

April 22, 1941.

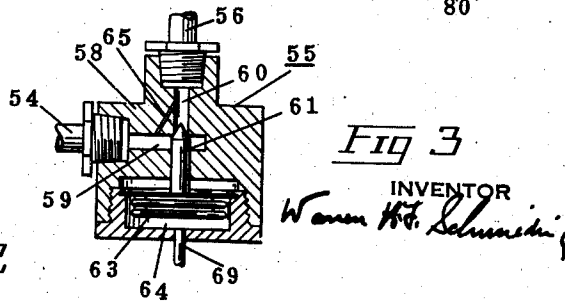
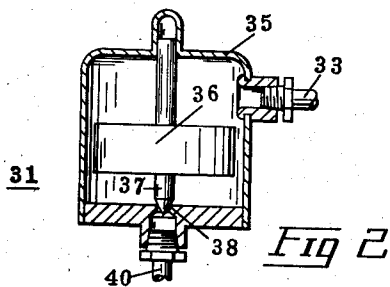
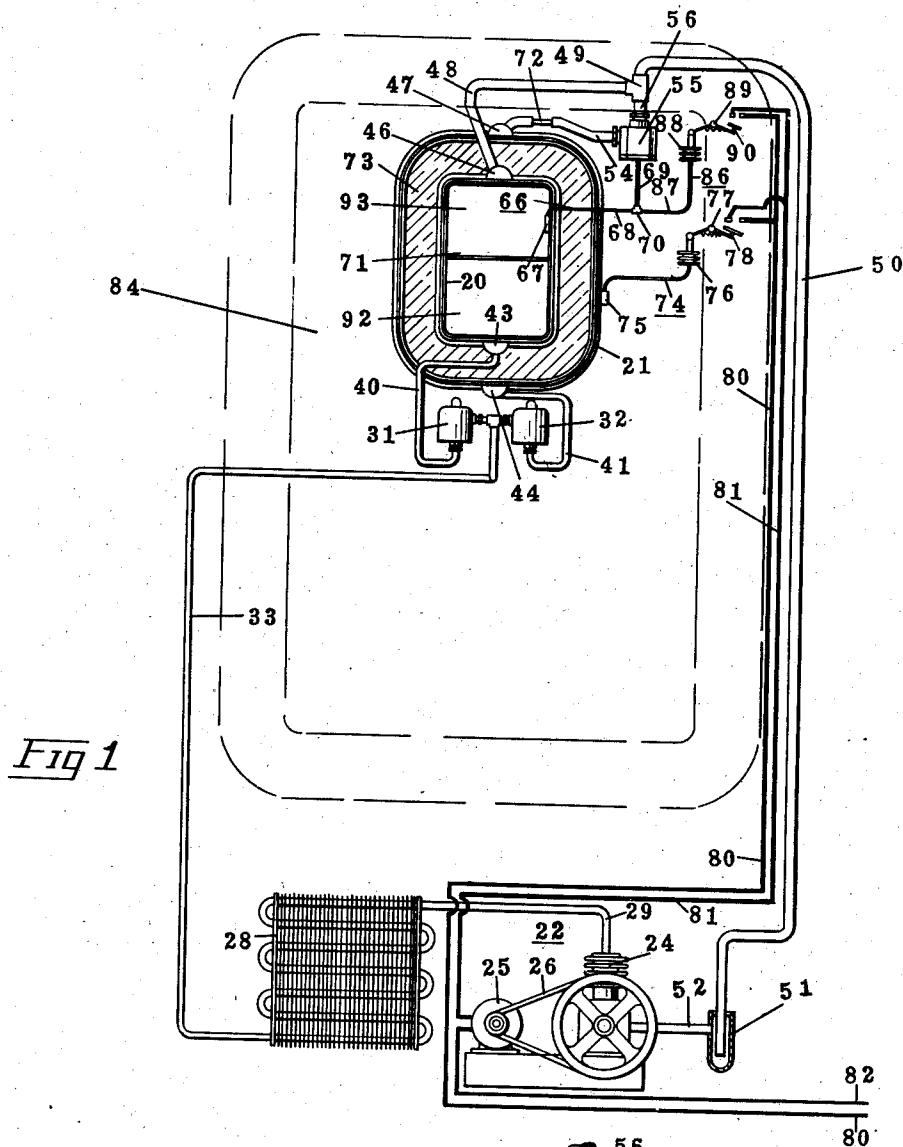
W. H. F. SCHMIEDING

2,239,583

REFRIGERATING SYSTEM

Filed July 7, 1938

4 Sheets-Sheet 1



INVENTOR

Wm H. Schmieding

April 22, 1941.

W. H. F. SCHMIEDING

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Fig 4

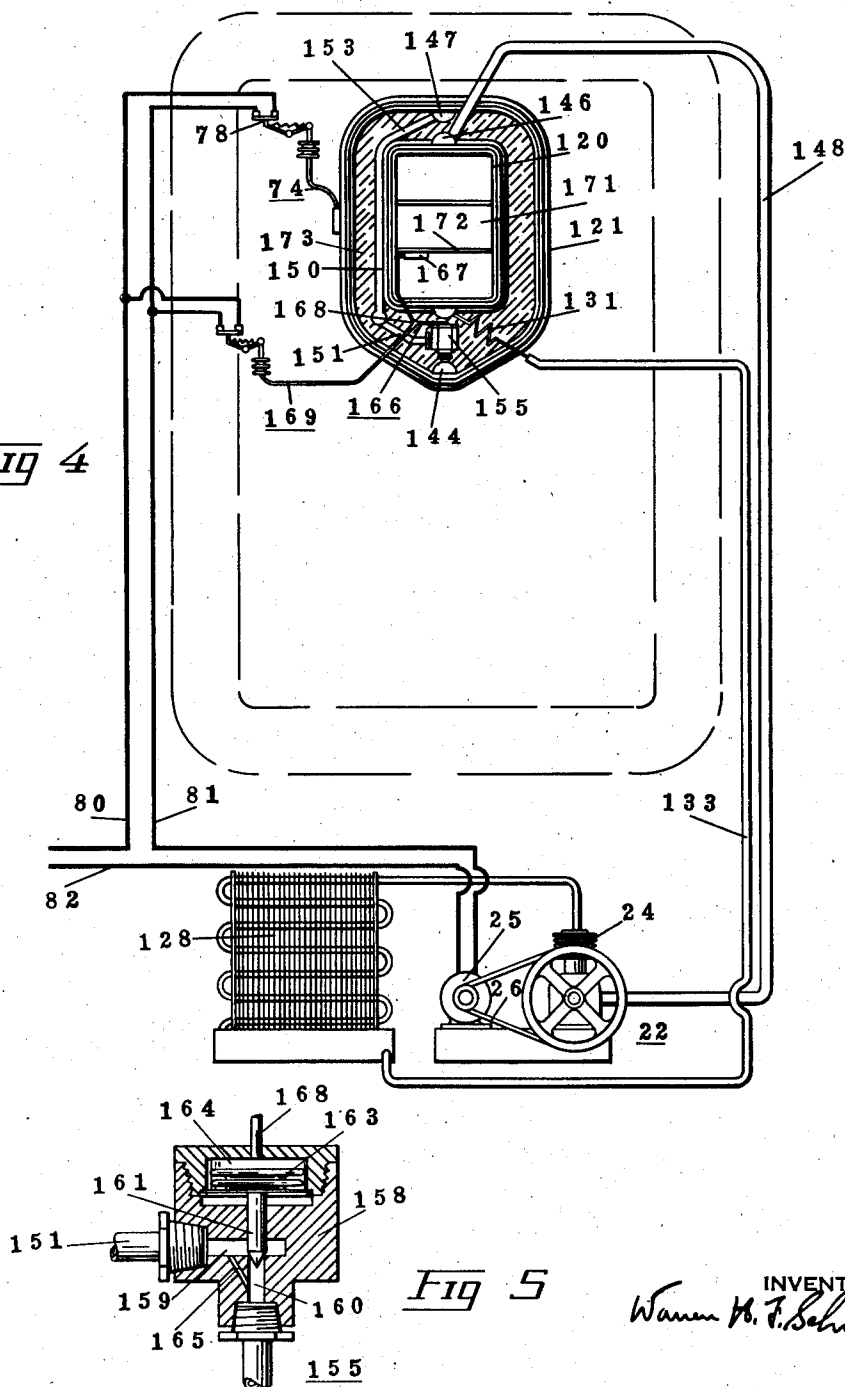


Fig 5

INVENTOR
Wm. H. F. Schmieding

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W. H. F. SCHMIEDING

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Fig 6

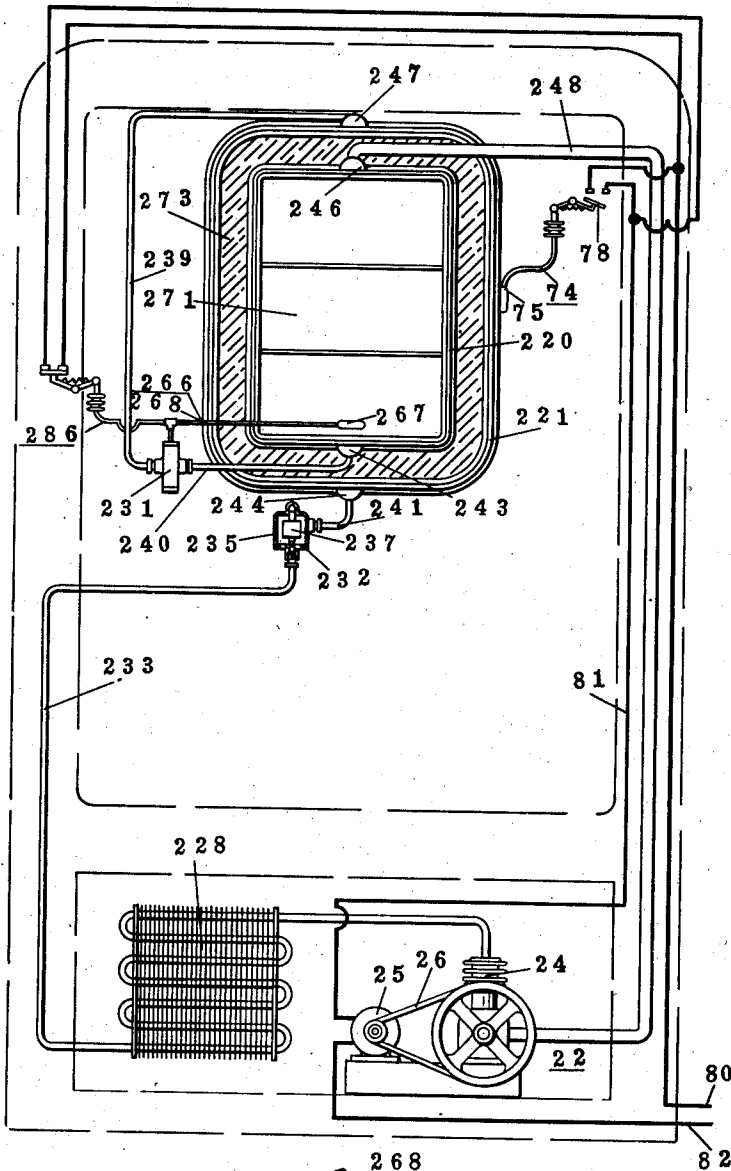
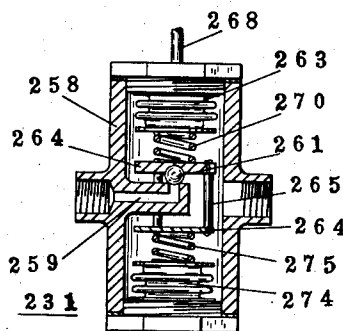


Fig 7



INVENTOR
Wm. H. F. Schmieding

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W. H. F. SCHMIEDING

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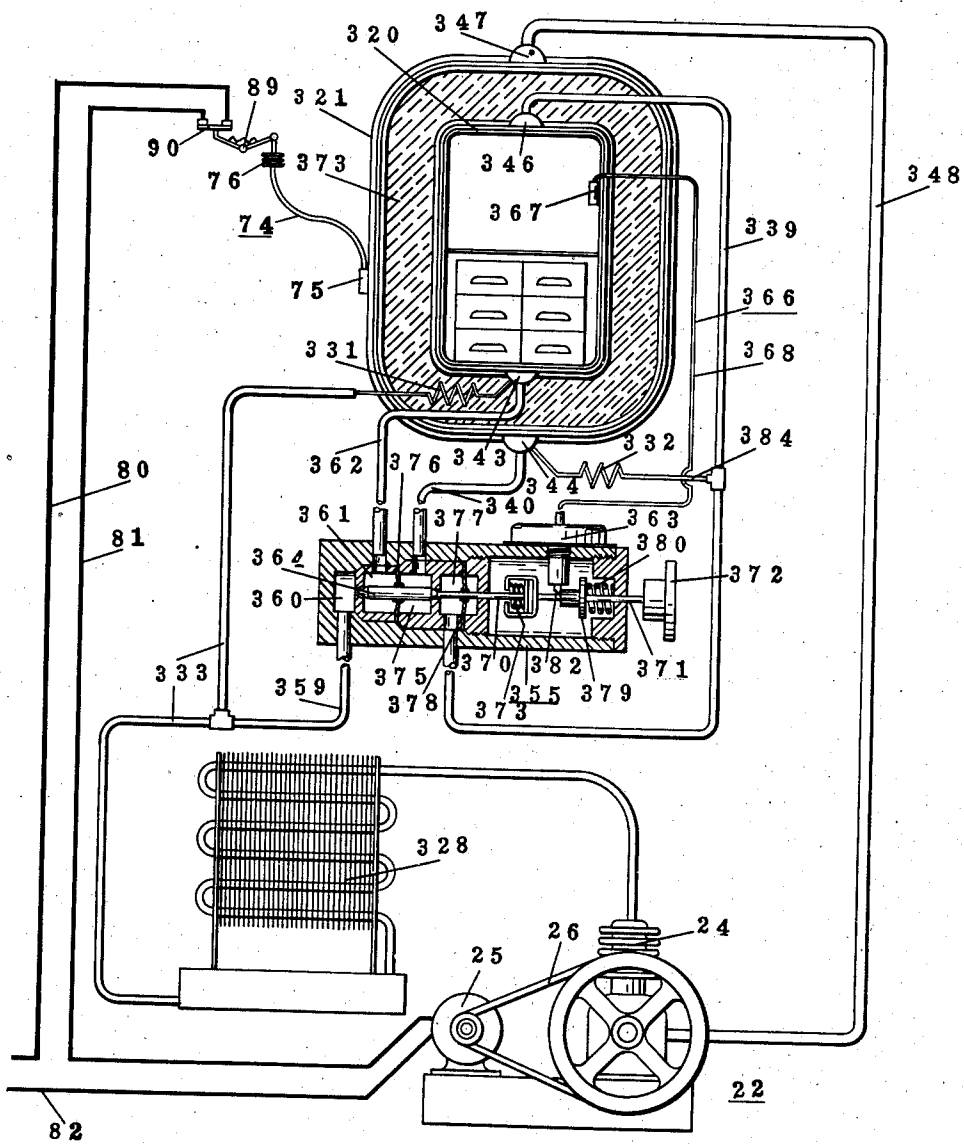


Fig 8

INVENTOR
Warren H. J. Schmedding

UNITED STATES PATENT OFFICE

2,239,583

REFRIGERATING SYSTEM

Warren H. F. Schmieding, Columbus, Ohio

Application July 7, 1938, Serial No. 217,873

20 Claims. (Cl. 62—116)

The present invention relates to refrigerating systems wherein a plurality of heat absorbers are associated with a single heat dissipator for cooling the absorbers and particularly to that type of system in which one of the heat absorbers is maintained at a relatively cold temperature for freezing or storing frozen products and the other is maintained at a relatively higher temperature for cooling air.

One of the objects of the present invention is to provide an improved method of and apparatus for obtaining a different temperature in one of the heat absorbers than the other and increasing the removal of heat from the low temperature absorber and decreasing the removal of heat from the higher temperature absorber in response to a demand for refrigeration on the relatively cold absorber.

More specifically it is a further object of the present invention to impede the flow of refrigerant through the relatively warm heat absorber in response to a demand for refrigeration on the relatively cold heat absorber.

Another object of the present invention is to provide a refrigerating system utilizing a plurality of evaporators connected in series circuit relation and controlling the pressure differential between the evaporators in response to a demand for refrigeration on the relatively cold evaporator.

A still further object of the present invention is to provide a refrigerating system employing a plurality of evaporators in which warm refrigerant under high pressure is directed through one of the evaporators when it is desirable to remove the frost therefrom.

Other and further objects and advantages will be apparent from the following description, reference being had to the accompanying drawings wherein preferred forms of embodiments of the present invention are clearly shown.

In the drawings:

Fig. 1 is a diagrammatic view of one form of my improved refrigerating system;

Fig. 2 is a cross sectional view of a pressure reducing valve employed in the system shown in Fig. 1;

Fig. 3 is a cross sectional view of another control valve employed in Fig. 1;

Fig. 4 is a diagrammatic view of another form of the invention;

Fig. 5 is a cross sectional view of one of the valves employed in Fig. 4;

Fig. 6 is a diagrammatic view of another form of the invention;

Fig. 7 is a cross sectional view of one of the valves employed in Fig. 6; and

Fig. 8 is a diagrammatic view of another form of the invention.

Referring first to Fig. 1, there is shown a refrigerating system embodying two heat absorbers 20 and 21 and a heat dissipator 22. The heat absorbers are herein shown as evaporators and the heat dissipator includes a compressor 24 which is driven by a motor 25 and belt 26. The heat dissipator also includes an air cooled condenser 28 which is connected with the high pressure side of the compressor by a pipe 29. Liquid refrigerant is conveyed to pressure reducing valves 31 and 32 by a pipe 33. The pressure reducing valves each include a casing 35 containing a float 36 which actuates a needle valve 37. When a predetermined amount of liquid is contained within the casing 35, the float 36 rises off of its seat 38 and admits liquid refrigerant in the case of valve 31, to pipe 40 and, in the case of valve 32, to the pipe 41. The pipe 40 is connected to the header 43 of evaporator 20 and the pipe 41 is connected to the header 44 of evaporator 21. The evaporators are preferably of the sheet metal type now generally used in the refrigerating industry and include two sheets of metal hermetically joined with one another, one of which being corrugated whereby to provide a plurality of ducts extending horizontally from either header 43 or header 44 and vertically to headers 46 and 47 of evaporators 20 and 21, respectively. Gaseous refrigerant is withdrawn from evaporator 20 through pipe 48 which is connected with header 46. This pipe 48 is connected by a coupling 49 to a pipe 50. The pipe 50 is connected to a vaporizing chamber or surge tank 51 and this tank is connected by a pipe 52 to the low pressure side of the compressor 24. Gaseous refrigerant is withdrawn from evaporator 21 by a pipe 54 which is connected with the outlet header 47. This gaseous refrigerant flows through a valve 55, whence it flows by a pipe 56 to the coupling 49 and from coupling 49 it flows by way of pipe 50, tank 51 and pipe 52 to the low pressure side of compressor 24.

The valve 55 is adapted to, at times, impede or stop, if desirable, the flow of gaseous refrigerant from the evaporator 21 to the compressor 24. This valve 55 includes a valve body 58 having a passage 59 for receiving refrigerant from pipe 54 and a passage 60 is controlled by a valve 61. This valve is actuated by a diaphragm 63 contained in a chamber 64. When the valve is closed the flow of refrigerant from evaporator

21 is stopped. It may be desirable, however, to permit a small quantity of gaseous refrigerant to escape from evaporator 21 and for this purpose I have provided a restricted by-pass 65 which interconnects passage 59 with the passage 60 so that a limited amount of refrigerant may be withdrawn from evaporator 21 although valve 61 is closed. The valve 61 is actuated by a thermostatic system 66 including a bulb 67 and pipes 68 and 69 connected by a coupling 70. This thermostatic system also includes the chamber 64. The thermostatic system contains a volatile fluid and the charge is such that when the bulb is at or above 32 deg. F., the pressure in the system is sufficient to collapse the diaphragm 63 and close the valve 61 on its seat.

Thus it is apparent that when warm foods or water, adapted to be frozen, are placed within the storage chamber 71 of evaporator 20, the thermostatic system 66 will function to stop or impede the flow of gaseous refrigerant from evaporator 21. In that event the withdrawing action of the compressor will be concentrated or primarily concentrated on withdrawing gaseous refrigerant from evaporator 20. This will continue until the evaporator 20 and the food stored therein have been reduced to the desired low temperature at which time the pressure will be reduced in the thermostatic system 66 to open the valve 61 whereby the refrigerating system will be returned to normal operation.

It is desirable to normally maintain the evaporator 21 above the temperature of evaporator 20, the purpose being to maintain the evaporator 21 merely slightly below the desired temperature of the air and the food products so as to limit or substantially prevent dehydration of the food products such as vegetables. This normal differential in temperature between evaporator 20 and 21 is obtained by making the evaporator 21 much larger than the evaporator 20, insulating the evaporators from one another by insulation 73 and providing a restriction 72 in outlet pipe 54 of evaporator 21.

Preferably the temperatures are controlled by thermostatic control system 74 including a bulb 75, a diaphragm 76 and snap acting mechanism 77, which controls the switch 78. The switch 78 controls the starting and stopping of the motor 25. The circuit for the motor comprises wire 80, switch 78, wire 81, motor 25 and wire 82.

The evaporators 20 and 21 are disposed within the storage compartment 84 of a refrigerator. Since the evaporator 20 is maintained below freezing temperature and the evaporator 21 is relatively higher in temperature, refrigerant vaporizing in evaporator 21 will condense within evaporator 20 during the idle period of the compressor. Now in the event that warm food or water is placed in the storage space 71 of evaporator 20, valve 61 will close and the flow of vaporized refrigerant from evaporator 21 to evaporator 20 will be stopped or impeded to such an extent that substantially no condensation will take place in evaporator 20. When this occurs the evaporator 21 will increase in temperature rapidly. When the temperature of the air within the compartment 84 increases beyond that desired, thermostatic system 74 will function to close the switch 78 to start the compressor 24. Preferably the bulb 75 is connected in intimate metallic contact with the wall of the evaporator so as to be responsive to the temperature thereof. Thus it is apparent that when warm food is contained within evaporator 20 and there is a

demand for refrigeration by evaporator 20, the thermostatic system 74 will function to start the compressor.

If desirable another thermostatic system 86 may be employed which will include in part, thermostatic system 66 for valve 61; namely, it will include bulb 67, pipe 68 and coupling 70 and will also include a pipe 87, a diaphragm 88 which actuates snap acting mechanism 89 for actuating a switch 90. This switch 90 is connected in parallel with switch 78. It is arranged to directly close the motor circuit when the bulb 67 functions to close valve 61. The thermostatic system 74 will maintain the compressor operative until the temperature of the evaporator 21 has been decreased to its desired normal low temperature and it is quite apparent that this relatively low temperature will not be attained until the demand for refrigeration on evaporator 20 has been satisfied because, until the demand on evaporator 20 is satisfied, the valve 61 will be maintained closed, and due to the fact that the compressor is concentrating or substantially concentrating on evaporator 20, the evaporator 21 will not be reduced to desired temperature until evaporator 20 is satisfied. If thermostatic system 86 is also employed, thermostatic system 74 will nevertheless maintain the compressor in operation until evaporator 21 has been satisfied.

Thus it is apparent that thermostatic system 86 may be omitted for the sake of reduction in cost of the apparatus. It does, however, have the effect of starting the compressor quickly in response to a demand for refrigeration by evaporator 20.

From the foregoing it will be seen that the evaporators 20 and 21 are maintained at the desired temperatures substantially at all times and that evaporator 21 will not ordinarily be reduced to a temperature which is too cold for the proper preservation of food products such as vegetables even though there is an extensive demand on evaporator 20 which would require a continuous or substantially continuous operation of compressor 24. During this period the flow of gaseous refrigerant from evaporator 21 is stopped or impeded to such an extent that the temperature throughout will not be reduced beyond that normally desired.

The compartment 71 of evaporator 20 is preferably divided into a food storage compartment 92 for frozen foods and an ice freezing compartment 93.

In the embodiment illustrated in Fig. 4 one of the heat absorbers 120 is illustrated as an evaporator and the other heat absorber 121 is part of a secondary system which is cooled by evaporator 120. In this embodiment the evaporator 120 is constructed similar to evaporator 20 and evaporator 121 is similar to evaporator 21 except that the upper header 147 of the evaporator 121 extends downwardly merely for convenience. In this embodiment the well known resistor type pressure reducer 131 is employed comprising a long spiral having a very small inside diameter. Refrigerant is withdrawn from the upper header 146 to the low pressure side of the compressor 24 by a pipe 148 and the condensed refrigerant from condenser-receiver 128 is conducted by the pipe 133 to the restrictor 131. Like in Fig. 1, the evaporator 120 is the low temperature evaporator for freezing water and storing frozen foods and is supported in insulation 173. The secondary system includes a condenser 150 which is in intimate heat exchange relation

with a side wall of evaporator 120. The condensed refrigerant flows from the low part thereof by a pipe 151 to a valve 155 and the outlet of the valve 155 is connected with the header 144 of evaporator 121. The inlet of condenser 150 is connected by a pipe 153 to the outlet header 147 of the evaporator 121. The valve 155 is substantially the same as valve 55 of Fig. 1 except that it is inverted. It includes a valve body 158 forming passages 159 and 160 which are controlled by a valve 161 actuated by a diaphragm 163. This diaphragm 163 is contained within a closed chamber 164 and is actuated by a thermostatic system 166 including a bulb 167, and a pipe 168, which is connected with the chamber 164. The bulb 167 is disposed within the storage compartment 171 of evaporator 120 and if desirable it may be placed in intimate metallic contact with an ice tray support 172.

When warm water or relatively warm food is placed in the compartment 171, the volatile fluid in the thermostatic system 166 will expand and cause the valve 161 to close to impede or stop the flow of liquid in condenser 150 to the header 144 of evaporator 121. When circulation through the secondary system is stopped or impeded, less heat will be withdrawn from the condenser 150 to the evaporator 120 and therefore the evaporator 120 concentrates its cooling effect upon the products stored within the compartment 171.

In this system, like that shown in Fig. 1, the motor 25 is started and stopped by the closing and opening of a switch 78 which is controlled by the same type of thermostatic system 74 as is employed in Fig. 1. When the temperature of the evaporator 121 attains a predetermined high value the switch 78 will be closed and remain closed until the evaporator is cooled to a predetermined low value. When there is a demand for refrigeration by evaporator 120, the valve 155 will be closed or the flow of refrigerant therethrough will be impeded causing the temperature of evaporator 121 to increase to start the motor. When the demand from evaporator 120 is satisfied, valve 155 will be opened widely and the refrigerating system will be maintained operative until temperature of evaporator 121 is satisfied at which time, it will operate to stop the motor. If desirable, valve 155 may be provided with a restricted by-pass 165 interconnecting passages 159 and 160 so as to provide a limited flow of refrigerant through evaporator 121 during the period when there is a demand for refrigerant on evaporator 120. Also, if desired a thermostatic system 169 may be employed including a pressure operative switch in parallel with switch 78 for the purpose as described relative to Fig. 1.

In the embodiment shown in Fig. 6, evaporators 220 and 221 are connected in series circuit relation. In this embodiment the refrigerant from the condenser 228 flows through a pipe 233 to a pressure reducing valve 232 whence it flows by pipe 241 to the header 244 of evaporator 221. The refrigerant first passes through evaporator 221 to its header 247 whence it flows by a pipe 239 through a pressure reducing valve 231 through a pipe 240 and empties into the header 243 of evaporator 220. Refrigerant after passing through evaporator 220 flows from the header 246 through a pipe 248 to the low pressure side of the compressor.

Preferably the valve 232 is of the pressure differential type, that is it includes a casing 235 containing a weighted valve 237. Pressure in the

high pressure side lifts the valve off its seat to permit the flow of liquid refrigerant from the pipe 233 to pipe 241. When the differential in pressure in pipe 233 is at a predetermined value with respect to the pressure within the evaporator 221, the weighted valve 237 is lifted off its seat to admit more refrigerant to the evaporator 221.

Valve 231 is also of the pressure differential type and one form thereof is shown in Fig. 7 in which the casing 258 is connected with pipes 239 and 240. A passage 259 is connected with the pipe 239 and the flow of refrigerant through the passage is controlled by a ball valve 261. This ball valve 261 is weighted by upper and lower discs 264 connected with one another by three spacers 265. Valve 261 is lifted off its seat by pressure within the pipe 239 and the pressure at which valve 261 is opened is controlled by the weight of valve 261 the discs 264 and spacers 265 as one factor and pressure of a thermostatic system 266 as another factor. This thermostatic system 266 includes a bulb 267, a pipe 268 and a bellows type diaphragm 263. An increase in pressure in the thermostatic system 266 causes an increase in the closing pressure of the valve 261, the force being transmitted from the bellows 263 to the top of the upper disc 264 through a spring 270. The valve 231 is balanced for changes in pressure within the low pressure side of the valve by a second bellows 274 and a spring 275 which latter is interposed between the bellows 274 and the lower disc 264. Thus it is apparent that the valve 261 is not affected by mere change in the pressure in the low pressure side of casing 258 but raised off its seat by an increase in pressure differential between the pressure above and below the valve. This pressure differential is varied by the pressure in the thermostatic system 266.

Obviously since the pressure within the evaporator 220 is less than the pressure in evaporator 221 and the inner evaporator 220 is insulated by insulation 273 the former is maintained relatively colder. The valve is so adjusted that evaporator 221 is maintained considerably above freezing temperature while the evaporator 220 is maintained below water freezing temperature. When warm water or unfrozen foods are placed within the compartment 271 of evaporator 220, thermostatic system 266 will function to increase the closing pressure on the valve 261 whereby a lower pressure must be drawn on evaporator 220 before the valve opens and consequently the refrigerant in evaporator 220 will be colder. In this manner the withdrawing effect of the compressor will be concentrated on evaporator 220 and under certain conditions the pressure and temperature within evaporator 221 will be increased.

Like in Figs. 1 and 4 the motor is controlled by a thermostatic system 74 which actuates a switch 78. This switch 78 includes a thermostatic bulb 75 placed in intimate heat exchange relation with the evaporator 221. It is apparent therefore that when relatively warm products are placed within evaporator 220 the thermostatic system 266 will function to cause a relative increase in the removal of heat from evaporator 220 and since the refrigerating effect of evaporator 221 is decreased the thermostatic system 74 will not function to shut off to interrupt the motor circuit until after the demand on evaporator 220 has first been satisfied and then only after the evaporator 221 has been reduced to its

desired minimum temperature. If desirable a thermostatic system 286 may also be employed and connected with bulb 267 so as to start the compressor when the thermostatic system 266 functions to increase the pressure differential between evaporators 220 and 221.

In the embodiment illustrated in Fig. 8 the flow of high pressure refrigerant is normally as follows: High pressure refrigerant flows from condenser-receiver 328 through a pipe 333 and restrictor 331 to the header 343 of the evaporator 320. The refrigerant then flows through evaporator 320 into header 346. From the header 346 the refrigerant flows by a pipe 339 through a valve 355 and pipe 340 to the header 344 of evaporator 321. The outlet header 347 of evaporator 321 is connected by the pipe 348 to the low pressure side of the compressor. The inner evaporator 320 is insulated from the outer evaporator 321 by insulation 373 and since it is insulated and since it is the first to receive the liquid refrigerant, it is maintained at a relatively colder temperature than the evaporator 321. The construction of the arrangement is such that normally evaporator 320 is maintained below freezing temperature while evaporator 321 is maintained slightly below the temperature of the surrounding air and the temperature of the food to be refrigerated.

Due to the fact that evaporator 320 is maintained at a relatively low temperature, moisture from the air and food stored therein will condense upon the walls thereof and the evaporator will become frosted and impair the efficiency thereof. Therefore it is desirable to, at times, defrost evaporator 320 and a valve 355 is provided for this purpose. In the embodiment illustrated the valve is in its defrosting position in which it will be seen that the liquid refrigerant will flow through a conduit which by-passes the restrictor 331. This by-pass includes a pipe 359 and a pipe 362. The pipe 359 is also connected with the pipe 333 and the pipe 362 is also connected with the header 343 of evaporator 320.

The flow of refrigerant from passage 360 and 361 is controlled by a valve 364. This valve is carried by a rod 370. Rod 370 is coupled with a rod 371 having a pull knob 372 thereon. A spring coupling is interposed between rod 371 and 370 including a spring 373 which normally urges the rod 370 to the right when the valve is in the position shown.

The valve 355 also includes a chamber 375 which is separated from chamber 361 by a diaphragm 376. The valve 355 also includes a chamber 377 which is sealed from the exterior and to rod 370 by a diaphragm 378. The flow of refrigerant from chamber 377 to chamber 375 is also controlled by the valve 364, that is when the chambers 360 and 361 are in communication, the passage between chambers 377 and 375 is closed, and vice versa, when the valve is in the opposite position. The rod 371 carries an abutment 379 and a spring 380 is interposed between the abutment 379 and an end wall of the valve 355 and normally urges the rod 371 to the left. The rod 371 is held in the position shown by a latch 382. When the latch 382 is withdrawn, the spring 380 forces the rod 371 and the rod 370 to the extreme left whereby the passage between chambers 360 and 361 is closed and the passage between chambers 377 and 375 is opened.

A thermostatic system 366 is employed for releasing the latch 382. This thermostatic system includes a bulb 367 and a diaphragm contained

within housing 363. The housing 363 is connected with the bulb 367 by a pipe 368.

When the valve is in the position shown; namely, in the defrosting position, the high pressure refrigerant will flow from the condenser receiver 328 through pipes 333 and 359, chambers 360 and 361 and pipe 362 to the header 343 of evaporator 320. The refrigerant will first flow through the evaporator and out of the header 346 thence into the pipe 339 whence it will flow by a pipe 384 through a restrictor type pressure reducer 332 and into the header 344 of evaporator 321. Refrigerant after passing through the evaporator 321 will leave by header 347 and flow to the low pressure side of the compressor by pipe 348.

It will be noted that at this time the evaporator 320 will be in the high pressure side of the refrigerating system and will function to absorb heat from the liquid refrigerant in the high pressure side, thus causing the ice thereon to be melted. It will also be noted that at this time refrigerant cannot pass through the by-pass including the lower part of pipe 339, chambers 377 and 375 of valve 355 and pipe 344 but must flow through the restrictor 332.

The thermostatic system 366 contains a freezing substance such as water within the bulb 367 and oil within the pipe 368 and the chamber 363. When the ice within bulb 367 melts, the pressure will be decreased within the thermostatic system causing the latch 382 to be released whereby the spring 380 will cause the valve 364 to close the passage between chamber 360 and 361 and open the passage between chambers 377 and 375 whereby the system will be reduced to normal.

The evaporator 320 may be defrosted by merely pulling outwardly on the knob 372 and the latch 382 will hold the rods 370 and 371 in the position shown. The defrosting operation will take place quickly in view of the fact that the ice will be melted by the heat of the high pressure refrigerant. In other words, during the defrosting operation the quick freezing evaporator 320 functions as a condenser for a refrigerating system in which the air cooling type of evaporator is the other evaporator of the system. When the ice is melted, the pressure will be reduced in thermostatic system 366 and the latch 382 will be retracted. Thus the system is returned to normal automatically.

A thermostatic system like 86 of Fig. 1 may be employed for starting and stopping the compressor in accordance with the temperature of the low temperature evaporator 320. In the preferred embodiment the compressor motor 25 is controlled by a thermostatic system 74 like that shown in Fig. 1.

While the forms of embodiments of the present invention as herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow:

1. A refrigerating system comprising in combination, a plurality of heat absorbers, one of which provides a relatively low temperature for freezing and storing frozen products and another provides a relatively higher temperature for maintaining products above freezing temperature, a heat dissipator associated with the heat absorbers for removing heat from the latter including a fluid conduit continuously open while the heat dissipator is operating for the circulation of refrigerant through the second mentioned heat absorber, means responsive to a temperature

slightly above 32 Deg. F. of the environment affected by the first mentioned heat absorber for varying the rate of removal of heat units from the first mentioned heat absorber.

2. A refrigerating system comprising in combination, a plurality of heat absorbers, one of which provides a relatively low temperature for freezing and storing frozen products and another provides a relatively higher temperature for maintaining products above freezing temperature, a heat dissipator associated with the heat absorbers for removing heat from the latter including a fluid conduit continuously open while the heat dissipator is operating for the circulation of refrigerant through the second mentioned heat absorber, means responsive to a temperature slightly above 32 Deg. F. of the environment affected by the first mentioned heat absorber for increasing the removal of heat units from the first mentioned heat absorbers and decreasing the removal of heat units from the second mentioned heat absorbers.

3. A refrigerating system comprising in combination, a plurality of heat absorbers, one of which provides a relatively low temperature for freezing and storing frozen products and another provides a relatively higher temperature for maintaining products above freezing temperature, a heat dissipator associated with the heat absorbers for removing heat from the latter including a fluid conduit continuously open while the heat dissipator is operating for the circulation of refrigerant through the second mentioned heat absorber, means responsive to a temperature slightly above 32 Deg. F. of the first mentioned heat absorber for varying the effects of the heat absorbers.

4. The method of refrigeration which consists in withdrawing heat from a plurality of evaporators by a heat dissipator at such rates that one of the evaporators is reduced to below water freezing temperature and the other is maintained, at least part of the time, above water freezing temperature, and increasing vaporization in the first mentioned evaporator while vaporizing liquid refrigerant in the second mentioned evaporator and decreasing vaporization in the second mentioned evaporator in response to an increased demand for refrigeration on the first mentioned evaporator.

5. The method as defined in claim 4 including the step of decreasing vaporization in the first mentioned evaporator when the increased demand for refrigeration is satisfied.

6. The method of refrigeration which consists in withdrawing heat from a plurality of heat absorbers by a heat dissipator, having a limited capacity, at such rate that one of the heat absorbers is reduced to below water freezing temperature and the other is maintained, at least part of the time, above water freezing temperature, and concentrating the withdrawing effect of the heat dissipator upon the first mentioned heat absorber by restricting the withdrawing effect of the heat dissipator upon the second mentioned heat absorber in response to an increased demand for refrigeration on the first mentioned heat absorber.

7. The method of refrigeration which consists in vaporizing volatile refrigerant in a plurality of evaporators by a refrigerant circulating and heat dissipating means, having a limited capacity, at such rate that one of the evaporators is reduced to below water freezing temperature and the other is maintained, at least part of the time,

above water freezing temperature, and increasing the rate of volatilization in the first mentioned evaporator by restricting circulation of refrigerant through the second mentioned evaporator in response to an increased demand for refrigeration on the first mentioned evaporator.

8. The method of refrigerating in that type of system in which a freezing type heat absorber and an air cooling type heat absorber are employed and in which it is desirable to defrost the freezing type heat absorber at times, which method consists in circulating a refrigerating medium through the heat absorbers at such rate that desired temperatures are maintained constantly in the air cooling heat absorber and at times a sub-freezing temperature is maintained in the freezing heat absorber, and when defrosting the latter, causing the same to function as a cooling element for the refrigerating medium.

9. A refrigerating system comprising in combination, a freezing type evaporator and an air cooling type evaporator, said evaporators being connected in series, a regulating valve for controlling the flow of refrigerant from the air cooling type evaporator to the freezing type evaporator, means for withdrawing gaseous refrigerant from the freezing type evaporator and for condensing the refrigerant and for delivering the same to the air cooling type evaporator, pressure reducing mechanism between said means and said air cooling type evaporator, and means responsive to the temperature of the environment affected by the freezing type evaporator for controlling said regulating valve.

10. A refrigerating system comprising in combination, a heat dissipator, a freezing type heat absorber and an air cooling type heat absorber connected in parallel circuit relation with respect to one another and each in series circuit relation with respect to the heat dissipator, means for varying the rate of flow of refrigerating medium through the air cooling type heat absorber, and means responsive to temperature of the environment affected by the freezing type heat absorber for actuating the first mentioned means.

11. A refrigerating system comprising in combination, a heat dissipator, a freezing type heat absorber and an air cooling type heat absorber connected in series circuit relation with one another and with the heat dissipator, means for controlling the flow of refrigerating medium from one to the other of said heat absorbers and means responsive to temperature of the environment effect by the freezing type heat absorber for actuating the first mentioned means.

12. A refrigerating system comprising in combination, a heat dissipator, a freezing type heat absorber and an air cooling type heat absorber connected in series circuit relation with one another and with the heat dissipator, means for varying the flow of refrigerating medium through the air cooling type heat absorber, and means responsive to temperature of the environment affected by the freezing type heat absorber for actuating the first mentioned means.

13. A refrigerating system comprising in combination, a freezing type heat absorber and an air cooling type heat absorber, a heat dissipator associated with the absorbers for reducing the freezing type heat absorber to below 32 deg. F. and for maintaining the air cooling type heat absorber, at least at times, above 32 deg. F., means for varying the rate of flow of refrigerating medium through the air cooling type heat absorber, and means responsive to temperature

of the environment affected by the freezing type heat absorber for actuating the first mentioned means.

14. A refrigerating system comprising in combination, a heat dissipator; a freezing type heat absorber and an air cooling type heat absorber; valve means, said valve means having two operating positions, said valve means, when in one position, connecting the absorbers with the heat dissipator for causing cooling of the absorbers, and when in the other position, connecting the absorbers in series with one another and in series with the heat dissipator, said last connection providing a path for the flow of refrigerant to the freezing type absorber at a temperature above 32 deg. F. for heating the said freezing type absorber; and means responsive to the temperature of the environment affected by the freezing type absorber for actuating the valve means.

15. A refrigerating system comprising in combination, a freezing type evaporator; an air cooling type heat absorber; a heat dissipator associated with the aforementioned elements for reducing the temperature of the evaporator to below 32 deg. F. and for maintaining the heat absorber, at least at times, at a temperature above 32 deg. F.; and means for varying the refrigerating effect of the evaporator including a valve for varying the rate of flow of refrigerating medium through the absorber, and a thermostatic device responsive to the environment affected by the evaporator for controlling the valve.

16. A refrigerating system comprising in combination, a freezing type evaporator and an air cooling type evaporator, said evaporators being connected in series, pressure reducing means connected with the inlet of the air cooling type evaporator, a second pressure reducing means interposed between the outlet of the air cooling type evaporator and the inlet of the freezing type evaporator, means for withdrawing refrigerant from the outlet of the freezing type evaporator and for condensing such refrigerant and for delivering the condensed refrigerant to the first mentioned pressure reducing means, and means responsive to the temperature of the environment affected by the freezing type evaporator for regulating the second mentioned pressure reducing means.

17. A refrigerating system comprising in combination, a freezing type evaporator and an air

cooling type evaporator; pressure reducing means at the inlets of each of said evaporators; a by-pass for each of the means; valve means having two positions, said valve means, when in one position, connecting the evaporators in series circuit relation with one of the by-passes open and the other closed, said valve means, when in another position, connecting the evaporators in series circuit relation with the first mentioned by-pass closed and the second mentioned by-pass open, means for withdrawing refrigerant from the evaporator last to receive refrigerant and for compressing the same and for delivering compressed refrigerant to the evaporator first to receive refrigerant; and means for controlling the valve means.

18. The method of refrigeration in that type of system employing a freezing type heat absorber and an air cooling type heat absorber which method consists in circulating a refrigerating medium through the heat absorbers at such rate that the freezing type heat absorber is reduced to below water freezing temperature and the air cooling type heat absorber is maintained, at least part of the time, above water freezing temperature, maintaining the air cooling type heat absorber at substantially normal temperature and simultaneously defrosting the freezing type heat absorber by continuing the circulation of refrigerant medium through the air cooling type heat absorber while causing the heated refrigerating medium to flow through the freezing type heat absorber.

19. The method of refrigeration which consists in vaporizing liquid refrigerant in a plurality of evaporators by a heat dissipator at such rates that one of the evaporators is maintained, at least part of the time, above water freezing temperature, and, while vaporizing liquid refrigerant in said one evaporator, increasing the rate of vaporization in the other of the evaporators to provide a quick freezing temperature in response to a demand for such temperature on said other evaporator.

20. The method as defined in claim 19 including the step of decreasing the rate of heat absorption by the first mentioned evaporator when the increased demand for refrigeration is satisfied.

WARREN H. F. SCHMIEDING.