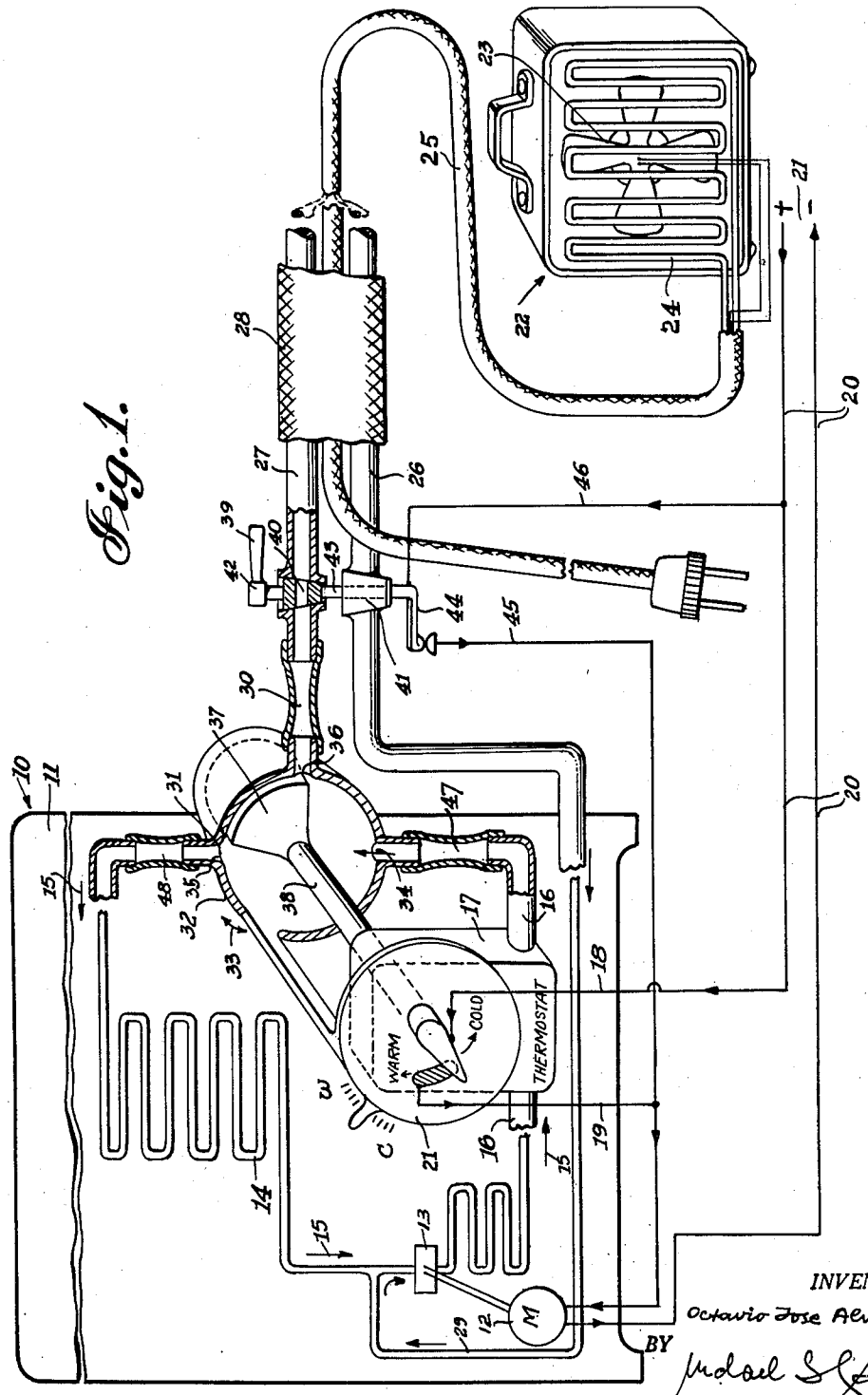
Jan. 3, 1950 O. J. ALVAREZ 2,493,378

COMBINED ELECTRICAL REFRIGERATOR AND AIR COOLING UNIT

Filed June 9, 1947 2 Sheets-Sheet 1

Fig. 1.



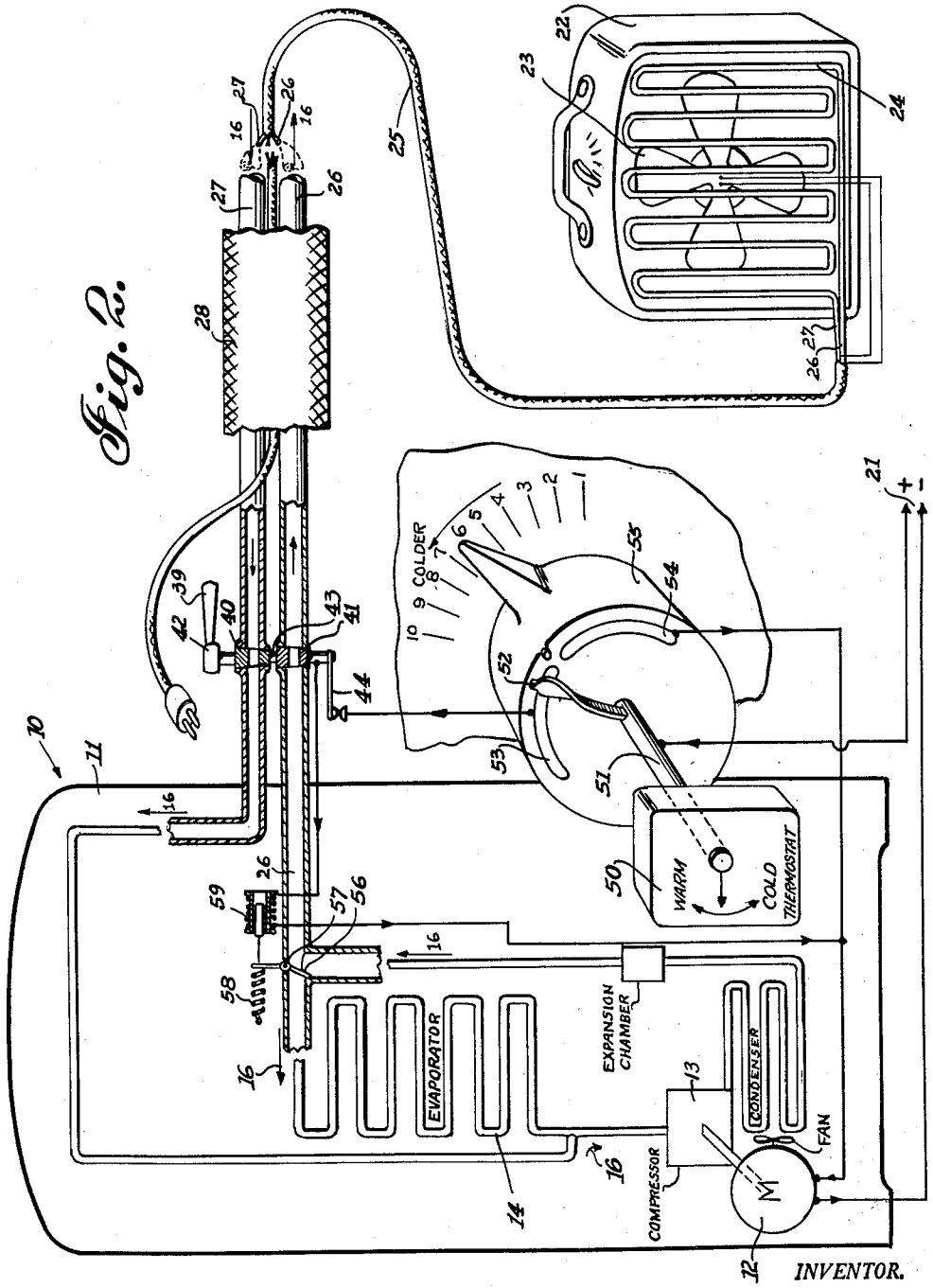
INVENTOR.
Octavio Jose Alvarez
BY

Jan. 3, 1950 O. J. ALVAREZ 2,493,378

COMBINED ELECTRICAL REFRIGERATOR AND AIR COOLING UNIT

Filed June 9, 1947 2 Sheets-Sheet 2

Fig. 2.



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UNITED STATES PATENT OFFICE

2,493,378

COMBINED ELECTRICAL REFRIGERATOR AND AIR-COOLING UNIT

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Application June 9, 1947, Serial No. 753,420

13 Claims. (Cl. 62—4)

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My present invention relates to combined electrical refrigerator and air cooling units.

It is an object of my present invention to provide a unit of the above type in which only the excess cooling capacity of a refrigerator is used for operating a portable air cooling device.

It is another object of my present invention to combine a refrigerator with a portable air cooling device in a very simple and efficient manner.

Furthermore, it is an object of my present invention to attach a portable air cooler to a refrigerator and to operate it by the same without the necessity of any considerable changes in the construction of the refrigerator.

It is also an object of my present invention to arrange in a combined electrical refrigerator and air cooling unit means ensuring that the temperature within the refrigerator is held at the desired level despite attachment of the air cooling unit.

Finally, it is also an object of my invention to provide means automatically preventing flow of refrigerant fluid to the air cooling unit when such refrigerant fluid is needed for keeping the electrical refrigerator at the proper temperature.

With the above objects in view, my present invention mainly consists of a combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing, a refrigerator compartment within this housing, a stationary refrigerator cooling coil within this refrigerator compartment, a portable air cooling coil, an at least partly flexible conduit connecting this portable air cooling coil with the above mentioned stationary refrigerator cooling coil, refrigerant fluid filling the above listed stationary refrigerator cooling coil, the at least partly flexible conduit and the portable air cooling coil, pumping means adapted to circulate this refrigerant fluid through the stationary refrigerator cooling coil and also by means of the at least partly flexible conduit through the portable air cooling coil, and motor means for operating these pumping means, whenever desired.

In order to enable proper operation of a unit of the above type, I propose to combine with the same a first valve included in the stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through this coil, e. g. by opening or closing this valve; furthermore, it is also advisable to provide a second valve included in the conduit leading from the stationary refrigerator cooling coil to the portable air cooling coil for adjusting the amount of refrigerant

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fluid circulating through this air cooling coil, e. g. by closing or opening this second valve.

In order to prevent during operation of the air cooling coil a temperature drop within the refrigerator compartment below a predetermined temperature, I provide two operating means, namely first operating means for automatically moving the first valve towards or into open position when the temperature within the refrigerator compartment rises above a predetermined temperature and towards or into closed position when the temperature within the refrigerator compartment drops below this predetermined temperature, and second operating means for automatically moving the second valve means towards or into open position when the temperature within the refrigerator compartment drops below the above mentioned predetermined temperature and towards or into closed position when the temperature within the refrigerator compartment rises above this predetermined temperature.

In order to hold the temperature within the refrigerator compartment at the proper level, I have found it advisable to provide manually operable means for adjusting operation of both of the above described operating means so as to vary the predetermined temperature at which they operate and move the valves as described above.

In accordance with a preferred embodiment of my present invention, the above described operating arrangement includes means permanently tending to hold the first valve in open and the second valve in closed position, operating means adapted to move the first valve from open into closed and the second valve from closed into open position, and actuating means for automatically actuating these operating means when the temperature within the refrigerator compartment drops below the predetermined temperature.

Furthermore, in this embodiment of my present invention, I provide a manually operable valve in the flexible conduit for opening and closing the same and combine with this valve preferably electrical connecting means operated by this valve so as to connect the actuating means with the operating means only when the valve is in open position.

Finally, in order to obtain proper circulation of the cooling fluid by the above described pumping means and the motor operating the same, I arrange first operating means being independent from the manually operable valve described

above and adapted to automatically connect the electric motor with a source of electric current when the temperature within the refrigerator compartment rises above the predetermined temperature and to automatically disconnect the electric motor from this source of electric current when the temperature within the refrigerator compartment drops below the predetermined temperature; furthermore, I provide also second motor operating means adapted to automatically close a separate circuit connecting the electric motor with the source of electric current while the temperature within the refrigerator compartment is below the predetermined temperature and the manually operable valve is in open position and to automatically open this circuit when the temperature within the refrigerator compartment rises above the predetermined temperature or the manually operated valve is closed.

The novel features which I consider as characteristic for my invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a partly sectional, partly perspective view of a combined refrigerator and air cooling unit of the type proposed by me; and

Fig. 2 is a partly sectional, partly perspective view of a modified embodiment of the combined refrigerator and air cooling unit shown in Fig. 1.

The unit shown in Fig. 1 includes a refrigerator 10 of conventional design provided with a refrigerator compartment 11, a motor 12, a pump 13, and a refrigerator cooling coil 14 connected with pump 13 and serving for cooling the refrigerator compartment 11. The pump 13 is operated by the motor 12 and adapted to circulate the cooling fluid through the refrigerator cooling coil 14 and tube 16 in the direction of arrow 15.

Thermostat 17 is equipped with a thermostatic switch not shown in the drawing which is adapted to connect the terminals of the electric conductors 18 and 19 if the temperature within the refrigerator compartment 11 rises above a certain predetermined temperature and to disconnect these terminals if the actual temperature within the compartment 11 drops below this predetermined temperature.

Conductors 18 and 19 are included in the electric circuit 20 connecting the electric motor 12 with the source of electric current 21 so that when the thermostat switch is closed the electric motor 12 operates and when the thermostat switch is open the motor 12 is at a standstill.

The thermostat 17 is provided in the usual manner with an adjusting knob 21 by which it is possible to adjust the predetermined temperature at which the thermostat switch should close or open the circuit 20. This knob 21 is connected with the other parts of the thermostat 17 in such a manner that it is possible to raise the predetermined temperature by turning the knob in clockwise direction and to lower this temperature by turning the knob in counterclockwise direction.

In accordance with my present invention, I provide a portable cooling device 22 comprising an electrically operated fan 23 and a portable air cooling coil 24. This air cooling coil 24 is connected, as clearly shown in Fig. 1, by a flexible double tube 25 with the refrigerator cooling coil 14. Actually, the flexible double tube 25 consists of the two flexible tubes 26 and 27 enclosed within the flexible woven fabric hose 28.

The flexible tube 26 is directly connected by means of the stationary tube 29 with the cooling coil 14, while the flexible tube 27 is connected by means of a highly flexible tube portion 30 with a combined valve 31.

This combined valve 31 comprises a common tubular valve housing 32 rigidly connected with the thermostat knob 21 so as to be adapted to be turned by the same to and fro in the direction of arrow 33.

This common tubular valve housing 32 is provided with one inlet opening 34 by which the refrigerant fluid passing through the tube 16 flows into the space within this housing completely filling the same. Furthermore, housing 32 is provided with two valve openings 35 and 36. Valve opening 35 is connected with the refrigerator cooling coil 14, while valve opening 36 is connected with the flexible tube 27 by means of the highly flexible tube portion 30.

Within housing 32, a turnable valve member 37 is arranged. This turnable valve member 37 is connected by shaft 38 with the heat sensitive element of the thermostat 17 in such a manner that it is turned by the same in clockwise direction when the temperature within the refrigerator compartment 11 rises above the predetermined temperature obtained by adjustment of knob 21 and in counterclockwise direction when the temperature within the refrigerator compartment 11 drops below this predetermined temperature.

It is evident that when shaft 38 and valve member 37 carried by the same are turned in clockwise direction, the valve member 37 will gradually open the valve opening 35 and at the same time gradually close the valve opening 36 and that when shaft 38 and valve member 37 are turned in the opposite direction, the valve opening 36 will be gradually opened while the valve opening 35 will be at the same time gradually closed.

In addition to the above described valve arrangement, I provide a manually operable valve 42 composed of the two valve members 40 and 41 adapted to close and open the conduits 27 and 26, respectively. Handle 39 serves for turning this valve 42 to and fro between closed and open position, whenever required.

The shaft 43, carrying the two valve members 40 and 41 and the handle 39, is equipped at its lower end with the switch 44 adapted to connect the conductors 45 and 46 when valve 42 is in open position and to disconnect these conductors when the valve is in closed position.

The conductors 45 and 46 are included into the circuit 20 and are arranged parallel to the conductors 18 and 19 so that it is possible by closing the switch 44 to operate the motor 12 while the thermostat switch within thermostat 17 is in open position.

My above described refrigerator-air cooling unit operates as follows:

If it is not desired to use the cooling unit 22, the manually operated valve 42 is in closed position preventing flow of the refrigerant fluid through the tubes 26 and 27. In this position of valve 42 the switch 44 is open.

It is evident that under such circumstances operation of the unit depends entirely upon the temperature within the refrigerator compartment 11.

In order to obtain proper operation, the de-

sired predetermined temperature within the compartment 11 is adjusted by turning of knob 21. Turning of this knob not only results in adjustment of the contact members of the thermostat switch in conventional manner, but causes also turning of the valve housing 32. Such turning is made possible by the fact that not only tube 27 is provided with a highly flexible tube portion 30 but that also tube 16 and the tube forming the refrigerator cooling coil 14 are provided with highly flexible end portions 47 and 48, respectively.

It should be stressed that shaft 38 is connected with the heat sensitive thermostat member within the thermostat 17 and operated by the same in such a manner that when a certain predetermined temperature prevails in the refrigerator compartment 11, the valve member 37 is in its central position positioned between the two valve openings 35 and 36 shown in Fig. 1. The moment the temperature within the refrigerator compartment drops below this predetermined temperature, the heat sensitive thermostat member will turn shaft 38 in counterclockwise direction and partly or entirely close the valve opening 35. Similarly, the moment the temperature within the refrigerator compartment 11 rises above the predetermined temperature, shaft 38 will be turned in clockwise direction, partly or entirely opening the valve opening 35 and partly or entirely closing at the same time the valve opening 36.

From above follows that proper operation, i. e. obtainment of the predetermined temperature within the refrigerator compartment 11 is independent from and not influenced by operation of the cooling device 22:

If the valve 42 is closed, operation of thermostat and the temperature of the refrigerant fluid will depend exclusively upon the temperature within the refrigerator compartment 11.

If valve 42 is in open position and the temperature within the refrigerator compartment 11 is above the predetermined temperature, the valve member 37 will close the valve opening 36 and prevent refrigerant from being diverted to the cooling coil 24. However, if and when the temperature within the refrigerator compartment drops below the predetermined temperature, the valve member 37 will automatically open the valve opening 36 and permit circulation of refrigerant fluid through the refrigerator cooling coil 14.

Thus, it is evident that if valve 42 is closed, the refrigerator operates in the same way as any conventional refrigerator of usual type.

In order to operate the cooling device 22, it is only necessary to turn valve 42 into open position. Such turning will have one of the two following effects: If the temperature within compartment 11 is above the predetermined temperature, the valve opening 36 will stay closed and the cooling device 22 will not operate. If the temperature within compartment 11 is at or below the predetermined temperature, the valve opening 36 will be open and refrigerant fluid will flow through the air cooling coil 24 operating the device.

I wish to mention that in the open position of the valve 42 the switch 44 closes the circuit 29 and operates motor 12 independently from thermostat 17. Thus, refrigerant fluid will be circulated through the refrigerator cooling coil 14 and cool compartment 11 also at a time when no further cooling of the same is needed. This will result in operation of thermostat 17 and

counterclockwise turning of shaft 38 relative to the housing 31 which, in turn, will cause closing of the valve opening 35 by valve member 37, preventing further flow of refrigerant fluid through the refrigerator cooling coil 14.

In Fig. 2 of the drawings, I have shown another embodiment of my combined refrigerator-air cooling unit which differs from the unit shown in Fig. 1 mainly in the valve means and the electrical arrangement for operating the same. Also in this figure, the refrigerator housing is designated with the reference numeral 10, the refrigerator compartment with 11, the electric motor with 12, the circulating pump with 13, the refrigerator cooling coil with 14, the direction of flow of refrigerant through this coil with 16, the source of electric current with 21, the air cooling device with 22, the air cooling fan with 23, the air cooling coil with 24, the flexible double tube with 25, the single tubes with 26 and 27, the heat insulating hose of this tube with 28, and the manually operated valve with 42.

In a unit of this type, I use a thermostatic arrangement 50 which turns shaft 51 in clockwise direction if the temperature within the refrigerator compartment 11 is rising and in counterclockwise direction if the temperature in this compartment is decreasing.

This shaft 51 is provided with a contact member 52 adapted to slide along the contact strips 53 and 54 mounted on the turnable adjusting member 55. This turnable adjusting member 55 is independent of shaft 51 but can be turned coaxially with the same in clockwise direction if it is desired to have a higher predetermined temperature, and in counterclockwise direction if it is desired to have a lower predetermined temperature.

Furthermore, I provide in this embodiment of my new unit a combined valve 56 adapted to be turned about pivot 57 from its position shown in Fig. 2 closing the cooling coil 14 and admitting refrigerant fluid only into tube 26, into a position closing tube 26 and admitting refrigerant fluid only into cooling coil 14.

The spring 58 is combined with the valve 56 so as to tend to hold this valve 56 in a position closing tube 26 and admitting fluid only into coil 14. Furthermore, valve 56 is also combined with the solenoid 59 tending to turn the valve, when energized, from its above described position into the position shown in Fig. 2.

The solenoid 59 is included into a circuit connecting the motor 12 with the source of electric current 21. This circuit includes also, as clearly shown in Fig. 2, the switch 44, shaft 51, the contact member 52, and contact strip 53.

As also clearly shown in the drawings, solenoid 59 and switch 44 can be by-passed by means of the contact strip 54 and contact member 52.

In this connection, it should be stressed that the two contact strips 53 and 54 are arranged so that the contact member 52 is located substantially between them if the temperature in compartment 11 is identical with the predetermined temperature set by the turnable adjusting member 55.

This refrigerator-cooler unit operates as follows:

If valve 42 is in closed position, the switch 44 is open, and, accordingly, solenoid 59 is deenergized. Consequently, spring 58 will turn the valve member 56 so that tube 26 is closed and

the refrigerant fluid is admitted only to the cooling coil 14.

In this position, the thermostat 50 will operate in the conventional manner: If the temperature in compartment 11 rises above the predetermined temperature, the shaft 51 and contact member 52 will turn in clockwise direction and contact the contact strip 54, closing the motor circuit and causing rotation of the motor 12. This, in turn, will result in circulation of refrigerant fluid through the cooling coil 14 and reduction of the temperature in compartment 11, causing turning of shaft 51 and contact member 52 in counterclockwise direction out of contact with the contact strip 54. This, of course, will in turn cause the motor 12 to stop until the temperature in the compartment 11 again rises above the predetermined one.

If valve 42 is in open position admitting refrigerant fluid to the air cooling coil 24, there are two possibilities:

If the temperature within compartment 11 is below the predetermined temperature, the contact member 52 will be out of contact with contact strip 54 and in contact with contact strip 53. This, in turn, will result in rotation of motor 12 and energization of solenoid 59. Energization of solenoid 59, in turn, will cause turning of the valve member 56 into the position shown in Fig. 2, closing the cooling coil 14 and admitting refrigerant fluid only into tube 26. Thus, in this position, refrigerant fluid will flow through the air cooling coil 24. This flow will be maintained either until valve 42 is closed or until the temperature within compartment 11 rises above the predetermined temperature.

If the temperature within compartment 11 rises above the predetermined temperature, the contact member 52 will be turned by thermostat 50 out of contact with contact strip 53, resulting in deenergization of solenoid 59 which, in turn, causes turning of valve 56, closing the tube 26 and admitting refrigerant fluid to the refrigerator cooling coil 14. Simultaneously, the contact member 52 will contact the contact strip 54, resulting in rotation of motor 12 and circulation of refrigerant fluid through the coil 14.

This situation will be maintained until the temperature in the compartment 11 is sufficiently decreased by circulation of the refrigerant fluid through coil 14. At that moment, contact member 52 will move in clockwise direction shutting off coil 14 and connecting the cooling coil 24 as described above in detail.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of cooling devices, differing from the types described above.

While I have illustrated and described the invention as embodied in combined refrigerator and cooling units, I do not intend to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of my invention.

Without further analysis, the foregoing will so fully reveal the gist of my invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; and operating means for automatically moving said first valve means towards open position when the temperature within said refrigerator compartment rises above a predetermined temperature and towards closed position when the temperature within said refrigerator compartment drops below said predetermined temperature and for automatically moving said second valve means towards open position when the temperature within said refrigerator compartment drops below said predetermined temperature and towards closed position when the temperature within said refrigerator compartment rises above said predetermined temperature.

2. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for closing and opening the same; second valve means included in said at least partly flexible conduit for closing and opening the same; and operating means for automatically moving said first valve means into open position when the temperature within said refrigerator compartment rises above a predetermined temperature and into closed position when the temperature within said refrigerator compartment drops below said predetermined temperature and for automatically moving said second valve means into open position when the temperature within said refrigerator compartment drops below said predetermined temperature and into closed position when the tempera-

ture within said refrigerator compartment rises above said predetermined temperature.

3. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; and operating means for automatically moving said first valve means towards open position when the temperature within said refrigerator compartment rises above a predetermined temperature and towards closed position when the temperature within said refrigerator compartment drops below said predetermined temperature and for automatically moving said second valve means towards open position when the temperature within said refrigerator compartment drops below said predetermined temperature and towards closed position when the temperature within said refrigerator compartment rises above said predetermined temperature; and manually operable means for adjusting the operation of said operating means so as to vary said predetermined temperature at which they operate and move said first and said second valve means.

4. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for closing and opening the same; second valve means included in said at least partly flexible conduit for closing and opening the same; and operating means for automatically moving said first valve means into open position when the temperature within said refrigerator compartment rises above a predetermined temperature and into closed position when the temperature within said refrigerator compartment drops below said predetermined temperature and for automatically moving said second valve means into open position when the temperature within said refrigerator compartment drops below said predetermined temperature and into closed position when the temperature within said refrigerator compartment rises above said predetermined temperature; and manually operable means for adjusting the operation of said operating means so as to vary said predetermined temperature at which they operate and move said first and said second valve means.

5. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; means tending to hold said first valve means in open position and said second valve means in closed position; operating means for moving said first valve means from open into closed position and said second valve means from closed into open position; and actuating means for automatically actuating said operating means when the temperature within said refrigerator compartment drops below a predetermined temperature.

6. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; means tending to hold said first valve means in open position and said second valve means in closed position; operating means for moving said first valve means from open into closed position and said second valve means from closed into open position; actuating means for automatically ac-

tuating said operating means when the temperature within said refrigerator compartment drops below a predetermined temperature; and manually operable operating means for adjusting operation of said actuating means so as to vary said predetermined temperature at which said actuating means actuate said operating means.

7. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; means tending to hold said first valve means in open position and said second valve means in closed position; operating means for moving said first valve means from open into closed position and said second valve means from closed into open position; actuating means for automatically actuating said operating means when the temperature within said refrigerator compartment drops below a predetermined temperature; a manually operable valve in said at least partly flexible conduit for opening and closing the same; and connecting means operated by said manually operable valve so as to connect said actuating means with said operating means when said manually operable valve is in open position.

8. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; means tending to hold said first valve means in open position and said second valve means in closed position; operating means for moving said first valve means from open into closed position and said second valve means from closed into open position; actuating means for automatically actuating said operating means when the temperature within said refrigerator compartment drops below a predetermined temperature; a manually operable valve in said at least partly flexible conduit for opening and closing the same; connecting means operated by said manually operable valve so as to connect said actuating means with said operating means when said manually operable valve is in open position; and manually operable operating means for adjusting operation of said actuating means so as to vary said predetermined temperature at which said actuating means actuate said operating means.

9. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; means tending to hold said first valve means in open position and said second valve means in closed position; electrical operating means for moving said first valve means from open into closed position and said second valve means from closed into open position; electrical actuating means for automatically actuating said electrical operating means when the temperature within said refrigerator compartment drops below a predetermined temperature; a manually operable valve in said at least partly flexible conduit for opening and closing the same; and electrical switch means operated by said manually operable valve so as to electrically connect said electrical actuating means with said electrical operating means when said manually operable valve is in open position.

10. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for oper-

ating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; means tending to hold said first valve means in open position and said second valve means in closed position; electrical operating means for moving said first valve means from open into closed position and said second valve means from closed into open position; electrical actuating means for automatically actuating said electrical operating means when the temperature within said refrigerator compartment drops below a predetermined temperature; a manually operable valve in said at least partly flexible conduit for opening and closing the same; electrical switch means operated by said manually operable valve so as to electrically connect said electrical actuating means with said electrical operating means when said manually operable valve is in open position; and manually operable means for adjusting the operation of said electrical actuating means so as to vary said predetermined temperature at which said electrical actuating means actuate said operating means.

11. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; means tending to hold said first valve means in open position and said second valve means in closed position; electrical operating means for moving said first valve means from open into closed position and said second valve means from closed into open position; electrical actuating means for automatically actuating said electrical operating means when the temperature within said refrigerator compartment drops below a predetermined temperature; a manually operable valve in said at least partly flexible conduit for opening and closing the same; electrical switch means operated by said manually operable valve so as to electrically connect said electrical actuating means with said electrical operating means when said manually operable valve is in open position; first motor connecting means adapted to automatically connect said electric motor with a source of electric current when the temperature within said refrigerator compartment rises above said predetermined temperature and to automatically disconnect said electric motor from said source of electric current when the temperature within said refrigerator compartment drops below said predetermined temperature; and second motor connecting means adapted to automatically connect said electric motor with said source of electric current while the temperature within said refrigerator compartment is below said predetermined temperature and said manually operable valve is in opened position and to automatically disconnect said electric motor from said source of electric current when the temperature within said refrigerator compartment rises above said predetermined temperature or said manually operable valve is closed.

12. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; means tending to hold said first valve means in open position and said second valve means in closed position; electrical operating means for moving said first valve means from open into closed position and said second valve means from closed into open position; electrical actuating means for automatically actuating said electrical operating means when the temperature within said refrigerator compartment drops below a predetermined temperature; a manually operable valve in said at least partly flexible conduit for opening and closing the same; electrical switch means operated by said manually operable valve so as to electrically connect said electrical actuating means with said electrical operating means when said manually operable valve is in open position; manually operable means for adjusting the operation of said electrical actuating means so as to vary said predetermined temperature at which said electrical actuating means actuate said connecting means; first motor operating means adapted to automatically connect said electric motor with a source of electric current when the temperature within said refrigerator compartment rises above said predetermined temperature and to automatically disconnect said electric motor from said source of electric current when the temperature within said refrigerator compartment drops below said predetermined temperature; and second motor connecting means adapted to automatically connect said electric motor with said source of electric current while the temperature within said refrigerator compartment is below said predetermined tempera-

ture and said manually operable valve is in opened position and to automatically disconnect said electric motor from said source of electric current when the temperature within said refrigerator compartment rises above said predetermined temperature or said manually operable valve is closed.

13. Combined electrical refrigerator and air cooling unit comprising in combination a refrigerator housing; a refrigerator compartment within said refrigerator housing; a stationary refrigerator cooling coil within said refrigerator compartment; a portable air cooling coil; an at least partly flexible conduit connecting said portable air cooling coil with said stationary refrigerator cooling coil; a refrigerant fluid filling said stationary refrigerator cooling coil, said at least partly flexible conduit and said portable air cooling coil; pumping means adapted to circulate said refrigerant fluid through said stationary refrigerator cooling coil and also by means of said at least partly flexible conduit through said portable air cooling coil; motor means for operating said pumping means, whenever desired; first valve means included in said stationary refrigerator cooling coil for adjusting the amount of refrigerant fluid circulating through said stationary refrigerator cooling coil; second valve means included in said at least partly flexible conduit for adjusting the amount of refrigerant fluid circulating through said at least partly flexible conduit and said portable air cooling coil; means tending to hold said first valve means in open position and said second valve means in closed position; electrical operating means for moving said first valve means from open into closed position and said second valve means from closed into open position; electrical actuating means for automatically actuating said electrical operating means when the temperature within said refrigerator compartment drops below a predetermined temperature; a manually operable valve in said at least partly flexible conduit for opening and closing the same; electric switch means operated by said manually operable valve so as to electrically connect said electrical actuating means with said electrical operating means when said manually operable valve is in open position; manually operable means for adjusting the operation of said electrical actuating means so as to vary said predetermined temperature at which said electrical actuating means actuate said connecting means; first electric motor operating means adapted to automatically connect said electric motor with a source of electric current when the temperature within said refrigerator compartment rises above said predetermined temperature and to automatically disconnect said electric motor from said source of electric current when the temperature within said refrigerator compartment drops below said predetermined temperature; and second electric motor connecting means adapted to automatically connect said electric motor with said source of electric current while the temperature within said refrigerator compartment is below said predetermined temperature and said manually operable valve is in opened position and to automatically disconnect said electric motor from said source of electric current when the temperature within said refrigerator compartment rises above said predetermined temperature or said manually operable valve is closed.

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