37 are provided extending inwardly from the inner flange 16 of the longitudinal wall 10 and corresponding inner flange of the partition 21 and the inner flange of the partition 22. These angular or L-shaped flanges 37 are on the same plane as the flanges 30 at the upper end of each leg 29. Right angular flanges 39 are provided at the juncture of each end wall 12 or 13 and the partition 17. Similar angularly extending flanges 40 are provided at the junctures between the partition walls 17 and the partition walls 21 and 22. The flanges 39 and 40 are on a common plane with the flanges 30 and 37 and are designed to support the peripheral flange of a disposable dish thereupon.

Right angularly extending horizontal flanges 41 are provided at the corners between the partitions 26 and 27 and the longitudinal partition 17, outwardly of the partitions 26 and 27. Opposed right angular flanges 42 are provided at the junctures between partitions 26 and 27 and the longitudinal tray wall 11 outwardly of the partitions 26 and 27. The rectangular compartments formed in these areas are designed to support disposable dishes, the peripheral flanges of which are designed to rest upon the flanges 30 of the corner legs, at two corners of each of these compartments, and the flanges 41 and 42 at the opposite two corners of each of these compartments. The flanges are on a common plane.

The space between the partitions 26 and 27, and between the longitudinal wall 11 and the longitudinal partition 17 also provides a rectangular recess designed to accommodate an intermediate disposable dish. The corners of this rectangular intermediate compartment adjoining the longitudinal tray frame side 11 are provided with legs 36 having horizontal flanges 30. Right angular flanges 43 are provided at the junctures between the longitudinal partition 17 and the transverse partitions 26 and 27, these flanges 43 being on a common plane with the flanges 30 of the legs 36. The flanges 30 and 43 are designed to support the peripheral flange of a disposable dish inserted into this portion of the tray.

In view of the fact that a variety of dish sizes is desirable, different identifying numerals have been given to the dishes of different sizes. The fixed receptacle 23 has been described. The frame end opening on opposite sides of the receptacle 23 which are between the end member 12 and the partition 21, and between the end member 13 and the partition 22 are designed to accommodate dishes 44. The center area between the partitions 26 and 27, and between the frame side 11 and the intermediate partition 17 accommodates a dish 45 which is usually

designed to accommodate the entree of the meal. The dishes to opposite sides of the dish 45 and which are positioned between the end wall 12 and the partition 26, and between the end wall 13 and the partition 27, are designed to accommodate the dishes 46. In view of the fact that the dishes 44, 45, and 46 are identical except in size, similar identifying numerals for the various walls forming the dishes have been used. As an example, one dish 44 is indicated in FIGURE 2 of the drawings. A transverse section through this dish is indicated in FIGURE 5 of the drawings, and FIGURE 7 is a sectional view taken at right angles to FIGURE 5. As will be noted, all four sides of the dish are similarly constructed.

As indicated in the figures mentioned, each dish such as 44 includes a generally rectangular bottom panel 49, upwardly and outwardly inclined end walls 50, and outwardly and upwardly inclined side walls 51. The side and end walls join at the corner to form a tray. The side and end walls 50 and 51 terminate in short outwardly turned flanges, the end flanges being indicated by the numeral 52, and the side flanges being indicated by the numeral 53. Downwardly and outwardly inclined walls are provided on the outer edges of the end flanges 52, these walls being indicated by the numeral 54. The side walls are also provided with downwardly and outwardly inclined flanges 55 integral with the outer edges of the peripheral flanges 53 as indicated in FIGURE 4. The lower edges of the outer walls 54 and 55 terminate in outwardly directed coplanar flanges 56 and 57.

This arrangement provides a dish having an inverted channel-shaped encircling wall which lends considerable strength to the dish. This channel-shaped wall combined with the outwardly directed flange which confines the wall to a predetermined outline provides a dish which is capable of supporting the desired weight of food, even though it is produced of thin sheet plastic. The inverted channel-shaped edge about each of the dishes extends substantially to the surface of the top flange 14 of the encircling frame so that the entire tray combined with the dishes is of generally uniform height so that the trays may be stacked one upon the other even when filled with the food.

Means are provided for retaining the dishes in the frame when inserted therinto. It will be understood that the peripheral flanges 56, 57 of each dish is supported by the various angular flanges 30, 37, 39, 40, 41, 42, and 43. FIGURES 4 and 8 of the drawings indicate a locking means for holding each dish in place. It will be understood that while the particular locking means indicated in FIGURES 4 and 8 are in the frame side 10, similar locking means are provided on each side and on each end of the dishes 44, 45, and 46. In other words, dish locking means are provided engaging all four sides of the dishes 44, 45, and 46.

As indicated in FIGURES 4 and 8, an elongated notch 60 is provided centrally of each wall of each of the dish containing compartments, the notches being at the juncture of the top flange such as 14 or 19 and the flanges such as 16 or 20 which extend downwardly and inwardly therefrom. The notches 60 separate the top flange from the downwardly and inwardly inclined flange in such a manner that the downwardly and inwardly inclined flange may flex outwardly of the compartment to extend beneath the top flange to which it is connected. A cam projection 61 is located in the downwardly and inwardly inclined flange near the center portion of each slot 60, the cam 61 being short relative to the length of the slot 60. As the dish is forced downwardly into each of the dish containing compartments of the tray, the peripheral flange 56, 57 of the dish engages against the cam projections 61, deflecting the portions of the flanges bearing the cam projections 61 outwardly of the compartment. The lower end 62 of each cam projection 61 is slightly above the level of the angular flanges such as 30. Accordingly, when the peripheral flange 56, 57 is moved into face contact with

the various angular flanges at the corners of the dish compartment, the peripheral flanges become disengaged from the cam projection 61, and the wall supporting the cam projection flexes back into its normal position overlying the peripheral flange of the dish.

With this arrangement, the various dishes may be filled with the proper foods, and each dish may be placed in its compartment with the peripheral flange 56, 57 of the dish resting upon the cam projections 61. Downward pressure on the dish causes the cam projections to flex outwardly as the dish is lowered into the compartment until the cam projections finally snap over the peripheral flange and lock the dish in place.

Once assembled, and used, the tray frame and its dishes are normally discarded. However, the dishes may be removed by flexing outwardly the portions of the downwardly and inwardly inclined flanges beneath the slots 61 to disengage the peripheral flange of the dish from the locking projections.

I claim:

1. A disposable tray including,
 - a frame,
 - a partition means dividing said frame into a plurality of compartments, said partition means being of inverted channel-shaped cross-section,
 - legs depending downwardly from said frame to support the same,
 - receptacle supporting means extending into said compartments from the lower edges of said frame and partition means,
 - receptacles in said compartments resting upon said receptacle supporting means, and
 - locking means on said frame and on said partition means engaging said receptacles to hold them in position.
2. The structure of claim 1 and including a fixed integral receptacle filling one of said compartments.
3. The structure of claim 2 and in which the bottom of said fixed integral receptacle is coplanar with the lower ends of said legs.
4. The structure of claim 1 and in which said frame is substantially rectangular, and in which said partition means forms compartments which are substantially rectangular in shape.
5. The structure of claim 4 and in which said receptacle supporting means are located at the corners of said compartments.
6. The structure of claim 4 and in which said receptacle supporting means are located only at the corners of said compartments, and said locking means are located intermediate the corners of said compartments.
7. A disposable tray comprising,
 - a generally rectangular frame of substantially inverted channel-shaped cross-section, and formed of flexible plastic material,
 - a first partition member of substantially inverted channel-shaped cross-section extending between, and connecting, two opposed sides of said frame parallel to the other two opposed sides thereof,
 - second partition members of substantially inverted channel-shaped cross-section extending from said first partition member to said other opposed sides of said frame,
 - said frame and partition members forming a series of receptacle compartments,
 - leg means on said frame depending downwardly therefrom and terminating on a common plane below said frame,
 - receptacle supporting means at the corners at least certain of said compartments extending into said compartments on a second common horizontal plane, and
 - tray shaped receptacles in said certain compartments having peripheral edges resting upon said receptacle supports.

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8. The structure of claim 7 and in which one of said compartments is filled by an integral tray-shaped receptacle having its bottom substantially on said first common plane.

9. The structure of claim 7 and including locking means extending into said certain compartments engaging said peripheral edges of said tray shaped receptacles to lock the same in said compartments.

10. The structure of claim 9 and in which said locking means are located intermediate the corners of said compartments.

11. The structure of claim 7 and in which the side walls of said frame and partition members are slotted intermediate the corners of said certain compartments to permit flexing of portions of said side walls relative to the base portion of said channel-shaped frame and partition members, and including a cam-shaped projection extending into said certain compartments to extend over portions of said receptacles to lock said receptacles in said compartments.

12. The structure of claim 11 and in which said cam-shaped projections incline downwardly and inwardly to the center of said compartments.

13. The structure of claim 7 and in which said receptacles include a bottom panel, connected side and end walls inclining upwardly and outwardly from said bottom panel, connected downwardly and outwardly inclined flanges secured to the upper edges of said side and end walls and encircling the same, and a peripheral coplanar flange secured to, and encircling, the lower edge of said downwardly and outwardly inclined flanges.

14. A receptacle lock for use in conjunction with a

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rectangular compartment formed by a framework of flexible plastic having a top flange portion and downwardly and inwardly inclined flanges secured to the inner edges of said top flange portion,

spaced coplanar receptacle supports on said inwardly inclined flanges at the corners of said compartments, said inwardly inclined flanges being longitudinally slotted intermediate said receptacle supports, said slots separating intermediate portions of said inwardly inclined flanges from said top flange portion to permit outward flexing of the portions of said inwardly inclined flanges beneath said slots,

downwardly and inwardly inclined cam projections on said inwardly inclined flanges intermediate the ends of said slots,

a receptacle shaped to fit into said compartment and including a peripheral flange adapted to rest on said receptacle supports,

said peripheral flange extending beneath said cam projections and being locked in position thereby when resting upon said supports.

References Cited

UNITED STATES PATENTS

2,764,309	9/1956	Zelonka	220—23.4
3,139,208	6/1964	Irwin	220—23.8
3,240,610	3/1966	Cease	220—23.6 X
3,341,053	9/1967	Keene	220—23.4 X

GEORGE T. HALL, Primary Examiner