Oct. 6, 1964 H. P. HARLE ETAL 3,151,472

HOUSEHOLD REFRIGERATOR

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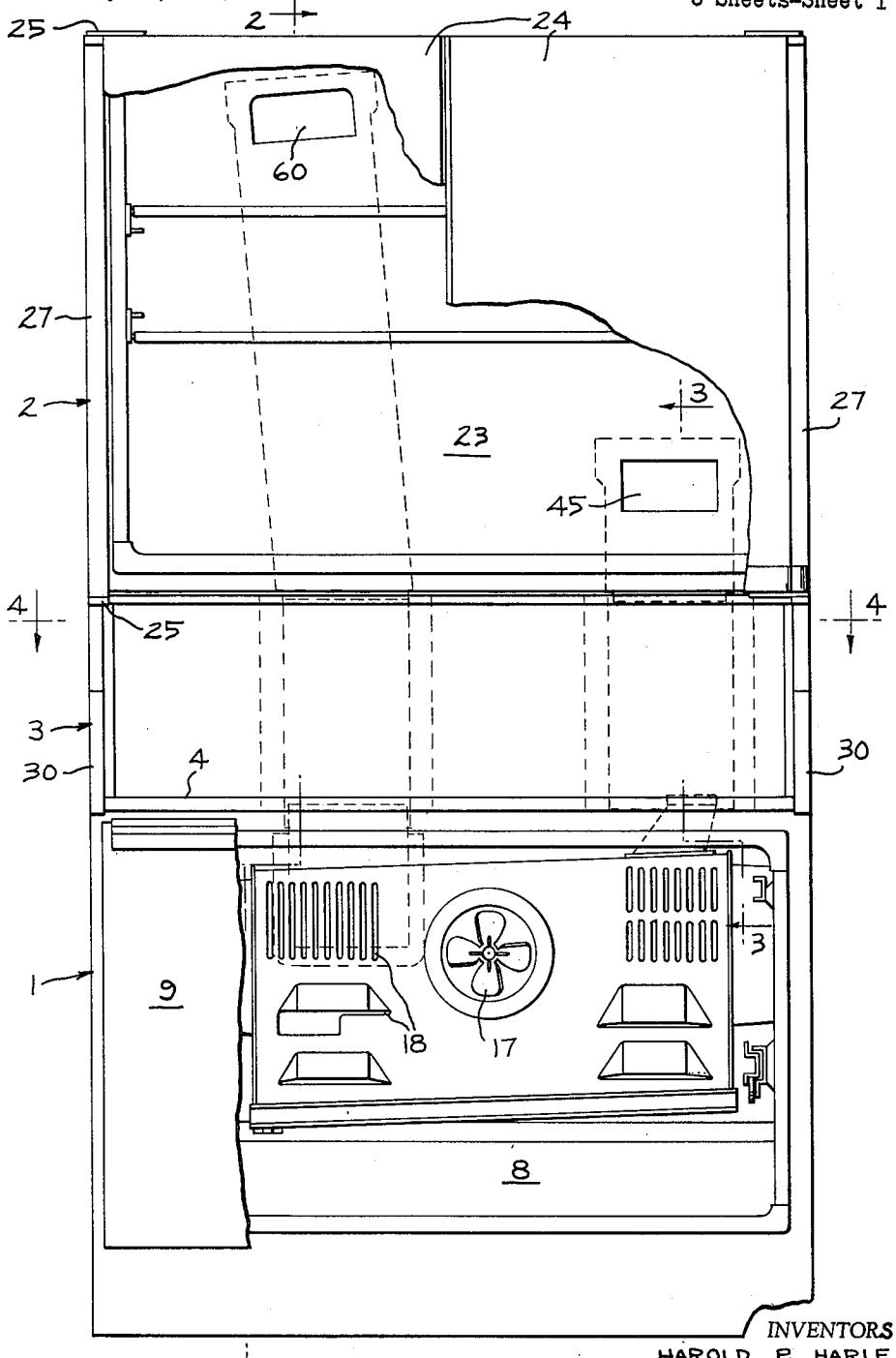


FIG. 1

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FIG. 2

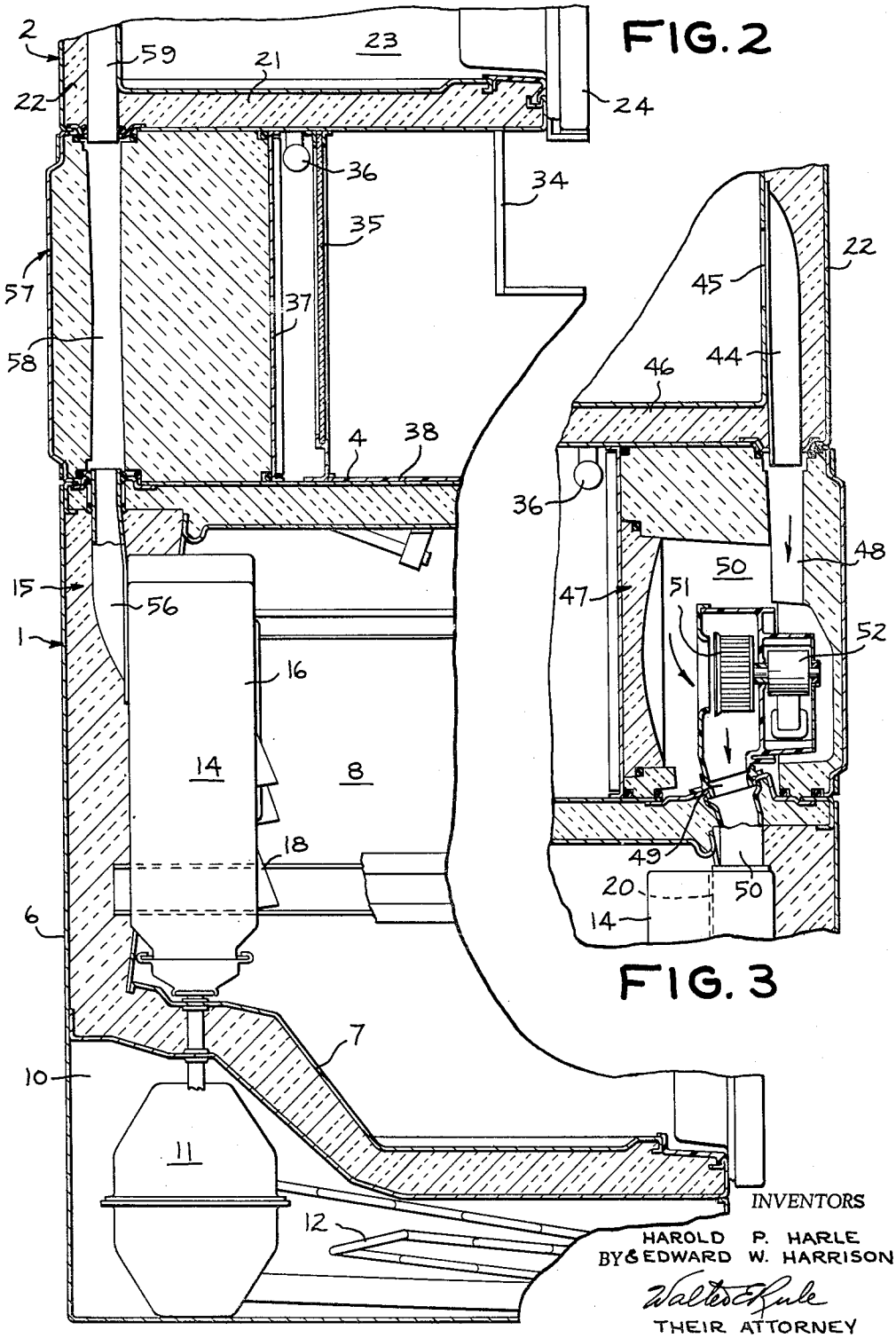


FIG. 3

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FIG. 4

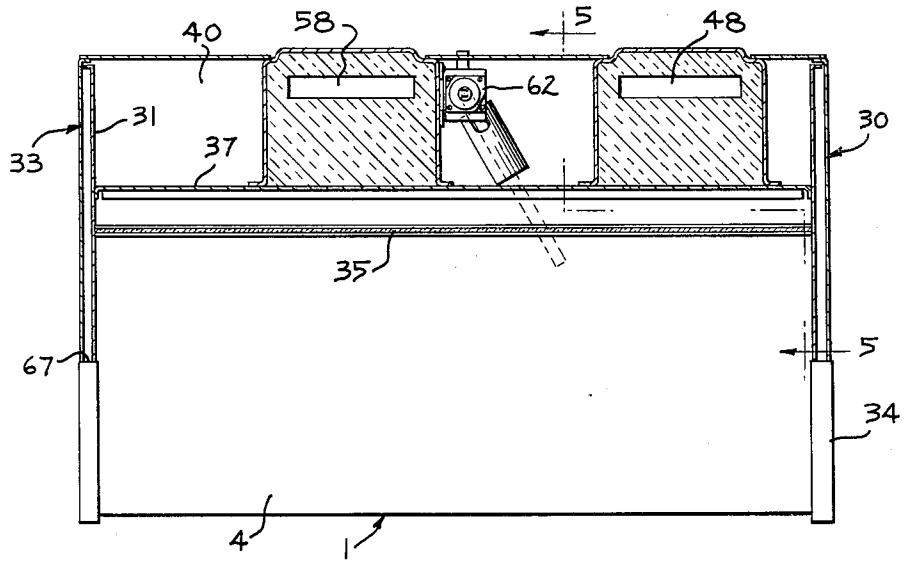
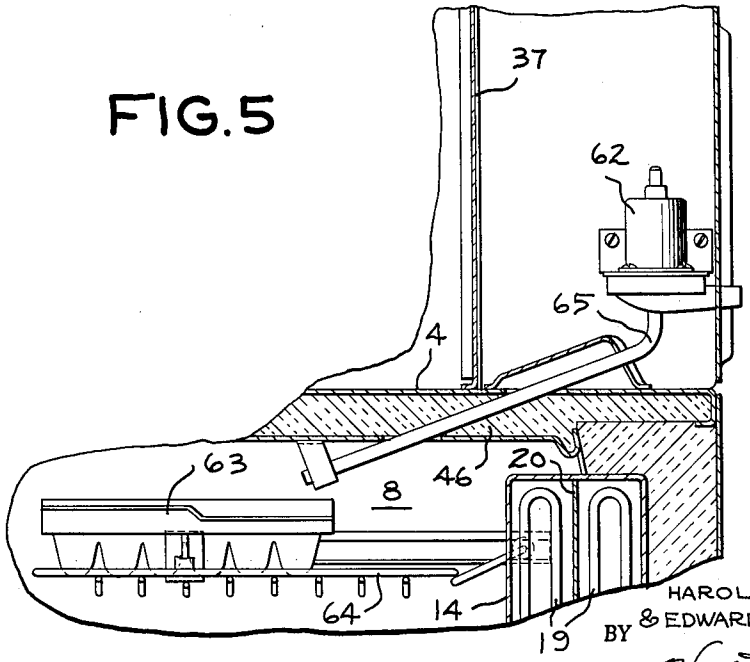


FIG. 5



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HOUSEHOLD REFRIGERATOR

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Filed July 22, 1963, Ser. No. 296,527
4 Claims. (Cl. 62—391)

The present invention relates to household refrigerators and is more particularly concerned with a refrigerator cabinet comprising a base section having a counter top work surface, an upper section at eye level and an intermediate unrefrigerated section supporting the upper section on the base section.

An object of the present invention is to provide a refrigerator cabinet of the aforementioned type of improved construction.

Another object of the invention is to provide a refrigerator cabinet of this type including three basic sections which can be separately manufactured and subsequently fastened together into the form of a complete refrigerator.

Further objects and features of the present invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

In accordance with the preferred form of the present invention, there is provided a refrigerator cabinet comprising a base or counter section including a freezer compartment and a machinery compartment and an upper or eye level section containing a fresh food storage compartment. The upper section is supported on the base section by means of an unrefrigerated intermediate section which is set back from the forward edges of both the base section and the upper section to provide a counter top or work area of substantial dimensions. In addition to supporting the upper section on the base section, this intermediate section includes duct and fan means for circulating air from a single evaporator contained in the base section through the upper fresh food compartment.

For a better understanding of the invention, reference may be had to the accompanying drawing in which:

FIGURE 1 is a front elevational view, partly in section, of a refrigerator cabinet of the present invention;

FIGURE 2 is an enlarged sectional view taken generally along line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged sectional view taken generally along line 3—3 of FIGURE 1;

FIGURE 4 is a sectional view taken generally along line 4—4 of FIGURE 1; and

FIGURE 5 is a sectional view taken generally along line 5—5 of FIGURE 4.

With reference to the drawing, there is shown in FIGURE 1 a refrigerator cabinet including a base section 1 having the general shape of a kitchen base or counter type cabinet, an upper section 2 having the general shape of a kitchen wall cabinet and an intermediate unrefrigerated section 3 which is set back from the forward edges or faces of both the base and upper sections 1 and 2 to provide a flat countertop or work area 4 of substantial area on the front top surface of the base section 1.

The lower or base section 1 comprises an outer shell 6 and a liner 7 spaced from the shell 6 with the space between the shell and liner being filled with suitable heat insulation. The liner 7 defines a freezer storage compartment 8 in the upper portion of the base section 1, the access opening to which is closed by means of a drawer front 9 forming part of a drawer structure (not shown) for the storage of frozen foods in the freezer compartment 8. A machinery compartment 10 is provided in the lower portion of the base section 1 for containing a refrigerant condensing unit including a compressor 11 and a condenser 12. The compressor 11 and condenser 12 form part of a refrigerating system including a single evaporator 14 for providing refrigeration for both storage compartments.

The evaporator structure 14 is disposed along the rear wall 15 of the freezer compartment 8 and includes a housing 16 containing a serpentine evaporator 19 (FIGURE 5) including front and rear sections divided by a partition 20. A fan 17 circulates air from the freezer compartment 8 over the front evaporator section in the housing 14, the cooled air flowing out of the housing 16 through a plurality of louvers 18 and 19 provided on the front wall of the housing. For a more detailed description of the evaporator structure, reference may be had to Patent 3,050,955—Solley et al. issued August 28, 1962 and assigned to the same assignee as the present invention.

The upper section 2 comprises insulated walls including a bottom wall 21 and a rear wall 22 defining a fresh food storage compartment 23 for the storage of fresh or unfrozen foods. The access opening at the front of the storage compartment 23 is closed by a pair of doors 24 supported by pivot hinges 25 on the upper and lower ends of the side walls 27.

The base section 1 and the upper section 2 of the refrigerator are specifically designed to be separately manufactured or preassembled and thereafter assembled to form a unitary structure in which the upper section 2 is supported on and in spaced relationship with the lower section 1 by means of an intermediate unrefrigerated section 3.

To this end, the intermediate section 3 comprises opposed L-shaped vertical side members 30 for supporting the side edges of the upper section 2 on the side edges of the base section 1. More specifically, as shown in FIGURE 4 of the drawing these side members 3 comprise an inner sheet metal member 31 having upper and lower flanges secured as for example by means of metal screws 32 to the base and upper sections 1 and 2 and an outer decorative sheet metal compartment 33. The forward and top edge portions of the members 30 which are not in direct engagement with the upper section of the cabinet are covered by means of trim strips 34. More specifically, while the lower edges of the member 30 extend the full depth of the base section 1, the upper edges terminate short of the front of the upper cabinet section 2 as shown in FIGURE 2 of the drawing so that the trim strips 34 are employed to cover the exposed front and top edges of these members.

The vertical side members 30 are braced in vertical alignment by means of a transverse member 37 suitably secured to the side members 30 rearwardly from the front edges of the lower and upper sections 1 and 2 and also in spaced relation with the rear edge of the base section 1. In front of the transverse member 37, there is provided a decorative wall member 35 of a translucent material such as glass or a suitable plastic material and this member is spaced a sufficient distance from the transverse member 37 to provide room for a fluorescent light 36. The illumination provided by the light 36 through the decorative member 35 illuminates the countertop area 4 ahead of the member 35. The countertop area 4 ahead of member 35 may be covered by any suitable work surface 38 such as a plastic sheet material or the like.

The space 40 rearwardly from the transverse member 37 contains portions of the cooling system and other components of the refrigerator which are desirably disposed outside of either of the refrigerated compartments 8 and 23. In this connection, the upper compartment 23 is cooled by means of air circulated in heat exchange relationship with the rear portion of the evaporator pro-

vided in the freezer compartment 8 and to this end there are provided a plurality of passages and ducts in certain of the insulated walls of the lower and upper compartments 1 and 2 and between these compartments. More specifically, there are provided in the rear wall 22 of the upper compartment an air return passage 44 having an inlet 45 communicating with the lower portion of the fresh food storage compartment 23 and an outlet opening through the insulated bottom wall 46 of the upper section 1. A removable duct structure 47, including an inlet passage 48 and an outlet passage 49 is provided between the upper section 2 and the lower section 1 and the outlet passage 49 communicates with an air passage 50 in the base section which is connected to the evaporator housing 16.

The duct 47 includes an enlarged portion 50 containing a fan 51 and a fan motor 52 arranged within the duct structure 47 and completely supported thereby in such a manner that the fan withdraws air from the compartment 23 through the duct 44 and the passage 48 and discharges the air downwardly through the passage 50 in the lower section of the cabinet into the evaporator structure 14. This air flows into the evaporator housing rearwardly from the partition 20 and after passing over the rear section of the evaporator is returned to the fresh food compartment through an air passage 56 provided in the insulated rear wall of the lower section 1 and a second duct structure 57 containing an air passage 58 and an air passage 59 provided in the rear wall of the upper section 2 and having an outlet 60 opening into the compartment 23 adjacent the top thereof.

Thus during normal operation or refrigerating operation of the refrigerator, air from the fresh food compartment 23 is circulated through the evaporator structure 14 and back to that compartment by means of the fan 51 while air from the freezer compartment 8 is circulated through the evaporator structure and back to that compartment by means of the fan 17.

The ducts 47 and 57 provided in the intermediate section of the cabinet are separable from that cabinet so that they can be preassembled and placed in the desired positions during assembly of the base and upper sections 1 and 2.

The illustrated embodiment of the invention also includes a solenoid operated water supply valve 62 for automatically supplying water to one or more freezing trays 63 provided on a shelf portion 64 forming part of the drawer structure provided in the freezer compartment 8. The supply line 65 from the valve 62 extends downwardly through the insulated wall 46 into the compartment 8 to a point immediately above the trays 63 when they are in their recessed position, that is, when the drawer is closed. For further details concerning the structure and the operation of an ice service of this type reference is made to Harle Patent 3,089,312 issued May 14, 1963 and assigned to the same assignee as the present invention.

Preferably, the height of the base section 1 is such that the countertop or work area 4 is at a height somewhat less than the height of the usual kitchen base cabinet while the shoulder or ledge 67 forming part of the vertical side members 30 forwardly from the face of the upper cabinet section 2 are at approximately the same height as the average kitchen base cabinet. By this structure, the refrigerator cabinet of the present invention blends into the usual kitchen cabinet arrangement regardless of the particular height of the other storage cabinets provided in the kitchen. In other words, no attempt is made to match exactly the height of the other storage base cabinets but rather the matching problem is avoided by having the work surface area 4 of the refrigerator cabinet somewhat below the usual counter height and the shoulders 67 at about the same height. The particular advantage of this design is that it permits the upper section 2 or more specifically the compartment 23 contained therein to be positioned at eye level height while at the same time providing sufficient distance between the lower base section 1 and the upper section 2 to provide full use of the countertop area 4. In other words, the vertical side members 30 can be of sufficient height so that milk bottles or the like normally stored in a refrigerator can be placed on the counter area 4 without interfering with the opening or closing movement of the door 24.

While three has been shown and described a particular embodiment of the present invention it will be understood that the invention is not limited thereto but is intended by the appended claims to cover all modifications within the true spirit and scope of the invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. A refrigerator cabinet comprising:

(*a*) a base section including insulated rear, side, bottom and top walls defining a freezer compartment, an evaporator structure disposed in said freezer compartment adjacent said rear wall, supply and return air passages in the insulated rear wall of said base section extending from said evaporator structure to the top surface of said base section,

(*b*) an upper section including rear and bottom insulated walls defining a fresh food compartment, an air supply passage in the rear wall of said upper section having an inlet in the bottom wall of said section and an outlet opening into said fresh food compartment, an air return passage having its inlet opening into the lower portion of said fresh food compartment and an outlet opening in the bottom wall of said upper section,

(*c*) an intermediate unrefrigerated section including vertical side members supporting the lower side edges of said upper section on the upper side edges of said lower section, a transverse member extending between said side members intermediate the front and rear edges of said base section and defining with said side members a countertop area on the top of said base section forwardly from said transverse member and a second area rearwardly from said transverse member,

(*d*) a first insulated duct in said second area connecting said air supply passages in said base and upper sections, a second insulated duct connecting said return air passages in said base and upper sections, and a fan disposed in and supported on one of said ducts for circulating air from said fresh food compartment through said evaporator structure.

2. A refrigerator cabinet comprising:

(*a*) a base section including insulated rear, side, bottom and top walls defining a freezer compartment in the upper portion thereof, a condensing unit compartment in the lower portion of said base section, an evaporator structure disposed in said freezer compartment adjacent said rear wall, supply and return air passages in the insulated rear wall of said base section extending from said evaporator structure to the top surface of said base section, a freezing tray in the upper portion of said freezer compartment,

(*b*) an upper section including rear and bottom insulated walls defining a fresh food compartment, an air supply passage in the rear insulated wall of said upper section having an inlet opening in the bottom wall of said section and an outlet opening into the upper portion of said fresh food compartment, an air return passage having its inlet opening into the lower portion of said fresh food compartment and an outlet opening in the bottom wall of said upper section,

(*c*) an intermediate unrefrigerated section including L-shaped vertical side members supporting the lower side edge of said upper section on the upper side edges of said lower section, a transverse member ex-

tending between said side members and defining with said side members, a countertop area on the top surface of said base section forwardly from said transverse member and a second area rearwardly from said transverse member,

(*d*) a first insulated duct between said base and upper sections connecting said supply passages in said base and upper sections, a second insulated duct connecting said return air passages in said base and upper sections, a fan disposed in and supported on one of said ducts for circulating air from said fresh food compartment through said evaporator structure,

(*e*) water supply means including a valve supported on one of said ducts and a supply line extending through the top wall of said base section,

(*f*) said ducts and water supply means being disposed in said second area.

3. A refrigerator cabinet comprising:

(*a*) a base section adapted to rest on the floor including insulated rear, side, bottom and top walls defining a freezer compartment in the upper portion thereof, a condensing unit compartment in the lower portion of said base section, an evaporator structure disposed in said freezer compartment adjacent said rear wall, supply and return air passages in the insulated rear wall of said base section extending from said evaporator structure to the top surface of said base section,

(*b*) an upper section including rear and bottom insulated walls defining a fresh food compartment, an air supply passage in the rear insulated wall of said upper section having an inlet opening in the bottom wall of said section and an outlet opening into the upper portion of said fresh food compartment, an air return passage having its inlet opening into the lower portion of said fresh food compartment and an outlet opening in the bottom wall of said upper section,

(*c*) an intermediate unrefrigerated section including vertical side members supporting the lower side edge of said upper section on the upper side edges of said lower section, a transverse member extending between said side members rearwardly from the front edge of said base section and defining with said side members a countertop area on the top surface of said base section and a second area behind said transverse member,

(*d*) ducts in said second area including a first insulated duct between said base and upper sections connecting said supply passages in said base and upper sections, and a second insulated duct connecting said air return passages in said base and upper sections, a fan disposed in and supported on one of said ducts for circulating air from said fresh food compartment through said evaporator structure,

(*e*) a translucent wall member extending between said side members in front of and spaced from said transverse member, and a source of light in the area between said translucent wall member and said transverse member for illuminating said countertop area.

4. A refrigerator cabinet comprising:

(*a*) a base section including insulated rear, side, bottom and top walls defining a freezer compartment in the upper portion thereof, a condensing unit compartment in the lower portion of said base section, an evaporator structure disposed in said freezer compartment adjacent said rear wall, supply and return air passages in the insulated rear wall of said base section extending from said evaporator structure to the top surface of said base section, a freezing tray in the upper portion of said freezer compartment,

(*b*) an upper section including rear and bottom insulated walls defining a fresh food compartment, an air supply passage in the rear wall of said upper section having an inlet in the bottom wall of said section and an outlet opening into the upper portion of said fresh food compartment, an air return passage having its inlet opening into the lower portion of said fresh food compartment and an outlet opening in the bottom wall of said upper section,

(*c*) an intermediate unrefrigerated section including L-shaped vertical side members supporting the lower side edges of said upper section on the upper side edges of said lower section, a transverse member extending between said side members intermediate the front and rear edges of said base section and defining with said side members a countertop area on the top of said base section forwardly from said transverse member and a second area rearwardly from said transverse member,

(*d*) a first insulated duct in said second area between said base and upper sections connecting said supply passages in said base and upper sections, a second insulated duct in said second area connecting said air return passages in said base and upper sections, a fan disposed in and supported on one of said ducts for circulating air from said fresh food compartment through said evaporator structure,

(*e*) water supply means for supplying water to said tray including a flow control valve supported on one of said ducts and a supply line extending through the top wall of said base section,

(*f*) a translucent wall member extending between said side members in front of and spaced from said transverse member, and a source of light in the area between said translucent wall member and said transverse member for illuminating said countertop area.

References Cited in the file of this patent

UNITED STATES PATENTS

2,328,130	Earle	Aug. 31, 1943
2,708,350	Earle	May 17, 1955
2,961,851	Ehrenfreund	Nov. 29, 1961
3,050,955	Solley	Aug. 28, 1962