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Futch

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[54] **APPARATUS AND METHOD FOR USE IN ASSEMBLING FOOD ON TRAYS**

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Related U.S. Patent Documents

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Appl. No.: **512,001**
Filed: **Oct. 4, 1974**

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[52] **U.S. Cl.** ..... **186/1 D;** 108/22; 312/250

[58] **Field of Search** ..... 312/236, 250, 268; 198/181; 186/1 TA, 127; 53/390; 108/22, 137, 140

[56] **References Cited**

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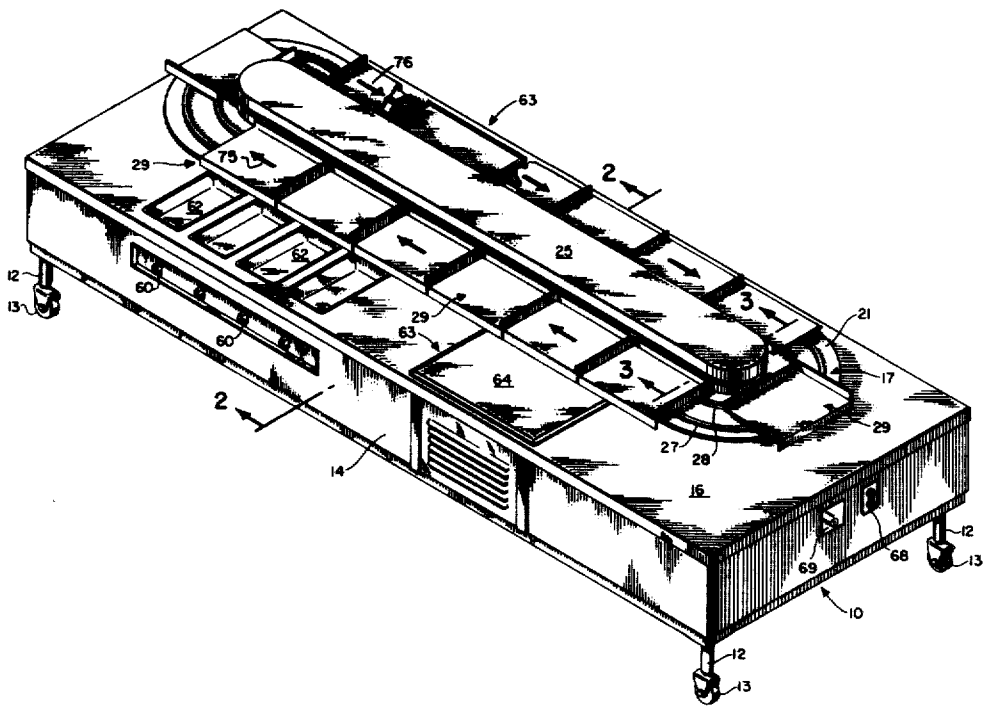
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[57] **ABSTRACT**

An apparatus for use in assembling hot and cold food portions onto moving trays. The apparatus includes a generally rectangular cabinet section which may be mounted on casters for portability. The top surface of the cabinet is provided with a plurality of hot food wells and frost plates adjacent each of its longitudinally extending sides. Mounted centrally on the top of the cabinet and extending upwardly therefrom is a tray conveyer assembly. Food trays carried by continuously rotating tray carriers mounted on the conveyer assembly pass in front of attendants who place the required portions of hot and/or cold food upon the trays.

17 Claims, 6 Drawing Figures



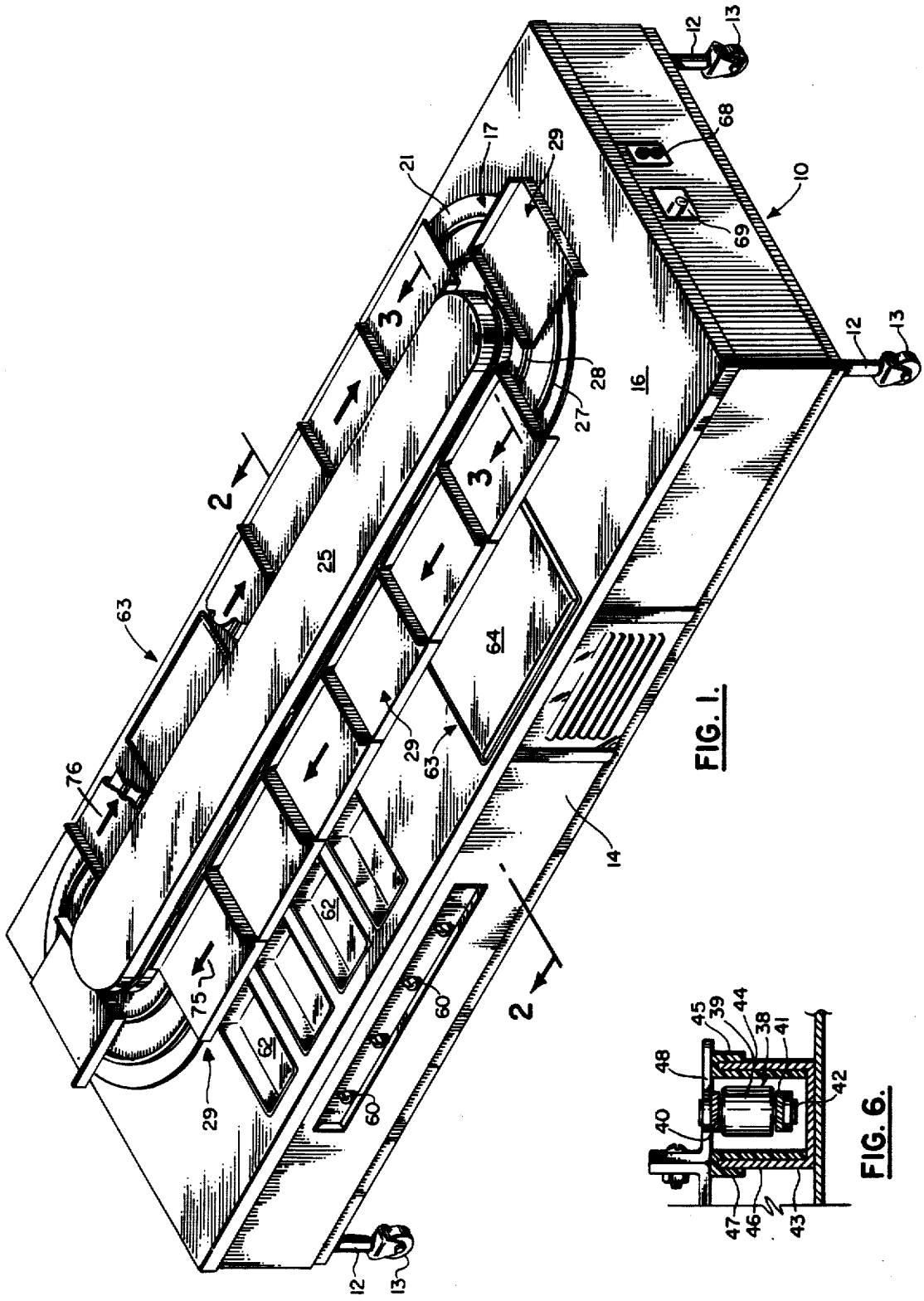

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FIG. 1.

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FIG. 6.

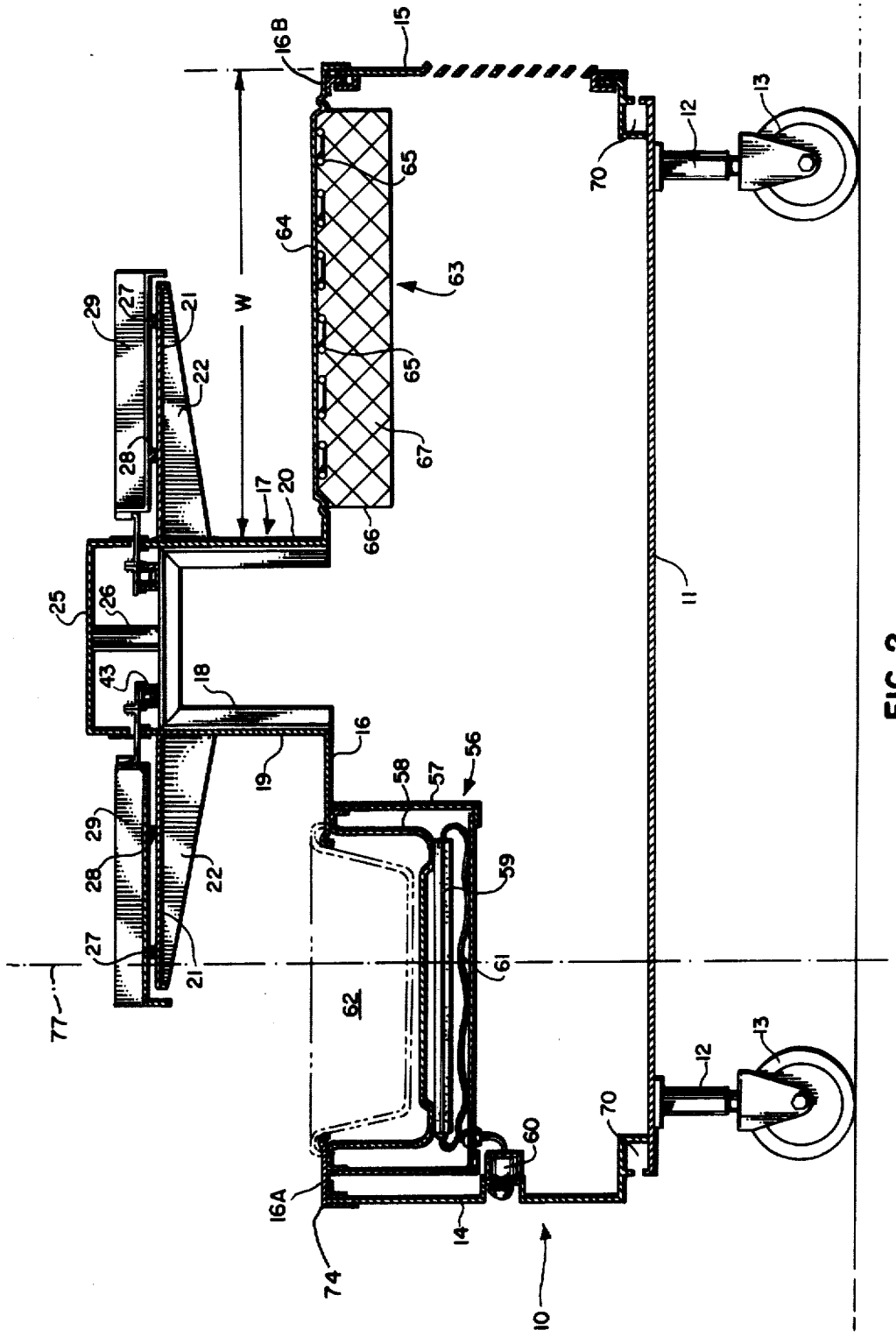

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FIG. 2.

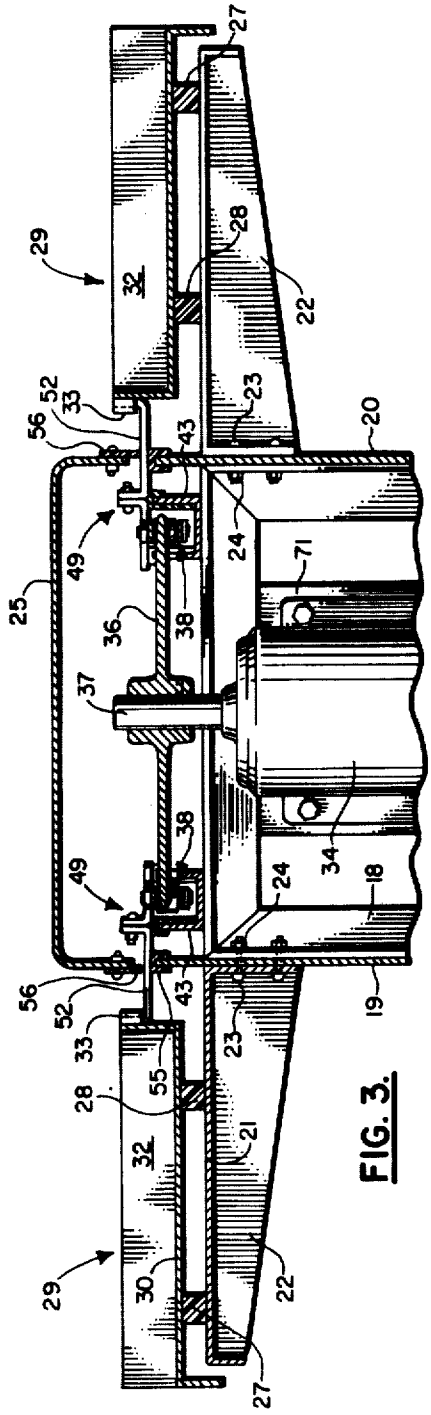


FIG. 3.

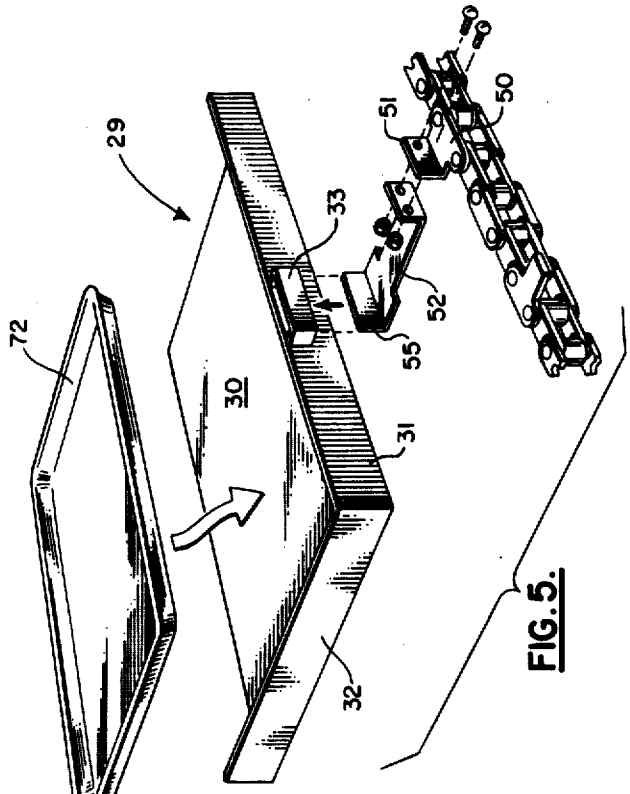


FIG. 5.

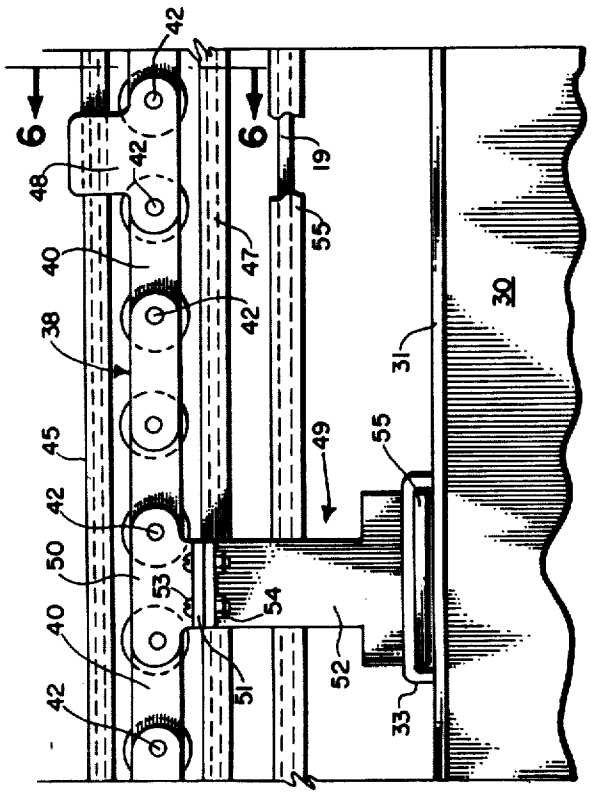


FIG. 4.

APPARATUS AND METHOD FOR USE IN ASSEMBLING FOOD ON TRAYS

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an apparatus for use in assemblying individual food portions on service trays which are to be transported to a remote location. 2. Description of the Prior Art

The pre-preparation of food trays containing hot and cold food portions, together with the necessary eating and drinking utensils, is routinely carried out in institutions such as hospitals, rest homes and in commercial kitchens for meal preparation for airlines. Various systems for food assembly have been devised for use in the above places. However, most of the systems are permanent and fixed in place and are thus quite expensive and do not provide for very much flexibility in floor space utilization and/or modification of the food assemblying procedure. The most frequently used tray assembly system in hospitals has been the straight line conveyer used in conjunction with hot and cold food counters arranged perpendicularly to the conveyer that requires a large amount of floor space which is extremely costly in commercial kitchens. In some previous food assembly systems, the fixed hot food wells and cold trays are set in permanent counter installations wherein a conveyer belt runs parallel to the counter on the side opposite where the food attendant stands, thus requiring them to reach across the hot pans and cold plates to place food portions on the trays as they move past the attendants. While the prior art has recognized the advantage of having a portable system for meal assembly, the layout of the systems have been conventionally the same as those utilized in fixed installations. More recent mobile or portable food assembly systems have utilized a conveyer assembly carrying the trays around the peripheral portion of the cabinet and have the bulk food containers or pans mounted on shelves positioned inwardly of the tray conveyer. Such an arrangement requires the attendants to reach across the trays and place the individual food portions thereon. Additionally, the bulk food pans must be put in place and removed when empty across the top of the conveyer carrying the food trays, thus requiring the food attendants to move out of position during the placement of the bulk foods. The system also suffers another disadvantage in that contamination can occur from foreign material that may drop from the underside of the bulk food receptacles as they are moved in and out across the tray conveyor assembly.

Therefore, it can be seen that there is a need in the food service industry for a compact, unitary food assembly system that occupies a small amount of floor space, that preferably is readily movable from one location to another, and that provides convenience and cleanliness in assemblying the various food portions onto serving trays.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an apparatus for use in assemblying individual food portions on trays, which apparatus is compact, efficient and entirely self-contained.

It is another object of the present invention to provide an apparatus for use in assemblying individual food portions on trays wherein the food can be placed on the trays conveniently by the attendant.

It is still another object of the present invention to provide an apparatus for use in assemblying individual food portions on trays wherein the trays are elevated above the surface of the bulk foods storage portion of the apparatus.

The foregoing and other objects of the present invention are realized in an apparatus for making up serving trays with food portions which includes a cabinet assembly having a length greater than its width. An elongated tray conveyer assembly is centrally and longitudinally positioned on the top surface of the cabinet and extends upwardly therefrom. The tray conveyer assembly is provided with means located adjacent its upper end for moving a plurality of the serving trays in a closed path. The top surface of the cabinet is provided with means on each of its longitudinally extending side portions for accommodating a plurality of bulk or individually portioned food containers for placement of individual portions on each of the serving trays by an attendant.

BRIEF DESCRIPTION OF THE DRAWING

The preferred embodiment of this invention, including the tray conveyer system and a bulk food holding assembly, will be more readily understood by the following detailed description when taken in conjunction with the following drawings:

FIG. **1** is an elevational, perspective view of an apparatus for use in assemblying individual food portions on serving trays constructed in accordance with the present invention;

FIG. **2** is an enlarged, transverse cross section of the apparatus of FIG. **1** taken along line **2—2**;

FIG. **3** is an enlarged, cross-sectional view of the tray conveyer assembly portion of the apparatus of FIG. **1** taken along line **3—3**;

FIG. **4** is an enlarged, plan, broken view of a portion of the tray conveyer assembly of FIG. **3** showing the conveyer chains and guides;

FIG. **5** is an exploded, perspective, elevational view of a portion of the tray conveyer apparatus showing the drive chain, tray conveyer coupling means, tray conveyer and serving tray; and

FIG. **6** is a cross-sectional view of a portion of the chain conveyer taken along line **6—6** of FIG. **4**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. **1** and **2**, the apparatus of the present invention for use in assemblying food portions on serving trays includes a generally elongated, rectangular cabinet, designated generally by the numeral **10**. The cabinet includes a base **11** which may be supported above the floor level and made portable by means of downwardly extending, tubular support members **12** which receive casters **13**. While only four tubular supports and casters are shown, one in each corner, it is understood that any number of supports and casters

may be utilized to provide the necessary support and mobility for the food assembly apparatus. A left sidewall member **14** and a right sidewall member **15** are attached to the base **11** by any suitable means, e.g. welding, bolting, and support top wall **16** of the cabinet. The supports and casters may be omitted if it is desired to utilize the apparatus as a permanent installation. The base **11** may rest directly on the floor and sidewalls **14** and **15** lengthened to raise the top surface of the cabinet to a convenient height.

A tray conveyer assembly, designated generally by the numeral **17**, is centrally positioned on the top surface **16** of the cabinet **10** and extends upwardly therefrom and longitudinally substantially the full length of the cabinet. *The counter top surface 16, which is stationary relative to tray carriers 29, includes a first section 16A and a second section 16B, both sections 16A and 16B being of an extended, generally linear length and being parallel one to the other, see FIGS. 1 and 2.* The tray conveyer assembly includes a plurality of spaced apart, inverted, U-shaped support brackets **18** having their ends attached to the under bracing (not shown) of the top surface **16** of the cabinet and extending upwardly therefrom. Attached to the support brackets are the left tray conveyer wall **19** and the right conveyer wall **20**. The walls may be attached to the support brackets by any suitable means, e.g., screws, nuts and bolts, or welding. A continuous, endless, elliptical shelf **21** extends outwardly from the sidewalls **19** and **20** adjacent their upper ends and is supported by means of braces **22** which are preferably attached to the sidewalls **19** and **20** and to the support brackets **18** by means of bolts **23** and nuts **24** as may be seen in FIG. **3**. The removable top cover **25** of the conveyer assembly is supported over the sidewalls **19** and **20** by means of a plurality of vertical support members **26** resting at their lower ends on top of support brackets **18**.

A pair of spaced apart, continuous, generally rectangularly shaped runners or slides **27** and **28** are mounted on the top surface of shelf **21** and slidingly support a plurality of tray carriers, designated generally the numeral **29**[.], *in a generally horizontal position.* Each tray carrier **29** includes a bottom wall **30**, an upturned back wall **31** and one upturned end wall **32**. Each tray carrier back wall **31** has attached thereto a generally U-shaped, outwardly projecting bracket member **33**. Each tray carrier supports and conveys a food serving tray **72** as seen in FIG. **5**. *Note that each tray carrier 29 extends over a counter top section 16A or 16B from adjacent one edge (the inner edge 73) thereof toward, but not beyond, the other edge (the outer edge 74) thereof, see FIG. 2. More particularly, each tray carrier 29 extends over a counter top section 16A or 16B to adjacent the median longitudinal plane 77 of that counter top section, thereby exending over no more than about one half the width W of the counter top section (i.e., the inner half), and leaving the remaining or outer half of the counter top section with no tray carrier thereabove, see FIG. 2.*

As seen in FIG. **3**, the tray conveyer assembly includes an electric, variable speed, drive motor **34** which is mounted on a support plate **71** which is attached to one of the brackets **18** adjacent one end of the tray conveyor assembly. Sprocket **36** is mounted on drive motor shaft **37** for rotation therewith. Sprocket **36** engages one end of an endless drive chain assembly **38** which travels the length of the tray conveyor housing. *The closed loop drive chain 38 cooperates with the tray carriers 29, since all tray carriers are attached thereto, to establish a closed loop of tray carriers having a first run (indicated by arrows 75) over and above the first counter top section 16A and a second run (indicated by arrows 76) over and above the second counter top section, see FIG. 2.* As seen more clearly in FIGS. **4** and **6**, the drive chain assembly **38** includes a plurality of rollers **39** coupled together by means of top links **40** and bottom links **41** carried by coupling pins **42** extending through axial openings (not shown) in the rollers **39**. Chain drive **38** is received in a generally U-shaped, endless, elliptical track **43** which is fixed to the top surface of the brackets **18** and extends the entire length of the tray conveyer assembly **17**. As seen more clearly in FIG. **6**, the right sidewall **44** of the track has a generally U-shaped slide cap **45** which is received over its top end. The left sidewall **46** of the track is provided with a like slide cap **47**. The inner walls of both of the slide caps **45** and **47** extend over the entire length of the inner surface of the sidewalls **44** and **46**. It will be understood that at the end of the tray conveyer assembly opposite the motor there is provided an idler sprocket (not shown) which engages the end of the chain drive opposite the drive motor. The mounting mechanism of the sprocket is adjustable for taking up slack of the chain caused by stretching of the chain. The inner wall **44** of the track is cut away at each end of the track to permit the sprockets to engage the ends of the drive chain **38**.

At periodic intervals on the drive chain assembly **38**, there is provided generally T-shaped support guides **48** having one end coupled to the chain by means of the pins **42**—**42** and the other end slidably abutting the top of slide cap **45** on the track **43**. These support guides hold the chain freely suspended within the guide track **43**, thus minimizing frictional contact of the lower end of the chain drive assembly with the track **43**. At intervals which are determined by the length of the tray support **29**, there is attached to the chain a plurality of tray carrier drive brackets generally designated **49**. As seen in FIG. **5**, each bracket includes a rear section **50** which is coupled to the drive chain assembly **38** by means of the pins **42**—**42** and which has an upturned end **51** coupled to bracket extension member **52** by means of bolts **53** and nuts **54**. Bracket extension member **52** has an upturned outer end **55** which is received in the slot provided in the bracket **33** on the tray carrier **29**[.] *thereby establishing a detachable coupler that permits each of the tray carriers 29 to be easily uncoupled from and then recoupled to the drive chain 38.* Thus when the conveyer chain moves within the chain guide **43**, the tray drive bracket **49** coupled each tray carrier **29** to the drive chain thereby moving it in the direction of the arrows shown in FIG. **1** over the shelf **21** slidingly supported on the runners or slides **27** and **28**. It is preferred that the runners **27** and **28** be made of a very low friction material preferably Teflon or other fluorinated thermoplastic material. Additionally, the slide caps and linings **45** and **47** for the chain track should be made of similar materials. As seen in FIGS. **3** and **4**, bracket extension member **52** extends through a space provided between the downturned ends of the top wall of the conveyer assembly and the sidewalls **17** and **19** of the conveyer assembly. The upper ends of left sidewall **19** and right sidewall **17** are provided with a U-shaped slide cap **55** and the downturned walls of the top **25** are also provided with a flexible, depending band **56** which will narrow the opening between the sidewalls and the downturned ends of the top wall of the tray assembly.

Referring now to FIGS. 1 and 2, it can be seen that the top surface 16 of the cabinet is provided with *heating means in the form of* a plurality of hot wells, designated generally by the numeral 56. Each hot well includes a generally rectangular open top box structure 57 which is attached to the underside of the top surface 16 of the cabinet adjacent an opening therein. Each box encloses a water pan member 58 which has an electrical heating element 59 attached to the bottom thereof. Heating element 59 is connected to thermostat 60 by means of an electrical wiring 61 extended to wiring (not shown) in electrical raceway 70 provided on all sides of the cabinet. Each hot well 56 is adapted to receive a generally rectangular hot food pan 62 which is supported on its lip by the peripheral edge of the water pan member 58.

It is to be understood that a like member, or any number, of hot food wells and hot food pans are also provided on the right-hand side of the cabinet.

The top surface of the cabinet is also preferably provided on each side with *refrigerating means in the form of* one or more cold plate assemblies, designated generally 63. As seen in FIG. 2, each cold plate assembly includes a top metal cold surface 64 which is provided with a plurality of refrigerant runs 65 attached to its undersurface. A generally rectangular insulation box 66 is attached to the underside of the top surface 64 of the cold plate adjacent its periphery and is filled with insulation 67 to minimize refrigeration loss. The required number of standard refrigerations units (not shown) are located within the cabinet 10 and are connected by suitable means (not shown) to the cold plates 63. Wiring (not shown) from the refrigeration units and controls are extending to electrical raceway 70.

Start-stop control 67 for the variable speed drive unit on the tray conveyer is located on both ends of the cabinet. A locked door 69 is also provided at each end of the cabinet and provides access to a suitable conveyer motor speed control (not shown) for the tray conveyer drive motor 34. Cabinet 10 is equipped with electrical outlets (not shown) located in electrical raceway 70 for auxiliary equipment such as toasters, heated plate dispensers, etc. All wiring for hot food wells 56, cold plates 63 and receptacles for auxiliary equipment (not shown) is extended through electrical raceway 70 to an electrical panel box with approximately sized circuit breakers (not shown) connected to a cord and plug (not shown) for a single electrical connection to a building receptacle.

Prior to the intended utilization of the apparatus of the present invention, the electrical lead (not shown) furnishing the main power to the assembly will be plugged into the proper receptacle, the refrigeration units activated for the cold plates and the heater units activated for the hot food wells. If wet heat is desired in some of the hot food wells, water will be placed in the containers 58 and allowed to come to the proper temperature. Hot foods will be delivered from the preparation area in the hot food pans 62, *i.e., bulk food containers,* which are placed in the hot food wells 56. Predished cold foods such as salads, ice cream, etc. will be placed in appropriate containers, *i.e., individual food containers,* and positioned on the cold plates 64. The portions of the top walls 16 of the cabinet 10 which do not include hot food wells 56 and cold plates 63 will accommodate food items that do not require heating or cooling. Thus flexibility is built into cabinet 10 to allow for rearrangement of hot food wells 56 and cold plates 64 to best suit the needs of the user. Serving attendants will then take their positions around the entire perimeter of the cabinet. One attendant positioned at the forward end of the apparatus will place a food serving tray 72, which may contain the eating utensils and condiments and other accessories, on each of the tray carriers 29 as each of the carriers passes in front of her position. The supervisor will have adjusted the tray conveyer speed control in order to convey the tray carriers 29 around the shelf 21 at the desired speed [.] *prior to transferring of individual food portions, which are in a stationary position, from the counter top surface 16 onto the serving trays 72.* As each serving tray passes each attendant, the attendant places thereon the *different individual* food portion for which they are responsible [.] *by removing that portion from said counter top surfare 16 and then lifting up that portion onto the tray on the elevated tray carrier 29, see FIG. 2.* Each serving tray continues on around the tray support assembly until it reaches the edge of the right-hand forward end of the assembly where it will be removed by an attendant and placed in a suitable transport container (not shown) for conveyance to the hospital patient or forwarding to the airline in case of air flight food perparation.

From the foregoing, it can be seen that the apparatus for use in food assembly of the present invention provides a portable, compact, versatile, economic and efficient unit which is readily adapted for rapid assembly of individual food portions onto serving trays. The arrangement of the tray conveyer assembly above the middle center surface of the cabinet provides easy loading of the individually served portions [on] *of different foods from different locations on the counter top surface 16 onto* each serving tray by each attendant as it passes the attendant's position. Contamination of the food by any other food which is being served is minimized by the serving trays being in the elevated position where no foreign matter or other food particles will fall into the individual serving trays. It is preferred that the apparatus be constructed of stainless steel, at least in its exterior portion, in order that it may be corrosion proof and may be easily cleaned and maintained in a sanitary condition. If desired, however, the tray carriers 29 may be made from a suitable thermoplastic material which is capable of being sterilized.

While there has been described and illustrated a preferred embodiment of my invention, and several modifications have been indicated, it is to be understood that various further changes and modifications may be made therein by those skilled in the art without departing from the broad principle and intent of this invention.

What is claimed is:

1. A device for use in making up serving trays with food portions comprising:

a. a cabinet assembly having two spaced apart, longitudinally extending, generally flat top counter surfaces;

b. a hollow, narrow, elongated, serving tray conveyer assembly centrally and longitudinally fixedly positioned between said two top surfaces and extending upwardly a substantial distance therefrom,

i. said tray conveyer assembly having end and sidewalls extending upwardly from said top surface, a continuous shelf projecting outwardly from said end and sidewalls adjacent their upper ends, a plurality of tray support means supported by said shelf for movement thereover, and means located in the upper portion of said tray con-

veyer assembly for moving said plurality of tray support means around a closed path; and

c. each of said two top surfaces of said cabinet providing means for accommodating a plurality of bulk or individually portioned food containers for placement of individual portions on each of said serving trays by an attendant.

2. The device of claim 1 wherein said tray support moving means includes a rotatable wheel mounted within said conveyer assembly at each end thereof, drive means for driving one of said wheels, an endless, flexible drive member connected to each of said wheels, a plurality of spaced apart tray support drive brackets attached to said flexible drive member and extending transversely through an endless opening in the sides and ends of said housing, and coupling means on each of said tray supports for attaching thereto one of said drive brackets.

3. The device of claim 1 wherein at least one low friction slide member is mounted on the top surface of said shelf and extending completely therearound to slidingly support said plurality of tray support means.

4. The device of claim 1 including readily detachable means for coupling said tray support means to said flexible drive member.

5. The device of claim 2 wherein said wheels are sprockets and said flexible drive member is a drive chain assembly, which assembly is carried by a generally U-shaped, endless, elliptical track which is carried by said sidewalls of said conveyer assembly.

6. The device of claim 5 wherein said drive chain assembly includes a plurality of spaced apart, transversly extending tray carrier drive brackets and support guide, each being coupled at one end to said drive chain and being slidably supported by the upper end of one of the sidewalls of said U-shaped track.

7. The device of claim 6 wherein said upper end of each of the track sidewalls is provided with a slide cap of low friction material.

8. The device of claim 5 wherein said U-shaped track inner walls are covered by a layer of low friction material.

9. A device for use in making up serving trays with food portions comprising:

a. an elongated, generally rectangular cabinet having [tow] *two* spaced apart, longitudinally extending, generally flat, top counter surfaces with a plurality of openings therein;

b. a hot food well or a cold plate assembly received in each of said plurality of openings provided in each of said two top surfaces;

c. an elongated, generally rectangular tray conveyer assembly positioned between and fixedly connected at its base to said two top surfaces and extending upwardly therefrom and terminating inwardly from the ends of said cabinet,

i. said tray conveyer assembly including a hollow housing having opposed sidewalls and end walls having a continuous shelf projecting freely outwardly from the upper end of said housing and supported by a plurality of brackets attached to said side and end walls,

ii. a plurality of tray carriers slidingly supported by said shelf, and

iii. a tray carrier drive assembly mounted within said hollow housing adjacent its upper end, said drive assembly including an endless drive chain carried by a pair of sprockets, one sprocket positioned at each end of said housing, one of said sprockets having a variable speed drive motor coupled thereto, said drive chain being connected to each of said tray carriers by a drive bracket extending transversely through a continuous opening provided in said hollow housing above the level of said shelf.

10. The device of claim 9 including a removable top cover for said hollow housing, said top cover having downturned sidewalls terminating above said hollow housing sidewalls to provide space therebetween for projection of said drive brackets therethrough.

11. Apparatus for use in assembling individual food portions on serving trays, said apparatus comprising

first and second sections of an extended length counter top surface, said counter top surface being adapted to accommodate at least one of bulk food and individual food containers in a stationary position thereon prior to transferring of individual food portions from said counter top surface onto said serving trays,

a plurality of tray carriers with each tray carrier extending generally horizontally over one of said counter top sections from adjacent one side edge thereof toward but not beyond the other side edge thereof, each tray carrier being elevated above said counter surface a distance ther permits an attendant to remove an individual food portion from said counter top section beneath said tray carrier and then to lift up that individual food portion onto a serving tray positioned on said elevated tray carrier, said tray carriers being connected together in a closed loop, and said closed loop of tray carriers being positioned to provide a first run of tray carriers above said first counter top section and a second run of tray carriers above said second counter top section, and

drive means connected with said tray carriers, said drive means being adapted to move said elevated tray carriers through said closed loop over and above said first counter top section, and then over and above said second counter top section, while at least one attendant lifts up individual food portions from said counter top surface and assembles those individual food portions of said elevated serving trays.

12. Apparatus as set forth in Claim 11, including

a shelf disposed beneath said closed loop of tray carriers, said shelf being adapted to support said tray carriers in the generally horizontal position as said tray carriers are moved through said loop by said drive means. drive means.

13. Apparatus as set forth in claim 12, including

a low friction slide fixed to at least one of said tray carriers and said shelf, said slide supporting said tray carriers on said shelf, thereby permitting said tray carriers to slide easily over said shelf as said tray carriers are moved through said closed loop.

14. Apparatus as set forth in claim 12, said drive means including

a flexible drive member to which said tray carriers are connected, said flexible drive member cooperating with said tray carriers to define said closed loop of tray carriers, and

a detachable coupler connecting each tray carrier to said flexible drive member, said detachable coupler permitting each of said tray carriers to be easily uncoupled from and then recoupled to said flexible drive member as desired.

15. Apparatus as set forth in claim 11, each of said tray carriers within each run of said closed loop extending over

a counter top section from adjacent one edge of said counter top section to adjacent the median plane of said counter top section, thereby extending over no more than about one half the width of said counter top section and leaving the remaining half of said counter top section with no tray carrier thereabove.

16. Apparatus as set forth in claim 11, said counter top surface including

heating means in one counter top section adapted to keep food in a heated condition, and

each of said tray carriers extending at least partially over said heating means.

17. Apparatus as set forth in claim 11, said counter top surface including

refrigerating means in one counter top section adapted to keep food in a chilled condition, and each of said tray carriers extending at least partially over said refrigerating means.

* * * * *