

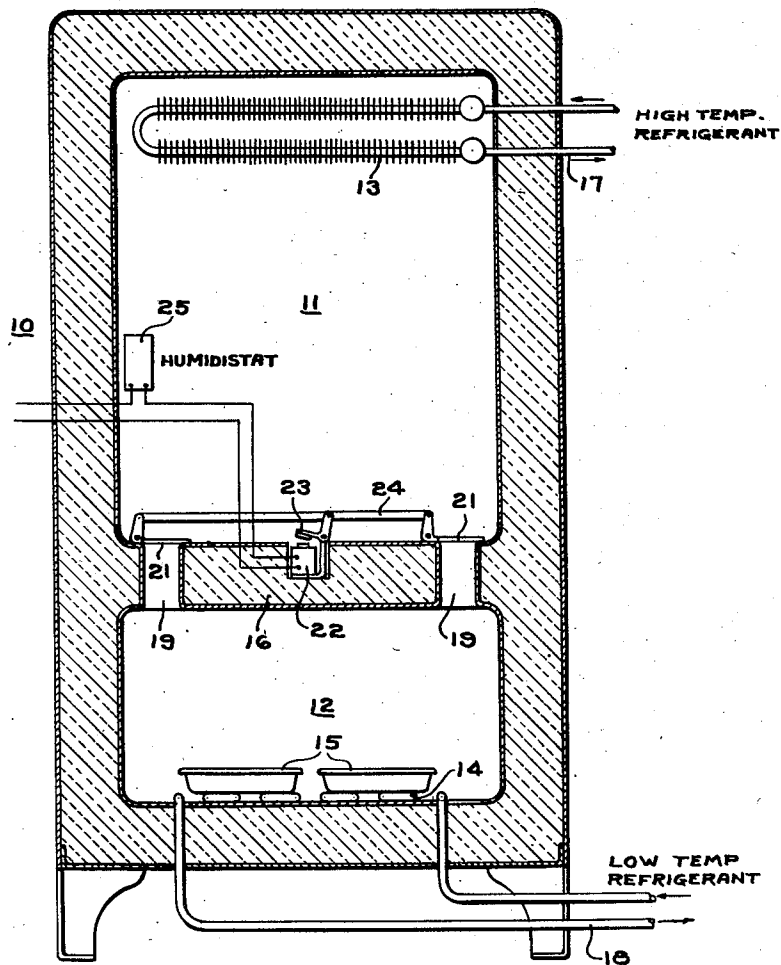
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HUMIDITY CONTROL FOR REFRIGERATORS

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WITNESSES:

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HUMIDITY CONTROL FOR REFRIGERATORS

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3 Claims. (Cl. 62—6)

My invention relates to refrigerating apparatus and has for an object to provide improved apparatus of this kind.

5 A further object of my invention is to control the humidity of the air in the food storage chamber of a refrigerator.

10 A still further object of the invention is to dehumidify the air in the food storage zone of a refrigerator in response to a predetermined high value of the humidity thereof by subjecting the air to refrigeration exterior of the zone.

15 These and other objects are effected by my invention, as will be apparent from the following description and claims, taken in connection with the accompanying drawing, forming a part of this application, in which:

The single figure of the drawing is a vertical section through a two-temperature refrigerator arranged in accordance with my invention.

20 While not so limited, my invention is particularly adapted to two-temperature refrigerators having high and low temperature zones refrigerated by respective high and low temperature evaporators. The low temperature evaporator is employed for freezing purposes and for maintaining its respective zone at a relatively low temperature of say 15°. As the preservation of most food products is effected at temperatures above freezing, the food storage zone is maintained at a much higher temperature of approximately 40°.

30 As it is desirable that the humidity of the food storage zone be maintained at a relatively high value to prevent excessive dehydration of the food, the evaporator in the food storage zone is made as large as practical and is operated at a relatively high temperature in order that the dew point of the air is not greatly depressed with an excessive reduction in the moisture content of the air. However, it is desirable that the relative humidity of the air be maintained at a value below saturation, such as, for example, 70%, otherwise, undesirable results may be experienced such as the depositing of moisture upon the stored articles and upon portions of the cabinet defining the high temperature zone.

45 In accordance with my invention, I provide means for establishing communication between the atmospheres in the high and low temperature zones when the humidity of the air in the higher temperature zone exceeds a predetermined value. During these periods moisture is diffused from the higher temperature zone to the lower temperature zone whereby the humidity of the air in the higher temperature zone is reduced. Communication between the atmospheres

is interrupted when the humidity of the air is reduced to the desired value.

Reference will now be had to the drawing wherein a refrigerator of the two-temperature type is shown. The refrigerator includes a cabinet structure, generally indicated by the numeral 10, and having a plurality of heat insulating walls for defining relatively high and low temperature refrigerating zones or chambers 11 and 12 which are cooled by evaporators 13 and 14, respectively. The evaporator 13 may be finned as shown and operates to cool the air in the chamber 11 to a suitable value, such as, for example, 40°, for the preservation of food products. The evaporator 14 is employed for cooling the air in the low temperature or freezing zone 12 to a value below 32° F. and for congealing fluid that may be disposed in trays 15. An insulating wall member 16 separates the high and low temperature chambers.

25 Refrigerant for the higher temperature evaporator 13 is conveyed by conduits, shown at 17, and relatively low temperature refrigerant is conveyed to the evaporator 14 by conduits 18. A refrigerating machine of any suitable type (not shown) may be employed for the circulation of the refrigerant.

The relative humidity and the dew point temperature of the air in the high temperature chamber 11 are maintained relatively high by the evaporator 13. The latter is operated at a high refrigerating temperature so that the amount of moisture precipitated from the air in the chamber 11 is relatively low, a substantial portion of the cooling effect of the evaporator 13 being effective for the abstraction of sensible heat from the air. The humidity of the air should not be maintained at or near the saturation value, however, as food products when subjected to an atmosphere of too high moisture content may accumulate a film of moisture.

45 In order to reduce the humidity of the atmosphere in the chamber 11 when it exceeds a predetermined value, I provide means for subjecting the air to the low temperature within the freezing zone 12. Accordingly, one or more passages 19 may be provided in the wall 16 and controlled by dampers shown at 21. The dampers may be operated by a solenoid 22 having a pivoted armature 23 connected to the dampers by links 24. Energization of the solenoid is controlled by a device 25 that is responsive to a condition of the humidity of the air. Preferably, the device 25 responds to the relative humidity of the air.

Normally, the refrigerated air in the chamber

11 is maintained at a relative humidity of 70% for example, during which periods the humidity responsive device 25 maintains the solenoid 22 de-energized and the dampers 21 are, therefore, closed. If, for any reason, the relative humidity of the air exceeds 70% the humidity responsive device 25 energizes the solenoid 22 for opening the dampers 21. Accordingly, the air adjacent the bottom of the zone 11 is subjected to the cold and relatively dry air in the freezing zone 12, and diffusion of moisture from the higher temperature compartment 11 to the low temperature compartment 12 is effected due to the difference in vapor pressures therein. When the relative humidity of the warmer air is reduced below 70%, the dampers are closed by the humidity responsive device 25.

Moisture condensed from the air by the evaporators 13 and 14 may be removed or collected in any well known manner. The moisture condensed in the chamber 12 will appear upon the evaporator 14 as frost. Periodic removal of the frost is effected in any suitable manner.

From the foregoing, it will be apparent that I have provided an improved control for the humidity of the air in the food storage zone of a refrigerator, wherein refrigeration produced at low temperature exterior of the zone is employed for dehydrating the air when its humidity exceeds a predetermined value.

While I have shown my invention in but one form it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1. In refrigerating apparatus, the combination

of a structure defining first and second zones to be refrigerated, means for cooling the air in the first zone to a relatively low temperature, means for cooling the air in the second zone to a relatively high temperature, and means responsive to a predetermined value of the humidity of the air in the higher temperature zone for establishing communication between the zones.

2. In refrigerating apparatus, the combination of a structure defining first and second zones to be refrigerated, first and second evaporators for cooling the air in the first and second zones, respectively, a device responsive to the humidity of the air in the first zone, said device being operative to effect communication between the zones when said humidity is above a predetermined value and to terminate communication between the zones when the humidity is below said predetermined value.

3. In refrigerating apparatus, the combination of means defining relatively high and low temperature chambers for the storage of perishables, relatively high and low temperature evaporators for abstracting heat from the high and low temperature chambers, respectively, said high temperature evaporator being primarily effective for abstracting sensible heat from the air in the high temperature chamber, whereby a relatively high humidity is maintained therein, said low temperature evaporator being effective for reducing the temperature of the air in the low temperature chamber to a low value and thereby effect a substantial reduction in the moisture content thereof, and means responsive to a predetermined high value of the humidity of the air in the high temperature chamber for establishing communication between said air and the air in the low temperature chamber, whereby the moisture content of the air in high temperature chamber is reduced.

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