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[21] Appl. No. 831,852
[22] Filed June 10, 1969
[45] Patented Sept. 28, 1971
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[54] APPARATUS AND SYSTEM FOR FOOD
PREPARATION
9 Claims, 11 Drawing Figs.

[52] U.S. Cl. 220/16,
206/4, 229/3.5 MF
[51] Int. Cl. B65d 25/00
[50] Field of Search 220/16, 13,
10, 20, 23.8; 206/4; 229/3.5 MF

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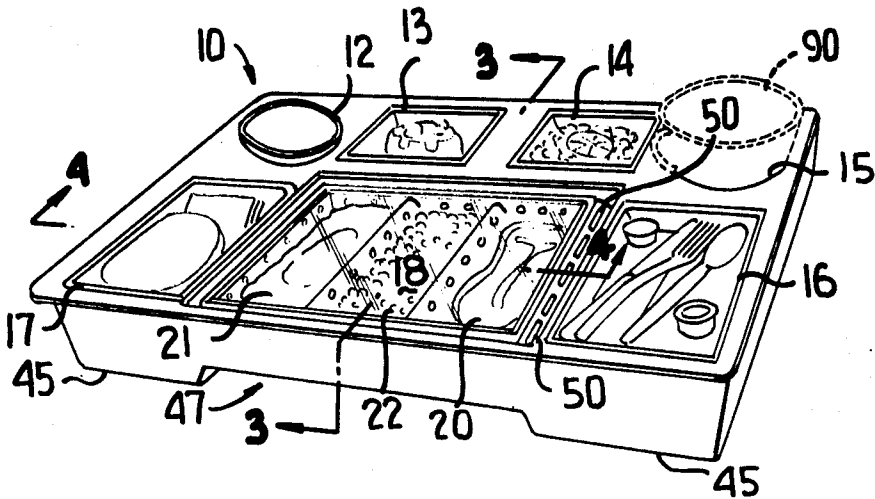
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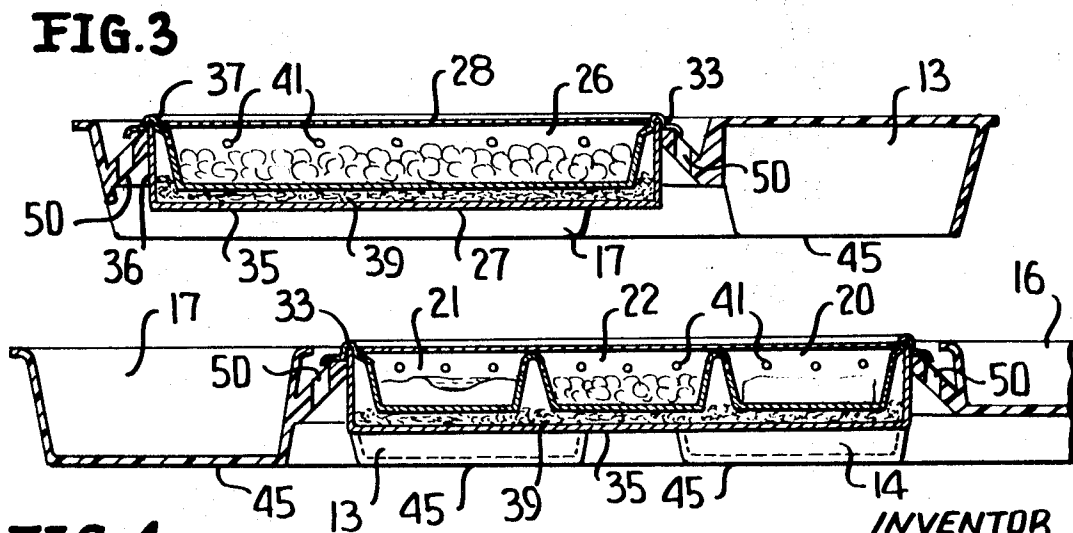
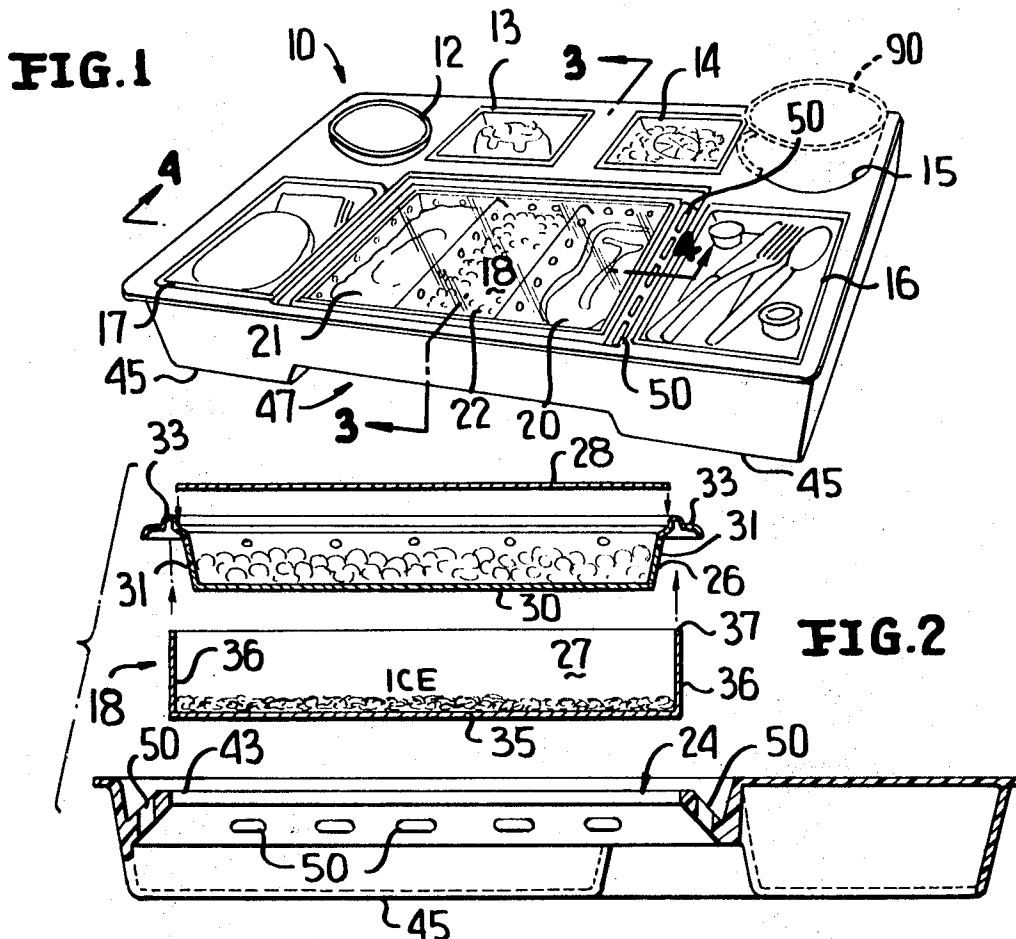
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ABSTRACT: An apparatus and system for food preparation wherein a novel tray is loaded with a full course meal, transported within a novel carrier, placed into a novel oven or heating chamber, and portions of the food are heated to an elevated serving temperature while other portions of the foods are maintained at unheated serving temperatures.





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FIG. 5

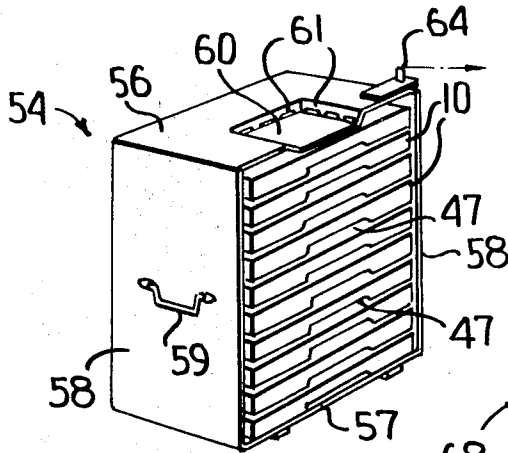


FIG. 6

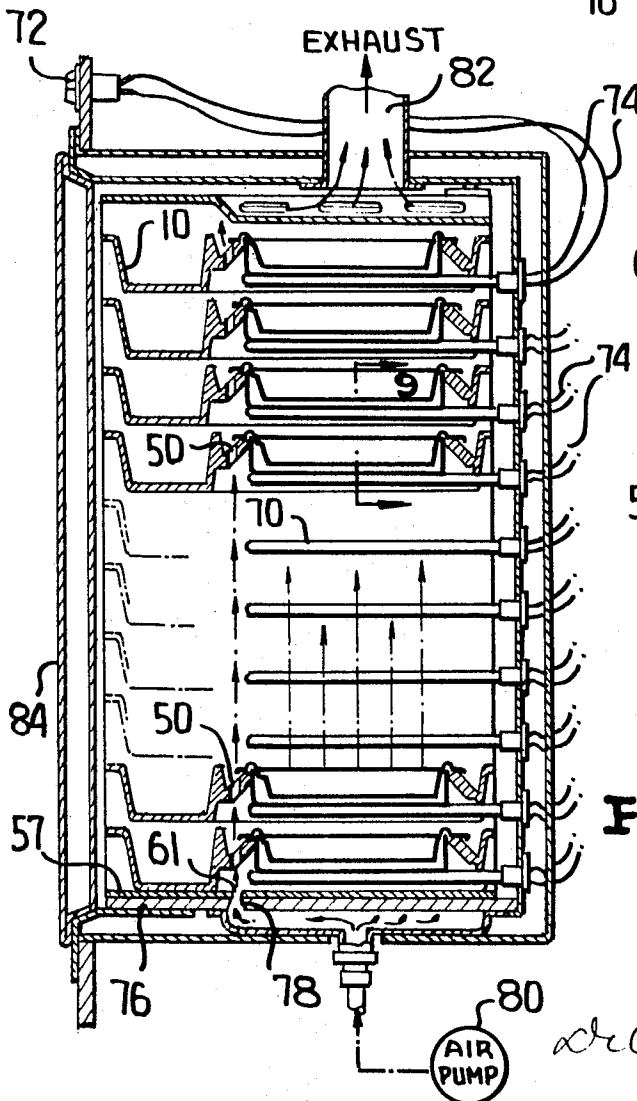
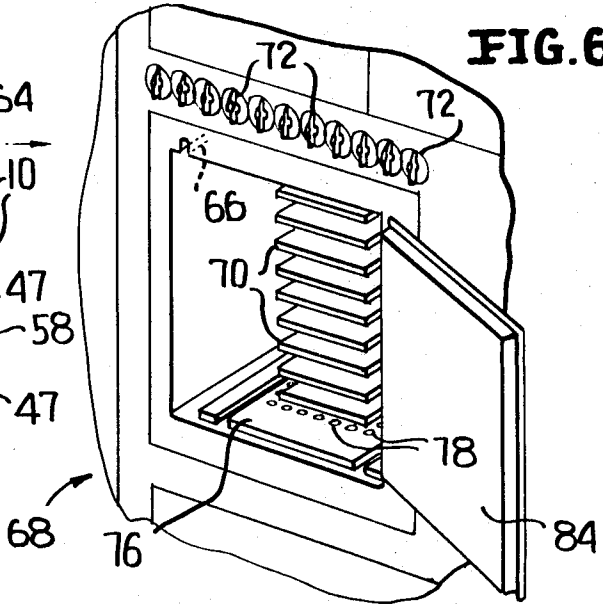


FIG. 7

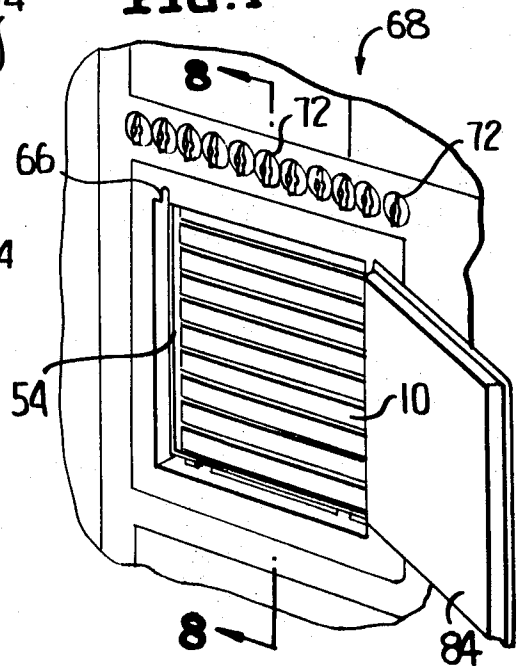
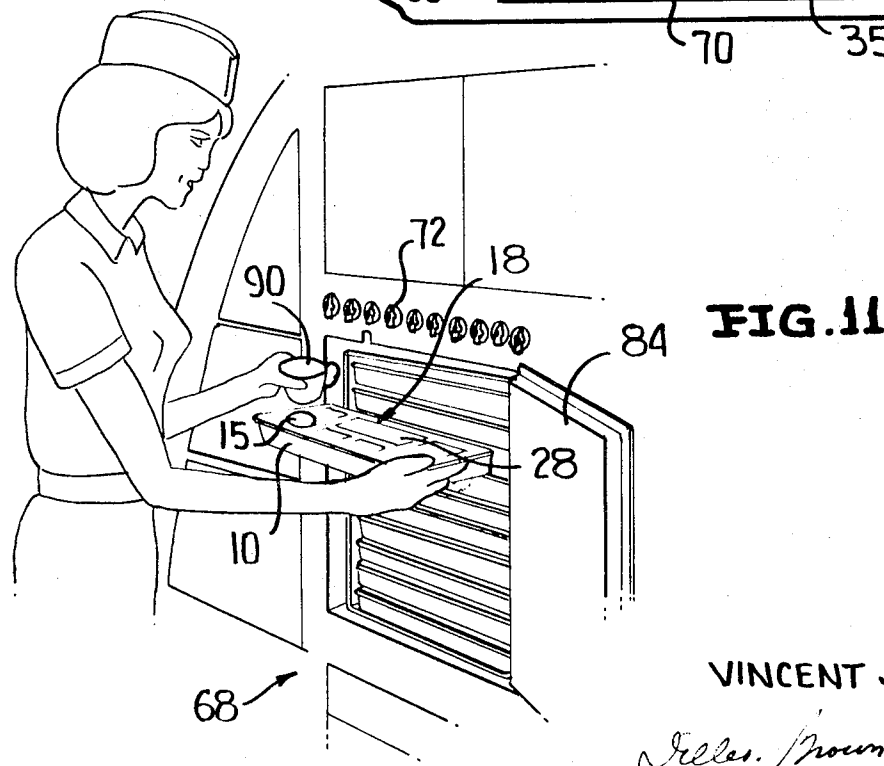
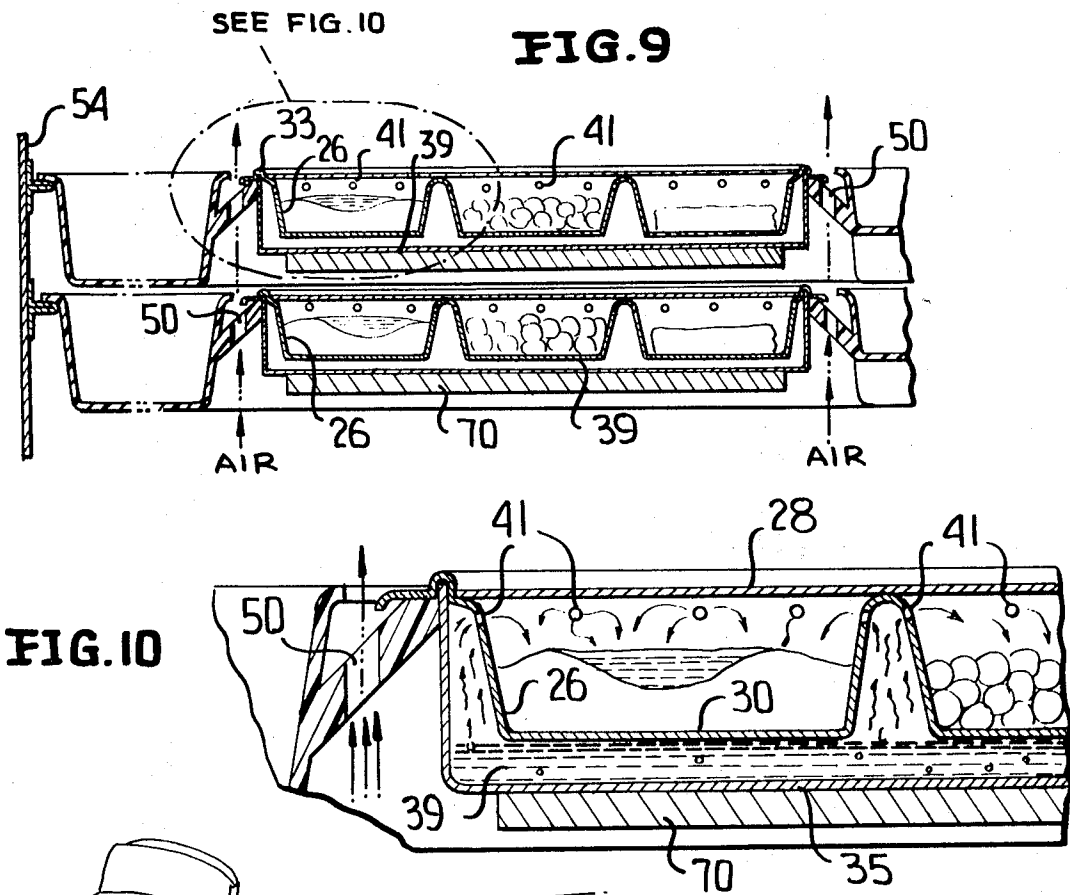


FIG. 8

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APPARATUS AND SYSTEM FOR FOOD PREPARATION

BACKGROUND OF THE INVENTION

The invention relates to food preparation and handling wherein a complete meal can be preassembled onto one food tray, transported from the food preparation center, and have portions of the meal heated to serving temperature without adversely effecting accompanying foods normally served unheated.

Prior methods can best be described by considering the manner in which airlines previously have prepared meals for airline passengers. Food was prepared at a commissary ideally located at the air terminal for minimum transportation and waste. Increasing traffic and demand for more space have caused commissaries to locate some distance from the air terminal. Peak passenger loads demand advance preparation of meals that must be kept hot, or cold, for considerable periods of time before serving. Scheduling and efficient use of manpower is a problem because of the fluctuations in demand and the short advanced notice of the estimated quantities required. Final quantities can only be determined at flight time, too late for adjustments unless the commissary is at the air terminal. Upon preparation of meals, they are stored in carriers until delivery from the commissary to the aircraft. Hot foods are kept in insulated boxes at lower than serving temperatures while cold foods are kept cool in their carrier racks by means of plastic film enclosures and dry ice. Hot and cold foods are handled manually along with separate containers for utensils, rolls, napkins, dry ice, etc. Separate storage space must be provided on the aircraft for hot foods, cold foods and utensils. Cold foods are kept cool by dry ice and hot foods are brought up to serving temperature in electric ovens. Prior to serving the passengers, the stewardess assembles each tray with its cold food, the hot entree, roll, utensils, napkins and cup.

Present day reductions in flight times and increases in passenger loads do not provide sufficient time for the stewardess to assemble the meal, serve, retrieve and repack the utensils before the aircraft is ready to land. In addition, present methods and equipment are uneconomical because of the congestion of airport facilities and space, and because of a general shortage and high cost of labor in all facets of the business.

Further, the present systems are wasteful in that many meals are prepared which are never served. Meals placed aboard the aircraft for persons who miss the flight and for persons who refrain from eating are wasted while other problems are created by delays and last minute passenger additions.

SUMMARY OF THE INVENTION

The present invention relates to apparatus and systems for food preparation particularly useful for use in the airline industry but also useful for railroads, short haul passenger ferries, convention banquets, feeding military troops in the field, and as an improvement over the present day "TV-dinners."

Various objects of the present invention are to reduce labor at the commissary, provide a steadier flow of work, reduce the time necessary to assemble meal orders, handle and store hot and cold foods as one unit, where two units were previously necessary, reduce space necessary for the buffet on aircraft, make it possible to locate storage lockers for carrier units at airline terminals close to loading platforms for better utilization of trucking and personnel, reduce the cooking time necessary to provide quality meals, permit excess meals to be carried without waste since only those required need be cooked, eliminate assembly time required of the stewardess, avoid washing and handling costs by making serving pieces and utensils disposable, and effecting economies in the purchase of meats and vegetables at optimum market conditions.

Another object of the invention is to provide a novel food tray having separate compartments therein, a compartment for heated foods being particularly located with respect to,

and insulated from, compartments for unheated foods and utensils.

Another object of the invention is to provide a novel carrier rack for food trays, the carrier rack being particularly adapted to cooperate with food trays within a novel oven, or heating chamber, which is provided with means for establishing an insulative air curtain between the compartments for heated and unheated foods.

A further object of the invention is to provide a novel method, or system, for food preparation and handling to overcome disadvantages of current systems.

IN THE DRAWINGS

FIG. 1 is a perspective view of an assembled food tray.

FIG. 2 is an exploded sectional view showing the components making up the compartment for foods normally served at an elevated temperature.

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 1.

FIG. 4 is a sectional view taken on the line 4—4 of FIG. 1.

FIG. 5 is a perspective view showing the novel carrier rack with a plurality of food trays assembled therein.

FIG. 6 is a fragmentary perspective view of the novel oven or heating chamber, containing a plurality of vertically disposed heating plates therein.

FIG. 7 shows the carrier rack and plurality of food trays disposed within the oven.

FIG. 8 is a vertical sectional view, taken on the line 8—8 of FIG. 7, and shows electrical connections to the heating plates and the manner in which an insulative air curtain is created between different compartments of the food trays.

FIG. 9 is a vertical sectional view, taken on the line 9—9 of FIG. 8.

FIG. 10 is an enlarged sectional view of the food compartment containing the heated portion of the meal.

FIG. 11 is a perspective view showing a stewardess removing the food tray from the oven and adding the beverage to complete the assembly of the food tray.

Referring to the drawings in detail, an assembled food tray, generally indicated by the numeral 10, includes a first compartment comprised of a dessert section 12, an appetizer section 13, a salad section 14, a beverage section 15, a utensil section 16 and a roll section 17. The tray 10 also includes a second compartment comprised of an entree container 18 which includes a meat section 20 and vegetable sections 21 and 22. The first compartment may be molded in one piece from a thermoset plastic material while the second compartment or entree container 18 is formed of heat-conductive material such as metal foil or sheet.

The container 18 is of a size to fit within a recess 24 and is comprised of an inner tray 26, an outer tray 27 and a lid 28. Inner tray 26 is comprised of a bottom panel 30, upstanding sidewalls 31 and an outwardly extending shoulder 33. Inner tray 27 includes a bottom panel 35, and upstanding sidewalls 36 which terminate at a shoulder support surface 37 for supporting shoulder 33 of the inner tray 26.

As is shown in FIGS. 2 and 3, the inner tray 26 is nested within the outer tray 27 such that the bottom panels 30 and 35 are spaced from each other to define a space 39 there between for containing ice, or water, used during the heating process. The shoulder 33 may be crimped, or sealed, to the support surface 37 on the upstanding sidewalls 36 of the outer tray 27. A series of openings or vents 41 are provided in the walls 31 of the inner tray 26 for allowing steam to enter the inner tray 26 during the heating process.

The recess or cut out portion 24 includes a shoulder support surface 43 such that shoulder 33 rests thereon and keeps the bottom panel 35 spaced upwardly from spaced bottom members or support surfaces 45. As is best shown in FIGS. 1 and 3, a gap 47 is provided between support surfaces 45 so that a heating plate (to be later described) can be placed into contact with the bottom 35 of container 18.

As is clearly shown in FIGS. 1-4, a plurality of air passageways 50 are located around the shoulder support 43 and recess or cutout portion 24 for allowing air to flow through passageways 50 and provide an insulative air curtain surrounding the container 18.

As is shown in FIGS. 5-8, a plurality of food trays 10 are stacked within a carrier rack 54 which is comprised of a top panel 56, a bottom panel 57 and side panels 58 which are connected together for forming a substantially rectangular carrying case provided with handles 59. The top panel 56 is provided with a central recessed portion 60 and a plurality of open slits 61 border the recessed portion 60 and provide vent means at the top portion of the carrier rack 54. Corresponding slits 61 are also formed in the bottom panel 57, as can be seen in FIG. 8.

The entire food tray, except for the beverage container is preassembled at a Food Preparation Center by placing the dessert, appetizer, salad, utensils, roll, and entree into the respective tray sections. It is envisioned that the containers for the various foods be disposable, as is the entree container 18 and the utensils. Preferably, the entree is frozen and a layer of ice is located within the space 39 between the inner tray 26 and outer tray 27 of the container 18. The preassembled food tray can then be stored, at refrigerated temperatures, in the carrier racks 54 for an indefinite time.

As is shown in FIGS. 5 and 6, the carrier rack 54 is provided with an upstanding lug 64 which cooperates with a guide slot 66, in an oven or heating chamber 68 to provide a hinge-slide arrangement. Carrier rack 54 and stacked food trays 10 are placed within oven 68 such that a plurality of heating plates 70 fit into the gaps 47 in the trays 10 and contact the bottom panel 35 of the outer tray 27.

Each of the heating plates 70 is connected to a respective temperature control knob 72 by individual sets of electric wires 74 to provide the capability of heating separate ones of the trays 10 to various temperatures depending upon the particular entree contained therein. As is readily apparent, the number of heating plates 70 actually used corresponds to the number of meals to be served; in this way, there is no waste of unused foods.

As is shown in FIGS. 6 and 8, the oven 68 has a bottom panel 76 which includes a plurality of air vents 78 which provide inlet ports for a flow of air which can be created by air pump 80. Air flows through the inlet port 78 upwardly through slits 61 in the bottom panel 57 of the carrier rack 54, and continues upwardly through the air passageways 50 in the stacked trays 10 for providing an insulative air curtain which separates the entree container 18 from the remaining sections of the tray. The flow of air continues upwardly through the slits 61 in the recessed portion 60 of the top panel 56 and is discharged through an outlet port 82. Alternatively, the flow of air through oven 68 can be created by drawing air therethrough, rather than blowing air therethrough, by placing the air pump above the outlet port 81.

When the oven door 84 is closed and the air pump 80 is operating, heating plates 70 are turned on by control knobs 72 and heat is transmitted to the entree within container 18. As is shown in FIGS. 9 and 10, ice, or water, within the space 39 is rapidly heated in order to heat the entree within the inner tray 26. Continued heating of the water creates a flow of steam which passes through the vents 41 into the inner tray 26 thereby aiding in heating the entree and, additionally, adding moisture thereto during the cooking, or heating, process.

As is shown in FIG. 11, after the heating process is completed, the stewardess removes the tray 10 by handling the unheated portions thereof and inserts the beverage container 90 into the beverage section 15. Garnishments may be added to the entree by removing the lid 28 from the entree container 18. The meal is now ready to be served to the passenger and the stewardess has been freed from the former time-consuming operations of assembling the tray during the flight.

After the passenger has finished the meal, the disposable containers and utensils can be placed into a compactor (not shown) and formed into a brickette for easy disposal at the next air terminal.

The empty trays 10, and beverage containers 90, may be reusable or may be disposable depending upon economics. If these items are disposable, all costs incident to washing and sterilizing thereof are avoided.

While the preferred apparatus and system have been described in connection with feeding passengers on airlines, the invention is not limited thereto but has utility in all mass feeding situations and even for home consumption by individuals. It is apparent that the entree container 18 can be placed into contact with the heater element of a range, or stove, in the conventional home kitchen and the entree can be heated without raising the temperature of the foods in the other sections of the tray.

While preferred forms and arrangement of parts have been shown in illustrating the invention, it is to be clearly understood that various changes in details and arrangement of parts and various changes in operative steps of the system may be made without departing from the spirit and scope of the invention.

I claim:

1. A food tray comprising first compartment means for containing chilled foods and second compartment means for containing heated foods, said second compartment means comprising a container constructed of material which conducts heat more readily than the material forming said first compartment means, said container comprising an outer tray and an inner tray in nested relationship such that the bottom of said inner tray is spaced from the bottom of said outer tray

2. A food tray as defined in claim 1 wherein said first compartment means includes a plurality of separated sections for separating chilled foods from each other, and said second compartment means includes a plurality of separated sections for separating heated foods from each other.

3. A food tray as defined in claim 1 including insulating means for thermally segregating said first compartment means from said second compartment means, said insulating means being comprised of air passageway means extending vertically through said tray between said first and second compartment means for permitting an air curtain to be developed therebetween.

4. A food tray as defined in claim 1 wherein said first compartment means has a shoulder support means defining a cutout portion, said second compartment means being comprised of a container of a size to fit within said cutout portion, and shoulder means on said container overlying said shoulder support means.

5. A food tray as defined in claim 1 wherein said first compartment means includes horizontally spaced bottom members defining support surfaces and a gap therebetween, said second compartment means having a bottom surface, located above said gap and between said spaced bottom members.

6. A food tray as defined in claim 1 wherein said tray includes recess means for removably receiving said second compartment means therein.

7. A food tray as defined in claim 6 including insulating means for thermally segregating said first compartment means from said second compartment means, said insulating means being comprised of air passageway means extending vertically through said tray between said first and second compartment means for permitting an air curtain to be developed therebetween.

8. A food tray comprising first compartment means for containing chilled foods and second compartment means for containing heated foods, and insulating means for thermally segregating said first compartment means from said second compartment means, said second compartment means comprising a container constructed of material which conducts heat more readily than the material forming said first compartment means, said container comprising an outer tray and an

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inner tray in nested relationship such that the bottom of said inner tray is spaced from the bottom of said outer tray.

9. A food tray as defined in claim 8 wherein said inner tray

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includes vent means communicating with the space between the bottom of said inner tray and the bottom of said outer tray, and lid means for closing the top of said inner tray.

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