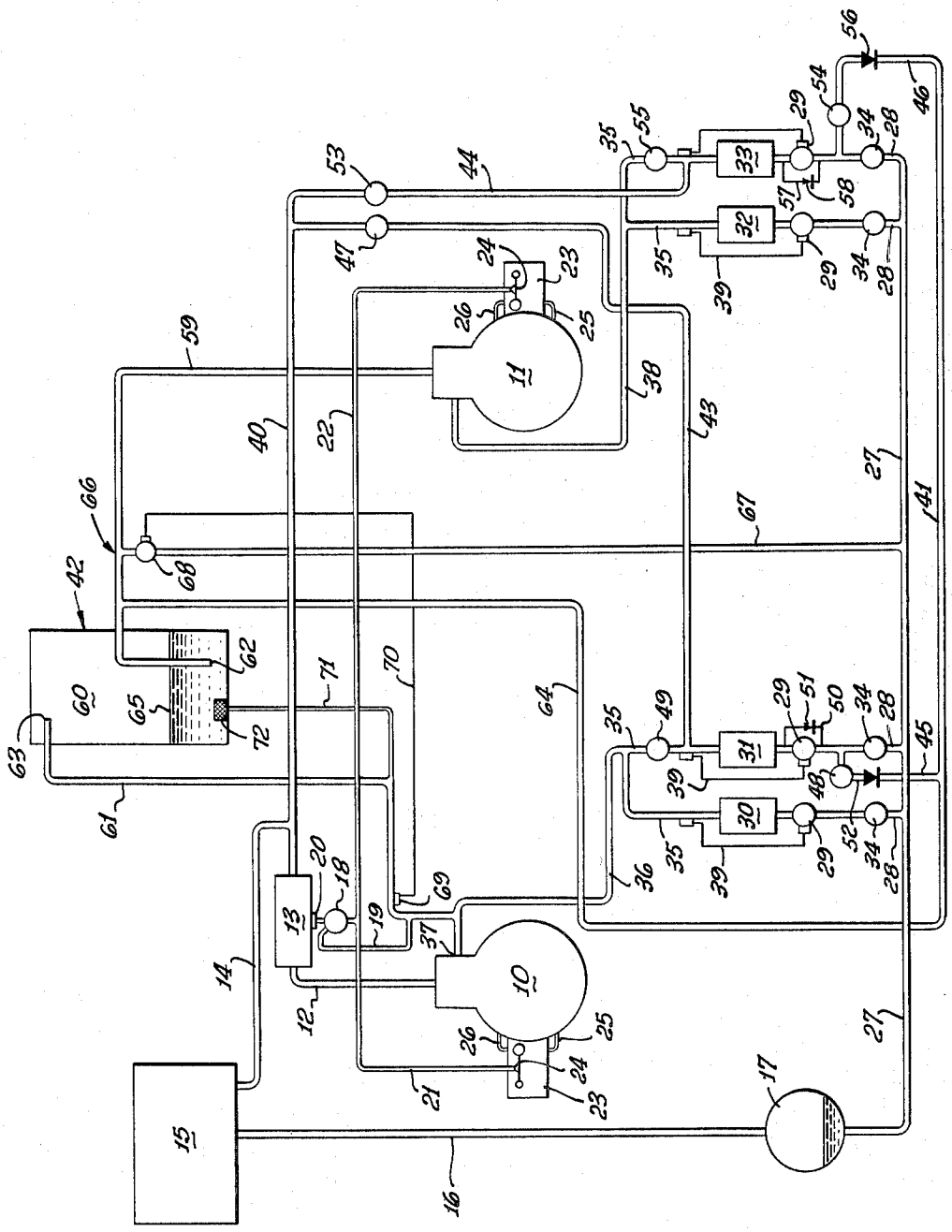
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DESUPERHEATER FOR REFRIGERATION SYSTEM

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DESUPERHEATER FOR REFRIGERATION SYSTEM

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This invention relates to a system for defrosting the evaporator coils of a refrigeration system, and in particular, relates to a defrosting system wherein the hot compressed gaseous refrigerant from the refrigeration system compressor is the source of heat used in defrosting the evaporator coils of the refrigeration system and is directed to a system wherein the refrigerant so used in the defrosting cycle is evaporated and added to the output of one compressor for introduction into a second compressor of the refrigeration system.

In the normal refrigeration cycle which is employed in this invention, a refrigerant gas such as ammonia, Freon or the like is compressed in a compressor, passes through a condenser where it gives off heat and changes to a liquid state and then is passed through an expansion valve to an evaporator coil to absorb heat and change the refrigerant back to a gaseous state for recompressing in the compressor to complete the refrigeration cycle. The evaporator coil is positioned within a refrigerated box, display case, or cabinet and the heat absorbed by the refrigerant passing through the coil serves to extract heat from the refrigerated box and its contents to maintain the box at the desired temperature. As is well known, this extracting of heat from the refrigerated box and its contents causes frost to form on the evaporator coil and refrigerated box which periodically must be removed to maintain proper functioning of the evaporator coil and avoid undesirable build-up of frost on the coil or other parts of the refrigerated box.

In modern stores, warehouses, and supermarkets, it is common to have numerous refrigerated boxes, display cases or cabinets which are refrigerated by separate individual refrigeration systems or by a single central refrigeration system supplying compressed-condensed refrigerant to each of the separate evaporator coils positioned in the refrigerated cases. Since these evaporator coils and refrigerated cases accumulate frost which must be intermittently removed, it is conventional to provide some type of heater such as an electric heating coil which when activated serves to automatically defrost the refrigerated case and evaporator coil. Although this intermittent defrosting is essential to the proper operation and maintenance of the refrigerated box, it is also relatively expensive both in initial cost of the heaters and in their operation due to the amount of power consumed in accomplishing the defrosting by these individual heaters. Generally, it is desirable that the defrosting be relatively rapid in order to avoid raising the temperature of the refrigerated box and its contents an objectionable amount.

As is well known the refrigerant leaving a compressor of a refrigeration system is in a hot compressed gaseous state and therefore is capable of supplying the heat necessary to accomplish the defrosting of the evaporator coils in refrigerated boxes. However, if this hot compressed gaseous refrigerant is used to accomplish the defrosting its pressure and temperature are changed due to the heat given off but the exact amount of such changes may not always be the same for each defrosting cycle or each refrigerated box, although, as is well known, for a particular temperature the pressure is known and vice versa. The refrigerant so used must be reintroduced into the normal refrigeration cycle but the variation between the liquid and gaseous state for different defrosting cycles and the low pressure of this refrigerant prevents its direct reintroduction into any portion of the normal refrigeration cycle. For example, this refrigerant cannot be introduced into the intake of the compressor because of the presence of liquid refrigerant which would damage the compressor. Further, the cooling of this refrigerant which occurs during the defrosting will reduce its pressure so that it cannot be directly introduced into the high pressure side of the refrigeration system.

It has been found advantageous in these refrigeration systems which employ numerous refrigerated boxes, display cases, and cabinets to provide a single refrigerant compressing and condensing system and to distribute the liquid refrigerant to the various evaporator coils from this single system. Further, it has been found that for efficient operation of the compressor system for these multiple evaporator systems that at least two compressors be provided wherein one compressor compresses the gaseous refrigerant to an intermediate temperature and pressure, and a second compressor takes this compressed gaseous refrigerant and compresses same to a proper pressure and temperature for condensing to a liquid for use in the refrigeration system evaporator coils. Although it is desirable that the first compressor compress the refrigerant to a particular pressure which has been found most efficient for the operation of the second compressor, the increase in temperature caused as a natural result of the compressing in the first compressor will reduce the efficiency of the second compressor. As is well known, the higher the temperature of the refrigerant entering the second compressor, the higher the output temperature of that compressor will be. This higher output temperature would actually cause the refrigerant to be superheated above the "saturated" temperature for that pressure and the higher temperature can cause damage to valves, etc., and even cause the breaking-down of the refrigerant or the oil carried with the refrigerant.

Accordingly, it is a principal object of this invention to provide a novel system for defrosting the evaporator coils of a refrigeration system wherein the heat required for accomplishing the defrosting is extracted from the hot compressed gaseous refrigerant supplied by the refrigeration system compressor and the refrigerant so used is evaporated in the gaseous refrigerant being supplied to the intake of the refrigeration system compressor.

Another object of this invention is to provide a defrosting system using the hot gaseous refrigerant produced by the refrigeration system compressors wherein the refrigerant so used is added to the output of one refrigeration system compressor and is thereby evaporated and the resulting gaseous refrigerant is supplied to the intake of a second refrigeration system compressor for additional compressing.

A further object of this invention is to provide a hot gas defrosting system for refrigeration systems wherein the refrigerant used in defrosting is evaporated in a novel form of accumulator for reintroducing that refrigerant back into the refrigeration system and for cooling the compressed gaseous refrigerant being supplied to one of the refrigeration system compressors.

Another and more detailed object of this invention is to provide a novel form of apparatus for accumulating the refrigerant used in the hot gas defrosting of the evaporator coils of a multiple evaporator refrigeration system wherein such apparatus is adapted to receive the output gaseous refrigerant from one compressor and cool such gaseous refrigerant by evaporation of the refrigerant used in defrosting for passing the resulting cooled gaseous refrigerant to another compressor associated with the refrigeration system.

A more specific object of this invention is to provide such a refrigerant accumulating apparatus wherein the gaseous refrigerant is bubbled through the refrigerant

liquid resulting from defrosting for evaporating the latter refrigerant and wherein any liquid within such apparatus is continually atomised and introduced into the intake of the other compressor.

Other and more detailed objects and advantages of this invention will appear from the following description and the accompanying drawing.

The drawing is a diagrammatic illustration showing the preferred form of the invention as incorporated with a refrigeration system including a plurality of refrigerated fixtures and at least two compressors in compounded relationship for increased efficiency.

In the refrigeration system as shown in the drawing, compressor means are provided for compressing the refrigerant gas including a commercial temperature compressor 10 and a low temperature compressor 11 in compounded relationship for discharging the total amount of refrigerant required for the system from compressor 10 through conduit 12 to oil separator 13 and thence through conduit 14 to condenser 15 where the refrigerant is cooled and condensed to a liquid. The condensed refrigerant passes from condenser 15 through conduit 16 to receiver 17 where the refrigerant is retained for subsequent distribution. If desired, an auxiliary condenser, not shown, may be provided in conduit 16 between condenser 15 and receiver 17.

As is conventional, the oil separator 13 serves to remove some of the oil pumped with the gaseous compressed refrigerant from the compressors. The oil thus separated drains to reservoir 18 where it is retained for redistribution to the compressors as needed. A degassing line 19 connects the upper portion of the oil reservoir 18 to the suction side of the commercial temperature compressor 10 for reducing the pressure within the reservoir 18 to a pressure equal to the suction or intake pressure of compressor 10. This reduction in pressure in reservoir 18 serves to evaporate the refrigerant entrapped within the oil separated in the separator 13 and drained to the reservoir 18 and returns the refrigerant to compressor 10. A float valve 20 is positioned between the oil separator 13 and the oil reservoir 18 to permit only liquid to pass from the separator to the reservoir thus preventing the degassing line 19 from drawing hot compressed refrigerant gas directly from the separator 13. Oil return lines 21 and 22 serve to return the oil from reservoir 18 to the compressors 10 and 11, respectively. The oil return lines 21 and 22 each feed into a chamber 23 provided on each of the compressors 10 and 11, respectively, and each chamber 23 has a float valve 24 controlling the flow of oil into that chamber. Oil flow from the chambers 23 into the compressor sumps is permitted through a lower feed line 25 and the oil levels in the chambers 23 and compressor sumps are allowed to equalize by pressure balancing lines 26. Hand valves (not shown) may be appropriately provided for manually stopping the flow of oil to compressors 10 and 11, respectively, as desired. Although this oil separating and return system is not essential to our invention, we prefer to incorporate same for the overall efficiency and automation of the refrigeration system and defrosting system.

The compressed-condensed liquid refrigerant passes from receiver 17 to header 27. From header 27 the liquid refrigerant passes through individual conduits 28 to individual expansion valves 29 where the refrigerant is expanded and passes to the evaporator coils 30, 31, 32 and 33 associated separately with each of the expansion valves 29 and connected conduits 28. While four evaporator coils are shown, it will readily appear that more or fewer coils may be used without departing from this invention. Each of the evaporator coils may be positioned in a separate refrigerated fixture, box, display case or cabinet (not shown) and subject to individual control. A solenoid valve 34 is provided in each conduit 28 between the header 27 and the associated expansion valve 29. Each solenoid valve 34 is responsive to thermostatic means positioned in the refrigerated fixture associated with the evaporator coil which communicates with that solenoid valve 34 for opening the solenoid valve 34 when the temperature within the refrigerated box increases above the predetermined temperature range and for closing such valve when the refrigerated box is within or below the predetermined temperature range. The pressure of the refrigerant is reduced as it passes through the expansion valves 29 and this expanded refrigerant evaporates as it passes through the evaporator coils thereby absorbing heat from each of the refrigerated boxes, display cases or cabinets within which these evaporator coils are positioned.

A separate outlet conduit 35 is associated with each evaporator coil 30 and 31 for passing the expanded evaporated gas to header 36 which communicates with conduit 61 for returning the gaseous refrigerant to the suction or intake 37 of compressor 10 thereby completing the refrigeration cycle. Likewise, separate outlet conduits 35 are associated with each of the evaporator coils 32 and 33 for passing the expanded evaporated gas to header 38 returning the gaseous refrigerant to the suction or intake of compressor 11. Each of the expansion valves 29 are individually responsive to the temperature in the outlet conduit 35 which is associated with the same evaporator coil through any convenient means such as separate capillary tubes 39 which thereby control the rate of flow of refrigerant through each expansion valve to the associated evaporator coil in a conventional manner.

Hand valves (not shown) may be positioned in each of the conduits 28 and 35, the headers 27, 36 and 38, and the other conduits for manual operation to isolate any one or more of the evaporator coils, the compressors, or other apparatus, from the rest of the system for maintenance or repair as desired.

Although it is not essential to our invention, in a normal installation the evaporator coils 30 and 31 are preferably associated with commercial temperature refrigerated boxes, such as produce cases, and evaporator coils 32 and 33 are preferably associated with low temperature refrigerated cases such as freezers. Further, a conventional intercooler may be incorporated in this system and preferably would be located in header 27 between the conduits 28 leading to evaporator coils 31 and 32 so that the liquid refrigerant supplied to the evaporator coils 32 and 33 would be cooler than the liquid refrigerant supplied to the evaporator coils 30 and 31.

Means are provided for accomplishing the defrosting of the evaporators 31 and 33 and, as shown in the drawing, these means may include a hot gas header 40, a condensate header 41 and an accumulator assembly 42. The header 40 is connected to conduit 14 for tapping off hot compressed gaseous refrigerant supplied by compressor 10 to condenser 15 as such hot gas is needed for defrosting the evaporator coils. Conduits 43 and 44 connect the hot gas header 40 to the separate outlet conduit 35 associated with evaporator coils 31 and 33, respectively, for separately supplying hot compressed gaseous refrigerant to those evaporator coils for accomplishing the defrosting of each. Conduits 45 and 46 connect the separate inlet conduits 28 associated with the evaporator coils 31 and 33, respectively, to the condensate header 41 for conducting the gaseous and condensed refrigerant used in defrosting those evaporator coils from the coils to the header 41. While apparatus is described for defrosting only two of the evaporator coils, it is to be understood and will readily appear to those skilled in the art that additional apparatus may be and usually is provided for defrosting all of the evaporators.

When it is desired to defrost the evaporator 31, for example, normally closed solenoid valves 47 and 48 provided in conduits 43 and 45, respectively, are opened and solenoid valves 34 and 49 provided in conduits 28

and 35, respectively, associated with evaporator coil 31 are closed so that the hot gaseous refrigerant passes from header 40, through conduit 43, through evaporator coil 31, through a bypass line 50 and thence through conduit 45 to the condensate header 41. The bypass line 50 is provided so that the refrigerant used in defrosting the evaporator coil 31 is not passed through the associated expansion valve 29 in a reverse direction during the defrosting cycle. A check valve 51 is provided in bypass line 50 for permitting refrigerant flow through the bypass line during defrosting of the evaporator coil but prohibiting such flow in the opposite direction during the normal refrigeration. If desired an expansion valve having a built-in check valve may be used.

A check valve 52 is provided in conduit 45 for permitting refrigerant to flow from evaporator coil 31 through conduit 45 to header 41 during the defrosting of the evaporator coil 31, but prohibiting the flow of refrigerant from header 41 through conduit 45 in a reverse direction toward the evaporator coil 31. Without the check valve 52 in conduit 45, it may be possible for certain conditions of refrigerant pressures to exist in header 41 and conduit 28 associated with the evaporator coil 31 when the defrosting of another evaporator coil is taking place, as hereinafter described, that refrigerant could inadvertently flow from header 41 to the evaporator coil 31 in a quantity which would be undesirable in that particular evaporator coil.

Similarly, normally closed solenoid valves 53 and 54 are provided in conduits 44 and 46, respectively, and normally opened solenoid valves 34 and 55 are provided in conduits 28 and 35, respectively, associated with evaporator coil 33 for defrosting that evaporator coil by opening solenoid valves 53 and 54 and closing those solenoid valves 34 and 55. A check valve 56 is provided in conduit 46 similar to and serving the same function as the check valve 52 provided in conduit 45 as heretofore described. Also, a bypass line 57 and check valve 58 are provided and associated with the expansion valve 29 associated with evaporator coil 33 in order to avoid reverse flow of refrigerant through that expansion valve during the defrosting cycle. Similar conduits, valve, bypass lines and check valves may be provided with the remaining evaporator coils for similar operation in the defrosting of that particular evaporator coil through the use of hot gas from header 40.

When the hot compressed gaseous refrigerant passes from header 40 through any one of the evaporator coils, heat is extracted from the gaseous refrigerant to accomplish the melting of the frost present on the coils and this loss of heat from the refrigerant generally results in condensation of at least some, if not all, of the gaseous refrigerant to a liquid state. It is highly undesirable to permit any substantial quantity of condensed refrigerant to enter the intake of a compressor. Even a small amount of liquid refrigerant entering the intake of a compressor will cause objectionable "hammering" of a compressor and the introduction of a large quantity of liquid refrigerant into the intake of the compressor would be likely to cause appreciable damage due to the incompressibility of the liquid refrigerant. It has, therefore, been found impractical to permit the refrigerant used in the defrosting of an evaporator coil to be passed directly to the intake of one of the compressors although this would appear to be a likely solution to the problem of the reintroduction of this refrigerant back into the normal refrigeration cycle. Further, though it would appear to be a ready solution that the refrigerant used in the defrosting of an evaporator coil merely be reintroduced into the refrigeration system at some portion which contains condensed refrigerant, this is not directly possible. As previously indicated, the pressure of the refrigerant at the end of any one defrosting cycle will not always be the same as any other defrosting cycle and the pressure usually will not exceed the pressure of any one point in the refrigeration cycle containing liquid refrigerant at any one particular moment. For example, if it were attempted to introduce the refrigerant used in defrosting from condensate header 41 directly into conduit 16, the pressure within conduit 16 would exceed the pressure within the header 41, thus causing the compressed-condensed refrigerant coming from condenser 15 to flow in a reverse direction through the condensate header 41 thereby defeating the defrosting operation.

In order to completely evaporate the refrigerant used in defrosting the evaporator coils so that such evaporated refrigerant can be introduced into the intake of one of the refrigeration system compressors and thereby reduce the intake temperature to that compressor, the accumulator assembly 42 is provided. A conduit 59 connects the high pressure side of compressor 11 to the tank portion 60 of accumulator assembly 42 and a conduit 61 connects tank portion 60 to the intake 37 of compressor 10. Conduit 59 preferably has its open end 62 positioned in the lower part of tank portion 60 and conduit 61 has its open end 63 positioned in the upper part of tank portion 60. A conduit 64 connects the condensate header 41 to the accumulator assembly 42. Although the conduit 64 may be connected directly to the tank portion 60 for discharging the defrosting refrigerant into tank portion, we prefer to connect the conduit 64 to the conduit 59 in advance of the latter conduit's open end 62 for improved mixing of the refrigerants coming from compressor 11 and header 41. As previously described, the compressed refrigerant gas passing from compressor 11 through conduit 59 to the accumulator 42 has been compressed to an intermediate pressure and relatively elevated temperature.

Further, the quantity of liquid refrigerant produced by the defrosting of one or more evaporators may at any one time be sufficient to form a liquid level 65 in the tank portion 60 of the accumulator 42. Thus, the hot compressed gaseous refrigerant passing through conduit 59 will be added to the refrigerant passing through conduit 64 from header 41 and bubbled through the liquid refrigerant present within the tank portion 60. This bubbling of the hot gaseous refrigerant through the liquid refrigerant serves to cool the gaseous refrigerant so that the refrigerant drawn through the opened end 63 of the conduit 61 to the compressor 10 will be relatively cool whenever there is liquid refrigerant present in tank portion 60 or being added from conduit 64 to the gaseous refrigerant passing through conduit 59. This reduction in the temperature of the refrigerant entering compressor 10 improves the efficiency of compressor 10, as is well known to those skilled in the art, in that the compressed refrigerant may be condensed at a lower temperature.

If so desired, a conventional hot gas desuperheater, generally designated 66, may be provided for accomplishing the conventional function of cooling the intake refrigerant to a compressor. A conduit 67 is connected to header 27 for passing liquid refrigerant to the hot gas desuperheater 66. The flow of refrigerant through conduit 67 to desuperheater 66 is controlled by an expansion valve 68 responsive to temperature sensitive means 69 associated with conduit 61 near intake 37 of compressor 10. The refrigerant from conduit 67 is expanded, evaporated and added into the flow of hot compressed refrigerant passing from compressor 11 through the hot gas desuperheater 66 to the compressor 10. As is conventional, this addition of expanded-evaporated refrigerant to the hot compressed gaseous refrigerant serves to cool the refrigerant gas thereby lowering its pressure and temperature before entering the intake 37 of compressor 10.

Thus, it may be seen that in effect, the accumulator 42 through the use of the refrigerant used in defrosting accomplishes the same objectives accomplished by a conventional hot gas desuperheater such as desuperheater 66, in that it cools the intake refrigerant to the commercial temperature compressor. Since the expansion valve 68 is responsive to the temperature in conduit 61 through tem-

perature sensitive means 69 and capillary tube 70 (whereby the valve 68 is opened when the temperature of the gas within conduit 61 exceeds the desired temperature), the expansion valve 68 will remain closed when there is sufficient liquid refrigerant within tank portion 60 of the accumulator 42 to cool the gas being discharged from the opened end 62 of conduit 59. When it occurs that not enough liquid refrigerant is being added from header 41 through conduit 64 to cool the gaseous refrigerant being discharged from conduit 59, the liquid level 65 will begin to drop and eventually the temperature within conduit 61 will increase to the point where expansion valve 68 will open to add liquid refrigerant to the gaseous refrigerant passing through conduit 59 and thence through tank portion 60 and conduit 61 to compressor 10, thereby maintaining the temperature of the intake refrigerant to compressor 10 at a relatively constant and desired level.

In order to avoid the objectionable accumulation of oil within tank portion 60 due to the liquid oil separating from the liquid refrigerant, capillary tube 71 is provided with one end positioned in the bottom of tank portion 60 and the other end communicating with conduit 61. The tank portion 60 is preferably positioned above compressor 10 and the attachment of capillary tube 71 to conduit 61 so that liquid will slowly drain from tank portion 60 through tube 71 to conduit 61 and be added to the gaseous refrigerant passing into compressor 10. The gaseous refrigerant passing through conduit 61 also serves to draw liquid through capillary tube 71. A strainer 72 may be provided in tank portion 60 to prevent clogging of tube 71. While primarily liquid refrigerant will be drawn through capillary tube 71, it is obvious that any oil present in the bottom of tank portion 60 will also be drawn through capillary tube 71 and injected into the stream of flowing gaseous refrigerant in conduit 61. Thus, there cannot be an objectionable accumulation of oil within tank portion 60.

In bubbling the hot compressed gaseous refrigerant from conduit 59 through the liquid refrigerant present in tank portion 60, the liquid refrigerant will be continually evaporated and drawn into compressor 10. Thus, the refrigerant used in defrosting the evaporator coils is continually and automatically reintroduced into the refrigeration system cycle and in doing so accomplishes a useful and efficiency improving result. Further, by our arrangement no pumps are needed to reintroduce the refrigerant used in the defrosting back into the refrigeration system nor is there any need for generating heat or power specifically for evaporating the defrosting refrigerant which would amount to an increased cost of operation resulting in reduced efficiency. But rather, we provide a useful accumulator which functions as a hot gas desuperheater and thereby reduces the amount of compressed-condensed liquid refrigerant which is consumed by the normally provided hot gas desuperheater 66.

In normal operation we prefer to defrost only one evaporator coil at a time so that all of the hot compressed gaseous refrigerant in header 40 is available for passing through that evaporator coil to accomplish the defrosting. With this large quantity of available heat, the defrosting can be accomplished rapidly thereby avoiding any objectionable increase in the temperature of the refrigerated fixture box, display case or cabinet. In installations employing a large number of evaporator coils, it is possible to defrost more than one coil at a time due to the larger capacity compressors which would be used in such an installation. The solenoid valves which are associated with the evaporator coils, with the hot gas header 40 and with the condensate header 41, may all be controlled by an automatic timing device (not shown) which serves to open and close the appropriate solenoid valves for a predetermined period of time to accomplish the sequential defrosting of the various evaporator coils. The period of time would be determined by considering the type of refrigerated box, its contents, its normal temperature and through defrosting tests. The only electrical heaters which may be needed to accomplish the complete automatic defrosting of the evaporator coils and refrigerated boxes are those usually associated with the drains for carrying off water resulting from defrosting of the evaporator coils. These electrical heaters would obviously be relatively inexpensive in original cost and inexpensive to operate when compared to the heaters normally necessary for defrosting the entire evaporator coil and refrigerated box. Although we have illustrated and described a refrigeration system and defrosting system which employs two compressors, one condenser, and four evaporators, it will be readily apparent to those skilled in the art and is to be understood that more compressors, more or fewer condensers, and more or fewer evaporators may be used without departing from our invention as individual installation requirements dictate.

Having fully described our invention it is to be understood that we do not wish to be limited to the details herein set forth or to the details illustrated in the drawing, but our invention is of the full scope of the appended claims.

We claim:

1. In a defrosting system for use with a refrigeration system employing at least two compressors in compounded relationship with a conduit connecting the output of one compressor to the intake of another and at least one evaporator coil, the combination of: conduit means operatively connecting the evaporator coil to the output of one of the compressors for conducting hot compressed gaseous refrigerant to the evaporator coil for defrosting the coil, accumulator means for receiving the refrigerant used in defrosting the evaporator coil, said accumulator means having a tank portion, conduit means operatively connecting the evaporator coil to the said tank portion of the accumulator means for conducting the defrosting refrigerant to said tank portion, and said accumulator means being operatively connected in the conduit connecting the two compounded compressors for passing the hot compressed refrigerant into said tank portion and through any liquid defrosting refrigerant present in said tank portion for evaporating that liquid defrosting refrigerant and desuperheating said hot compressed refrigerant.

2. The combination of claim 1 in which valve means are operatively associated with each evaporator coil and with each of said conduit means connecting the evaporator coil to the output of one compressor and said tank portion of the accumulator means, said valve means operable to arrest the normal flow of refrigerating refrigerant to and from the evaporator coil and to allow defrosting refrigerant flow from that one compressor output through that evaporator coil to the said accumulator means.

3. The combination of claim 2 in which the said conduit connecting the output of one compressor to the intake of another compressor includes a first conduit connecting the output of said one compressor to said tank portion of said accumulator means for discharging compressed refrigerant through any liquid defrosting refrigerant present in said tank portion for evaporating that liquid defrosting refrigerant, and a second conduit connecting said tank portion to the intake of the other compressor; and a capillary tube means connecting the lower most portion of said tank portion to said second conduit for drawing liquid from said tank portion and adding that liquid to the gaseous refrigerant flowing to the intake of that other compressor.

4. In a defrosting system for use with a refrigeration system including at least two compressors in compounded relationship with the hot gas discharge of one compressor being connected to the suction side of another compressor and at least one evaporator requiring periodic defrosts; the combination of accumulator means interposed in the connection between said compounded compressors for receiving the hot gas discharge from said one com-

pressor, means for isolating said evaporator from its normal refrigeration system circuit and operatively connecting said evaporator to the discharge of said other compressor for conducting hot gaseous refrigerant to said evaporator for defrosting same, and means operatively connecting said evaporator to said accumulator means during the defrost period for conducting the refrigerant condensed in said evaporator to said accumulator means where the hot gas discharged from said one compressor vaporizes the condensed refrigerant received in said accumulator means from said evaporator to cool the gaseous refrigerant drawn into the suction side of said other refrigeration system compressor.

5. In a refrigeration system including at least two compressors in compounded relationship with the hot gas discharge of one compressor being connected to the suction side of another compressor, condenser-receiver means providing a liquid refrigerant source, a plurality of evaporator means including at least one evaporator requiring periodic defrosts, and liquid and suction headers normally connecting said evaporator means with said condenser-receiver means and the suction side of said compressors, respectively; the combination of a defrost system for defrosting said one evaporator, comprising accumulator means interposed in the connection between said compounded compressors for receiving the hot gas discharged from said one compressor, means for isolating said one evaporator from said liquid and suction headers and operatively connecting said one evaporator to the discharge of said other compressor for conducting hot gaseous refrigerant to said one evaporator for defrosting same, means operatively connecting said one evaporator to said accumulator means during the defrost period for conducting the refrigerant condensed in said evaporator to said accumulator means whereby the hot gaseous refrigerant discharged from said one compressor vaporizes the condensed refrigerant received in said accumulator means from said one evaporator and desuperheats the hot gaseous refrigerant received from said one compressor to provide cooled gaseous refrigerant to be drawn into the suction side of said other compressor, and conduit means connected between said liquid header and the connection from the discharge of said one compressor to said accumulator means, said conduit means having a temperature responsive expansion valve adapted to meter liquid refrigerant into said connection to vaporize said liquid refrigerant and desuperheat said hot gaseous refrigerant when the condensed refrigerant is substantially completely vaporized from said accumulator means.

6. In a refrigeration system having first and second compressors in compounded relationship with the hot gas discharge of the first connected to the suction side of the second, condenser-receiver means providing a liquid refrigerant source, a plurality of evaporator means normally connected to said condenser-receiver means for receiving liquid refrigerant therefrom, at least one of said evaporator means being connected to the suction side of said first compressor and at least one other of said evaporator means being connected to the suction side of said second compressor, said evaporator means producing a cumulative refrigerant heat load substantially in excess of the heat load required to defrost any one of said evaporator means, and means for selectively isolating individual evaporator means from the condenser-receiver means and connecting said isolated evaporator means to the discharge side of said second compressor for receiving hot gaseous refrigerant to effect defrosting of said isolated evaporator means; the combination of accumulator-desuperheater means interposed in the connection between said first and second compressors, said accumulator-desuperheater comprising a tank having a lower liquid section and an upper gas section, said connection including a first conduit between said first compressor and said tank having an open end in said tank and a second conduit between said accumulator-desuperheater means and the suction side of said second compressor and having an open end in said upper gas section of said tank, and conduit means operatively connecting said isolated evaporator means to said accumulator-desuperheater means during the defrost period of the former for conducting condensed refrigerant to the latter, said conduit means having an open discharge end connected to the first conduit adjacent to its open end providing aspiration and intimate flow of condensed refrigerant with said hot gas discharge into said tank whereby vaporization of condensed refrigerant and desuperheating of hot gas takes place.

7. The refrigeration system according to claim 6 in which said open end of said first conduit is positioned in the lower liquid section of said tank.

8. The refrigeration system according to claim 6 in which supplemental desuperheater means is provided between said first and second compressors, comprising a liquid line connection from said condenser-receiver means, and means for metering liquid refrigerant through said liquid line connection into the said connection between the hot gas discharge of said first compressor and the suction side of said second compressor in response to predetermined high temperature values of the gaseous refrigerant passing to the suction side of said second compressor.

9. The refrigeration system according to claim 8 in which said metering means comprises an expansion valve through which refrigerant is adapted to be fed into the first conduit upstream of said accumulator-desuperheater means.

10. The refrigeration system according to claim 6 in which said tank includes a capillary oil connection from the bottom thereof in gravity flow relation to the suction side of said second compressor.

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