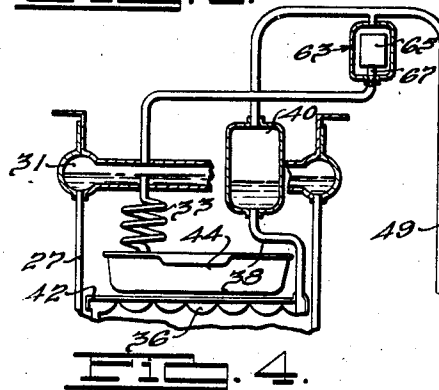
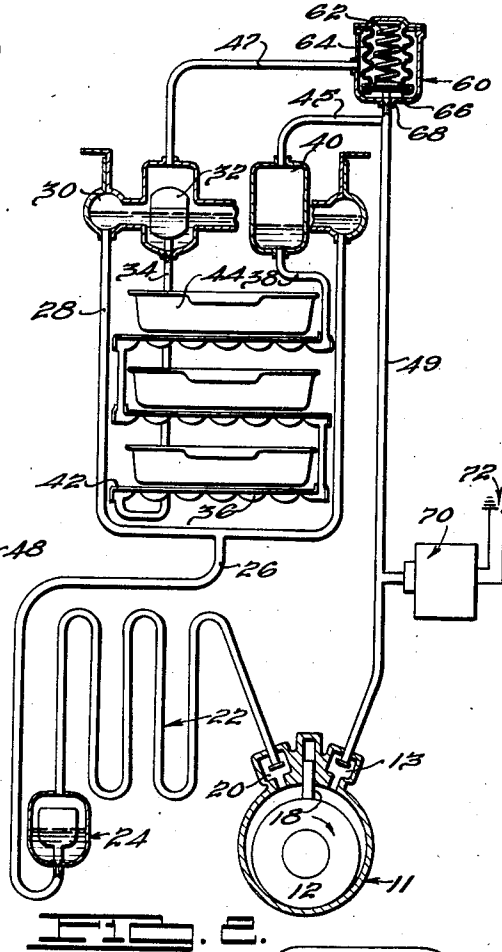


2,240,284

Filed Nov. 20, 1936



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2,240,284

REFRIGERATING APPARATUS

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Application November 20, 1936, Serial No. 111,765

14 Claims. (Cl. 62—126)

This invention relates to refrigerating apparatus and has particular reference to improvements in refrigerating systems, to improvements in the elements or apparatus used therein, and to a system or method of and apparatus for producing refrigeration at a plurality of different temperatures at the same time.

The refrigerating system selected for purposes of illustration include an evaporator having two sections, one being disposed within the other, and the unit as a whole contemplating the disposal thereof within a heat insulated compartment. The outside evaporator section is adapted for producing refrigeration at a relatively higher temperature and higher relative humidity than are produced by the inner section, and has as its purpose the cooling of the cabinet air so that foods may be stored and kept in an unfrozen condition. The inner evaporator section is adapted for producing refrigeration for fast freezing and storage of foods in a frozen condition, such as ice cream.

The use of the type of two-temperature evaporator embodied in this invention gives a refrigerating effect which simultaneously allows the air within the cabinet to be kept at a relative humidity of about 70 per cent and a temperature of about 35° F., rather than a relative humidity of about 35 per cent and a temperature of about 50° F., the latter percentage and temperature representing the present day conditions under which the interior of a refrigerator cabinet is operated and maintained; at the same time, the evaporator maintains an enclosed space within the cabinet at a freezing temperature and at a relative humidity which is admittedly low but not disadvantageously so as far as the cabinet air is concerned.

The household type of refrigerator now in use comprises, in part, an evaporator or cooling coil, its temperature being maintained lower than the freezing point of water. This results in condensation of the moisture in the air within the heat insulated compartment, and the dehydration of the cabinet air. Naturally, the foodstuffs also become dehydrated and shrink in size, and the quality and appearance of the food are generally impaired as a result thereof. It is thought that the amount of dehydration is substantially directly proportional to the temperature at which the evaporator or cooling coil is maintained. The modern refrigerator evaporator is usually operated at a pressure corresponding to a temperature of about 15° F. in order to produce adequate refrigeration, and this low temperature necessar-

ily places the quality or appearance of some of the stored food in jeopardy.

This invention contemplates the use of an evaporator having two individual sections, same being properly placed with relation to each other and interconnected so as to do away with the unfavorable conditions existing in the present day refrigerator. This is done by placing the low temperature evaporator within the high temperature evaporator and maintaining a lower suction pressure in the former than in the latter. The drawing in which this invention is embodied shows only diagrammatically the apparatus used therein, for it is the novel system and method of producing two-temperature refrigeration, rather than the apparatus used therefor, which is desirable of protection.

It is an object of the present invention to utilize in an ordinary refrigerator cabinet an evaporator or cooling coil having two sections, one of which sections being maintained at a temperature in the neighborhood of 30° F. in order to get a box temperature of about 35° F. and which is adapted for cooling the air within the heat insulated cabinet, and the other of which sections being maintained at a temperature around 0° F. and separated from the former section within the cabinet.

Another object of the invention is to provide a method or system of refrigeration, and the apparatus for performing same, which produces a plurality of different temperatures simultaneously with the production of a plurality of relative humidities, each temperature and its corresponding relative humidity representing the most favorable operating conditions for the particular part of the apparatus in which same are produced.

Another object of the invention is to provide a refrigerating system which is adapted for producing two-temperature refrigeration and which comprises means for simultaneously creating and maintaining a freezing temperature and an air cooling temperature, the former temperature having no substantially material effect upon the relative humidity of the air within the cabinet, and the latter tending to increase, rather than decrease, the relative humidity of the air within the cabinet.

Another object of the invention is to provide in a single refrigerating system a plurality of evaporators or cooling coils working at different suction pressures so as to obtain different temperature conditions in each section of the evaporator.

Another object of the invention is to provide

an evaporator for a heat insulated compartment so that the evaporator, when so assembled and installed, will divide the compartment into two separate areas, one within the other, the evaporator being designed and adapted for producing refrigeration at one temperature within one of said areas and at a different temperature within the other of said areas.

Other objects and advantages of the invention will be apparent from a consideration of the following specification taken in conjunction with the accompanying drawing of which there is one sheet and wherein:

Fig. 1 is a diagrammatic view of a refrigerating system embodying the invention herein described and shows a two-suction pressure compressor with suction lines leading therefrom to each section of the evaporator;

Fig. 2 is a modification of the system illustrated in Fig. 1 and shows diagrammatically a modified form of said system wherein the compressor has one, rather than two, suction lines connected to one, rather than two, suction ports, a pressure reducing valve accounting for the workability of this different design;

Fig. 3 is a modified form of the system illustrated in Fig. 2 and differs therefrom in the use of capillary action, rather than valve action, for the creation and maintenance of a pressure differential in the system; and

Fig. 4 is a modified form of the system illustrated in Fig. 3 and shows diagrammatically the system workability when a weight valve, rather than a capillary tube, is used for governing the establishment of different suction pressures in the evaporator sections.

It will be noted that in the following paragraphs which refer to the descriptions and operations of the structures embodied in the four disclosures appearing on the sheet of drawings that no mention has been made of the check valve which is usually placed in combination with the suction pressure inlet port of the compressor for maintaining a pressure difference in the system during the time the compressor is not operating. It is thought unnecessary to go into great detail both in explanation and disclosure concerning these check valves for, although they are necessary parts of the system, they represent no part of the invention embodied in this application. It need only be said that in Fig. 1 there is a pair of check valves provided, one being in workable combination with the low suction pressure inlet port 14, and the other in workable combination with the high suction pressure inlet port 16. In Fig. 2, there is provided a check valve in workable combination with the suction pressure inlet port 13. These check valves are of any make or type desired, and are assembled in the suction ports in the ordinary manner known to the industry today.

It will also be noted in the following paragraphs that no mention has been made of the oil return from the evaporator to the compressor. The presence of this feature is necessary, of course, but represents no part of the invention embodied herein. It need only be said with reference to this oil return that some appropriate means which is known to the present art is workably associated with the evaporator and adapted to have conveyed therefrom to the compressor certain amounts of the lubricant which collects in the evaporator.

The subject matter comprised in the two above paragraphs is not meant to be descriptive, but

merely to disclose the fact that said features are necessary for the efficient operation of each and every system embodied in the sheet of drawings.

Referring to Fig. 1, a rotary compressor 10 is shown diagrammatically and partly in cross-section as having a rotor 12 rotating in a clockwise direction so that suction pressure inlet ports 14 and 16, because of the location of the blade 18, represent the low and high suction pressure inlet ports, respectively. It follows that port 20 represents the discharge port of compressor 10. No attempt will be made to define more clearly compressor 10 and its component parts, because any operable compressor, possessing two suction pressure inlet ports, may be used in the novel system of two-temperature refrigeration illustrated in Fig. 1.

The compressed refrigerant is discharged from compressor 10, through discharge port 20, into an ordinary condensing unit, generally indicated at 22. From the condenser 22 the condensed and liquefied fluid passes into a high-side float valve, generally indicated at 24. Fluid continues to pass into valve 24, and when the amount is in excess of that required to open the float of said valve, it is permitted to pass therefrom into an insulated liquid line 26. The liquid in conduit 26 passes into the lower portion of the air cooling evaporator 28 and a portion of same vaporizes in passing up through the evaporator 28, during which change in state the cabinet in which evaporator 28 is contemplatively disposed is cooled. Liquid and vapor collect in header 30 of evaporator 28, the system being provided with enough liquid so that an overflow thereof in header 30 will pass through float valve 32, conduit 34 of the freezing unit 36, and up through the other end 38 of conduit 34 into an accumulator 40, and the liquid is thereby allowed to assume the level shown in Fig. 1. Float valve 24 is another means for permitting this level to be so assumed, and float valve 32 is adapted to maintain this level after it has been assumed. The opening of the float of valve 32 allows the liquid in header 30 to pass down through the conduit 34 and follow a series of coils comprising the freezing unit 36 and which are vertically and horizontally disposed with respect to shelves 42 upon which ice trays 44 are disposed. During the conveyance of the refrigerant in this manner, the liquid is evaporated and causes a great decrease in temperature within the space formed by the evaporator 28. The vapor and liquid pass up through the end 38 of conduit 34 into the accumulator 40 of the freezing section 36 of the evaporator and the vapor passes therefrom into the low suction pressure line 46 which is connected to the low suction pressure inlet port 14 of compressor 10. The vapor from header 30 of evaporator 28 passes therefrom into the high suction pressure line 48 which is connected to the high suction pressure inlet port 16 of compressor 10.

Passage of vapor through conduits 46 and 48 into the suction chamber of the compressor through ports 14 and 16, respectively, from accumulator and header 40 and 30, respectively, is simultaneous but not necessarily continuous. The system is adapted, by means of a thermostatic bulb 50 attached to a side of the air cooling section of the evaporator, to operate as long as the temperature of said section stays above, say, 20° F. A lower temperature will cause a contraction of the medium within bulb 50 sufficient to operate a thermostatic control 52 which, in turn, will

throw the motor-compressor unit out of circuit. This motor-compressor circuit is generally indicated at 54. The shutting down period of the system will last as long as it takes the system to build up a load of, say, 35° F. in the air cooling section, at which time the motor-compressor unit, will again be thrown in circuit. It is true that, when the air cooling section of the evaporator reaches the temperature of 20° F. through the vaporization of the fluid refrigerant therein, the compressor will shut down and not only cease the creation of a suction pressure therein, but will also stop further suction pressure maintenance in the freezing section. But, it must be remembered that, when this happens, the temperature of the air cooling section is 25° F., whereas the temperature of the freezing section is around 0° F.

Fig. 1, therefore, embodies a system of refrigeration which depends largely upon the use of a compressor capable of operating at two different suction pressures. As a result, the compressor is provided with two separate suction pressure inlet ports to each of which a vapor line leading from each section of the evaporator is connected. A lower pressure is created in one section than is created in the other because of the location of the ports with relation to the compressor blade, and because there is more gas in the suction chamber of the compressor after the suction stroke is well on its way than when it has just started. And, since temperature is substantially directly proportional to pressure, the lower the pressure is, the lower the temperature will be. It naturally must follow that the freezing section of the evaporator is connected to the inlet port of the compressor which is closer to the commencing point of the suction stroke. The system also contemplates the use of sufficient refrigerant to create the levels thereof indicated in Fig. 1, the use of the float valves (which have been only diagrammatically illustrated) which are adapted to maintain these levels and a resulting pressure differential between the evaporator sections, the use of a thermostatic control which is thermally associated with the air cooling section of the evaporator for maintaining said section between the limits of about 20° F. to 35° F., and the use of a well insulated cabinet in which the illustrated two-temperature evaporator is adapted to be disposed.

The results appear obvious. Refrigeration is produced at two temperatures at the same time, one, freezing, the other, air cooling. The refrigeration produced at the latter (and higher) temperature is carried out in atmosphere which retains its high relative humidity (because the temperature of the atmosphere never falls below freezing). And, the refrigeration produced around 0° F. is carried out in atmosphere set off from the cabinet (because the freezing evaporator section is disposed within the air cooling section and separated therefrom) and has, therefore, no effect upon the atmosphere within the cabinet. Foods which must be kept in very low temperatures to be preserved can be stored in the same refrigerator cabinet in which foods which must be kept only cool to be preserved are stored.

Fig. 2 diagrammatically illustrates a modified form of the invention which appears in Fig. 1. It will be noted that the compressor is provided with one suction pressure inlet port and one vapor line leading therefrom to the evaporator. It will also be noted that a pressure reducing valve, or snap-action valve, is inserted in this

single suction line and between the suction lines leading from the two sections of the evaporator. Another difference in this illustration over that disclosed in Fig. 1 is the fact that the system is controlled by a pressure control valve, rather than the thermostatic control used in Fig. 1, and that said valve is connected in the single system suction line rather than to the outside of the air cooling section of the evaporator, as is shown in Fig. 1.

The diagrammatically illustrated rotary compressor, generally indicated at 11, discharges compressed refrigerant therefrom, into a condenser, then into and through a high-side float valve, through an insulated liquid line, and into and up through the air cooling section of the evaporator. The air cooling section of the evaporator in Fig. 2, as in Fig. 1, has a float valve, the float of which is adapted to allow refrigerant to overflow into the freezing section of the evaporator and at the same time to maintain a pressure differential therebetween. The travel of the refrigerant from one section of the evaporator to the other, and the resulting effect upon the surrounding temperature, is similar to that disclosed in Fig. 1.

The pressure reducing valve, or snap-action valve, is generally indicated at 60 and is disposed in suction line 49 in such a way that, whether open or closed, the freezing section of the evaporator is always in communication with the suction side of compressor 11 by means of conduits 45 and 49. The parts thereof are disclosed only diagrammatically, but their functions and workability seem obviously clear. Within the valve 60 is a spring 62 which is telescoped by a bellows 64 and closed therewithin by a rigid base member 66 against which the pressure in suction line 47 is active and from which a needle section 68 downwardly projects and is adapted, under certain conditions, to engage with and close the suction line leading thereto from compressor 11. Valve 60 is adapted to open at about 5 lbs. gage pressure and close at about 0 lbs. gage pressure. The valve, when open, allows compressor 11 to exhaust the vaporous refrigerant from both sections of the evaporator through the valve and suction lines into the compressor. When valve 60 is closed, the gas is exhausted only from the freezing section of the evaporator, and it should be understood that this exhaust pressure might very easily go down to as low as 10 inches of vacuum without any effect upon the air cooling section of the evaporator.

The system illustrated in Fig. 2 is controlled by a pressure control valve, generally indicated at 70. This valve is connected to the single suction line 49 and is adapted to throw the motor-compressor unit in or out of circuit according to the load on the system. In other words, if the suction pressure produced in the freezing section of the evaporator has completed its work by lowering the temperature therein sufficiently to freeze the water or foodstuffs stored on shelves 42, the load upon the system decreases and valve 70 shuts off the motor-compressor unit. Subsequent opening and closing of the cabinet door, or other sources of internal temperature increase, will cause valve 70 to throw the motor-compressor unit back into circuit. The circuit is generally indicated at 72.

As has been said, a pressure of about 5 lbs. gage is adapted, by means of valve 70, to start the operation of compressor 11. At this pressure, valve 60 will be open and operation of compressor

11 will discharge refrigerant into both sections of the evaporator and exhaust therefrom through conduits 45 and 47, valve 60, and conduit 49, vapor which has been produced in the sections by the vaporization of said refrigerant in the process of cooling or freezing. As the compressor continues to operate, and until valve 60 closes, the temperature and pressure produced in each evaporator section will be the same. However, as soon as the system pressure gets down to around 0 lbs. gage, spring 62 of valve 60 seats needle 68 into conduit 49, whereby the air cooling section of the evaporator is closed off from further temperature and pressure reduction. It is reasonable to assume that the suction pressure in the freezing section of the evaporator can go down to as low as 10 inches of vacuum to produce extreme freezing conditions therein. However, as has been said before, as soon as the load in the system is relieved, in other words, as soon as the water or foodstuffs in the freezing section have become frozen, valve 70 operates to turn off the motivating means for the compressor. The system then remains at a standstill until the load in the system increases, namely, until 5 lbs. gage pressure is set up in the air cooling section of the evaporator, at which time valve 60 will open and the cycle repeated.

Fig. 3 shows, in part, a diagrammatic modification of the refrigerating system of Fig. 2, neglecting to include therein the compressor 11, condenser 22, high side float valve 24, liquid line 26, and pressure control valve 70, principally because these parts of the apparatus are similar in design, purpose, and function in both figures. The outstanding dissimilarities between Figs. 2 and 3 are that a capillary tube 33 in Fig. 3 replaces the float valve 32 of Fig. 2, and a capillary tube 61 in Fig. 3 replaces the pressure reducing, or snap-action, valve 60 of Fig. 2. The two-temperature refrigerating effect produced by the system illustrated in Fig. 3, in other words, can be said to depend largely upon capillary, rather than valve, action, as illustrated in Fig. 2.

The purposes of capillary tube 33 in Fig. 3, as are the purposes of float valve 32 in Figs. 1 and 2, are to provide for the overflow of refrigerant fluid therethrough from the air cooling section of the evaporator to the freezing section of the evaporator, and to maintain a pressure differential therebetween. The inlet end of tube 33 projects into header 31 of air cooling section 27 of the evaporator up to the level therein at which it is desired to maintain the system. Any surplus fluid collecting in header 31 will pass through tube 33 into the freezing section of the evaporator; if there is no fluid to so pass, then gas will flow instead. The constrictive quality of tube 33 is seen to maintain a different pressure in one evaporator section than in the other.

The capillary tube 61 in Fig. 3 is disposed in the system suction line 49 similarly as is the snap-action valve 60 of Fig. 2. That is, suction line 49 is connected directly with suction line 45 of the freezing section of the evaporator and indirectly (through tube 61) with suction line 47 of the air cooling section of the evaporator. The constrictive character of tube 61 is seen to permit the two sections of the evaporator to operate at different suction pressures and, therefore, different temperatures. At a time when the load upon the system is relieved by the freezing of the goods stored in the freezing section of the evaporator, the control valve 70 (not shown in Fig. 3, but identical with valve 70 in Fig. 2)

operates to shut down the compressor. This causes capillary tube 61 to permit the pressures in the two evaporator sections to eventually equalize. Addition of load on the system, of course, will cause valve 70 to throw the motor-compressor unit back in circuit, and the cycle will be repeated.

Fig. 4, like Fig. 3, illustrates a two-temperature refrigerating system and has a portion thereof cut away. The system is a modified form of the system shown in Fig. 3 in that, instead of using the capillary tube 61 of Fig. 3 for operating the two evaporator sections at different pressures, a weighted valve 63 is used therefor. This valve is disposed in the system suction line 49, connecting directly the freezing section of the evaporator with the suction space in the compressor, and connecting indirectly (through valve 63) the air cooling section of the evaporator with said suction space. The weight of weight member 65 of valve 63 operates to maintain the two evaporator sections at different pressures. Enough load on the air cooling evaporator section, say, 5 lbs. gage pressure, will act against the bottom of weight 65 and force needle member 67 to become unseated, and connect said section with the compressor through the open valve 63. When this pressure gets down to a point where the weight of member 65 overcomes the pressure in the air cooling evaporator section, valve 63 closes, and the system then commences to operate at dual pressures and temperatures. One point is worthy of noting, and that is that weight 65 of valve 63 closes the system during inoperation thereof, and the difference in pressure between the two evaporator sections is thereby maintained; in Fig. 3, when the system is not operating, capillary tube 61 allows the pressures to become eventually equalized.

Four separate and distinct systems of two-temperature refrigeration are embodied herein, and it seems needless to point out that each one of them contemplates the use of a refrigerator cabinet which must be sufficiently insulated because of the very low temperatures to be produced therein. Each system also contemplates an air cooling evaporator section which is sealed from the cabinet air so that one rather high and constant temperature can be maintained in the cabinet, while at the same time another constant, but very much lower, temperature is being maintained within the area formed by the sealed evaporator section. Fulfillment of these requirements, together with others set forth in the foregoing paragraphs, insures a dual temperature refrigerating system which is not only most efficient, but also capable of performing the objects set forth earlier in this specification.

It is to be understood that the invention is not limited to the specific features of the figures and systems disclosed, but is to be considered broadly as is represented by the scope of the appended claims.

I claim:

1. In a refrigerating system a pair of evaporators, each of which includes an accumulator, means for feeding liquid refrigerant to one of said evaporators, a refrigerant fluid connection between the accumulator of said one of said evaporators and the other of said evaporators and including flow regulating means, a suction line connected to each of said accumulators and means for establishing a different suction pressure in each of said suction lines, one of said

evaporators being arranged within and shielded by the other of said evaporators.

2. In a refrigerating system a pair of evaporators, each of which include an accumulator, means for feeding liquid refrigerant to one of said evaporators, a refrigerant fluid connection between the accumulator of said one of said evaporators and the bottom of the other of said evaporators and including flow regulating means, a suction line connected to each of said accumulators and means for establishing a different pressure in each of said suction lines and one of said evaporators being arranged within and shielded by the other of said evaporators.

3. In a refrigerating system a pair of evaporators adapted to be arranged within a heat insulated compartment, one of said evaporators being adapted to be exposed to the circulating air within said compartment and the other of said evaporators being arranged within said one of said evaporators so as to be shielded thereby, means for feeding liquid refrigerant to said one of said evaporators, a refrigerant fluid connection between said one of said evaporators and the other of said evaporators, a suction line connected to each of said evaporators and means for establishing different suction pressures in each of said suction lines so as to produce refrigeration in one evaporator at a temperature different than that produced in the other of said evaporators.

4. In a refrigerating system an air cooling evaporator adapted to be arranged within a heat insulated compartment, a second evaporator arranged within said air cooling evaporator and shielded thereby, means for feeding liquid refrigerant to said evaporators in series and means including a suction line connected to each of said evaporators operable for imposing a suction pressure upon the refrigerant in each of said evaporators for effecting the vaporization thereof at different temperatures in each of said evaporators so as to produce refrigeration in the air cooling evaporator at a temperature higher than that at which refrigeration is produced in the second evaporator.

5. In a refrigerating system a pair of evaporators arranged in series, means for feeding liquid refrigerant to one of said evaporators, a suction line connected to the other of said evaporators, a by-pass between said one of said evaporators and said suction line and around the other of said evaporators and pressure reducing means arranged in said by-pass, one of said evaporators being arranged within the other of said evaporators.

6. In a refrigerating system including a compressor, a condenser and a pair of evaporators and a suction line connected to said compressor for supplying refrigerant vapor thereto, means for supplying liquid refrigerant from said condenser to said evaporators in series, each of said evaporators including an accumulator, a connection between each of said accumulators and said suction line, and a weight valve arranged in one of said connections, one of said evaporators being arranged within the other of said evaporators.

7. In a refrigerating system including a compressor, a condenser and a pair of evaporators and a suction line connected to said compressor for supplying refrigerant vapor thereto, means for supplying liquid refrigerant from said condenser to said evaporators in series, each of said evaporators including an accumulator, a con-

nection between each of said accumulators and said suction line, and a capillary tube arranged in one of said connections.

8. In a refrigerating system including a compressor, a condenser and a pair of evaporators and a suction line connected to said compressor for supplying refrigerant vapor thereto, means for supplying liquid refrigerant from said condenser to said evaporators in series, each of said evaporators including an accumulator, a connection between each of said accumulators and said suction line and a pressure reducing valve arranged in one of said connections, one of said evaporators being arranged within the other of said evaporators.

9. In a refrigerating system a pair of evaporators, one of said evaporators comprising an air cooling evaporator and the other of said evaporators being arranged within and shielded by said air cooling evaporator, each of said evaporators including an accumulator, a refrigerant fluid connection between the accumulator of said air cooling evaporator and the bottom of the other of said evaporators and including flow regulating means, a compressor included in said system and means connecting said compressor to each of said accumulators so as to establish different suction pressures in each of said evaporators.

10. In a refrigerating system a pair of evaporators, one of said evaporators comprising an air cooling evaporator and the other of said evaporators being arranged within and shielded by said air cooling evaporator, each of said evaporators including a gas and liquid header at the upper end thereof and vertically arranged refrigerant conduits connected to said headers and arranged therebelow, means for feeding liquid refrigerant to the bottom of each of said evaporators and including a refrigerant fluid connection between the header of said air cooling evaporator and the bottom of the other of said evaporators and means for effecting vaporization of refrigerant in one of the evaporators at a temperature different than that in the other of said evaporators.

11. A refrigerating apparatus comprising in combination, an evaporator, expansion means for controlling the flow of liquid refrigerant to the evaporator, a high-side-float type expansion valve connected with the outlet of the evaporator, a second evaporator connected to receive refrigerant from the high-side-float type expansion valve, and means for withdrawing gaseous refrigerant from said evaporators compressing and condensing said refrigerant and delivering the same to the first-mentioned expansion means, one of said evaporators being disposed within the other of said evaporators.

12. In a refrigerating system an air cooling evaporator adapted to be arranged within a heat insulated compartment, a second evaporator arranged within said air cooling evaporator and shielded thereby, means for directing liquid refrigerant to said air cooling evaporator, expansion means for controlling the flow of refrigerant to said air cooling evaporator, a capillary tube connected with the outlet of said air cooling evaporator, said second evaporator being adapted to receive refrigerant from said capillary tube, and means for withdrawing gaseous refrigerant from said evaporators, compressing and condensing said refrigerant, and delivering the same to said expansion means, said means being adapted to establish different suction pressures

in said evaporators so as to produce refrigeration in said air cooling evaporator at a temperature higher than that at which refrigeration is produced in said second evaporator.

13. In a refrigerating system an air cooling 5 evaporator adapted to be arranged within a heat insulated compartment, a low temperature evaporator arranged within said air cooling evaporator and shielded thereby, means for directing liquid refrigerant to said air cooling evaporator, 10 means for withdrawing liquid refrigerant from said air cooling evaporator and delivering the same to said low temperature evaporator, and means for withdrawing gaseous refrigerant from said evaporators, compressing and condensing 15 said refrigerant, and delivering the same to said directing means, said last means being adapted to establish different suction pressures in said evaporators so as to produce refrigeration in the air cooling evaporator at a temperature higher 20 than that at which refrigeration is produced in the low temperature evaporator.

14. In a refrigerating system an air cooling evaporator adapted to be arranged within a heat insulated compartment, a low temperature evaporator arranged within said air cooling evaporator and shielded thereby, means for directing liquid refrigerant to the bottom of said air cooling evaporator, means for withdrawing liquid refrigerant from an upper region of said air cooling evaporator and delivering the same to said low temperature evaporator, and means for withdrawing gaseous refrigerant from said evaporators, compressing and condensing said refrigerant, and delivering the same to said directing means, said withdrawing means being adapted to establish different suction pressures in said evaporators so as to produce refrigeration in said air cooling evaporator at a temperature lower than that at which refrigeration is produced in said low temperature evaporator.

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