July 28, 1942. L. A. PHILIPP 2,291,559

REFRIGERATING APPARATUS

Filed Dec. 12, 1940 4 Sheets-Sheet 1

Fig. 1.

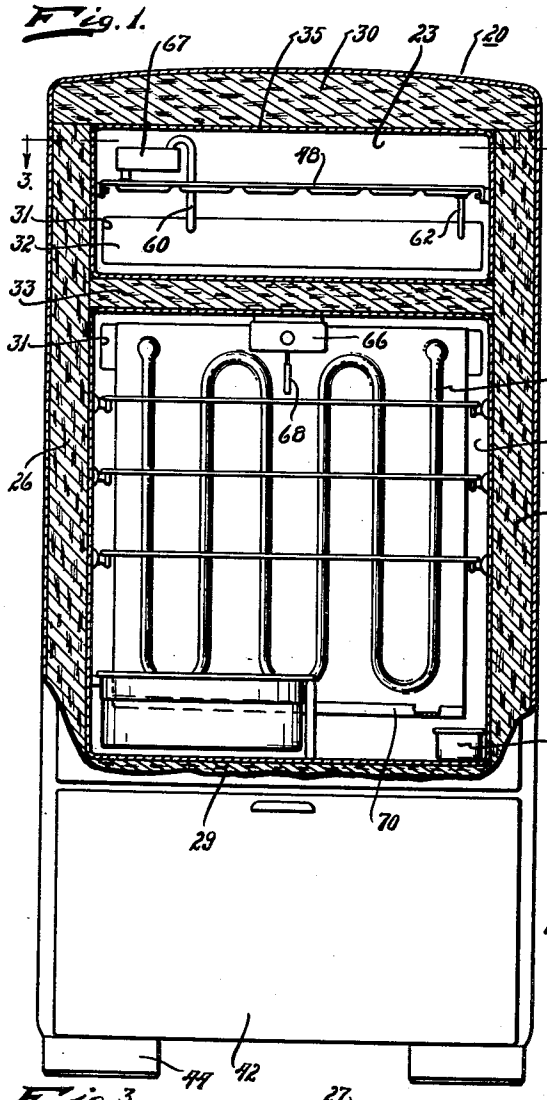


Fig. 2.

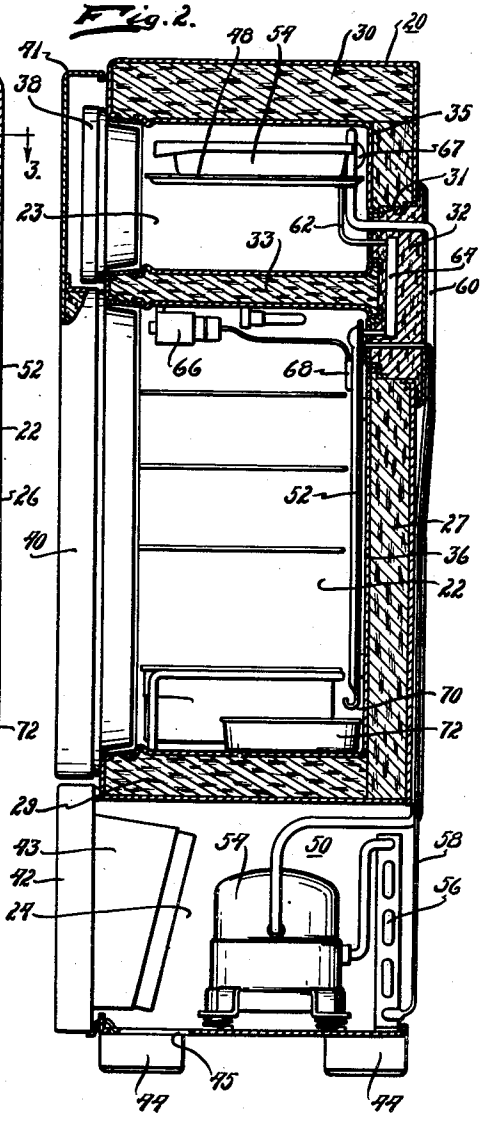
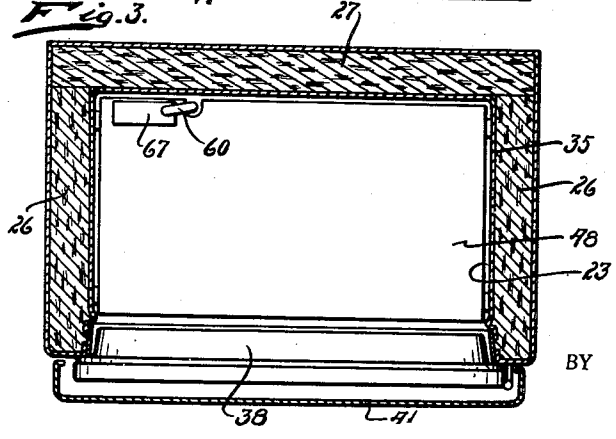


Fig. 3.



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REFRIGERATING APPARATUS

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Fig. 4.

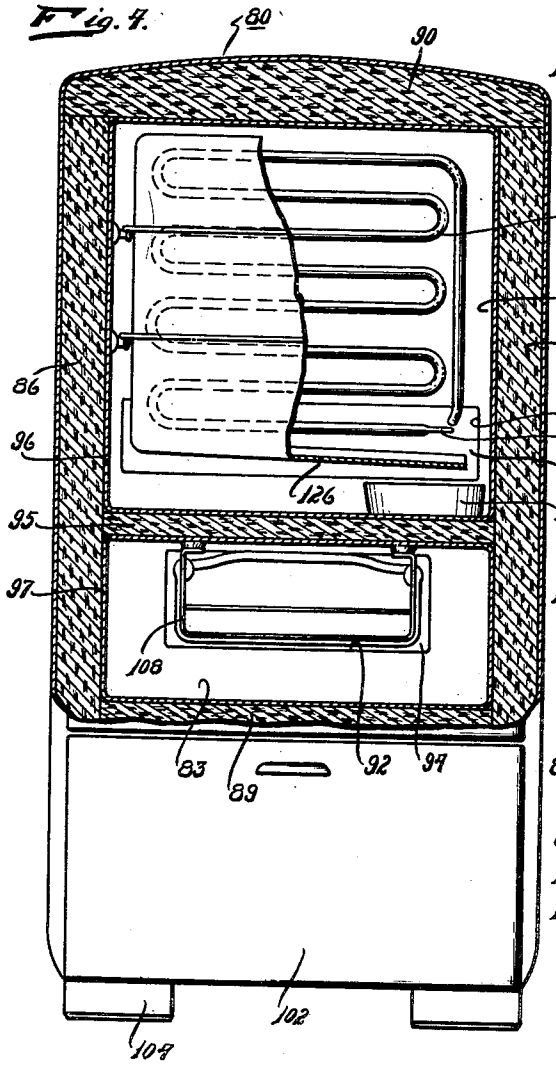
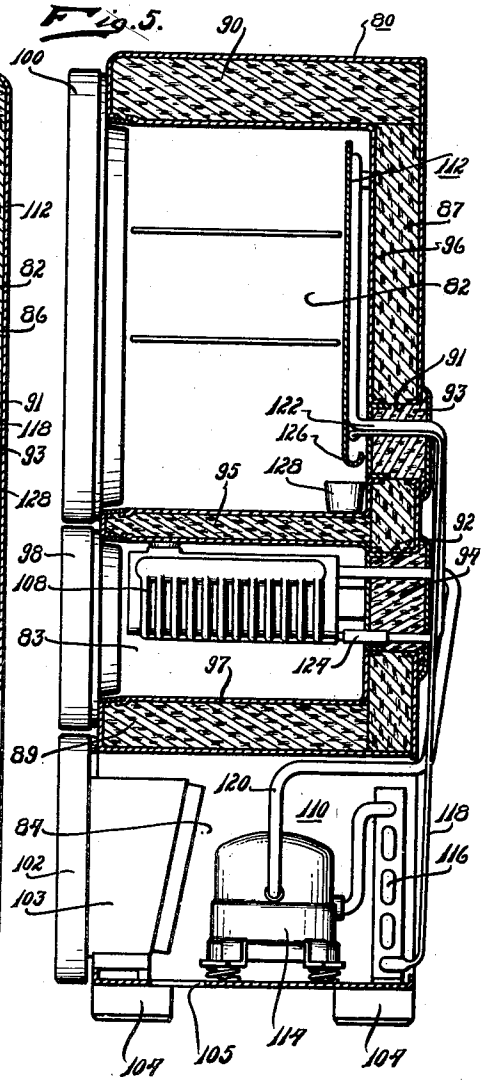


Fig. 5.



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REFRIGERATING APPARATUS

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Fig. 6.

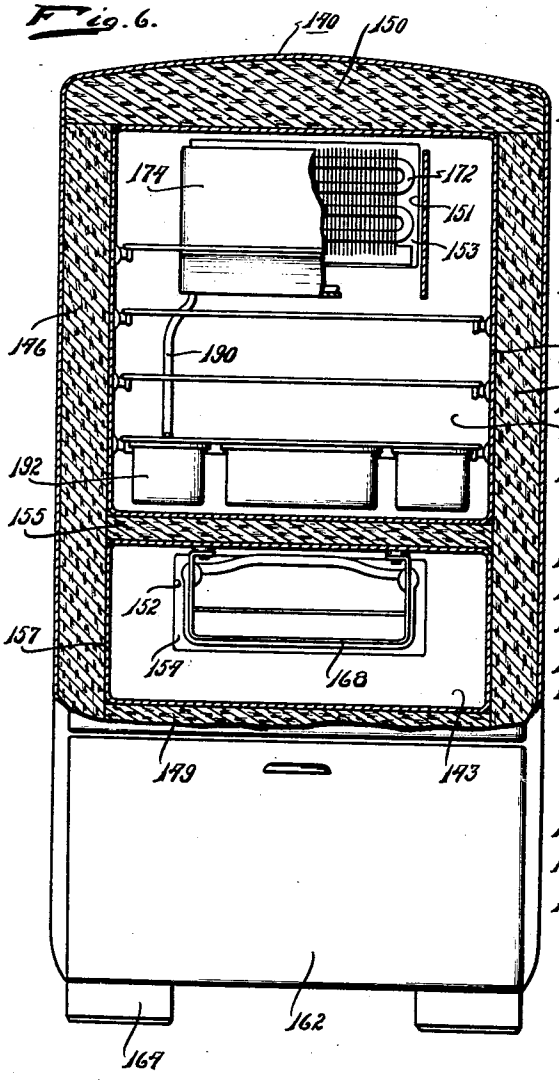
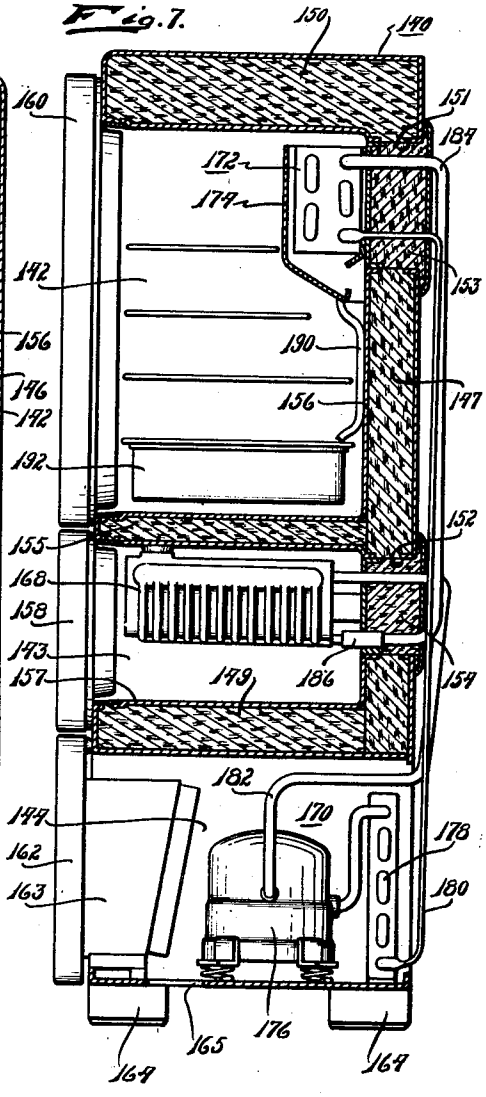


Fig. 7.



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REFRIGERATING APPARATUS

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Fig. 8.

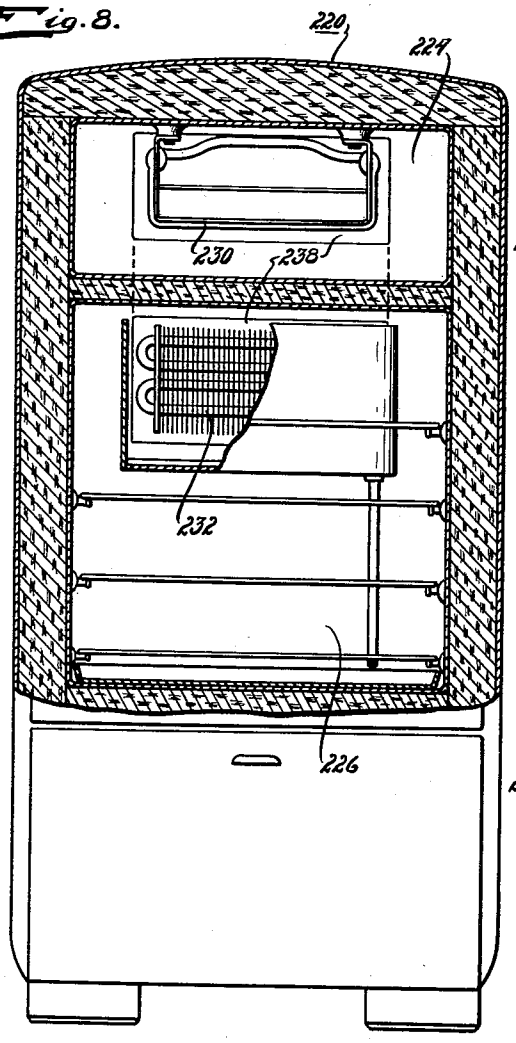
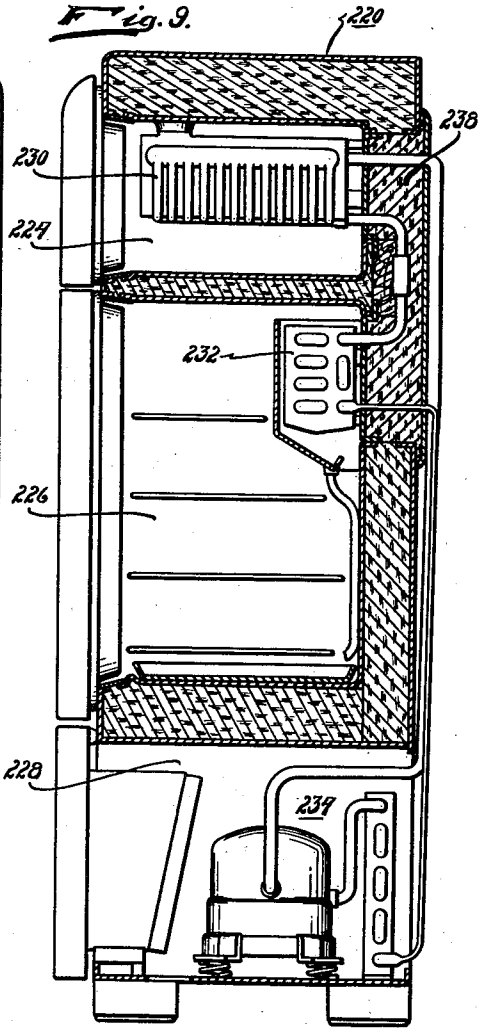


Fig. 9.



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Patented July 28, 1942

2,291,559

UNITED STATES PATENT OFFICE

2,291,559

REFRIGERATING APPARATUS

Lawrence A. Philipp, Detroit, Mich., assignor to Nash-Kelvinator Corporation, Detroit, Mich., a corporation of Maryland

Application December 12, 1940, Serial No. 369,716

4 Claims. (Cl. 62—116)

This invention relates to refrigerating apparatus, and more particularly to refrigerating apparatus of the multiple temperature type.

One of the objects of my invention is to provide a new and improved arrangement for freezing substances and for cooling circulating air in a refrigerator cabinet.

Another object of my invention is to provide an improved refrigerating apparatus which includes a refrigerator cabinet having two insulated compartments, said compartments being provided with removable insulation at the rear thereof and a two evaporator refrigerating system adapted to be removably disposed as a unitary structure in said cabinet, said evaporators including a low temperature element adapted to be removably disposed in one of said compartments for maintaining freezing temperatures therein, and a relatively high temperature evaporating element adapted to be removably disposed in the other of said compartments for maintaining proper food preserving temperatures therein and a condensing element disposed outside of said compartments and operatively associated with said evaporating elements through the removable insulation.

Another object of my invention is to provide an improved refrigerating apparatus which includes an insulated cabinet having a freezing compartment and a food storage compartment, and a unitary refrigerating system having a low temperature evaporator removably disposed in said freezing compartment and a relatively high temperature evaporator removably disposed in said food storage compartment, said cabinet having at the rear thereof an opening communicating with each of said compartments, through which opening said evaporators may be simultaneously withdrawn when desired and which is adapted to be closed by a removable closure element, and said refrigerating system having a condensing element operatively associated with said evaporators through said removable closure element.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a front vertical view partly in cross section and partly in elevation of a refrigerating apparatus embodying features of my invention;

Fig. 2 is a side vertical view in cross section of the apparatus shown in Fig. 1;

Fig. 3 is a view taken along the line 3—3 of Fig. 1;

Fig. 4 is a front vertical view partly in cross section and partly in elevation of a modification of the refrigerating apparatus shown in Fig. 1;

Fig. 5 is a side vertical view in cross section of the apparatus shown in Fig. 4;

Fig. 6 is a front vertical view partly in cross section and partly in elevation of another modification of my improved refrigerating apparatus shown in Fig. 1;

Fig. 7 is a side vertical view in cross section of the apparatus shown in Fig. 6;

Fig. 8 is a front vertical view partly in cross section and partly in elevation of a modified form of refrigerating apparatus embodying features of my invention; and

Fig. 9 is a side vertical view in cross section of the apparatus shown in Fig. 8.

Referring to the drawings, the numeral 20 designates, in general, a cabinet having a compartment 22 for the storage of foods to be refrigerated, a freezing compartment 23 and a machine compartment 24. The cabinet is provided with insulated walls for enclosing the food storage and freezing compartments, including side walls 26, rear wall 27, bottom wall 29 and top wall 30. In the rear wall 27, extending the width thereof, there is provided a rectangularly-shaped opening 31 which opens into both the food storage and freezing compartments and which is adapted to be closed by a removable insulated closure member 32. The food storage compartment and the freezing compartment are separated by a fixed, substantially horizontally disposed, insulated wall 33. An inner metallic lining member 35 forms the inner walls of the freezing compartment while an inner metallic lining 36 forms the inner walls of the food storage compartment. Both of these lining members are preferably provided with a coating of vitreous enamel, such as porcelain, to provide neat appearing compartments and ones which may be easily cleaned. The freezing compartment 23 is provided with an opening at the front of the cabinet which is adapted to be closed by a door 38 while the food storage compartment is also provided with an opening at the front of the cabinet which is closed by a door 40. An extension member 41 is provided on door 40, extending over door 38 in order to present an attractive front to the cabinet. The machine compartment 24 is provided with an opening adapted to be closed by a movable door 42. The inner side of this door is provided with a bin 43 for storing vegetables and

the like. The entire cabinet is raised above the level of the floor by means of legs 44 to allow air from the room to circulate freely through an opening 45 in the bottom of the machine compartment into said compartment.

A unitary refrigerating structure is arranged to be inserted in and removable from the cabinet without uncoupling the parts of said structure from one another. This structure comprises, in general, a refrigerant evaporating element 48, a refrigerant condensing element 50, the insulated closure member 32, and a refrigerant evaporating element 52.

As shown in the drawings, the refrigerant evaporating element 48 is horizontally disposed intermediate the top wall 30 and the wall 33 in the compartment 23, sufficient space being provided above the evaporator for the insertion of a receptacle 54 for quick freezing of ice cubes and the like, and space also being provided below the evaporator for storage purposes. The evaporator is detachably secured to the side walls 26 of the compartment by any suitable means. Preferably, the element 48 is of a plate-like conformation and, as shown, is constructed of a sheet metal plate to which there is suitably welded another plate having portions thereof pressed out to form a continuous refrigerant passage when the two plates are secured together.

Evaporating element 52 is preferably of construction similar to that of evaporating element 48 and is vertically disposed in the food storage compartment 22 adjacent the rear wall 27 but slightly spaced therefrom to permit circulating air in the compartment 22 to pass on all sides of the element 52.

The refrigerating condensing element 50 comprises, in general, a motor compressor unit 54, condenser 56 and restricting element 58. The motor compressor unit is of the type which includes a compressor and motor directly connected and enclosed within a hermetically sealed casing. Units of this type are well known in the art and further illustration thereof in the drawings is deemed unnecessary. The cooling of the condensing element may be accomplished either by forced or natural convection, the latter way being the one illustrated. Air from the room circulates through the opening 45 and thence over the condensing unit. A flue (not shown) may be provided on the rear wall of the cabinet for enhancing the natural convection effect as is well known in the art.

In operation, the compressor withdraws evaporated refrigerant from the evaporating elements through a vapor conduit 60, compresses the gaseous refrigerant and delivers it to the condenser 56 wherein it is liquefied and from which it is delivered in liquid form to the evaporator 52 through the restricting element 58, which, preferably, consists of a length of capillary tubing. This tubing is of proper dimensions to meter the quantity of liquid refrigerant flowing from the condensing element to the evaporating element during entire operation of the system. It is also preferably secured to the vapor return conduit 60 in intimate heat exchange relation therewith.

Liquid refrigerant is first delivered to the evaporating element 52 through the capillary conduit 58, and from the evaporating element 52 liquid and gaseous refrigerant is delivered to the evaporating element 48 through a conduit 62. A resistor or fixed restriction 64 is interposed in the conduit 62 and disposed in the removable closure member 32. This resistor serves to maintain a temperature and pressure differential between the evaporating elements 52 and 48 in the well known manner. Evaporated refrigerant is withdrawn from the evaporating element 48 through a liquid accumulator 67 and the vapor conduit 60.

Preferably, the condensing element is intermittently operated. In order to control the operation of the condensing element, there is provided a thermostatically controlled switch 66 to which is connected a thermostat fluid containing bulb 68 which is disposed in thermal contact with the evaporating element 52. The switch 66 is adapted to open and close the circuit to the motor of unit 54 in response to predetermined changes in temperature within the evaporating element 52. In view of the fact that the evaporating elements 48 and 52 are of the so called flooded type, the temperatures therein will bear a direct relation to the pressures existing therein. Preferably, the thermostat is set so that the evaporating element 48 will be operated at temperatures which cause rapid freezing, and the evaporating element 52 at temperatures which are slightly above that which would be likely to cause the collection of frost or ice thereon due to the deposition of moisture from the circulating air in the food compartment. Any moisture which does form on the evaporator 52 is collected in a trough 70 formed by turning up the lower edge of said evaporator in such a manner that the water therein will flow to one end of the trough where it drops into a drain pan 72.

The entire refrigerating system may be removed from the cabinet as a unitary structure. The structure includes the condensing element 50, the insulated closure member 32, evaporating element 52 and evaporating element 48. Preferably, the evaporating elements are secured to the walls of their respective compartments by any suitable means (not shown) so that they may be readily removed when desired. The vapor return conduit 60, interconnecting conduit 62, and liquid supply conduit 58 are not directly fixed in any manner to the cabinet proper but extend through the insulated closure member 32. After moving evaporating element 48 downwardly and evaporating element 52 upwardly, the entire structure as a unit may be moved toward the rear of the cabinet. The evaporating elements are slipped through the opening 31 at the rear of the cabinet while the condensing unit 50 is slipped through the opening at the rear of the machine compartment. Thus the entire structure may be readily removed for repairs and the like.

In Figs. 4 and 5 there is shown a modified form of refrigerating apparatus. The modification differs from the apparatus already described principally in that the freezing compartment and food compartment are positioned differently. In the modification, the freezing compartment is placed immediately above the machine compartment and the food compartment is located above the freezing compartment. Furthermore, in the modification, the openings in the rear wall of the cabinet communicating with the freezing and food storage compartments are separate from each other and are adapted to be closed by individual closure members rather than by a single one as in the apparatus described above.

Referring to Figs. 4 and 5 in the drawings, numeral 80 designates, in general, a cabinet having a compartment 82 for the storage of foods to be refrigerated, a freezing compartment 83 and a machine compartment 84. The cabinet is pro-

vided with insulated walls for enclosing the food storage and freezing compartments including side walls 86, rear wall 87, bottom wall 89 and top wall 90. In the rear wall 87 extending the width thereof there are provided rectangularly shaped openings 91 and 92 which open into the food storage and freezing compartments respectively and which are adapted to be closed by removable insulated closure members 93 and 94 respectively. The food storage compartment and the freezing compartment are separated by a fixed substantially horizontally disposed insulated wall 95. An inner metallic lining member 96 forms the inner walls of the food storage compartment while an inner metallic liner 97 forms the inner walls of the freezing compartment. Both of these lining members are preferably provided with a coating of vitreous enamel such as porcelain to provide a neat appearing compartment and one which may be easily cleaned. The freezing compartment 83 is provided with an opening at the front of the cabinet which is adapted to be closed by a door 98 while the food storage compartment is also provided with an opening at the front of the cabinet which is closed by a door 100. The machine compartment 84 is provided with an opening adapted to be closed by a movable door 102. The inner side of this door is provided with a bin 103 for storing vegetables and the like. The entire cabinet is raised above the level of the floor by means of legs 104 to allow air from the room to circulate freely through an opening 105 in the bottom of the machine compartment into said compartment.

A unitary primary refrigerating structure is arranged to be inserted in and removable from the cabinet without uncoupling the parts of said structure from one another. This structure comprises, in general, a low temperature refrigerant evaporating element 108, a refrigerant condensing element 110, the insulated closure members 93 and 94, and a relatively high temperature refrigerant evaporating element 112.

As shown in the drawings, the refrigerant evaporating element 108 is disposed in the freezing compartment 83 supported in part by the closure member 94 and in part detachably supported from the inner lining member 97. This evaporating element 108 is of the well known U-shaped type and preferably comprises two sheet metal plates welded together to form U-shaped refrigerant passages connecting an inlet refrigerant header with two outlet refrigerant headers. This evaporator encloses within its U-shaped confines a freezing zone for rapid freezing of ice cubes and the like. Space is provided about the evaporator for storing foods, etc. at freezing temperatures. The evaporating element 112 preferably comprises a sinuous refrigerant bearing conduit arranged in a vertical plane near the rear of compartment 82 and secured to a sheet metal plate. The element is slightly spaced from the rear wall of compartment 82 to permit circulating air in the compartment to pass on all sides thereof.

The refrigerating condensing element 84 comprises, in general, a motor compressor unit 114, condenser 116 and restricting element 118. The motor compressor unit is of the type which includes compressor and motor directly connected and enclosed within a hermetically sealed casing. The cooling of the condensing element may be accomplished either by forced or natural convection, the latter means being the one illustrated. Air from the room circulates through the opening 105 and thence over the condensing unit. A flue, not shown, may be provided on the rear wall of the cabinet for enhancing the natural convection effect as is well known in the art.

In operation, the compressor withdraws evaporated refrigerant from the evaporating elements through a vapor conduit 120, compresses the gaseous refrigerant and delivers it to the condenser 116. Here it is liquefied and then delivered in liquid form to the high temperature evaporator 112 through the restricting element 118. The latter preferably consists of a length of capillary tubing which is of proper dimensions to meter the quantity of liquid refrigerant flowing from the condensing element to the evaporating element during the entire operation of the system. From the evaporating element 112, liquid and gaseous refrigerant is delivered to the low temperature evaporating element 108 through a conduit 122. A resistor or fixed restriction 124 is interposed in the conduit 122. This resistor serves to maintain a temperature and pressure differential between the evaporating elements 112 and 108 in the well known manner. Evaporated refrigerant is withdrawn from the evaporating element 108 through the vapor conduit 120. The capillary tubing 118 is preferably disposed in heat exchange relation with one or the other of the conduits 120 or 122 or possibly both. Preferably the condensing element is intermittently operated under the control of a thermostatically controlled electric switch in a manner well known in the art.

The two evaporating elements 108 and 112 are operated at such temperatures that the freezing compartment 83 is maintained at a temperature below freezing and the food storage compartment is maintained at a temperature above freezing. The evaporating element 112 is preferably operated at temperatures which are above that which would cause frost to collect thereon. Moisture which may condense on the evaporator 112 is collected in a trough 126 at the bottom of the evaporator 112 from which it is drained into a pan 128.

The entire refrigerating system may be removed from the cabinet as a unitary structure. This structure includes the condensing element 84, the insulated closure members 93 and 94, evaporating element 112 and evaporating element 108. Preferably the evaporating elements are secured to the walls of their respective compartments by screws or the like (not shown) so that they may be readily removed when desired. The vapor return conduit 120, interconnecting conduit 122, and liquid supply conduit 118 extend through the insulated closure members 93 and 94 and are not attached in any manner to the stationary portion of cabinet 80. In order to remove the two evaporating elements, evaporating element 112 is pressed down into a horizontal position. The entire structure may then be slipped out of the cabinet, by slipping the two evaporating elements through the openings 91 and 92 and the condensing unit out the back of the machine compartment. Thus the entire structure may be readily removed for repairs and the like.

In Figs. 6 and 7 there is shown another modification of the refrigerating apparatus shown in Figs. 1, 2 and 3. This second modification differs from the apparatus shown in the first three figures in that the positions of the freezing compartment and food compartment are interchanged as in the modification shown in Figs. 4

and 5. Likewise in the second modification the openings in the rear wall of the cabinet communicating with the respective compartments are separated from each other and they are adapted to be closed by individual closure members. A still further difference existing between this modification and the preceding embodiments of my invention lies in the design of the evaporating element utilized to cool the food storage compartment. In this instance an evaporator is used consisting of a plurality of rows of sinuous refrigerant bearing conduits arranged to form a substantially rectangularly shaped box like element. This element is provided with a plurality of parallel fins to afford a large extended surface.

Referring to Figs. 6 and 7 in the drawings, numeral 140 designates, in general, a cabinet having a compartment 142 for the storage of foods to be refrigerated, a freezing compartment 143 and a machine compartment 144. The cabinet is provided with insulated walls for enclosing the food storage and freezing compartments including side walls 146, rear wall 147, bottom wall 149 and top wall 150. In the rear wall 147 there are provided rectangularly shaped openings 151 and 152 which open into the food storage and freezing compartments respectively and which are adapted to be closed by removable insulated closure members 153 and 154 respectively. The food storage compartment and the freezing compartment are separated by a fixed substantially horizontally disposed insulated wall 155. An inner metallic lining member 156 forms the inner walls of the food storage compartment while an inner metallic liner 157 forms the inner walls of the freezing compartment. Both of these lining members are preferably provided with a coating of vitreous enamel such as porcelain to provide a neat appearing compartment and one which may be easily cleaned. The freezing compartment 143 is provided with an opening in the front of the cabinet which is adapted to be closed by a door 158 while the food storage compartment is also provided with an opening at the front of the cabinet which is closed by a door 160. The machine compartment 144 is provided with an opening adapted to be closed by a movable door 162. The inner side of this door is provided with a bin 163 for storing vegetables and the like. The entire cabinet is raised above the level of the floor by means of legs 164 to allow air from the room to circulate freely through an opening 165 in the bottom of the machine compartment.

A unitary refrigerating structure is arranged to be inserted in and removable from the cabinet without uncoupling the parts of said structure from one another. This structure comprises, in general, a low temperature refrigerant evaporating element 168, a refrigerant condensing element 170, the insulated closure members 153 and 154 and a relatively high temperature refrigerant evaporating element 172.

As shown in the drawings, the refrigerant evaporating element 168 is disposed in the freezing compartment 143. It is supported at least in part by the closure member 154 and may also be detachably supported by any suitable means from the walls of the freezing compartment. This evaporating element is of the conventional U-shaped type which comprises two sheet metal plates embossed in such a manner that when welded together they form U-shaped refrigerant passages that connect an inlet refrigerant header with two outlet refrigerant headers. This evaporator encloses a freezing zone adapted to freeze ice cubes and the like. Space is provided about the evaporator for storing foods, etc., at freezing temperatures. The evaporating element 172 preferably comprises two rows of sinuous conduit connected in series and arranged in parallel vertical planes. Secured to the conduit are a plurality of parallel fins in order to provide the evaporator with a large extended surface to maintain a surface coil temperature above the point where frost is likely to form. A sheet metal shield 174 is provided adjacent the evaporating element 172 in order to guide the natural flow of air over the element and also to collect moisture condensing on said element. This shield may be supported in any suitable manner within the compartment.

The refrigerant condensing element 144 comprises, in general, a motor compressor unit 176, condenser 178 and restricting element 180. This motor compressor unit is of the conventional type which includes compressor and motor directly connected and enclosed within a hermetically sealed casing and no further explanation is deemed necessary. The cooling of the condensing element may be accomplished either by forced or natural convection, the latter means being the one preferred and illustrated. Air from the room circulates through the opening 165 and thence over the condensing unit. A flue, not shown, may be provided on the rear wall of the cabinet for enhancing the natural convection flow.

In operation the compressor withdraws evaporated refrigerant from the evaporating elements through a vapor conduit 182, compresses the gaseous refrigerant and delivers it to the condenser 178. Here it is liquefied and then delivered in liquid form to the high temperature evaporator 172 through the restricting element 180. The latter preferably consists of a length of capillary tubing which is of proper dimensions to meter the quantity of liquid refrigerant flowing from the condensing element to the evaporating element during the entire operation of the system. From the evaporating element 172 liquid and gaseous refrigerant is delivered to the low temperature evaporating elements 168 through a conduit 184. A resistor 186 in the form of a capillary tube or an orifice element is interposed in the conduit 184. This resistor serves to maintain a temperature differential between the two evaporating elements 172 and 168 respectively in the well known manner. Evaporated refrigerant is withdrawn from the evaporating element 168 through the vapor conduit 120 and the cycle is repeated. The capillary tubing 180 is preferably disposed in heat exchange relation with the conduit 184. The condensing element is intermittently operated preferably under the control of a thermostatically controlled electric switch in a manner well known in the art.

The two evaporating elements 168 and 172 are operated at such temperatures that the freezing compartment 143 is maintained at a temperature well below freezing and the food storage compartment is maintained at a temperature above freezing. Furthermore, in view of the extended surface of the evaporating element 174, its surface temperature is maintained sufficiently high to prevent the formation of frost on said surfaces or at least to reduce the amount of frost so formed sufficiently so that the frost may melt off during the off-cycle of the condensing unit. Any

moisture which may collect on the surface of the evaporator drains into the lower upturned portion of the shield 174 from which it is drained through a pipe 190 into a pan 192 at the bottom of the food compartment.

The entire refrigerating system may be removed from the cabinet as a unitary structure. This structure includes the condensing element 170, the insulated closure members 153 and 154, and the two evaporating elements 168 and 172. Preferably the evaporating elements are detachably secured to the walls of their respective compartments by screws or the like so that they may be readily removed when desired. The vapor return conduit 182, the interconnecting conduit 184 and liquid supply conduit 180 all extend through the insulated closure members 153 and 154 and are not attached in any manner to the stationary portion of the cabinet 140. The entire structure may then be slipped out the back of the cabinet by sliding the two evaporating elements through the openings at the rear of the respective compartments and the condensing unit out the rear of the machine compartment.

In Figs. 8 and 9 there is shown a modification of my refrigerating apparatus somewhat like that shown in Figs. 6 and 7. However, in Figs. 8 and 9, the food storage compartment is located below the ice making compartment. Two primary refrigerant evaporators similar to those shown in Figs. 6 and 7 are used to cool the respective compartments. A single removable plug similar to that shown in Figs. 1 and 2 is provided in the rear of the cabinet to permit ready removal of the primary evaporators. As shown in the drawings, numeral 220 designates a refrigerator cabinet similar to that shown in Figs. 1 and 2. Numeral 224 designates an ice making compartment; numeral 226, a food storage compartment; and numeral 228, a machine compartment. Disposed in the ice making compartment 224 is a low temperature refrigerant evaporator 230. Disposed in the food storage compartment 226, is a high temperature evaporator 232. A condensing unit 234 is placed in the machine compartment 228 and operatively connected to the refrigerant evaporators. The operation of and the refrigerating system is the same as of that shown in Figs. 6 and 7. Numeral 238 designates a removable plug at the rear of the cabinet provided for closing an opening leading to both compartments 224 and 226. Otherwise the cabinet is the same as that shown in Figs. 6 and 7.

Although only a preferred form of the invention has been illustrated, and that form described in detail, it will be apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. Refrigerating apparatus comprising, in combination, an insulated cabinet having means dividing the interior of same into two compartments, said cabinet having an opening through a wall thereof opening into both of said compartments, insulating means removably mounted in said opening, a plate type refrigerant evaporator disposed in one of said compartments between top and bottom thereof to provide a rapid freezing support for a receptacle on its upper surface and a storage space therebelow, a vertically disposed plate type evaporator located in the other of said compartments adjacent the rear wall thereof for maintaining proper food preserving temperatures therein, a refrigerant condensing element located exteriorly of said compartments and operatively connected with said evaporators through said insulating means, and restricting means disposed in said removable insulating means for maintaining a temperature differential between said evaporators, said evaporators, removable insulating means and condensing element being removable bodily as a unit from said cabinet.

2. Refrigerating apparatus comprising, in combination, a cabinet having insulated walls arranged to provide two compartments, each of said compartments having an opening in a wall thereof adapted to be closed by removable insulating means, a low temperature refrigerant evaporating element disposed in one of said compartments for providing a freezing zone and a low temperature storage zone therein, a high temperature refrigerant evaporating element disposed in the other of said compartments for providing a relatively high temperature and high humidity zone therein, a condensing element disposed exteriorly of said compartments and operatively connected to said evaporating elements, a conduit connecting said evaporating elements in series, means disposed in said connecting conduit for maintaining a pressure difference between said evaporating elements, said means dividing said connecting conduit into two parts, one extending to said low temperature evaporating element and the other extending to said high temperature evaporating element, said means and said one part of said connecting conduit being arranged to lie entirely within the outer boundary of the insulated walls of said cabinet, said evaporating elements, said removable insulating means, said connecting conduit and said condensing element being removable as a unit from said cabinet.

3. Refrigerating apparatus comprising, in combination, an insulated cabinet having means dividing the interior thereof into two compartments, said cabinet having an opening through a wall thereof communicating with each of said compartments, insulating means removably mounted in said opening, a low temperature refrigerant evaporating element arranged in one of said compartments to provide a freezing zone and a low temperature storage zone therein, a high temperature refrigerant evaporating element arranged in the other of said compartments to provide a relatively high temperature and high humidity zone therein, a condensing element disposed exteriorly of said compartments and operatively connected to said evaporating elements, a conduit for connecting said evaporating elements in series, said conduit extending from one of said compartments to the other through said opening at the rear of said cabinet and being shielded from outside air by said removable insulating means, said evaporating elements, said condensing element, said insulating means and said connecting conduit being removable as a unit from said cabinet.

4. Refrigerating apparatus comprising, in combination, a cabinet having insulated walls arranged to provide two compartments, each of said compartments having an opening in a wall thereof adapted to be closed by removable insulating means, a low temperature refrigerant evaporating element arranged in one of said compartments to provide a freezing zone and a low temperature storage zone therein, a high temperature refrigerant evaporating element ar-

ranged in the other of said compartments to provide a relatively high temperature and high humidity zone therein, a condensing element disposed exteriorly of said compartments and operatively connected to said evaporating elements by means of refrigerant supply and return conduits, a conduit connecting said evaporating elements in series, means disposed in said connecting conduit for maintaining a pressure difference between said evaporating elements, said means dividing said connecting conduit into two parts, one extending to said low temperature evaporating element and the other extending to said high temperature evaporating element, said means and said one part of said connecting conduit being arranged to lie entirely within the outer boundary of the insulated walls of said cabinet and said other part of said connecting conduit being arranged in heat exchange relation with said refrigerant supply conduit, said evaporating elements, said removable insulating means, said connecting conduit and said condensing element being removable as a unit from said cabinet.

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