July 29, 1952 L. W. ATCHISON 2,604,761

TWO-TEMPERATURE REFRIGERATING SYSTEM

Filed April 21, 1949

Fig. 1.

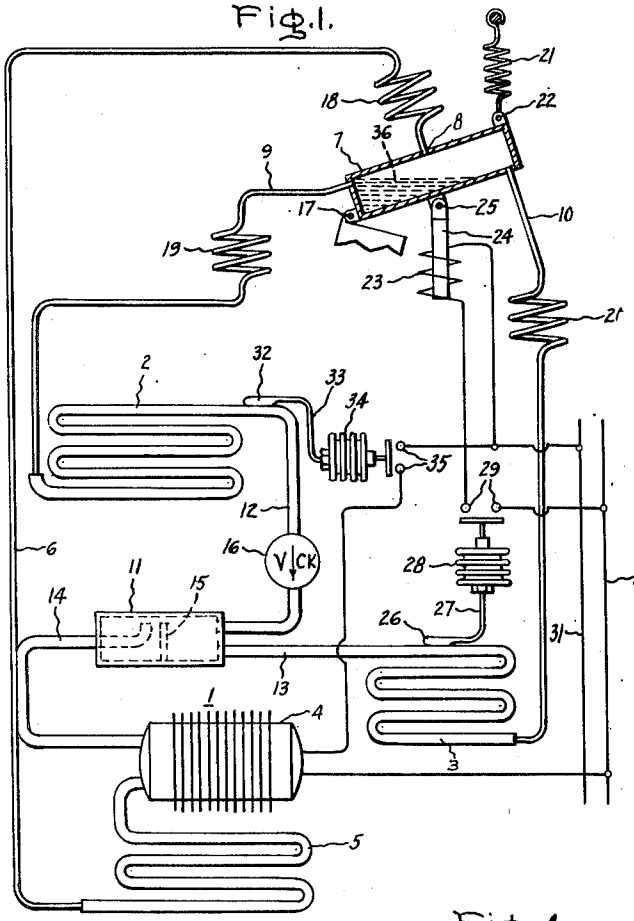


Fig. 2.

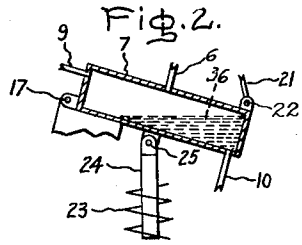


Fig. 3.

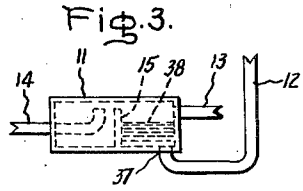
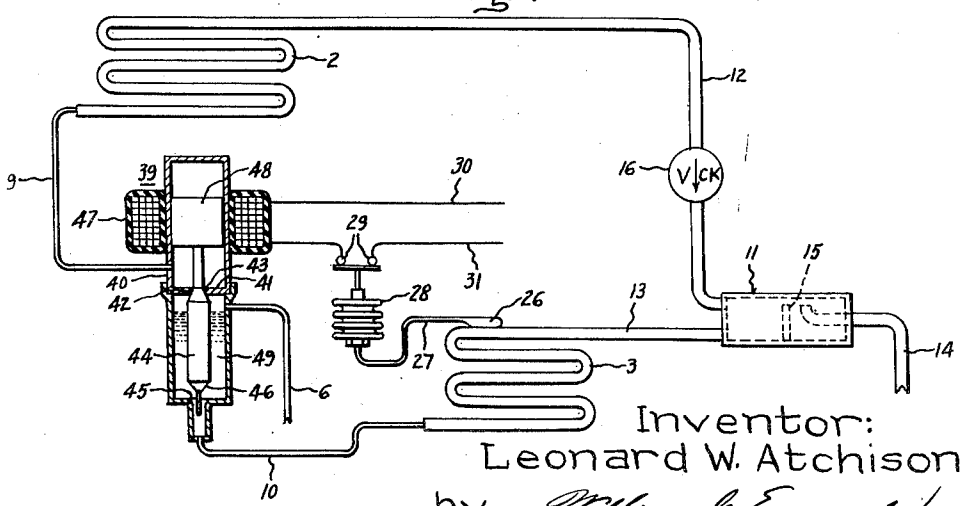


Fig. 4.



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TWO-TEMPERATURE REFRIGERATING SYSTEM

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13 Claims. (Cl. 62—3)

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My invention relates to refrigerating systems and more particularly to refrigerating systems including a plurality of evaporators.

In many refrigerating systems it is desirable to employ a plurality of evaporators. For example, in combination refrigerators, which include a compartment for storing frozen food and a second compartment for storing fresh food, it may be necessary to provide two evaporators, one of which operates at a low temperature for refrigerating the frozen food compartment, and the other of which operates at a higher temperature for refrigerating the fresh food compartment. Where both evaporators are supplied with refrigerant from a common condensing unit, some arrangement may be utilized for selectively directing liquid refrigerant to one or the other of the evaporators. Also, it may be desirable in some instances to operate the higher temperature evaporator on a defrosting cycle so that any frost accumulated during the operating period of the higher temperature evaporator is melted and disposed of during the idle period of this evaporator.

Accordingly, it is an object of my invention to provide a refrigerating system including two evaporators and including an improved arrangement for directing refrigerant selectively to either evaporator.

It is another object of my invention to provide an improved refrigerating system including two evaporators operated at different temperatures and including an arrangement for making a substantial body of liquid refrigerant available to the higher temperature evaporator when refrigeration is called for by the higher temperature evaporator.

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

In carrying out my invention a refrigerating system is provided which includes two evaporators. A reservoir is provided for receiving liquid refrigerant from the condensing unit and discharging the refrigerant selectively to either evaporator. Where the two evaporators are operated at different temperatures, the conduits connecting the two evaporators to the reservoir are arranged so that a substantial body of liquid refrigerant is maintained in the reservoir during refrigeration of the low temperature evaporator and this refrigerant is immediately available for discharge to the higher temperature evaporator when that evaporator calls for refrigeration. The vaporization of this body of liquid refrigerant in the higher temperature evaporator effects a rapid increase in the suction pressure of the system and hence the system rapidly reaches a more efficient operating condition during the time when refrigeration is supplied to the higher temperature evaporator.

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For a better understanding of my invention reference may be had to the accompanying drawing in which Fig. 1 is a schematic illustration of a refrigerating system incorporating my invention; Fig. 2 shows a portion of the apparatus illustrated in Fig. 1 in a different position; and Fig. 3 shows a modified form of a portion of the refrigerating system; and Fig. 4 is a schematic illustration of a modified form of my invention.

Referring now to Figs. 1 and 2, there is illustrated a refrigerating system including a condensing unit 1 and two evaporators 2 and 3. The condensing unit includes a motor-compressor unit positioned within a hermetically-sealed case 4 and a condenser 5. Liquid refrigerant is supplied from the condenser 5 through a restricted conduit, or capillary tube, 6.

In order to direct liquid refrigerant from the condensing unit selectively to either of the two evaporators 2 and 3, an elongated reservoir 7 is provided. The conduit 6 is connected to the reservoir 7 at the top central portion thereof, as indicated at 8. Refrigerant is supplied from the reservoir 7 to the evaporator 2 through a conduit 9, and refrigerant is similarly supplied to the evaporator 3 through a conduit 10. As implied above, the term "reservoir" as used in this specification and the claims thereof is intended to denote a storage container of appreciable size capable of storing a substantial body of refrigerant, and specifically capable of storing sufficient liquid refrigerant to have a material effect in rapidly raising the pressure of the higher temperature evaporator when this refrigerant is discharged thereto. The specific manner in which this is carried out in the applicant's invention is pointed out in detail in this specification.

A common header 11 is provided for the two evaporators 2 and 3. The evaporator 2 is connected to one end of the header 11 by a conduit 12, the evaporator 3 is connected to the same end of the header by a conduit 13, these conduits primarily conducting vaporized refrigerant from the evaporators to the header. Vaporized refrigerant is discharged from the header to the condensing unit 1 through a suction line 14. In

order to minimize discharge of liquid refrigerant from the header 11 to the compressor of the condensing unit 1, a baffle 15 is provided within the header 11. To prevent reverse flow of refrigerant from the header 11 to the evaporator 2 when the evaporator 3 is operating, a check valve 16 is provided in the conduit 12 between the evaporator 2 and the header 11.

In one application of this refrigerating system the evaporator 2 is operated at a low temperature, such as would be required for refrigerating a frozen food storage compartment, and the evaporator 3 is operated at a higher temperature, such as would be required for refrigerating a fresh food storage compartment. By way of example, the evaporator 2 may be operated at a temperature in the neighborhood of 0° F., and the evaporator 3 may be operated over a temperature range from a minimum of 28° F. to a maximum of 35° F. The reservoir 7 is arranged to direct liquid refrigerant from the condensing unit to either the low temperature evaporator 2 or the higher temperature evaporator 3. To accomplish this the reservoir 7 is pivotally supported at 17 for movement from the position shown in Fig. 1 to the position shown in Fig. 2. In order to allow for the above movement of the reservoir the conduits 6, 9, and 10 include flexible coiled portions 18, 19, and 20, respectively. It can be seen that when the reservoir occupies the position shown in Fig. 1, liquid refrigerant is directed through the conduit 9 to the low temperature evaporator 2. When the reservoir is tilted to the position shown in Fig. 2 liquid refrigerant is directed through the conduit 10 to the higher temperature evaporator 3.

It can be seen by reference to Figs. 1 and 2 that when the reservoir 7 occupies the position shown in Fig. 1, liquid refrigerant is supplied through the conduit 9 and any flash vapor in the reservoir 7 is passed through the conduit 10 and the evaporator 3; when the reservoir is in the position shown in Fig. 2, liquid refrigerant is supplied to the evaporator 3 through the conduit 10 and flash vapor passes through the conduit 9 and the evaporator 2. The diameter and length of the conduits 9 and 10 are chosen so that the pressure drop due to the flow of flash vapor through one conduit is somewhat greater than the pressure drop due to the flow of liquid through the other. Particularly, when the liquid refrigerant is being supplied to the evaporator 3, it is important that the resistance to passage of flash vapor through the conduit 9 be greater than the resistance to the passage of liquid through the conduit 10, since the evaporator 2 operates at a somewhat lower temperature and pressure than the evaporator 3.

A tension spring 21 is connected to the free end of the reservoir 7 at 22 for normally biasing the reservoir to the position shown in Fig. 1. In order to shift the reservoir to the position shown in Fig. 2 when refrigeration is required by the higher temperature evaporator 3, a solenoid 23 is provided. This solenoid actuates an armature 24, which is hinged at 25 to the reservoir, to move the reservoir to the position shown in Fig. 2. To control the energization of the solenoid 23 a temperature-responsive bulb 26 is positioned in contact with the evaporator 3. The bulb 26 is connected by a tube 27 to a bellows 28 for controlling the opening and closing of the contacts 29. The solenoid 23 is connected to power lines 30, 31 through the contacts 29. Hence, when the evaporator 3 reaches a predetermined maximum temperature which causes an expansion of the bellows 28 to close the contacts 29, the solenoid 23 is energized and moves the reservoir 7 to the position shown in Fig. 2 to direct liquid refrigerant from the reservoir to the evapoator 3.

The operation of the motor-compressor unit within the case 4 is controlled by a temperature-responsive bulb 32 which is positioned in contact with the low temperature evaporator 2. The bulb 32 is connected by a tube 33 to a bellows 34. The expansion and contraction of the bellows closes and opens a circuit from the power lines 30, 31 through contacts 35 to the motor of the motor-compressor unit. Hence, when the temperature of the evaporator 2 reaches a predetermined maximum the expansion of the bellows 34 under the control of the temperature-responsive bulb 32 closes the circuit to the motor to start operation of the condensing unit. Conversely, when the temperature of the evaporator 2 reaches a predetermined minimum, the circuit of the motor is interrupted to stop the operation of the condensing unit.

In order to operate the system more efficiently, it is desirable to have a higher suction pressure during the time when the higher temperature evaporator is being refrigerated. Should the condensing apparatus withdraw refrigerant from the higher temperature evaporator at the same low pressure as is utilized for operating the low temperature evaporator 2, there would be a considerable sacrifice in efficiency. In order to raise the suction pressure rapidly when refrigeration is shifted to the higher temperature evaporator 3, a particular arrangement of the conduits 9 and 10 with respect to the reservoir 7 is provided. Thus, the conduit 9, which supplies liquid refrigerant from the reservoir to the low temperature evaporator 2, is connected to the reservoir in the upper portion of one end. It can be seen by referring to Fig. 1 that this arrangement of the conduit 9 in communication with the reservoir 7 causes a substantial body of liquid refrigerant 36 to be retained within the reservoir during refrigeration of the low temperature evaporator. On the other hand, the conduit 10, through which liquid refrigerant is suplied from the reservoir 7 to the evaporator 3, is connected to the reservoir in the lower portion thereof at the opposite end from the conduit 9. Therefore, when the reservoir is tilted to the position shown in Fig. 2, the body of liquid refrigerant 36 immediately becomes available for discharge to the higher temperature evaporator 3. The vaporization of this substantial body of liquid refrigerant in the evaporator 3 causes a rapid increase in the suction pressure and hence the system rapidly begins operation at the more efficient higher pressure. In the absence of the arrangement described above there would at best be a delay in achieving an increased suction pressure during the refrigeration by evaporator 3, and hence there would be an unnecessarily low efficiency at least during this period of delay.

In order to avoid the necessity of defrosting the fresh food evaporator 3, it may be desirable to operate this evaporator on a defrosting cycle. To accomplish this, the evaporator 3 may be operated over a temperature range above and below the freezing point of water such that any frost collecting during the time that the evaporator 3 is refrigerating is melted and dissipated during the time that the evaporator 3 is not refrigerating. For example, this evaporator might

be operated over a range of temperatures from a minimum of 28° F to a maximum of 35° F.

In Fig. 3 there is shown a modified form of a portion of the refrigerating system in which a rearrangement of the connection of the conduit 12 to the header 11 is utilized to eliminate the check valve 16. In this modification the conduit 12 is connected in communication with the header 11 at the bottom portion thereof so that the mouth 37 of the conduit 12 is located below the level 38 of liquid refrigerant normally present in the header 11. Liquid refrigerant is forced from the header 11 into the evaporator 2, but vaporized refrigerant from the evaporator 3 is prevented from backing up into the evaporator 2 through the conduit 12. In the form shown in Fig. 3, the resistance offered by conduit 9 to flow of flash vapor does not have to be as great relative to the resistance of the tube 10 to flow of liquid as in the form shown in Figs. 1 and 2, since there is no pressure difference between the two evaporators in the form shown in Fig. 3.

The operation of the refrigerating system may be summarized as follows. When the low temperature evaporator 2 reaches a predetermined maximum temperature, the condensing unit is started in operation by the closing of the contacts 35. Liquid refrigerant is supplied through the capillary tube 6 to the reservoir 7. The reservoir 7 is normally biased by the spring 21 to the tilted position shown in Fig. 1. Hence, assuming the evaporator 3 is below its predetermined maximum temperature, liquid refrigerant is supplied through the conduit 9 to the low temperature evaporator 2. During this time a body of liquid refrigerant 36 is retained in the reservoir because of the positioning of the conduit 9 in communication with the reservoir at the upper portion of one end. Should the higher temperature evaporator 3 reach its predetermined maximum temperature, the solenoid 23 is energized by the closing of the contacts 29 and the reservoir is tilted to the position shown in Fig. 2. In this position liquid refrigerant is supplied to the higher temperature evaporator 3. Also, the substantial body of liquid refrigerant 36 retained in the reservoir during the operation of the low temperature evaporator 2 is immediately made available for the higher temperature evaporator 3 and is enabled to discharge to that evaporator because of the positioning of the conduit 10 in communication with the reservoir 7 at the lower portion of the reservoir. This supplying of a substantial body of liquid refrigerant to the higher temperature evaporator 3 results in a rapid increase in the suction line pressure because of the vaporization of this refrigerant, and hence the refrigerating system rapidly begins to operate at a higher efficiency. During the operation of the higher temperature evaporator 3 vaporized refrigerant is prevented from backing up into the evaporator 2 through the conduit 12 either by the use of the check valve 16 or by connecting the conduit 12 to the header 11 beneath the normal level of the liquid refrigerant therein.

In the modification shown in Fig. 4 a solenoid valve arrangement is utilized in lieu of the tilting reservoir for selectively directing liquid refrigerant either to the low temperature evaporator 2 or to the higher temperature evaporator 3. The same numerals have been used to designate corresponding parts in Figs. 1 and 4. Referring to Fig. 4, there is shown a solenoid-operated valve 39 which includes a housing 40. A partition 41 is formed within the housing and this partition includes a valve seat 42 against which one end 43 of a double-ended valve element 44 may be seated. The housing 40 further includes a second valve seat 45 against which the other end 46 of the double-ended valve element 44 is adapted to seat. Liquid refrigerant is supplied to the housing 40 from the condensing unit through a conduit 6. Liquid refrigerant is selectively directed from the housing 40 either through the conduit 9 to the low temperature evaporator 2 or through the conduit 10 to the higher temperature evaporator 3.

To control the flow of refrigerant to the evaporators 2 and 3 the valve element 44 is provided, and this valve element is operated by a solenoid 47. When the solenoid 47 is energized it acts upon an armature 48 to lift the valve element 44 to the position shown in Fig. 4 wherein liquid refrigerant is supplied through the conduit 10 to the evaporator 3 and flow of liquid refrigerant to the evaporator 2 is blocked by the engagement of the end 43 of the valve element 44 with the seat 42. When the solenoid 47 is deenergized, the valve element 44 falls by gravity into engagement with the seat 45 to block the flow of liquid refrigerant to the evaporator 3 and at the same time to disengage the valve element from the seat 42 directing the refrigerant through the conduit 9 to the evaporator 2. The housing 40, or at least a portion thereof adjacent the solenoid 47 and the armature 48, is made of a non-magnetic material.

As in the form previously described, a temperature-responsive bulb 26 is provided in contact with the evaporator 3 and this bulb is connected by the tube 27 to the bellows 28. When the evaporator 3 reaches a predetermined maximum temperature, the bellows 28 expands to close the circuit to the solenoid from the power lines 30, 31 through the contacts 29. This causes the lifting of the valve element 44 to the position shown in Fig. 4 and the supplying of liquid refrigerant to the higher temperature evaporator 3. When the evaporator 3 reaches a predetermined minimum temperature the circuit of the solenoid is interrupted by the contraction of the bellows 28 and the valve element 44 falls by gravity into engagement with the valve seat 45, blocking the flow of refrigerant to the higher temperature evaporator 3 and opening a path for flow of refrigerant past the valve seat 42 and through the conduit 9 to the low temperature evaporator 2. The starting and stopping of the motor-compressor unit (not shown) may be controlled by a bulb responsive to the temperature of the evaporator 2, as in the form shown in Figs. 1 and 2.

In order to make a body of liquid refrigerant available for discharge to the higher temperature evaporator as soo nas the higher temperature evaporator calls for refrigeration, so that the system refrigerates the higher temperature evaporator at a higher efficiency, the housing 40 includes a reservoir 49 at the lower portion thereof. The conduit 10 is connected in communication with the reservoir 49 at the bottom of this reservoir. On the other hand, the conduit 9, through which liquid refrigerant is supplied to the low temperature evaporator, is positioned in communication with the housing 40 at the top of the reservoir 49. It can be seen that when the valve element 44 is in its lower position the liquid refrigerant in the housing 40 must rise in the reservoir 49 to the level of the conduit 9

before liquid refrigerant can be supplied at the low temperature evaporator 2. Thus, a substantial body of liquid refrigerant is maintained in the reservoir 49 while the low temperature evaporator is being refrigerated. When the higher temperature evaporator calls for refrigeration and hence when the valve element 44 is shifted to the position shown in Fig. 4, this body of liquid refrigerant within the reservoir 49 is immediately made available for discharge to the higher temperature evaporator 3. The vaporization of this substantial body of liquid refrigerant in the evaporator 3 causes a rapid increase in the suction pressure and hence the system rapidly begins to operate at the increased efficiency resulting from operation at a higher suction pressure, in the same manner as previously described in connection with Figs. 1 and 2.

While I have shown and described specific embodiments of my invention, I do not desire my invention to be limited to the particular constructions shown and described, and I intend by the appended claims to cover all modifications within the spirit and scope of my invention.

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

1. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and a tiltable reservoir connected in a closed refrigerant circuit, means for conducting liquid refrigerant from said condensing unit to said reservoir, means connected to the upper portion of said reservoir for conducting liquid refrigerant from said reservoir to said low temperature evaporator, and means connected to the lower portion of said reservoir for conducting liquid refrigerant from said reservoir to said higher temperature evaporator, said reservoir being tilted in one direction for directing liquid refrigerant from said reservoir to said low temperature evaporator, sad reservoir being tilted in the opposite direction for directing liquid refrigenant from said reservoir to said higher temperature evaporator, said connecting means providing for retention of a substantial body of refrigerant in said reservoir when said reservoir is tilted in said one direction and making said substantial body of liquid refrigerant immediately available to said higher temperature evaporator when said reservoir is tilted in said opposite direction.

2. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and a reservoir connected in a closed refrigerant circuit, means for conducting liquid refrigerant from said condensing unit to said reservoir, means for directing liquid refrigerant from said reservoir selectively to either of said evaporators, means communicating with the upper portion of said reservoir for conducting liquid refrigerant to said low temperature evaporator, said communicating means being effective to retain a substantial body of liquid refrigerant in said reservoir when said directing means directs refrigerant to said low temperature evaporator, and means communicating with the lower portion of said reservoir for conducting liquid refrigerant to said higher temperature evaporator whereby said substantial body of liquid refrigerant retained in said reservoir during refrigeration of said low temperature evaporator is immediately made available for said higher temperature evaporator when said directing means directs liquid refrigerant to said higher temperature evaporator.

3. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and a reservoir connected in a closed refrigerant circuit, means for conducting liquid refrigerant from said condensing unit to said reservoir, a solenoid-operated valve for directing liquid refrigerant from said reservoir selectively to either of said evaporators, means communicating with the upper portion of said reservoir for conducting liquid refrigerant to said low temperature evaporator, means communicating with the lower portion of said reservoir for conducting liquid refrigerant to said higher temperature evaporator whereby liquid refrigerant retained in said refrigerant during refrigeration of said low temperature evaporator is immediately made available to said higher temperature evaporator when said valve directs liquid refrigerant to said higher temperature evaporator.

4. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and a valve connected in a closed refrigerant circuit, said valve including a housing having a reservoir for liquid refrigerant therein, means for conducting liquid refrigerant from said condensing unit to said reservoir, said valve being normally biased to one position for directing liquid refrigerant from said reservoir to said low temperature evaporator, a solenoid positioned adjacent said valve, means responsive to a condition of said higher temperature evaporator for energizing said solenoid to shift said valve to a second position for directing liquid refrigerant from said reservoir to said higher temperature evaporator, means communicating with the upper portion of said reservoir for conducting liquid refrigerant to said low temperature evaporator whereby a substantial body of liquid refrigerant is retained in said reservoir during operation of said low temperature evaporator, and means communicating with the lower portion of said reservoir for conducting liquid refrigerant from said reservoir to said higher temperature evaporator whereby said substantial body of liquid refrigerant is immediately made available to said higher temperature evaporator when said valve is shifted to said second position to direct liquid refrigerant to said higher temperature evaporator.

5. A refrigerating system comprising a condensing unit, two evaporators and a tiltable reservoir connected in a closed refrigerating circuit, means for conducting liquid refrigerant from said condensing unit to said reservoir, means for conducting liquid refrigerant from said reservoir to said evaporators, means normally biasing said reservoir in one direction for directing liquid refrigerant to one of said evaporators, and means for tilting said reservoir in the opposite direction for directing liquid refrigerant to the other of said evaporators.

6. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and a tiltable reservoir connected in a closed refrigerant circuit, means for conducting liquid refrigerant from said condensing unit to said reservoir, means for conducting liquid refrigerant from said reservoir to said evaporators, means normally biasing said reservoir in one direction for directing liquid refrigerant from said reservoir to said low temperature evaporator, and means for tilting said

reservoir in the opposite direction for directing liquid refrigerant from said reservoir to said higher temperature evaporator.

7. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and a tiltable reservoir connected in a closed refrigerant circuit, means for conducting liquid refrigerant from said condensing unit to said reservoir, means for conducting liquid refrigerant from said reservoir to said evaporators, means normally biasing said reservoir in one direction for directing liquid refrigerant from said reservoir to said low temperature evaporator, and a solenoid energized in response to a condition of said higher temperature evaporator for tilting said reservoir in the opposite direction to direct liquid refrigerant from said reservoir to said higher temperature evaporator.

8. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and tiltable reservoir connected in a closed refrigerant circuit, means for conducting liquid refrigerant from said condensing unit to said reservoir, a common header for said evaporators, a suction line for conducting vaporized refrigerant from said header to said condensing unit, a check valve for blocking reverse flow of refrigerant from said header to said low temperature evaporator, means normally biasing said reservoir in one direction for directing liquid refrigerant from said reservoir to said low temperature evaporator, and a solenoid energized in response to a condition of said higher temperature evaporator for tilting said reservoir in the opposite direction to direct liquid refrigerant from said reservoir to said higher temperature evaporator.

9. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and a tiltable reservoir connected in a closed refrigerant circuit, means for conducting liquid refrigerant from said condensing unit to said reservoir, a common header for said evaporators, a suction line for conducting vaporized refrigerant from said header to said condensing unit, a conduit for connecting said low temperature evaporator in communication with said header, said conduit being connected to said header beneath the normal level of liquid refrigerant therein whereby flow of vaporized refrigerant from said higher temperature evaporator through said header to said low temperature evaporator is blocked, means normally biasing said reservoir in one direction for directing liquid refrigerant from said reservoir to said low temperature evaporator, and a solenoid energized in response to a condition of said higher temperature evaporator for tilting said reservoir in the opposite direction to direct liquid refrigerant from said reservoir to said higher temperature evaporator.

10. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and an elongated reservoir connected in a closed refrigerant circuit, said reservoir being pivotally mounted for tilting movement to direct liquid refrigerant to one end or the other of said elongated reservoir, a conduit for conducting liquid refrigerant from said condensing unit to said reservoir, a second conduit communicating with said reservoir for conducting liquid refrigerant to said low temperature evaporator, said second conduit being connected to the upper portion of said reservoir at one end thereof, a third conduit communicating with said reservoir for conducting liquid refrigerant from said reservoir to said higher temperature evaporator, said third conduit being connected to the lower portion of said reservoir at the opposite end thereof, means for tilting said reservoir in one direction to direct liquid refrigerant from said reservoir to said low temperature evaporator, the connecting of said second conduit to the upper portion of said reservoir causing a substantial body of liquid refrigerant to be retained in said reservoir when said reservoir is tilted in said one direction, and means for tilting said reservoir in the opposite direction to direct liquid refrigerant from said reservoir to said higher temperature evaporator, said substantial body of liquid refrigerant being immediately made available to said higher temperature evaporator when said reservoir is tilted in said opposite direction.

11. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and an elongated reservoir connected in a closed refrigerant circuit, said reservoir being pivotally mounted for tilting movement to direct liquid refrigerant to one end or the other of said elongated reservoir, a conduit for conducting liquid refrigerant from said condensing unit to said reservoir, a second conduit communicating with said reservoir for conducting liquid refrigerant to said low temperature evaporator, said second conduit being connected to the upper portion of said reservoir at one end thereof, a third conduit communicating with said reservoir for conducting liquid refrigerant from said reservoir to said higher temperature evaporator, said third conduit being connected to the lower portion of said reservoir at the opposite end thereof, means normally biasing said reservoir in one direction to direct liquid refrigerant from said reservoir to said low temperature evaporator, the connecting of said second conduit to the upper portion of said reservoir causing a substantial body of liquid refrigerant to be retained in said reservoir when said reservoir is tilted in said one direction, and a solenoid energized in response to a condition of said higher temperature evaporator for tilting said reservoir in the opposite direction to direct liquid refrigerant from said reservoir to said higher temperature evaporator, said substantial body of liquid refrigerant being immediately made available to said higher temperature evaporator when said reservoir is tilted in said opposite direction.

12. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and an elongated reservoir connected in a closed refrigerant circuit, said reservoir being pivotally mounted for tilting movement to direct liquid refrigerant to one end or the other of said elongated reservoir, a conduit for conducting liquid refrigerant from said condensing unit to said reservoir, a second conduit communicating with said reservoir for conducting liquid refrigerant to said low temperature evaporator, said second conduit being connected to the upper portion of said reservoir at one end thereof, a third conduit communicating with said reservoir for conducting liquid refrigerant from said reservoir to said higher temperature evaporator, said third conduit being connected to the lower portion of said reservoir to the opposite end thereof, a spring for tilting said reservoir in one direction to direct liquid refrigerant from said reservoir to said low tem-

perature evaporator, the connecting of said second conduit in the upper portion of said reservoir causing a substantial body of liquid refrigerant to be retained in said reservoir when said reservoir is tilted in said one direction, and a solenoid energized in response to a condition of said higher temperature evaporator for tilting said reservoir in the opposite direction to direct liquid refrigerant from said reservoir to said higher temperature evaporator, said substantial body of liquid refrigerant being immediately made available to said higher temperature evaporator when said reservoir is tilted in said opposite direction.

13. A refrigerating system comprising a condensing unit, a low temperature evaporator, a higher temperature evaporator and an elongated reservoir connected in a closed refrigerant circuit, said reservoir being pivotally mounted for tilting movement to direct liquid refrigerant to one end or the other of said elongated reservoir, a conduit for conducting liquid refrigerant from said condensing unit to said reservoir, a second conduit communicating with said reservoir for conducting liquid refrigerant to said low temperature evaporator, said second conduit being connected to the upper portion of said reservoir at one end thereof, a third conduit communicating with said reservoir for conducting liquid refrigerant from said reservoir to said higher temperature evaporator, said third conduit being connected to the lower portion of said reservoir at the opposite end thereof, a common header for said evaporators, a suction line for conducting vaporized refrigerant from said header to

said condensing unit, a check valve for blocking reverse flow of refrigerant from said header to said low temperature evaporator, means for tilting said reservoir in one direction to direct liquid refrigerant from said reservoir to said low temperature evaporator, the connecting of said second conduit in the upper portion of said reservoir causing a substantial body of liquid refrigerant to be retained in said reservoir when said reservoir is tilted in said one direction, and means for tilting said reservoir in the opposite direction to direct liquid refrigerant from said reservoir to said higher temperature evaporator, said substantial body of liquid refrigerant being immediately made available to said higher temperature evaporator when said reservoir is tilted in said opposite direction whereby vaporization of said substantial body of liquid refrigerant rapdly raises the pressure of the vaporized refrigerant in said header and said suction line so that a more efficient operation of said refrigerating system is effected during refrigeration of said higher temperature evaporator.

LEONARD W. ATCHISON.

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