Oct. 5, 1943. L. A. PHILIPP 2,330,913

REFRIGERATING APPARATUS

Filed Aug. 8, 1940 6 Sheets-Sheet 1

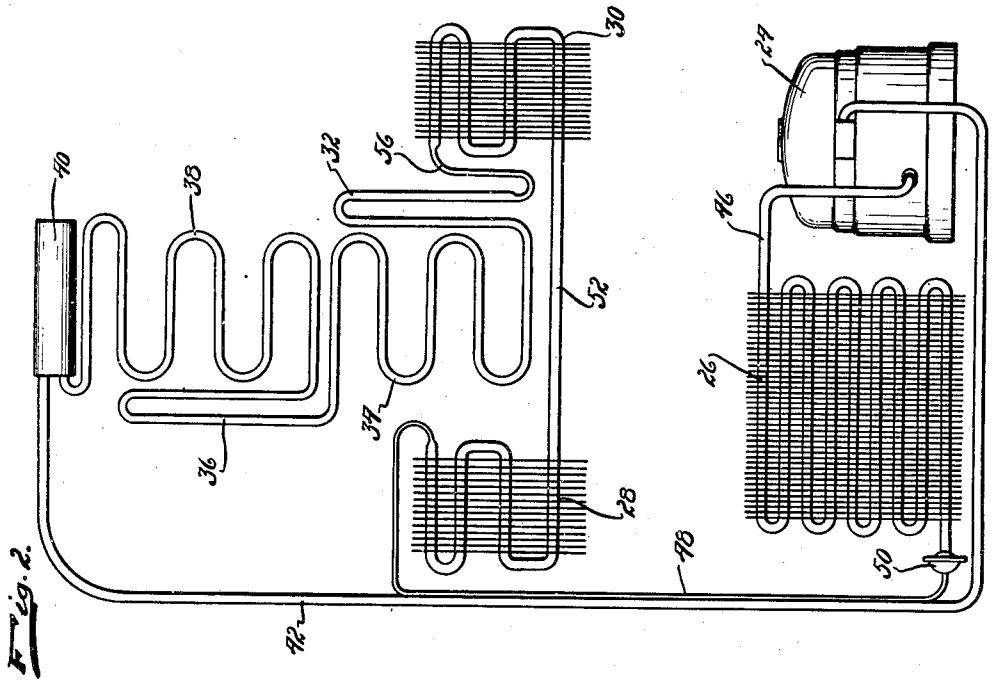


Fig. 2.

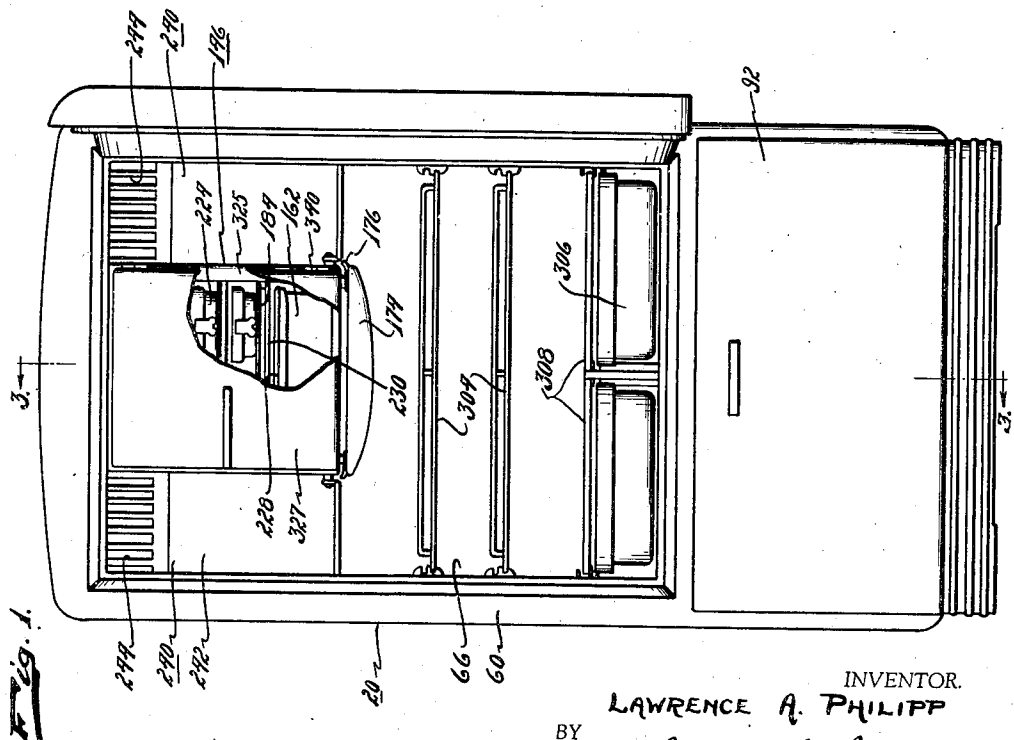


Fig. 1.

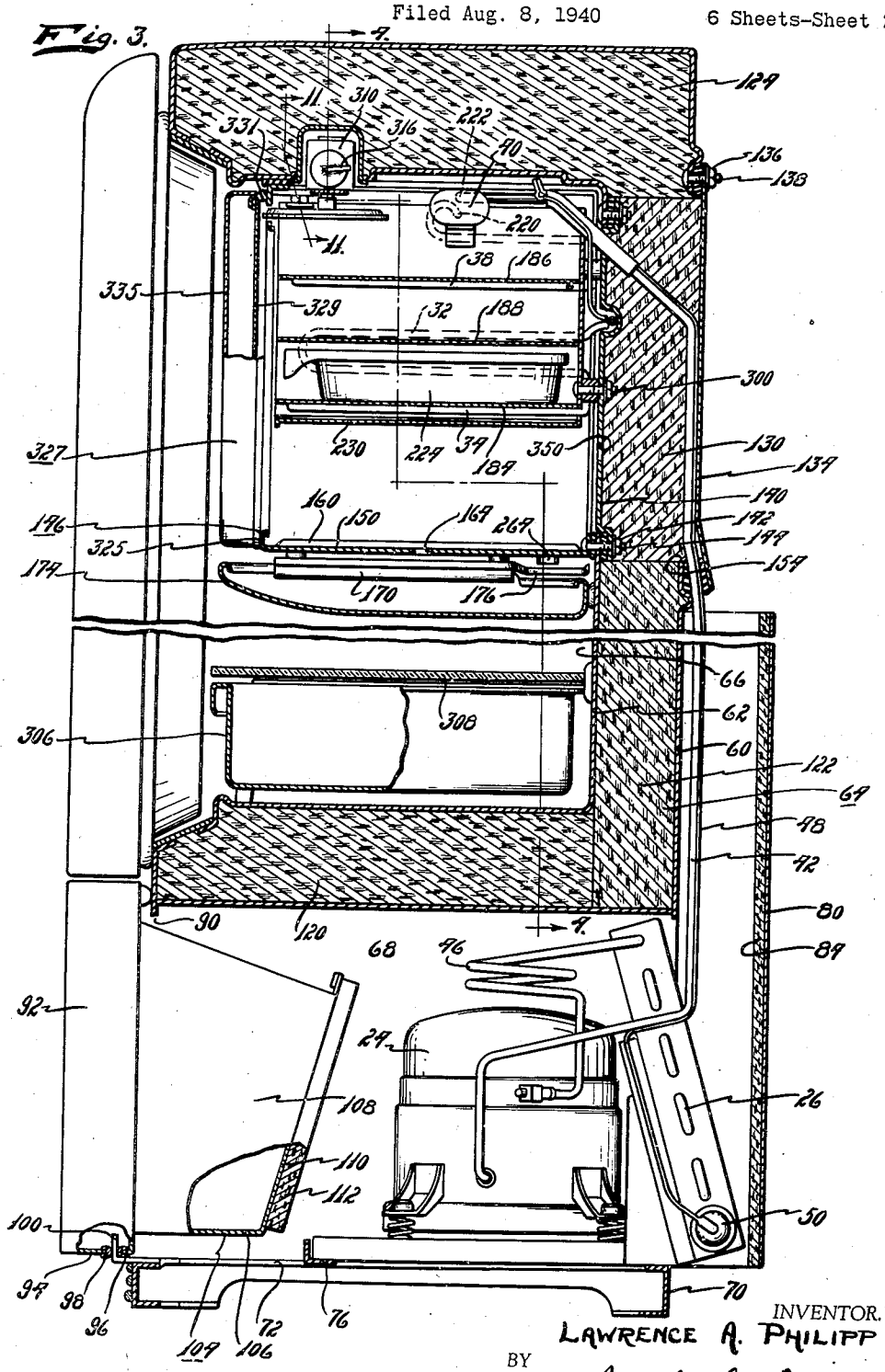
INVENTOR.
LAWRENCE A. PHILIPP
BY Ralph E. Baker
ATTORNEY.

Oct. 5, 1943. L. A. PHILIPP 2,330,913

REFRIGERATING APPARATUS

Filed Aug. 8, 1940 6 Sheets-Sheet 2

Fig. 3.



INVENTOR.
LAWRENCE A. PHILIPP

BY Ralph E. Baker

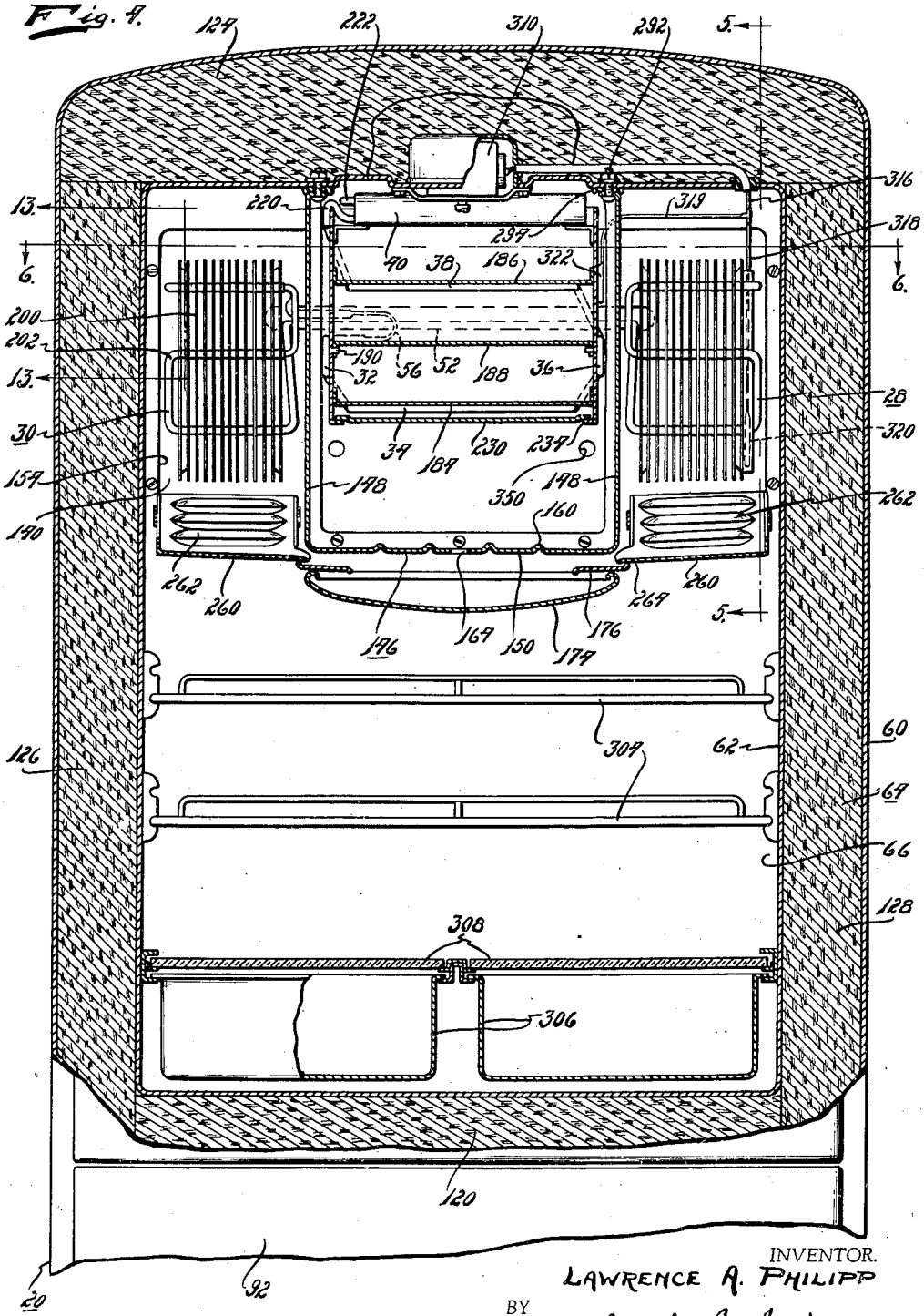
ATTORNEY.

Oct. 5, 1943. L. A. PHILIPP 2,330,913

REFRIGERATING APPARATUS

Filed Aug. 8, 1940 6 Sheets-Sheet 3

Fig. 4.



INVENTOR.
LAWRENCE A. PHILIPP
BY
Ralph E. Baker
ATTORNEY.

Oct. 5, 1943. L. A. PHILIPP 2,330,913

REFRIGERATING APPARATUS

Filed Aug. 8, 1940 6 Sheets-Sheet 4

Fig. 5.

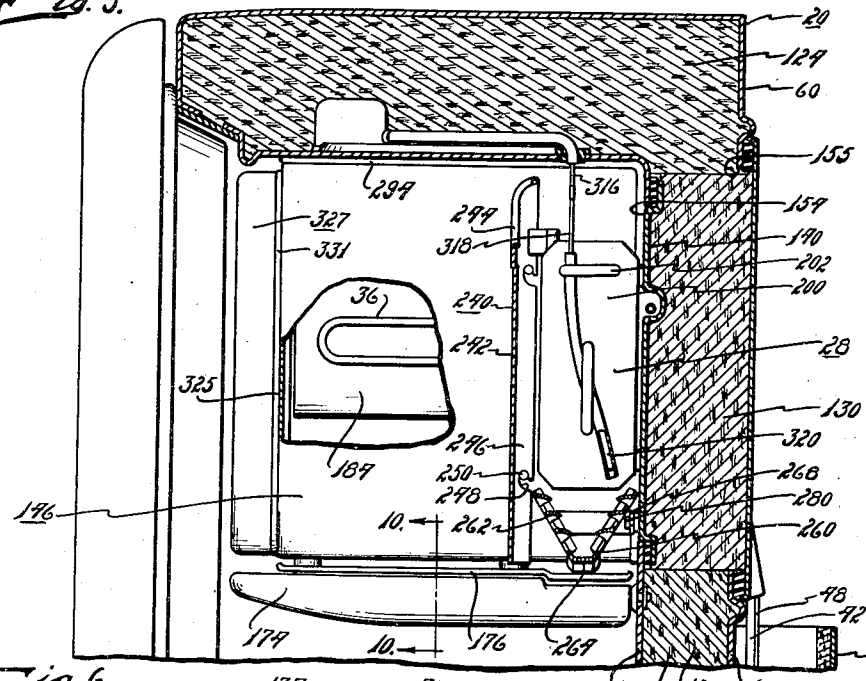
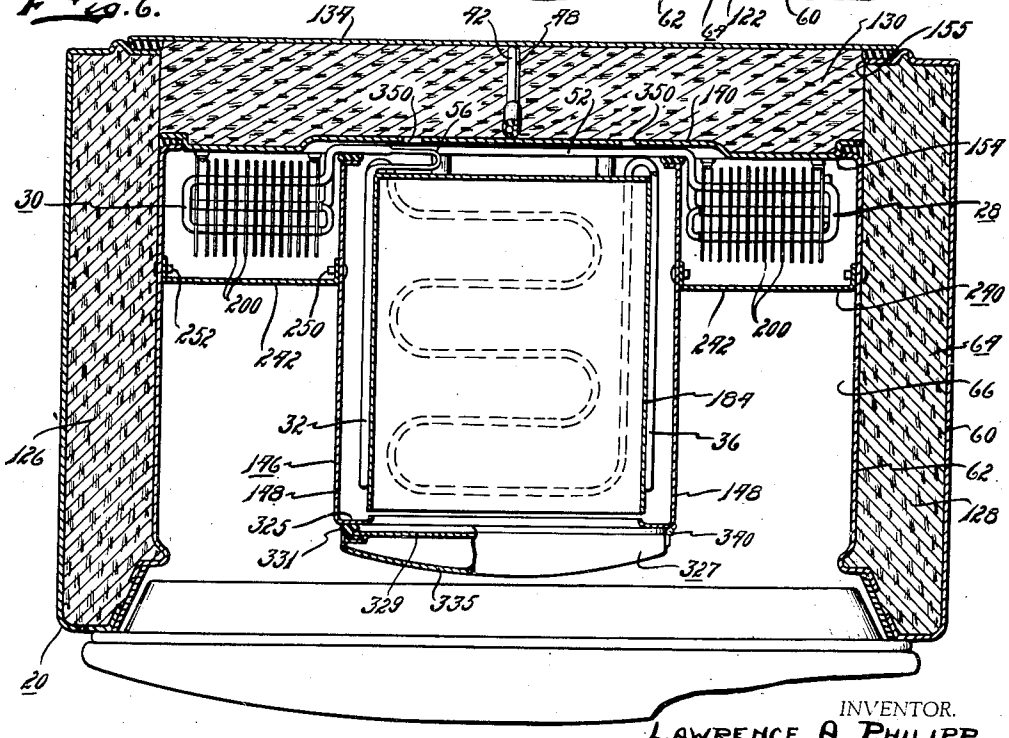


Fig. 6.



INVENTOR.
LAWRENCE A. PHILIPP

BY
Ralph E. Baker
ATTORNEY.

Oct. 5, 1943. L. A. PHILIPP 2,330,913

REFRIGERATING APPARATUS

Filed Aug. 8, 1940 6 Sheets-Sheet 5

Fig. 7.

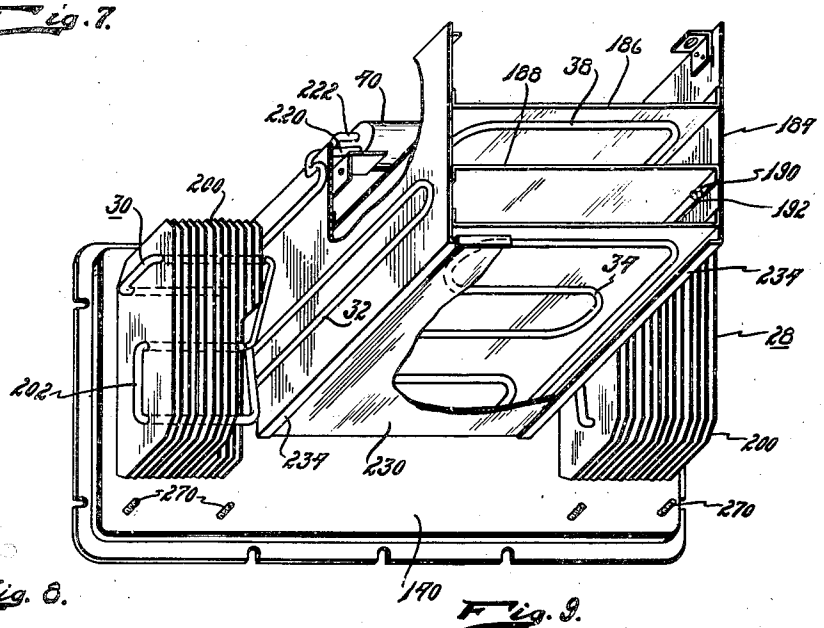


Fig. 8.

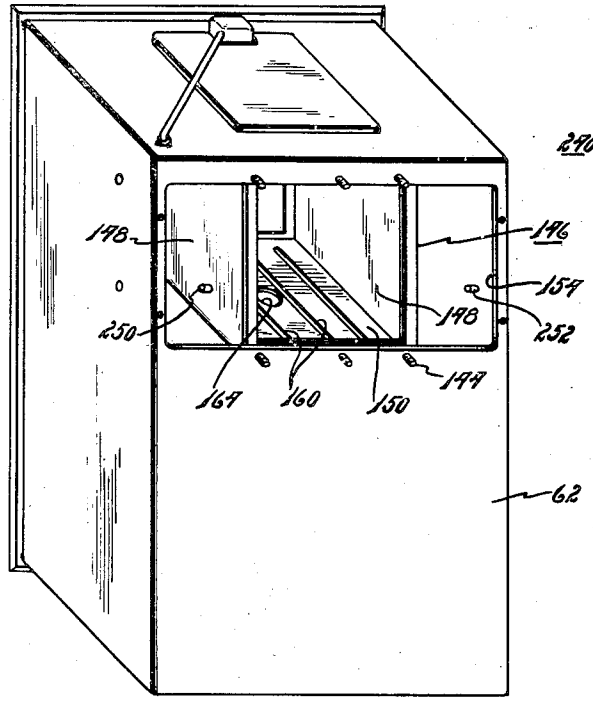
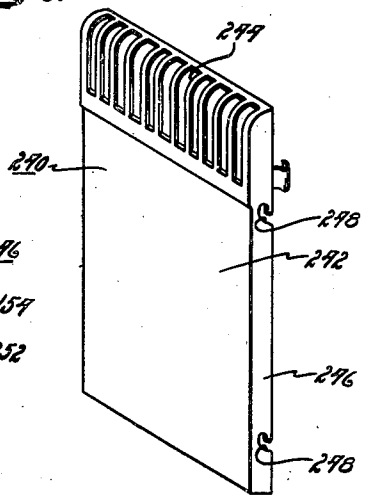


Fig. 9.



INVENTOR.
LAWRENCE A. PHILIPP

BY Ralph E. Baker

ATTORNEY.

Oct. 5, 1943. L. A. PHILIPP 2,330,913

REFRIGERATING APPARATUS

Filed Aug. 8, 1940 6 Sheets-Sheet 6

Fig. 10.

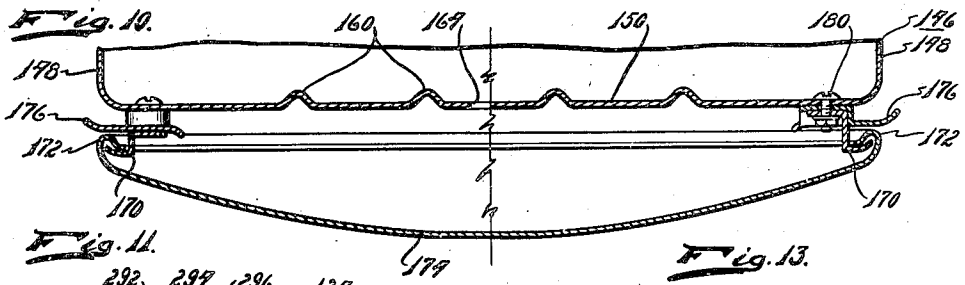


Fig. 11.

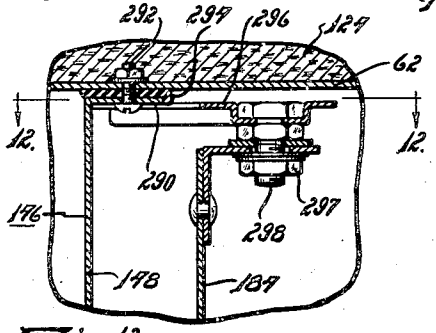


Fig. 13.

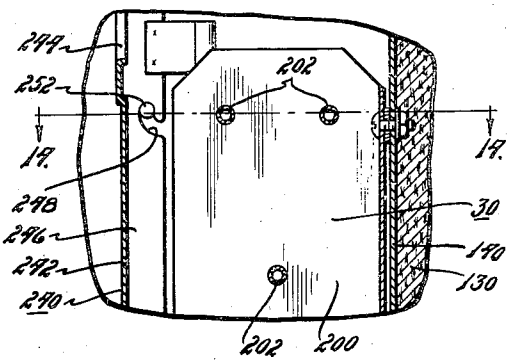


Fig. 12.

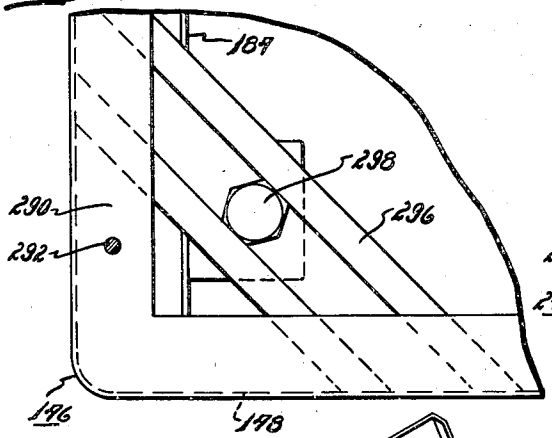


Fig. 14.

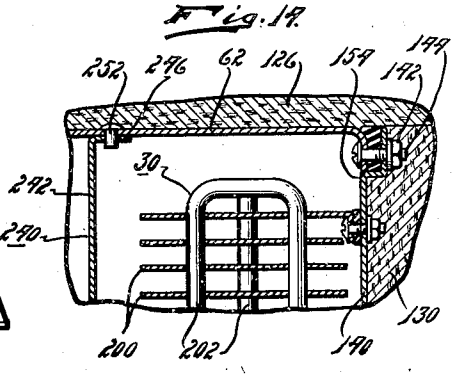


Fig. 15.

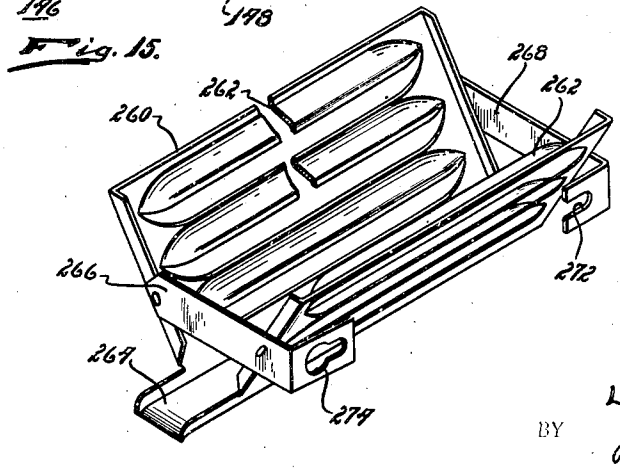
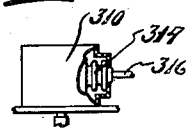


Fig. 16.



INVENTOR.
LAWRENCE A. PHILIPP

BY Ralph L. Baker

ATTORNEY.

Patented Oct. 5, 1943 2,330,913

UNITED STATES PATENT OFFICE

2,330,913

REFRIGERATING APPARATUS

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

Application August 8, 1940, Serial No. 351,834

6 Claims. (Cl. 62—89)

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 so as to maintain a relatively high humidity within the cabinet.

Another object of my invention is to provide an improved refrigerating system wherein large quantities of substances may be frozen and at the same time circulating air for cooling foods and the like may be cooled without undue dehydration of moisture from the air and without the collection of frost and ice upon the said system which would cause inoperative conditions periodically for defrosting.

Another object of my invention is to provide an improved refrigerating system for freezing substances and for the preservation of foodstuffs such as meats which require somewhat lower temperature than other foods, and to arrange the system in such a way that the meats or the like may be refrigerated to a point slightly above the freezing point of water and, if desired, may be readily refrigerated below the freezing point of water by simply adjusting the refrigerating apparatus to accomplish such a function.

Another object of my invention is to provide a refrigerant evaporating element with removable panels, or shelves, which unit operates for freezing substances and for the cooling of foodstuffs slightly above the freezing point of water, and when desired providing storage for such other foodstuffs at temperatures below the freezing point of water by simply removing the panels.

Another object of my invention is to provide an improved refrigerating system which includes heat absorbing means having the different portions thereof separated by a fixed restriction which provides for the operation of one portion at a higher pressure and temperature than the other portion, and to provide for the flow of liquid refrigerant to the heat absorbing means by a small diameter tube, and to pass the evaporated refrigerant in thermal heat exchange with said small diameter tube so as to pre-cool the liquid refrigerant in the cabinet.

Another object of my invention is to divide the interior of the food storage compartment by a casing so as to provide a freezing zone, and to provide for refrigerating the air in the food compartment and the freezing zone by heat absorbing units positioned in the zone and in said compartment, and to support a drip receiver by said casing for collecting drip water from the various heat absorbing units.

Another object of my invention is to provide an improved refrigerant evaporating element for cooling circulating air and which consists of vertically extending spaced apart fins and a refrigerant evaporating conduit extending therethrough, with the conduit being so arranged that a lesser area of fin is associated with the conduit in the upper region thereof than in the lower region thereof.

Another object of my invention is to provide for the ready removability of an entire refrigerating system including three sections of heat absorbing elements and a motor-compressor-condenser unit from the cabinet having a food storage compartment, a freezing compartment and a machine compartment.

Another object of my invention is to provide a new and improved drip trough which has the general formation of a V.

Another object of my invention is to provide an improved control device for the aforementioned refrigerating system which includes thermo-sensitive means having a portion extending into the freezing zone and another portion extending into an air cooling zone, and arranged so that each of said portions cooperate to control a power device for the control element.

Another object of my invention is to provide means for ventilating the insulation of the cabinet adjacent an ice freezing section of heat absorbing means so as to freeze out any moisture from the air in the insulation by its attraction to the ice making 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 view in elevation of my improved refrigerator showing a portion broken away;

Fig. 2 is a diagrammatic illustration of the refrigerating system utilized for refrigerating the refrigerator shown in Fig. 1;

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

Fig. 4 is a view taken along the line 4—4 of Fig. 3;

Fig. 5 is a view taken along the line 5—5 of Fig. 4;

Fig. 6 is a view taken along the line 6—6 of Fig. 4;

Fig. 7 is a perspective view of my improved heat absorbing means;

Fig. 8 is a rear view of the lining of the refrigerator showing a partition element secured within the interior of the lining;

Fig. 9 is a perspective view of a removable baffle;

Fig. 10 is a view taken along the line 10—10 of Fig. 5;

Fig. 11 is a fragmentary view taken in the direction of the arrows 11—11 of Fig. 3;

Fig. 12 is a view taken along the line 12—12 of Fig. 11;

Fig. 13 is a view taken along the line 13—13 of Fig. 4;

Fig. 14 is a view taken along the line 14—14 of Fig. 13;

Fig. 15 is a view of the V-shaped drip trough; and

Fig. 16 is a view in elevation showing a portion broken away of a switch element used for controlling the operation of my refrigerating system.

Referring to the drawings, Fig. 1 discloses my improved refrigerator cabinet, designated in general by the numeral 20. Within this refrigerator cabinet I have disposed refrigerating system disclosed in Fig. 2.

Referring to Fig. 2, my improved refrigerating system includes a motor compressor unit 24, condenser 26, high temperature heat absorbing sections 28 and 30, low temperature refrigerating sections 32, 34, 36 and 38, and an accumulator 40. Evaporated refrigerant is withdrawn from the accumulator 40 through a vapor return conduit 42 whence it passes to the motor compressor unit 24 wherein it is compressed and from which it is delivered through conduit 46 to condenser 26. In the condenser it is liquified and from which it is delivered to heat absorbing section 28 through a small diameter tube 48 after first passing through a strainer device 50. The refrigerant passes from the section 28 through conduit 52 to the section 30. Before passing to the section 32 from section 30, the refrigerant must pass through a fixed restriction, or small diameter tube 56. This reduces the pressure of refrigerant flowing to the sections 32, 34, 36 and 38 so as to maintain a higher temperature in the sections 28 and 30 than in sections 32, 34, 36 and 38. This system is of the non-flooded type wherein droplets of liquid refrigerant are passed into the heat absorbing sections, but due to the absorption of heat very little, if any, liquid refrigerant passes into the accumulator 40. Thus, the refrigerant passing through conduit 42 is gaseous refrigerant and, as disclosed, I have arranged the conduit 42 in thermal heat exchange relation with the small diameter tube 48 so as to cool the liquid refrigerant passing through the tube 48. These two conduits may be secured together by solder if desired.

Referring more specifically to the drawings, and more particularly to Figs. 3 and 4, the refrigerator cabinet includes an outer casing 60 and an inner liner 62. Insulation 64 is interposed between the walls 60 and 62 to insulate a food storage compartment 66 formed by the inner walls of the liner 62. The outer casing extends downwardly to provide a machine compartment 68. A base 70 is provided for the cabinet and is open as at 72 to provide for the free circulation of air through the machine compartment.

Within the machine compartment I have disposed my motor compressor unit 24 and condenser 26. The motor compressor unit is mounted upon an angle iron 76 which is supported by the base 70. At the rear of the cabinet I have provided a flue 80 for aiding and setting up a natural draft of air over the motor compressor unit and condenser to take the heat of condensation out of the machine compartment 68. It will be noted that on the inner side of the flue 80 I have provided insulating material 84, which may preferably be of sound absorbing characteristics. As indicated, the insulation is formed of sheet cork. It may, however, be of any suitable fibrous material which has characteristics for sound absorbing. The front of the cabinet is cut away as at 90 so as to provide an opening for gaining access to the machine compartment. This opening is closed by a door 92 which is formed of double walled sheet metal having ends 94 and 96 which carry gasket material 98. These ends are turned in toward each other and are spaced apart so as to receive an angle member 100 carried by the base 70. By this arrangement it is possible to tilt the door outwardly away from the machine compartment at its upper edge. The angle member 100 may extend from one side of the machine compartment to the other if desired or part way so that it will be sufficient for supporting the weight of the door. On the rear side of the door I have provided a vegetable bin 104 which is secured to the door in any suitable manner and is tiltable with the door. Thus when the upper part of the door 92 is tilted outwardly away from the machine compartment, access may be had to the interior of the vegetable bin. The bin includes bottom wall 106, side walls 108 and rear wall 110. Secured to the rear wall is a slab of insulating material 112, which, as indicated, is formed of sheet cork. This insulating material 112 like insulating material 84 may be of any suitable material so long as it has heat absorbing characteristics as well as insulation qualities so as to insulate the vegetables from the heat of condensation as well as absorb noises created by the motor compressor unit. This vegetable bin may extend from one side of the machine compartment to the other. As will be noted, the condenser is placed on an incline, with the lower portion being directly over the lowermost portion of flue 80 while the upper portion of the condenser is positioned slightly within the machine compartment 68. As will be noted in Fig. 2, the condenser is formed of a serpentine coil having spaced apart fins therein so as to be very effective in the dissipation of heat while permitting the free flow of air thereabout. Since the lower part of the cabinet is open at 72 and the lower part of the flue 80 is open to the atmosphere, air may freely pass up through the machine compartment and the flue and over the motor compressor unit and condenser and out through the flue to thus remove the heat of condensation. By placing the inner wall 110 of the vegetable bin at an angle it tends to guide the flow of air toward the motor compressor unit as the air travels upwardly due to the natural draft flow of air. Also, as air passes upwardly through the flue over the lower portion of the condenser, it tends to create an aspirating effect to draw air through the machine compartment over the motor compressor unit at the upper portion of the condenser.

The insulation 64 includes slab 120 in the bottom wall, 122 in the rear wall, 124 in the top wall and 126 and 128 in the side walls. As indicated in the drawings, this insulation is shown as slabs of cork. However, any suitable type of insulation

may be used such as fibrous material, "Rock Wool" or the like. In addition, insulation 130 is provided in the rear wall so that it may be readily removed. Conduits 42 and 48 enter the rear wall of the refrigerator and pass into the food compartment through insulation 130. If the insulation is made of cork, such cork may be slotted to receive the conduits and to permit removal of the insulation from each side of the conduits or if it is loose fibrous material such insulation may be readily removed by simply removing rear panel 134 of the cabinet by removing nuts 136 from bolts 138. On the inner side of the insulation 130 is a removable panel 140 which may be readily removed by removal of nuts 142 from bolts 144. The panel 140 carries the heat absorbing portion of the refrigerating system and includes sections 28, 30, 32, 34, 36, 38 and accumulator 40, as is clearly shown in Figure 7. The sections 28 and 30 are utilized for cooling circulating air within the food storage compartment while the other sections of the heat absorbing means are utilized for freezing ice in an ice freezing zone within the interior of the metal casing 146. The casing 146 is formed preferably of stainless steel or steel having a coating of vitreous enamel in the general shape of a U and includes upright walls 148 and bottom wall 150. The upright walls have their ends secured to the top wall of the liner 62 and the rear edges of the upright walls are in engagement with the rear wall of the liner 62. The rear wall of the liner 62 is provided with an opening 154 which is closed by the removable panel 140. The upright walls 148 extend vertically across such opening. This opening 154 is provided for the ready insertion or removability of the heat absorbing sections of the system as is hereinafter more fully described. The bottom wall 150 of the casing 146 is provided with upwardly directed corrugations 160 upon which may be inserted receptacle 162. The bottom wall is also provided with an opening 164 to permit drip water from the refrigerating sections in the casing to flow from the casing when such sections are defrosted. The casing 146 has secured thereto guideways 170 for receiving lips 172 of drip pan 174. This enables the drip pan to slide on the guideways 170 so that it may be readily removed from beneath the casing. Drip collectors 176 are also carried by the casing 146 to collect any moisture that may drip from the casing and conduct such moisture to the drip receptacle. The drip collectors 176 and the guideways 170 are secured to the casing by means of bolts 180.

The entire heat absorbing means is carried by the removable wall 140 and includes portions for ice making and air cooling. The portion utilized for ice making includes a U-shaped sheet metal member 184 of single thickness which has secured thereto an upper shelf 186 and a shelf 188 positioned therebelow. The shelf 188 is removably mounted to the U-shaped member 184 so that it may be readily removed from the said member. The removable shelf is carried by lugs 190 and is provided with slots 192 so that the removable shelf may be lifted upwardly and then removed through the open front of the U-shaped member 184. To the U-shaped member is secured the heat absorbing sections 32, 34, 36 and 38. The sections 32 and 36 are secured to the side walls of the member 184 and the section 34 is secured to the bottom wall thereof while the section 38 is secured to the upper shelf of the member 184. On each side of the U-shaped member are located heat absorbing sections 30 and 28. These sections are the same and so only one will be described. The sections include vertically extending fins 200 through which a refrigerant conduit 202 extends. This conduit is arranged so that parallel runs extend through the upper portions of the fins in a horizontal plane and parallel runs extend through the lower portion of the fins on a vertical plane. This provides for more refrigerating coil in the upper portion of the fins per fin area than in the lower portion. The reason for this arrangement is that warm circulating air in the food storage compartment 62 comes in contact with the uppermost portion of the fins first and tends to warm up the fins at that point. Consequently the fins may be cooled to a lower temperature at that point than at the lower portion of the fins where the air is somewhat cooled before it reaches that point. By this arrangement it is possible to have a small compact fin area and at the same time direct the warm air over such fin surfaces so that when the refrigerating system is in operation the collection of frost and moisture on the fins will be evenly distributed so that during periods when the compressor is not operating the frost and ice accumulated on the fins will entirely melt off before the compressor again resumes operation. As will be noted, the U-shaped member 184 and the ice making sections 32, 34, 36 and 38 are disposed within the casing 146 in spaced relation thereto. The accumulator 40 is also positioned within the casing 146. As will be noted in Figure 3, the accumulator is elliptical shape in cross section and includes an inlet pipe 220 near the lower portion of the accumulator and an outlet conduit 222 adjacent the upper portion of the accumulator. By this arrangement any liquid that may get into the accumulator 40 would enter near the bottom thereof while the gaseous refrigerant would leave by the outlet 222 from the upper part of the accumulator. The bottom wall of the U-shaped member, shelf 188 and shelf 186 are all provided for supporting ice making receptacles 224. It will be noted that when the U-shaped member 184 is positioned within the casing 146 that it is positioned somewhat above the bottom wall 150 of the casing. This provides ample space for the receptacle 162. The receptacle 162 is provided with a lid 228 which may be loosely fitted on the receptacle 162 to provide ventilation therebetween or may tightly engage the upper edge of the receptacle and have one or more small holes (not shown) positioned in the lid so as to give ventilation to the foodstuff stored therein. Preferably the receptacle 162 is provided for the storage of meats and at, for example, slightly above the freezing point of water. This is accomplished by operating the refrigerating sections 32, 34, 36 and 38 sufficiently low enough for freezing substances but due to a removable panel 230 carried by flanges 234 on the bottom of the U-shaped member 184 the temperature therebelow is above the freezing point of water. This panel acts to insulate the direct effect of the cooling of the section 34 and maintains the temperature therebelow approximately at 34 degrees F. When it is desired to refrigerate the space below the panel 230 to a lower temperature, such panel is removed and, for example, placed under the receptacle 162. At this time the receptacle will be refrigerated to a temperature below the freezing point of water and if it is desired meats may be stored in the receptacle at this time and frozen. Also if desired the

removable shelf 188 may be removed and the receptacle 162 may be inserted upon the bottom wall of the U-shaped member directly below the shelf 186 where the receptacle will be cooled to somewhat below the freezing point of water. Thus it is possible to shift the receptacle 162 to various positions within the casing and provide large storage spaces for the freezing of meats or the preservation of foods below the freezing point of water or slightly above the freezing point of water as desired. The sections 28 and 30 are used for cooling the circulating air within the food storage compartment. Removable baffles 240 are positioned in front of the sections 28 and 30 for directing the flow of air over the sections 28 and 30. The baffles include imperforate portions 242 and slotted portions 244. Side flanges 246 are provided with arcuate slots 248 for insertion over lugs 250 carried by the casing 146 on one side and lugs 252 carried by the liner 62 on the other side of the baffle. It will be noted in the drawings that by simply raising the baffles upwardly the slots 248 disengage the lugs so as to permit the baffles to be readily removed. Immediately below the sections 28 and 30 are provided drip troughs 260 which are provided with louvers 262 in each side wall. The drip troughs include a projection 264 which extends over the drip collectors 176 for conducting the drip water from the sections 28 and 30 to the drip pan 174. The drip water first collects in the trough 260 whence it passes over the projection 264 to the drip collector 176 whence it passes into the drip pan 174. The troughs include straps 266 and 268. These drip troughs are removably connected to the rear wall of the liner by means of bolts 270. These bolts pass over the open end slot 272 in strap 268 and key-hole type slot 274 in strap 266 of trough 260. Suitable nuts 280 engage bolts 270 to clamp the troughs to the rear panel 140. A preferred way of securing the casing 146 to the inner liner 62 is as disclosed in Fig. 11. The casing 146 has an inturned flange 290 which is secured to the upper wall of the liner 62 by bolts 292. Interposed between the flange 290 and liner 62 is a thin layer of soft rubber 294. The soft rubber serves to seal the upper edges of the casing and the liner. As will be noted in Fig. 12, a gusset plate 296 extends across flange 290 of the casing 146. This gusset plate may be secured to flange 290 in any suitable manner such, for example, as by welding. A gusset plate of this type is provided for supporting the U-shaped member 184 at the front thereof by bolts 298 and nuts 287, the rear of the U-shaped member 184 being secured to panel 140 by means of bolts 300.

Also within the food storage compartment there is provided slidable shelves 304, which may be of any suitable open work construction. In addition, there is provided sliding receptacles 306, which may be of any suitable construction, and are used primarily for the storage of vegetables. Supported above the receptacles 306 are transparent glas plates 308. The glass plates are independently suspended and are slidably removable independent of the receptacles 306. Likewise the receptacles 306 are independently suspended and are slidably removable and independent of glass covers 308.

Within the casing 146 and secured to the top wall of the liner 62 is a switch control element 310. This switch control element is of the pressure operated type well known in the art and includes a power element in the form of an expansible bellows 314 (see Fig. 16). To the bellows is connected a small diameter conduit 316 which is provided with branch 318 and branch 319. To the branch 318 is connected a thermal bulb 320 and to branch 319 is connected thermal bulb 322. The two thermal bulbs and the two branch conduits as well as conduit 316 are connected in open communication with the bellows 314 and with each other. Preferably, the conduits 316, 318 and 319 are of very small diameter. Within the bellows 314, conduits 316, 318 and 319 and thermal bulbs 320 and 322 is confined a volatile fluid which serves to control the operation of the switch element by expansion and contraction of the bellows 314 in the well known manner. As shown in the drawings, the thermal bulb 320 is primarily responsive to the temperature of the heat absorbing section 30, and the thermal bulb 322 is responsive to the temperature of the U-shaped member 184 and heat absorbing section 36. Thus, when the temperature of heat absorbing section 30 rises to a predetermined point, the volatile fluid therein will initiate the operation of the switch to control operation of the motor compressor unit. The switch 310 is operatively connected with the electric motor of the motor compressor unit to control the electric circuit thereof by electric conduits (not shown). The switch completes such electric circuit when there is a demand for refrigeration and interrupts such circuit when the demand has been satisfied. As the temperature of the U-shaped member 184 and heat absorbing section 36 rises to a predetermined point, the thermal bulb 322 will initiate operation of the switch to start the motor compressor unit.

In the operation of my refrigerating system, I have arranged so that sections 28 and 30 of the heat absorbing means cools the circulating air in the food storage compartment. Preferably, the switch 310 is adjusted so that during normal operation sections 28 and 30 collect a slight film of frost on the fins and refrigerant conduit during operation of the motor compressor unit, and this slight film of frost melts off when the compressor unit is not operating. Due to the fixed restriction 56, which is interposed between the section 30 and section 32 of the heat absorbing means, the pressure in sections 28 and 30 is somewhat greater than in the ice making sections 32, 34, 36 and 38. Thus it is possible to cool the circulating air in the food storage compartment and defrost the cooling elements by the cycles of refrigeration while at the same time freeze ice by another portion by the heat absorbing means. Due to the fixed restriction 56, the pressure and temperature in the ice making sections is sufficiently low during operation of the motor compressor unit to provide for the rapid freezing of ice in the receptacles 234. While the sections 34 and 38 are adequate for the rapid freezing of ice in the receptacles placed thereabove, I have also provided sections 32 and 36 along the side walls of the U-shaped member 184 so as to aid in retaining a low temperature within the confines of the U-shaped member 184 when the motor compressor unit is not operating. This is due to the fact that with these added sections 32 and 36 the temperature within the confines of the U-shaped member 184 is pulled down sufficiently low as to hold its freezing temperature until during periods when the compressor is not operating so that such freezing temperature is maintained and until the motor compressor unit

resumes operation. By arranging the switch 310 so that it is responsive both to the high temperature as well as the low temperature heat absorbing units, it is possible to initiate operation of the motor compressor unit when either the ice making or box cooling sections require refrigeration. In some instances, it may be desirable to omit the conduit 319 and thermal bulb 322. At this time it is desired to point out that the switch 310, which includes bellows 314, is positioned part way inside the casing 146 where the low temperature air confined in the casing comes in contact with the bellows 314. Consequently, the thermal bulb 320 may rise to a temperature which would normally initiate operation of the switch, nevertheless that operation may be delayed for a brief period of time due to the chilling down of the fluid in the bellows 314. The chilling down of the fluid in bellows 314 has a tendency to counteract the effectiveness of the rising temperature of the fluid contained within the thermal bulb 320. This sometimes is advantageous in that when such condition occurs it is evident that the temperature in the casing 146 is such that it retains the frozen substances therein in their frozen condition and that delayed action of the switch would result in melting of frost and ice from the fins of the air cooling sections of the heat absorbing means. Thus the system is balanced so as to properly cool circulating air in the food storage compartment and maintain substances in their frozen condition as well as initially freezing such substances. As will be noted, the ice making sections of the heat absorbing means, as well as the U-shaped member 184, is spaced somewhat from the walls of the casing 146. This is so arranged that the circulating air confined within the casing 146 will not cause the cooling of the walls or casing 146 to a very low temperature. By proportioning the ice making sections and spacing them from the walls of the casing, as disclosed herein, it is possible to operate my refrigerating system without the collection of moisture upon the outer surface of the casing 146 during days when the relative humidity is below a certain value and never at such a temperature so as to collect frost on the outer surfaces of the casing 146. The casing 146 also includes an inturned flange 325 about its front face which is engaged by a door 327. The door includes panel 329 and carries a rubber sealing gasket 331 which engages the flange 325 to seal the front of the casing 146. Secured to the panel 329 is a panel 325 arranged in spaced apart relation so as to provide a dead air space for the door. This limits the flow of heat through the door into the interior of the casing 146. The door is hinged as at 340 so as to permit ready access to the interior of the casing. Since the casing 146 is sealed on top, rear and front walls, the circulating air within the food storage compartment cannot enter the interior of the casing and consequently the ice making sections of the heat absorbing means cannot extract moisture from air other than that which is confined within the interior of the casing 146. This small volume of air causes a very slight accumulation of frost upon the ice making sections of the heat absorbing means and U-shaped member 184, thus requiring defrosting of such sections and member only after long periods of operation. In view of the fact that the heat absorbing sections for cooling the circulating air defrost during periods when the compressor is not operating between each cycle of operation, it is unnecessary to shut the system down for defrosting. When the ice making sections of the heat absorbing means are defrosting, the drip water drops to the bottom wall 150 of the casing 146 or falls upon the lid of receptacle 162 whence it flows to the bottom wall 150, and due to the corrugations 160 the drip water may freely flow under the receptacle 162 and pass through opening 164 to drip pan 174.

As will be notel in Fig. 6, rear panel 140 is provided with openings 350. These openings 350 provide for open communication between the air within the insulation and the interior of the casing 146. Thus if there is any moisture within the air in the insulation, it will not be condensed out upon the rear wall of the panel 140 and cause the insulation to become wetted, but instead the moisture along with the circulating air in the insulation will pass to the ice making sections of the heat absorbing means and such moisture will readily be frozen out of such air. In cooling the air in the food storage compartment, the circulating air passes upwardly and through the slots 244 in baffles 240. The air is then cooled by sections 28 and 30 and flows downwardly into troughs 260 and through the louvers 262 into the food compartment below the troughs. This gives two distinct circulatory paths of air in the food compartment. The casing 146 also does some cooling of the air in the food storage compartment.

When it is desired to remove the refrigerating system from the cabinet all that is necessary is to remove panel 134, insulation 130, panel 140 and nuts 297 from bolts 298 and the entire heat absorbing section as shown in Fig. 7 may be removed from the cabinet through opening 154 in the rear wall of liner 62. The next step is to remove the flue 80 and the motor-compressor-condenser unit may be removed from the cabinet as the rear portion of the machine compartment is open.

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 a cabinet having an inner liner, a casing positioned within said liner, a refrigerant evaporating element positioned within said casing but spaced therefrom to maintain non-frosting temperatures on the exterior surfaces of said casing, a door for giving access to the interior of said casing, sealing means cooperating with said door and said casing to prevent the flow of air into the space enclosed by said casing and means cooperating with said door to provide a dead air space to limit the flow of heat through the door into said space.

2. Refrigerating apparatus comprising a cabinet having a food storage compartment with a vertical air passageway formed therein, a refrigerant evaporating element arranged in said passageway for cooling said cabinet, and a V-shaped trough positioned entirely below said element in said passageway for collecting the drip water from said element and being provided with louvers in each side thereof for the circulation of air therethrough and being arranged to collect moisture

in the lower part thereof and conduct it to one end of said trough.

3. Refrigerating apparatus comprising a cabinet, a casing positioned in said cabinet, a refrigerant evaporating element in said casing, a drip pan positioned below said casing, a receptacle positioned on the bottom wall of said casing and said casing having an opening in its bottom wall and corrugations formed therein whereby the defrost water from said element may drip on said receptacle and then flow between the bottom thereof and below the top of said corrugations into said opening and into said pan.

4. Refrigerating apparatus comprising a cabinet having a food compartment, a partition member in said compartment arranged to completely isolate a freezing zone from air circulating relation with said food compartment, said cabinet having an opening in the rear wall thereof leading to said compartment and into the space enclosed by said partition member, and heat absorbing means readily insertible and removable through said opening part into said space and part into said compartment on the outside of said partition member.

5. Refrigerating apparatus comprising a cabinet having a food compartment, a partition member in said compartment, said cabinet having an opening in the rear wall thereof leading to said compartment and into the space enclosed by said partition member, and heat absorbing means readily insertible and removable through said opening part into said space and part into said compartment, a drip receiver below said partition, and a trough below the heat absorbing means in said compartment for directing the drip water therefrom to said receiver.

6. Refrigerating apparatus comprising a cabinet having a food compartment, a partition member in said compartment, said cabinet having an opening in the rear wall thereof leading to said compartment and into the space enclosed by said partition member, and heat absorbing means readily insertible and removable through said opening part into said space and part into said compartment, a drip receiver below said partition, and a trough below the heat absorbing means in said compartment for directing the drip water therefrom to said receiver and a removable baffle positioned adjacent the heat absorbing means in said compartment.

LAWRENCE A. PHILIPP.