

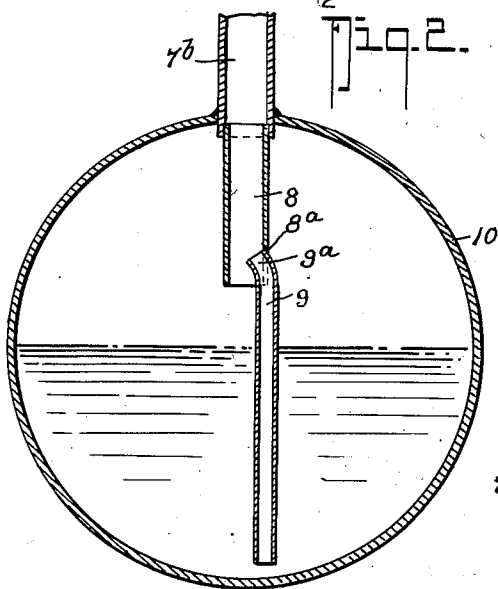
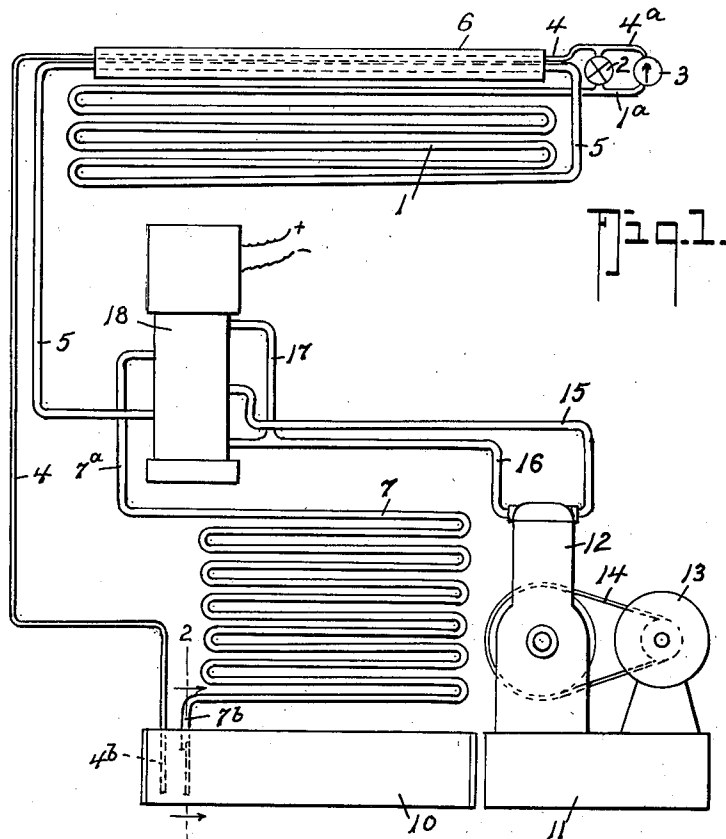
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LOW-TEMPERATURE DEFROSTING SYSTEM

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LOW-TEMPERATURE DEFROSTING SYSTEM

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3 Claims. (Cl. 62-115)

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My present invention relates to refrigerating systems having a reverse cycling defrosting means, such as that disclosed in my application Ser. No. 74,525, filed February 4, 1949, now Patent No. 2,525,560, October 10, 1950. That system included a compressor, a condenser, a receiver, a heat exchanger, an evaporator, a reversing valve, and piping operatively connecting the foregoing parts together so that at times the reversing valve operates to reverse the flow of refrigerant in the system whereby the condenser and the evaporator temporarily exchange their functions so as to defrost the evaporator.

In order for that system to operate, a thermostatic valve and a back check valve were included in the defrigerant circuit adjacent the evaporator and a capillary tube and a back check valve were included in the refrigerant circuit between the outlet of the condenser and the inlet of the receiver. In practice it was found that in the defrosting phase the return of the liquid from the coil being defrosted was slowed up. My present invention has for its object to remedy this defect by substituting for the capillary tube and back check valve between the condenser and receiver a service valve located in the receiver by means of which a liquid spray and gas mixture will be supplied to the condenser when the system is being operated in the defrosting phase. In this way the removal of the gas pressure above the liquid in the receiver provides for a more rapid return of liquid from the coil being defrosted.

More specifically, my invention resides in the elimination of the capillary tube and its association check valve, and the provision of a short tube extending into the receiver and terminating well above the liquid level with a syphon tube extending into the liquid, and assembled with the short tube, with the syphon's upper end projecting into the lower end of the short tube.

In the drawing:

Fig. 1 is a schematic view of a refrigerating system embodying my present invention.

Fig. 2 is an enlarged cross section on the line 2-2 of Fig. 1.

In the drawing, in which like numerals and letters of reference indicate like parts in all the figures, the evaporator coil 1 has one end 1^a connected to a thermostatically operated expansion valve 2 and to a one-way check valve 3, the valves 2 and 3 being connected, in parallel, to the coil end 1^a and to the beginning or entrant end 4^a of a pipe 4 which passes through a cylinder

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6 and has its other end 4^b passed into a receiver 10 to extend below the liquid level therein (see Fig. 1). The other end of the evaporator coil 1 is connected to a pipe 5 which also passes through the cylinder 6 in proximity to the pipe 4 and continues to a port of a reversing valve 18 of suitable construction, such as that disclosed in my application Ser. No. 93,123, filed May 13, 1949, for example. The portions of the pipes 4 and 5 which are contained within the cylinder 6 constitute therewith a heat exchanger.

The condenser has one end 7^b of its coil 7 connected to a short tube 8 whose lower end terminates well above the liquid level in the receiver. A syphon tube 9 has its upper end curved, as at 9^a, and welded or otherwise secured in a slot 8^a in the lower end of the tube 8; the upper end 9^a discharges into the tube 8 at its lower end, while the lower end of the tube 9 extends well below the liquid level in the receiver 10.

The other end of the condenser 7 connects with a pipe 7^a that extends from a port of the reversing valve 18.

12 indicates the compressor, 13 the motor which drives it via a belt and pulley connection 14. The high side of the compressor is connected to a port of the reversing valve by means of a pipe 15. The low side of the compressor is connected with ports of the reversing valve via pipes 16 and 17. The motor base is indicated by 11.

Operation

In the normal operation of the system the valve 18 is set to cause communication between pipe 15 and pipe 7^a and between pipe 5 and pipe 16. Therefore the compressed refrigerant (gas) flows from the compressor via pipe 15, valve 18, pipe 7^a, to condenser 7 where it is liquefied. From condenser 7 the refrigerant flows through my new valve 8-9 into the receiver 10, from which the defrigerant in the liquid phase passes via pipe 4, heat exchanger 6, thermostatic valve 2, pipe 1^a, into the evaporator where the refrigerant becomes evaporated, the refrigerant in the gaseous phase flowing from the evaporator via pipe 5, valve 18, pipe 16, to the compressor 12.

In the defrosting phase, the refrigerant from the compressor 12 passes through pipe 15, valve 18, pipe 5, heat exchanger 6, evaporator 5, check valve 3, pipe 4, to the receiver 10. From the receiver liquid refrigerant passes up the syphon tube 9 into the pipe 8, from which air and liquid spray passes into the condenser 7 and from the condenser, via pipe 7^a, valve 18, pipe 17,

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to pipe 16 and back to the compressor 12. At this time pipe 16 has no direct connection to the valve 18. As the pressure of the air in the receiver or reservoir is thus relieved, little or no back pressure on the flow of the refrigerant from the evaporator to the receiver will retard such flow.

From the foregoing description, taken in connection with the accompanying drawing, it is thought that the construction and advantages of my invention will be clear to those skilled in the art to which it appertains.

What I claim is:

1. In a refrigerating system, an evaporator, a condenser, a compressor, and a receiver, operatively connected in circuit with a reversing means for reversing the flow of refrigerant in the evaporator and condenser: combined with means located in the receiver and operable in the reverse phase for reducing the gas pressure in the receiver, said last named means comprising a pipe connected with a duct leading from the condenser to the receiver, the inner end of said pipe terminating well above the liquid level in the receiver and a syphon tube having an end connected to said pipe to discharge into the same and having its other end located well below the liquid level in the receiver.

2. In reverse-cycle-defrosting refrigerating systems, an evaporator, a condenser, and a receiver having a pipe leading from said evaporator and extending into the receiver well below the liquid level in the receiver, a second pipe secured to the shell of the receiver and connected to said

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condenser, a short pipe within the receiver secured at one end to said second pipe and having its other end terminated well above the liquid level in the receiver, and a syphon tube connected to said short pipe at its inner end to communicate with the same, said syphon tube extending well below the liquid level in the receiver.

3. In a refrigerating system, an evaporator, a condenser, a compressor, and a receiver, operatively connected in circuit with a reversing means for reversing the flow of refrigerant in the evaporator and condenser, a pipe leading from said evaporator and extending into said receiver below the liquid level in the receiver, a second pipe connected to said condenser and extending into said receiver and having its end terminating above the liquid level in the receiver, and a syphon tube connected to said second pipe and having communication therewith, said syphon tube extending below the liquid level in said receiver and controlling gas pressure and liquid flow from said receiver to said condenser.

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The following references are of record in the file of this patent:

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