

Aug. 10, 1965

L. H. FOSTER ETAL

3,199,579

HEATING AND COOLING FOOD STORAGE CABINET

Filed Feb. 11, 1960

3 Sheets-Sheet 1

Fig. 1

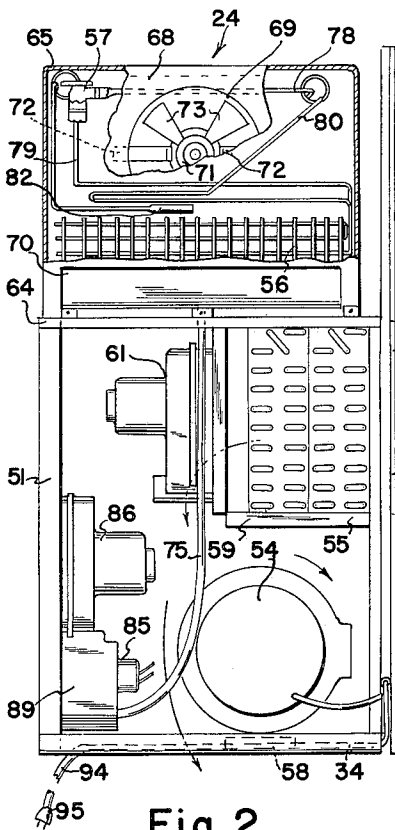
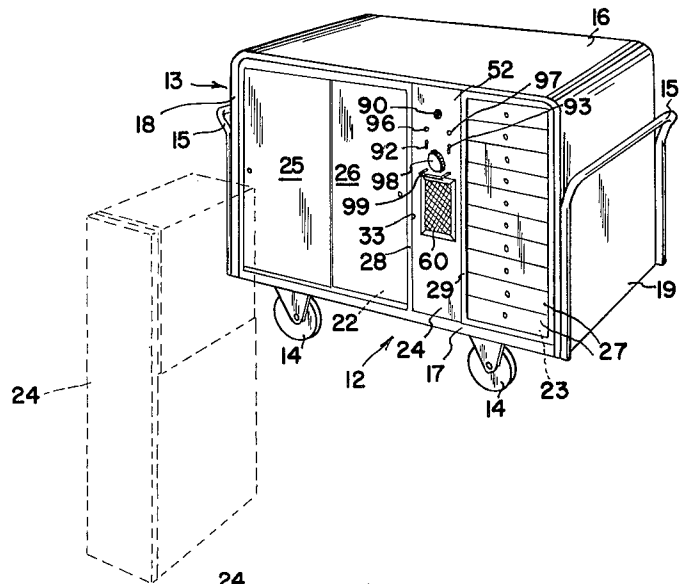


Fig. 2

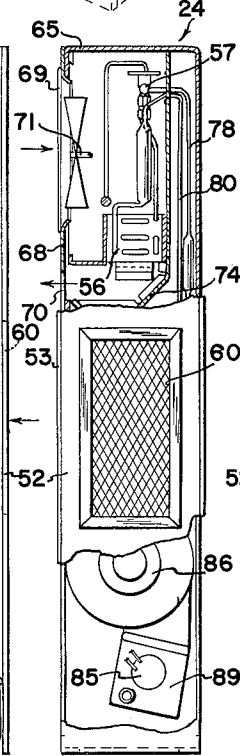


Fig. 3

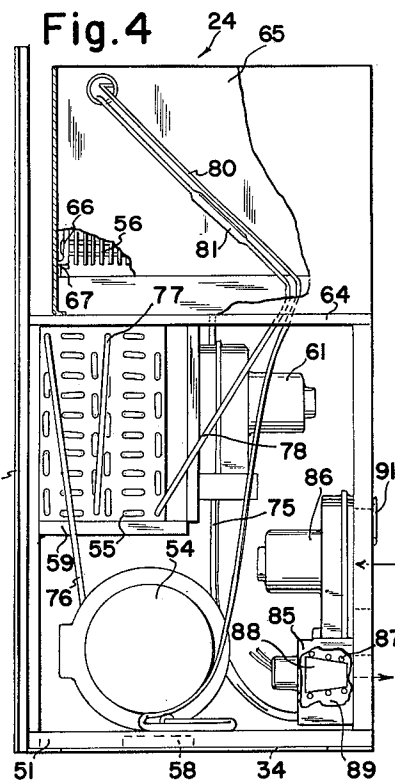


Fig. 4

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Fig. 5

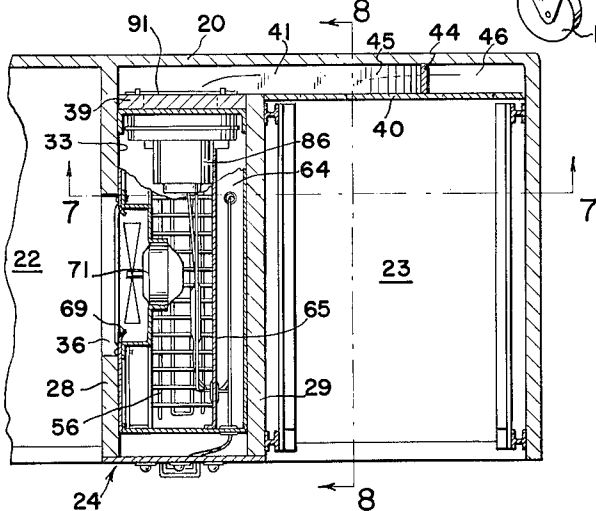
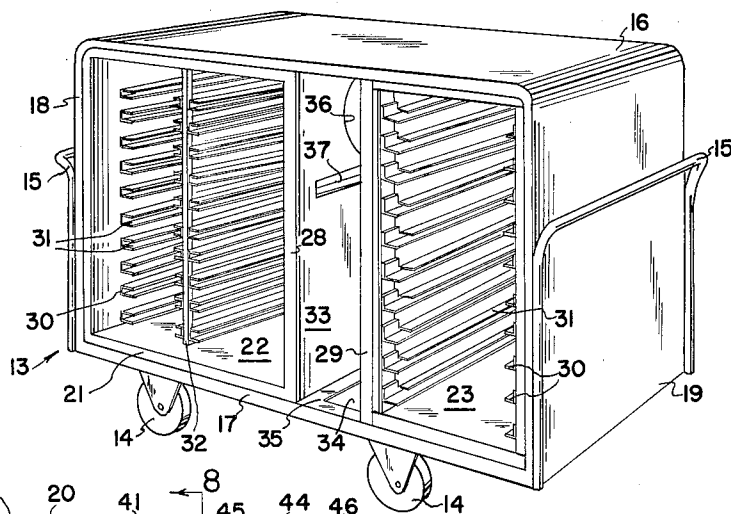


Fig. 6

Fig. 7

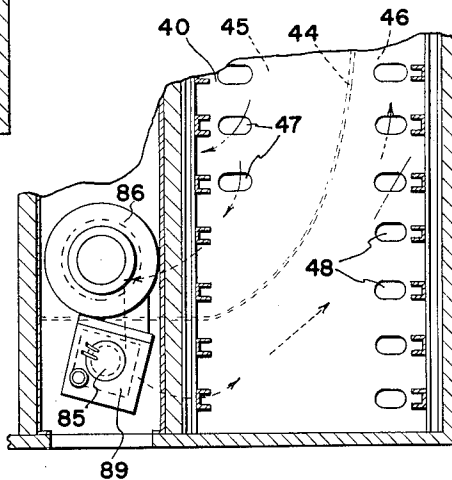
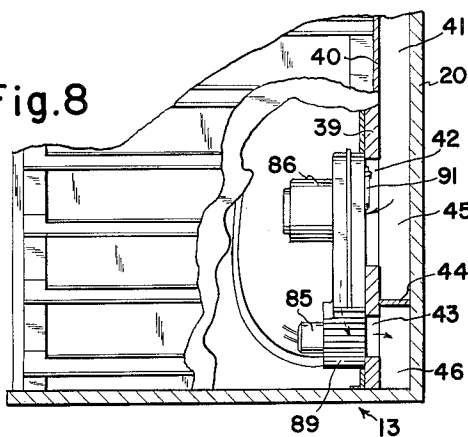


Fig. 8



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3 Sheets-Sheet 3

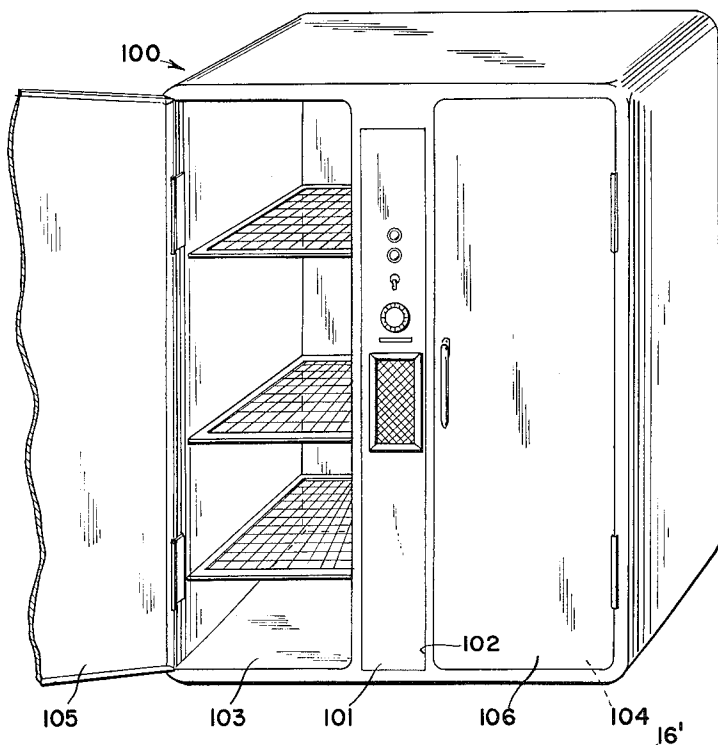


Fig. 9

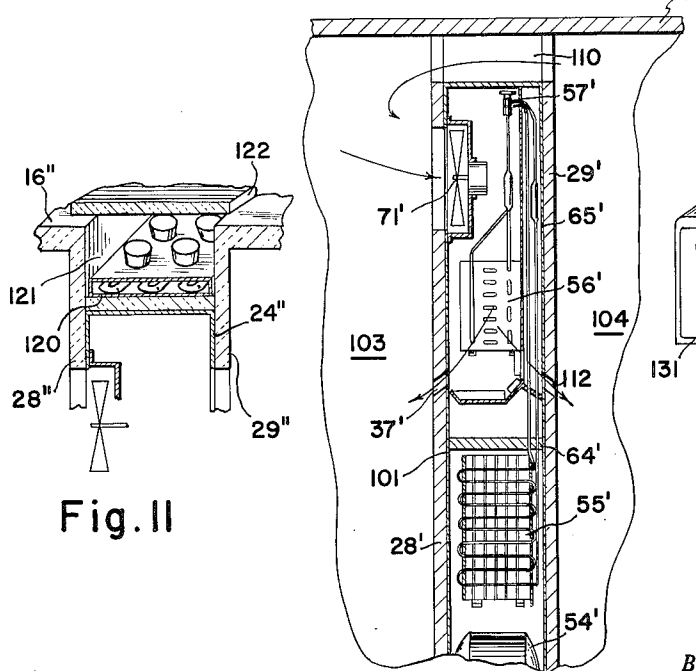


Fig. 10

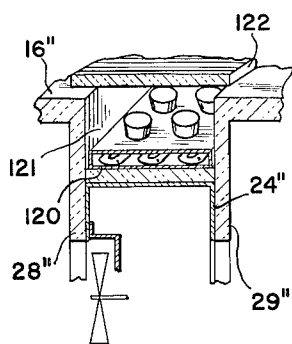


Fig. 11

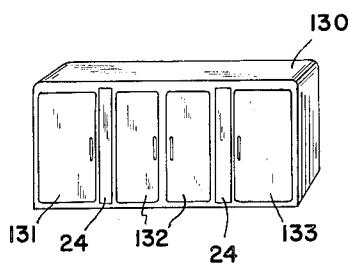


Fig. 12

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HEATING AND COOLING FOOD STORAGE CABINET

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Filed Feb. 11, 1960, Ser. No. 8,155
7 Claims. (Cl. 165—48)

The present invention relates to refrigerators and the like for storing perishable food products.

Conventional refrigerators comprise a cabinet having a food storage compartment and a machine compartment either under, over or at the rear of the food storage compartment. In older types of refrigerators the evaporator and condensing unit of the refrigeration system are separately mounted in the food storage and machine compartments and then connected by refrigerant lines for delivering liquid refrigerant to and refrigerant vapor from the evaporator. In the more modern refrigerators the mechanical refrigeration system is mounted in the cabinet as a self-contained unit and connected to the cabinet by fasteners.

In both types of constructions, the replacement of the mechanical refrigeration system is a difficult and time consuming operation. With the older types of refrigerators, the refrigerant must be pumped from the evaporator into the condenser, the lines between the condensing unit and evaporator disconnected and the evaporator and condensing unit separately detached from the food storage space and machine compartment, respectively. In the more modern constructions, the refrigerator must be moved from its location, turned back to front to provide access to the fastenings and provide a space for withdrawing the unit and the fastenings removed from the rear and base of the cabinet. Also, the sealing mastic between the window in the cabinet and the evaporator usually has hardened and presents a problem in breaking the seal therebetween. Furthermore, the elements of the refrigeration units are so constructed and spaced from each other to adapt them to fit into the cabinet that the units themselves require a considerable space. In addition, the shape of the elements is not compatible with the shape of the cabinet to produce a food storage space of the desired shape so that considerable waste space exists between the unit and walls of the cabinet. This necessarily results in a decrease in the space available in the food storage compartment.

One of the objects of the present invention is to provide a thin vertically arranged, self-contained and hermetically sealed refrigeration system unattached to the cabinet to adapt it to freely slide into and out of a cabinet through a slot in the front thereof.

Another object is to provide a refrigerator of the type indicated in which the slidably mounted refrigeration unit or plurality of modular units commensurate with the size of the cabinet and refrigeration capacity required divides the interior of the cabinet into a plurality of separate food storage compartments.

Another object is to provide a quickly removable refrigeration unit of the type indicated which extends from the front to the back of the cabinet and has its elements arranged one over the other in a compact and lightweight assembly.

Another object is to provide a self-contained refrigeration unit in a refrigeration cabinet so arranged that air in one or more food storage compartments at the sides of the unit may be circulated over the evaporator and a stream of outside air may be circulated over the condenser of the unit.

Another object is to provide a food storage apparatus

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in which a vertically arranged mullion unit or plurality of modular units divides the interior of the cabinet into separate food storage compartments and is adapted to refrigerate one compartment and heat the other compartment.

Another object is to provide a food storage apparatus in the form of a cart for transporting food products from one location to another, such as from the kitchen to the individual rooms of a hospital, hotel or the like.

Still another object is to provide a food storage apparatus of the type indicated which is of an extremely simple, compact and lightweight construction, economical to manufacture, reliable in operation and one which facilitates the replacement of the refrigeration and/or heating unit.

These and other objects will become more apparent from the following description and drawings in which like reference characters denote like parts throughout the several views. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawing:

FIGURE 1 is a perspective view of a hospital cart incorporating the present invention and showing a mullion refrigerating unit which slides into and out of the cabinet through a slot in the front thereof;

FIGURE 2 is a side elevational view partly in section of one side of the removable mullion unit and showing the path through which outside air is circulated over the condenser and compressor;

FIGURE 3 is a front elevational view of the unit partly in section and showing the passage in the unit for circulating air in one compartment over the evaporator;

FIGURE 4 is a side elevational view of the other side of the unit partly in section and showing the passage in the unit for circulating air from another compartment over a heater;

FIGURE 5 is a perspective view of the hospital cart with the mullion unit and doors removed to show the separate compartments and racks therein;

FIGURE 6 is a sectional plan view through one of the compartments and removable mullion unit;

FIGURE 7 is a sectional view taken on line 7—7 of FIGURE 6 to show the passage in the cabinet cooperating with the passage in the unit for circulating air in one compartment through the heater in the unit;

FIGURE 8 is a sectional view taken on line 8—8 of FIGURE 6 to show the fan and heater casing of the unit cooperating with the passages in the cabinet;

FIGURE 9 is a perspective view of a refrigerator incorporating a mullion type refrigeration unit of the present invention;

FIGURE 10 is a sectional view of the unit in FIGURE 9 in front elevation to show the paths through which air in each of the compartments is circulated over the evaporator;

FIGURE 11 is a sectional view showing a refrigerator and mullion unit of modified construction having a freezing plate in a compartment for ice cream or other ices; and

FIGURE 12 is a perspective view of a cabinet having a plurality of mullion refrigerating units.

While the improvement of the present invention may be used in a refrigerator having a single food storage compartment, it is particularly adapted for use in a cabinet having a plurality of compartments, which both may be refrigerated, or in which one compartment may be refrigerated while the other compartment is heated. In FIGURE 1, the invention is shown applied to a cart 12 for use in hospitals, hotels or the like, to transport both refrigerated

and hot meals to patients or guests in rooms remote from the kitchen.

As shown in FIGURES 1 and 5, the hospital cart 12 comprises a cabinet 13 having casters 14 and handles 15 at each end for pushing the cart to any desired location. Cabinet 13 has an insulated top wall 16, bottom wall 17, end walls 18 and 19, back wall 20 and an open front 21. The cabinet 13 is divided into separate food storage compartments 22 and 23 by a removable mullion unit 24, later to be described in detail, and the front of compartment 22 is closed and opened by sliding doors 25 and 26 and the compartment 23 has a series of sliding drawers 27 adapted to be individually opened. In the illustrated embodiment, insulated walls 28 and 29 are provided at opposite sides of the mullion unit 24, but it will be understood that the mullion unit itself may constitute the division wall between the compartments 22 and 23. The mullion walls 28 and 29 and end walls 18 and 19 have racks 30 mounted thereon at the sides of the food storage compartments 22 and 23 and the racks are provided with guide tracks 31 for slidably mounting food trays in compartment 22 and the drawers 27 in compartment 23 for supporting trays. As shown in FIGURE 5, an additional rack frame 32 is provided in compartment 22 between the end wall 18 and mullion wall 28 and has tracks 31 on its opposite sides to provide two separate spaces for mounting food trays. In the particular cart 12 as illustrated, the tracks 31 in compartment 23 are adapted to slidably mount a single row of drawers 27 so that the opening of any one of the drawers will expose only a small portion of the cabinet to the ambient.

In accordance with the present invention, the spaced mullion walls 28 and 29 form a slot 33 therebetween which is open at the front of the cabinet 13, see FIGURE 5, and through which the mullion unit 24 may be slid into and out of the cabinet. The mullion unit 24 extends from the front to the back of cabinet 13 to divide its interior into the separate compartments 22 and 23. Mullion unit 24 mounts the elements of a refrigeration system and has partition walls for circulating air from at least one of the compartments over the evaporator to cool the air. Also, outside air flows through an opening in the front of the unit, over the condenser of the refrigeration unit and out through the bottom of the unit. In addition, the mullion unit may contain a heater and partition walls for circulating air in at least one compartment over the heater so that one compartment may be heated while the other is being refrigerated.

To this end, the bottom wall 17 of the cabinet 13 below the unit 24 is open as indicated at 34 and has a marginal frame 35 surrounding the opening. The marginal frame 35 supports the mullion unit 24 and provides tracks on which the unit may be slid into and out of the cabinet 13 as illustrated diagrammatically in FIGURE 1. The mullion wall 28 has a circular opening 36 therein and a rectangular slotted opening 37 below the circular opening through which air in compartment 22 may be circulated through the mullion unit 24. Air in the other compartment 23 also is circulated through the rear of the mullion unit 24. As shown in FIGURE 6, the mullion wall 29 terminates short of the rear wall 20 of the cabinet 13 and a false wall 39 extends between the mullion walls 28 and 29 to close the rearward end of the slot 33. Another false wall 40 extends between the rearward end of the mullion wall 29 and end wall 19 of the cabinet to provide a space 41 therebetween. As shown in FIGURE 8, the false wall 39 at the rear of the slot 33 has vertically spaced openings 42 and 43. The space 41 between the false walls 39, 40 and the rear wall 20 of the cabinet 13 is divided by a transverse partition 44, see FIGURES 6, 7 and 8, extending laterally between the vertically spaced openings 42 and 43 in the false wall 40 to separate the space into separate passageways 45 and 46. False wall 40 has a series of vertically spaced openings 47 and 48 at opposite sides of transverse partition 44 to provide com-

munication between the interior of the compartment 23 and the passageway 45 and between the compartment and passageway 46.

The mullion unit 24 is shown in detail in FIGURES 2, 3 and 4 and is in the nature of a drawer having a marginal angle iron frame 51 with a front panel 52 positioned flush with the door 26 and drawers 27 at the front of the cart. Preferably, a gasket 53 is provided at the marginal edge of the front panel 52 for sealing engagement with the edge of the slot 33. The mullion unit 24 mounts a compressor 54, a condenser 55, an evaporator 56 and a suitable metering device illustrated as an expansion valve 57, one over the other, from the bottom to the top of the unit as shown in FIGURE 2. Because of this arrangement of elements, the mullion unit 24 may have a very narrow width corresponding to the smallest dimension of the compressor 54. For example, with a cart 12 which is sixty-nine and three-quarter inches long, fifty inches high and twenty-nine inches deep, the width of the mullion unit is only eight inches. The compressor 54 is mounted on a narrow platform 58 at the bottom of the frame 51. The condenser 55 comprises a finned coil of a width corresponding to the width of the unit 24 and is mounted on a bracket 59 supported by the frame 51. The condenser 55 is positioned at the rear of a screened opening 60 in the front panel 52 with its fins parallel to the sides of the unit and a motor-fan unit 61 mounted at the rear of the condenser draws outside air through the screened opening over the condenser and between the fins and discharges the air vertically downwardly over the compressor 54. The air propelled by the motor-fan unit 61 passes through the open bottom of the frame 52 and opening 34 in the bottom wall of the cabinet 13.

The evaporator 56 is separated from the condenser 55 by a transverse wall 64 at the top of the frame which, in turn, supports a rectangular 65. Evaporator 56 also is in the form of a finned coil supported at each end by brackets 66 and 67 on the coil and walls of the casing 65. The side wall 68 of casing 65 adjacent the mullion wall 28 has a circular opening 69 and slotted opening 70 which align with the correspondingly shaped openings 36 and 37 in the mullion wall 28. A motor-fan unit 71 is mounted on the casing 65 by means of brackets 72 and has propelling blades 73 rotatable in the opening 69. Thus, the fan blades 73 of the motor-fan unit 71 draw air from the compartment 22, direct it over the evaporator coil 56 and returns it through the slotted opening 70 back to the compartment. Underlying the evaporator 56 is a drip pan 74 for collecting condensate and delivering the condensate through a pipe 75 to a heating element, later to be described. Thus, the condensate is vaporized by the heating element and delivered to the heated section of the cabinet to humidify the latter. The expansion valve 57 is mounted on the mullion unit 24 above the evaporator 56 and fan 71.

The compressor 54, condenser 55, evaporator 56 and expansion valve 57 are connected to provide a refrigerant circuit. As shown in FIGURES 2 to 4, the compressor 54 is connected to the top of one section of the condenser 55 by a line 76 for delivering refrigerant vapor thereto at high pressure and temperature. The bottom of the first section of the condenser 55 is connected to the top of the next section by a line 77 and the outlet from the bottom of the second section is connected through a refrigerant line 78 to the expansion valve 57. The expansion valve 57, in turn, is connected by a line 79 to one end of the evaporator coil 56 for delivering liquid refrigerant thereto. The outlet from the evaporator 56 is connected by another line 80 to the suction side of the compressor 54 to complete the refrigerant circuit. The line 78 includes a refrigerant drier 81 to prevent any moisture from entering the evaporator. The flow of liquid refrigerant to the evaporator 56 is controlled by a thermostatic expansion valve 57 having a bulb 82 in thermal contact with the suction line 80 from the evap-

orator 56. Thermostatically operated expansion valve 57 controls the flow of liquid refrigerant to the evaporator.

The mullion unit 24, in addition to mounting the elements of a refrigeration system, also mounts a heater 85 and fan 86 for circulating and heating the air in the compartment 23. As shown in FIGURE 4, the heater 85 is in the form of a coil of electric resistance wire 87 wound on a ceramic insulator 88. The heater 85 is mounted in a hollow casing forming a heating chamber 89 at the rear of the compressor 54. The motor-fan unit 86 is mounted on the frame 51 of the unit 24 above the heating chamber 89 with its outlet connected to the top of the chamber. The inlet to the motor-fan unit 86 and the open side of the heating chamber 89 are aligned with the vertically spaced openings 42 and 43 in the false wall 39 at the rear of the slot 33, see FIGURES 4 and 8. Thus, the motor-fan 86 will draw air in compartment 23 through the vertically spaced openings 47 in the false wall 40 into the passageway 45 and through the opening 42 into the fan 86. The fan 86 delivers the air into the heating chamber 89 where it is heated by heating element 85 and then out through opening 43 into the passageway 46 and the openings 48 in the false wall 40 into the compartment 23 to complete its circuit. A thermostat having a temperature responsive element 91 adjacent the inlet opening 42 to fan 86 controls the supply of current to the electric heater 85.

Control switches 92 and 93 are provided on the front panel 52 of the mullion unit 24 to control the operation of the refrigeration system and heater, respectively, and the supply of refrigerant to the evaporator 56 and current to the heater 85 are controlled by thermostats having temperature responsive bulbs 82 and 91, respectively. A flexible electric cord 94 is connected to the compressor 54, heater 85 and fans 61, 71 and 86 as controlled by the switches 92 and 93 and thermostats and has a detachable plug 95 for connection to an electric outlet box at different locations where the cart may be used. A light 90 is provided on the front panel 52 which indicates when the plug 95 is inserted in an electric outlet box and individual pilot lights 96 and 97 for each switch 92 and 93 indicates when the refrigeration system and heater are in operation, respectively. The front panel 52 of the unit 24 also mounts an adjustable dial element 98 for adjusting the thermostat for controlling heater 85 and a handle 99 to facilitate insertion and removal of the unit. One form of the invention having now been described in detail, the mode of operation is next explained.

For purposes of description, let it be assumed that the cart 12 is to be used in a hospital for serving both hot and cold meals to patients in different rooms and on different floors. The cart 12 is pushed to the kitchen area where the plug 95 at the end of the electric cord 94 is plugged into an electric outlet. At a period of time to serving the meals the control switches 92 and 93 on the front panel 52 of the mullion unit 24 are actuated to initiate operation of the compressor 54 of refrigeration system and heater 85 to refrigerate the compartment 22 and heat the compartment 23.

Upon actuation of the control switch 92, the compressor 54 supplies refrigerant vapor at relatively high pressure and temperature to condenser 55, see FIGURE 4. Motor-fan unit 61, initiated simultaneously with compressor 54, draws outside air through the screened opening 60 in the front panel 52 of the mullion unit 24 and over the condenser coil 55 and discharges the air over the compressor 54. The air for cooling the condenser 55 and compressor 54 is discharged through the open bottom of the frame 51 and opening 34 in the bottom of the cabinet 13. The air circulated by motor-fan unit 61 removes heat from the refrigerant in the condenser 55 and compressor 54 and liquifies the refrigerant.

The liquid refrigerant flows from condenser 55 through a line 78 and expansion valve 57 to the evaporator coil 56 as controlled by the thermostat bulb 82. The oppo-

site end of the evaporator coil 56 is connected by line 80 back to the compressor 54 to complete the refrigeration circuit and maintain the evaporator at a low temperature. Operation of the fan 71 is initiated by switch 92 which draws air from compartment 22 through the aligned circular openings 36 and 69 in the mullion wall 28 and casing wall 68 which flows in heat exchange relation with the evaporator 56 to cool the air and delivers it back to the compartment 22 through the aligned slotted openings 37 and 70. The cooled air then flows across the compartment 22 and between any trays mounted on the racks 30.

The closing of the control switch 93 supplies current to the electric heater 85 and initiates operation of the motor-fan unit 86. The fan 86 draws air from the compartment 23 through the vertically spaced openings 47 in the false wall 40 into the passageway 45, see FIGURE 7, and then through the opening 42 into the fan, see FIGURE 8, and delivers the air to the heating chamber 89. The air passing over the heater 85 is heated and discharged through opening 43 into the passageway 46 at the other side of the transverse partition wall 44 and out through the vertically spaced openings 48 back into the compartment 23. Thus, the compartment 23 is gradually heated to a temperature of, for example, 140° F. as controlled by the thermostat bulb 91 to heat the compartment at the same time that the other compartment 22 is being refrigerated.

When the meals are to be served they are placed on individual trays, the doors 25, 26 and 27 of the cart 12 opened and the trays placed on the racks 30. The doors 25, 26 and 27 are then closed which maintains the food on the trays at the proper temperature. When the meals are to be served, the plug 95 is then withdrawn from the electric outlet and the cart 12 pushed to the desired location. For example, the cart may be pushed onto an elevator and lifted to the proper floor and then pushed along the corridor of the floor to particular rooms. If necessary, the plug 95 may be reinserted in an electric outlet on the particular floor to again initiate operation of the refrigeration system and heater. The doors 25 and 26 and drawers 27 are opened as required to remove the trays for delivery to the individual rooms where they are to be used. It will be noted that the top of the cart 12 provides a shelf for resting the trays so that the doors 25 and 26 and drawers 27 may be immediately closed after a tray or trays have been removed.

Whenever, the refrigeration system or heater fails or other parts require servicing, the mullion unit 24 may be easily and quickly removed to expose the parts by merely sliding the unit outwardly from the front of the cabinet 13 in the manner of a drawer. The parts may be serviced or the failure corrected after which the unit is slid back through open slot 33 into position in the cabinet. Also, the entire unit 24 may be removed and replaced by another unit with a minimum expenditure of time and labor.

While the invention is shown applied to a hospital cart 12 in FIGURES 1 to 8, it will be understood that the mullion type refrigeration unit may be used with conventional refrigerators and FIGURES 9 and 10 illustrate such an application. The refrigerator 100 illustrated in FIGURE 9 has a mullion unit 101 generally similar to the mullion unit 24 which is slidable into and out of the cabinet through a vertically arranged slot 102 in the front of the cabinet to divide the refrigerator into separate compartments 103 and 104. The separate compartments 103 and 104 are opened and closed by separate hinged doors 105 and 106.

As shown in FIGURE 10, the mullion unit 101 has a compressor 54', a condenser 55' and evaporator 56' and an expansion valve 57' connected in a refrigeration circuit the same as the mullion unit 24. The top of the mullion unit 101, however, is positioned below the top wall 16' of the refrigerator 100 to provide a passageway 110 between the compartments 103 and 104. The motor-

fan unit 71' draws air from the compartment 103 and air from compartment 104 through the passageway 110 to compartment 103. The fan 71' directs the air from both compartments over the evaporator coil 56'. The chilled air flows back to the compartment 103 through a rectangular slotted opening 37' in the same manner as explained with respect to the compartment 22 in FIGURES 1 to 8 and also delivers chilled air through a second slotted opening 112 in the side of the casing 65' and mullion wall 29' when a mullion wall is provided. Thus, the mullion unit 101 refrigerates both compartments 103 and 104 of the refrigerator 100 by circulating air from the compartment 104 through the passageway 110. Outside air is circulated over the condenser 55' in the same way as the mullion unit 24 in FIGURES 1 to 8.

While not shown, it will be understood that a heater such as that disclosed in the mullion unit 24 in FIGURES 1 to 8 may also be used in the mullion unit 101. However, the mullion unit 101 illustrated in FIGURES 9 and 10 is adapted to either refrigerate both compartments 103 and 104 as previously described or to heat both compartments from a single heater.

FIGURE 11 illustrates a further modified construction of a hospital cart 12 shown in FIGURE 1. In this construction, the slidable mullion unit 24' has a freezing plate 120 at its top positioned in a compartment 121 in the top 16" of the cabinet 13" and closed by a cover 122. The compartment 121 may be formed as a slot in the top wall of the cabinet through which products may be inserted and removed and having side walls formed by the insulated mullion plates 23" and 29" and a bottom wall formed by the freezer plate 120. Cups of ice cream or other ices may be placed in the compartment 121 on the freezer plate 120 which will hold the ices at a freezing temperature. The freezer plate is connected in the refrigeration system in a known manner to maintain the plate at a freezing temperature below the temperature of the air cooling evaporator coil 56.

FIGURE 12 illustrates a refrigerator and/or heating cabinet 130 in which a plurality of mullion units 24 are slidable into a single cabinet commensurate with the size of the cabinet and the refrigeration capacity required. For example, the cabinet 130 may mount two mullion units 24 to divide the cabinet into three compartments closed by doors 131, 132 and 133, respectively, with each compartment refrigerated as in FIGURES 9 and 10; or the central compartment may be refrigerated and the side compartments heated as in FIGURE 1. The construction illustrated in FIGURE 12 permits a minimal variety of units (size and capacity) to effectively and efficiently refrigerate and/or heat an extremely wide range of cabinet sizes. Such standardization of modular cabinets and units to provide the necessary heating and cooling capacities affords economies in manufacture as well as in servicing the units.

It will now be observed that the present invention provides a thin vertically arranged refrigeration unit or units adapted to slide into and out of a cabinet through a slot or slots in the front thereof. It will also be observed that the present invention provides a mullion type refrigeration unit adapted to divide the interior of the cabinet into a plurality of food storage compartments and refrigerate at least one of the compartments. It will also be observed that the present invention provides a quickly removable refrigeration unit which extends from the front to the back of the cabinet with its elements arranged one over the other and divided by partition walls to provide passageways for the circulation of separate streams of air over the evaporator and condenser. It will further be observed that the present invention provides a vertically arranged mullion type unit for dividing the interior of the cabinet into separate food storage compartments which refrigerates one compartment and heats the other compartment simultaneously. It will further be observed that the present invention

provides a food storage apparatus in the form of a cart for transporting food products from one location to another such as from the kitchen to the individual rooms of a hospital, hotel or the like. It will still further be observed that the present invention provides a food storage apparatus which is of extremely simple, compact and lightweight construction, economical to manufacture, reliable in operation and one which facilitates the replacement of the refrigerating and/or heating unit.

While two embodiments of the invention are herein illustrated and described, it will be understood that further changes may be made in the construction and arrangement of elements without departing from the spirit or scope of the invention. For example, a capillary tube may be used in place of the expansion valve in the refrigeration system to meter the flow of refrigerant to the evaporator; and the air for cooling the condenser may be discharged from the front or back of the mullion unit as well as through the bottom and the heated air may be caused to flow over the rear of the front panel of the unit before it is discharged to act as a stile heater. Therefore, without limitation in this respect, the invention is defined by the following claims.

What is claimed is:

1. A food storage apparatus comprising a cabinet having insulated walls to provide a food storage space with an opening at the front, a mullion dividing the opening in the front of the cabinet, said mullion having a vertical slot therein, a vertically arranged drawer slidable into and out of said cabinet through the slot in the front to divide the food storage space into separate compartments, said drawer mounting a compressor, condenser, evaporator and metering device connected to provide a refrigerating circuit in a portable, self-contained unit, a heater in said drawer, and partition walls dividing said drawer into separate passageways, one set of partition walls enclosing the evaporator and having openings communicating with one compartment to define a passageway for circulating air in said compartment over the evaporator, another set of partition walls enclosing the heater and having openings communicating with the other compartment to define a passageway for circulating air from the other compartment over the heater, and another set of partition walls enclosing the condenser and having openings communicating with the exterior of the apparatus for circulating outside air over the condenser.

2. A food storage apparatus in accordance with claim 1 in which the heater is an electric heating unit, the partition walls comprise a chamber in the drawer surrounding the heating unit, a fan casing in the drawer connected to the heating chamber, and said fan casing and chamber having inlet and outlet openings communicating with the compartment to be heated.

3. A vehicle for storing and transporting food to patients in a hospital, or the like, comprising a cabinet having insulated walls forming a food storage space with an opening at the front and a mullion dividing the opening, wheels for mounting said cabinet for traction, handles on the cabinet for pushing the vehicle, racks in the food storage space for mounting food trays, said mullion having a vertical slot therein, a vertically arranged drawer slidable into and out of the cabinet through the vertical slot in the mullion to divide the food storage space into separate compartments, said drawer mounting a compressor, a condenser, an evaporator and a metering device connected to form a refrigerating circuit in a portable, self-contained unit, a heater in said drawer, partition walls dividing said drawer into separate passageways for circulating air in one of said compartments over the evaporator, circulating air in the other compartment over the heater and circulating outside air over the condenser, and a fan in each passageway for circulating air therethrough.

4. A vehicle for storing and transporting food in ac-

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cordance with claim 3 in which the heated compartment has a vertical partition wall spaced from the back wall of the cabinet and having vertically arranged spaced openings therein at the rear of drawer, a transverse partition wall between the vertical partition wall and back of the cabinet and between the vertically arranged spaced openings at the rear of the drawer, said fan in the passageway for circulating air over the heater being mounted on the drawer and having an air inlet opening aligned with one of the openings in the partition wall, a casing surrounding the heater and connected to the outlet from the fan, and said casing having an outlet opening aligned with the other opening in the partition wall.

5. A vehicle for storing and transporting food in accordance with claim 4 in which the vertical partition wall spaced from the back wall of the cabinet is part of a partition wall means which extends throughout the width of the compartment, said transverse partition wall located between the openings at the rear of the drawer extending diagonally across the space between said vertical partition wall means and back wall of the cabinet to provide separate passages to and from the drawer, said partition wall means having vertically arranged spaced openings therein at opposite sides of the transverse partition wall at the rear of the food storage compartment to provide communication between the compartment and separate passages of the space between the vertical partition wall and back wall of the cabinet.

6. A vehicle for storing and transporting food in accordance with claim 3 in which the compressor and heater are electrically operated, switches on the front of the drawer for controlling the operation of the refrigeration system and heater, and a thermostat in each passageway connected to control the refrigeration circuit and heater, respectively.

7. In a refrigerator of the type having insulated walls with an access opening at the front and closed by a door to form an enclosure to be refrigerated, the combination with said refrigerator of a structure forming a slot in the front wall of the refrigerator, a complete self-contained

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refrigeration unit in the form of a drawer slidable into and out of said insulated enclosure through said slot, said drawer having a frame with a bottom for supporting it in and out of said refrigerator, said frame mounting a compressor, condenser, evaporator and metering device and supporting the elements one over the other, said condenser having coils extending transversely of the drawer and vertical fins extending at right angles to the coils in heat exchange contact therewith, means connecting the compressor, condenser, evaporator and metering device to form a self-contained refrigeration unit on said frame, a partition wall extending transversely of the drawer between the evaporator and condenser for dividing said drawer into separate compartments, other partition walls having openings therein for forming a passageway from the insulated enclosure over the evaporator in one compartment of the drawer and then back to the enclosure, a fan in the inlet opening in the wall of said passageway, said drawer having a front panel mounted on the frame for covering the open side of the slot when the self-contained refrigeration unit is in operative position in the refrigerator, said front panel and the bottom of the drawer having openings to form a passageway for ambient air from outside the refrigerator to flow rearwardly over the condenser in the drawer and then downwardly to the ambient, and a fan mounted in the last named passageway in the drawer for circulating ambient air over the condenser.

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