June 7, 1938. E. B. NEWILL 2,119,958

REFRIGERATING APPARATUS

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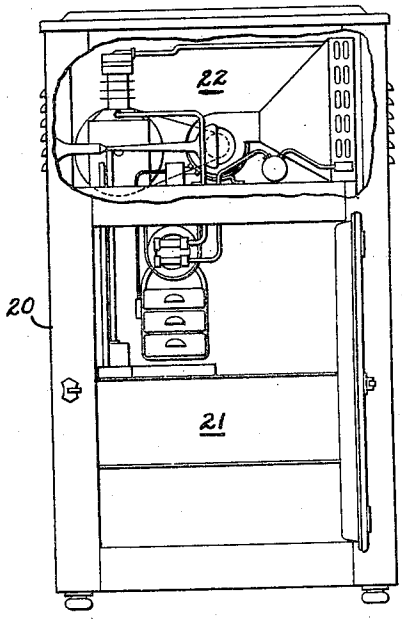


Fig. 1

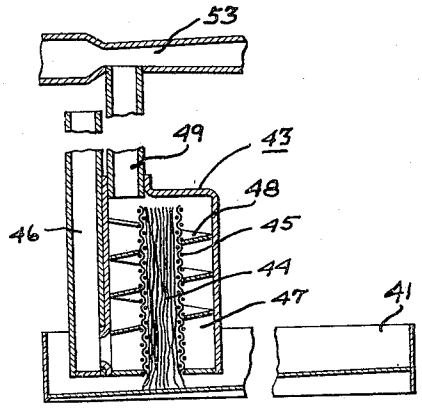


Fig. 3

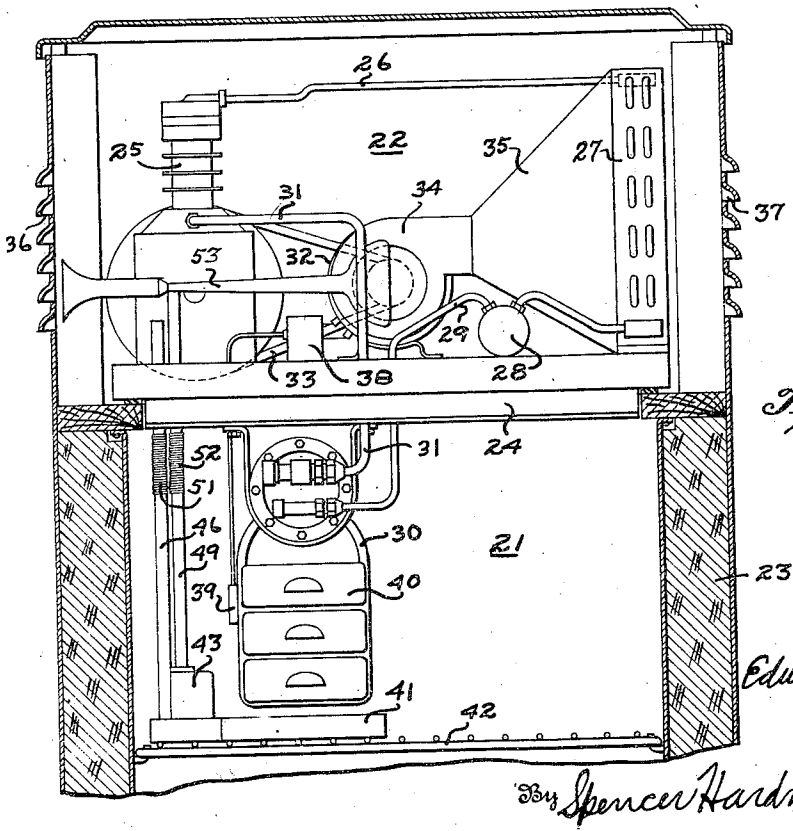


Fig. 2

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REFRIGERATING APPARATUS

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11 Claims. (Cl. 62—103)

This invention relates to refrigerating apparatus and more particularly to means for collecting and removing moisture dripping from the evaporator of a refrigerator.

There have been different ways provided for collecting and removing moisture dripping from the evaporator in refrigerators in which the machinery compartment is below the food compartment. In such cases moisture may be conducted by gravity to the machine compartment where it may be disposed of in several different ways.

It has now become very common to place the machinery compartment above the food compartment in such a case the moisture dripping from the evaporator can not be removed in the machinery compartment by gravity but a suitable lifting means must be provided for this purpose. In doing so, care must be taken to prevent heat leak from the food compartment to the machinery compartment.

The objects of my invention include the provision of means for collecting moisture dripping from the evaporator and removing it to the machinery compartment in the top of a cabinet without causing unnecessary heat leakage for the food compartment.

It is a more specific object of my invention to provide a wick for raising the water and an air stream for circulating air over the wick and causing the moisture therein to evaporate into the air.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a front view of a refrigerator cabinet of the top unit type;

Fig. 2 is an enlarged sectional view of the upper portion of Fig. 1, and

Fig. 3 is an enlarged sectional view of a portion of the moisture removing means.

Referring to the drawing, and more particularly to Fig. 1, there is shown a refrigerator cabinet 20 of the top unit type having the food compartment 21 in its lower portion and a machinery compartment 22 in its upper portion. The food compartment 21 is surrounded by insulated walls 23 upon which rests a removable insulated wall 24 which divides the food compartment 21 from the machinery compartment 22. Upon the upper portion of this removable wall 24 there is provided a compressor 25 for compressing the refrigerant and for forwarding the compressed refrigerant through a conduit 26 to an air cooled condenser 27 where the compressed refrigerant is liquefied and collected in a receiver 28. From the receiver 28 the liquid refrigerant is forwarded through a supply conduit 29 to an evaporator 30 located in the food compartment 21. The liquid refrigerant in the evaporator vaporizes because of the absorption of heat and is returned to the compressor 25 through the return conduit 31.

The compressor 25 is driven by an electric motor 32 by pulley and belt means 33. The electric motor 32 also drives a centrifugal fan 34 which has its outlet connected to a hood 35 which causes the air to be forced through the condenser 27 for cooling the compressed refrigerant. The machinery compartment 22 is provided with openings 36 and 37 on either side in the form of louvers for permitting the circulation of air therethrough under the influence of the centrifugal fan 34.

The operation of the electric motor 32 and the compressor 25 is controlled by a switch means 38 operated by changes in pressure in a thermostatic bulb 39 located at the side of the cooling unit 30. The switch means 38 causes the electric motor to start when the tamperature of the evaporator 30 is at a predetermined high temperature limit and causes the motor to stop when the evaporator reaches a predetermined low temperature limit.

Inasmuch as the evaporator 30 is at a lower temperature than the air in the food compartment 21 during the operation of the apparatus, moisture will collect upon the evaporator. If the evaporator at all times operates below a freezing temperature, this moisture will collect on the evaporator in the form of frost. This frost acts as an insulator of the evaporator and reduces the efficiency of the refrigerating system. Under these conditions in order to maintain a high efficiency, it is necessary to defrost the evaporator in order to remove this insulating blanket of frost therefrom. This is done by shutting off the refrigerating apparatus and allowing the evaporator to warm up considerably above freezing temperature so that the frost will be melted therefrom. This is sometimes aided by placing warm water in the freezing trays 40 which are provided in the evaporator 30. In order to collect this moisture dripping from the evaporator 30, a pan 41 is provided beneath the evaporator 30 and is supported upon a shelf 42.

If, on the other hand, the evaporator operates during a portion of its cycles at a temperature above 32°, any frost thereon will melt therefrom

and some moisture collecting thereon will merely condense thereon without turning into frost and this moisture may also be collected in the pan 41.

In order to remove the moisture from the pan 41, I have provided an evaporating means generally designated by the reference character 43. This evaporating means, which is illustrated in Fig. 3, has a vertical wick 44 extending into the pan 41. The wick is surfounded and held in position by a tubular screen 45. The moisture in the pan is attracted to the wick by capillary action and causes the wick to be moist whenever there is moisture in the pan 41. In order to remove moisture from the wick 44, an air circulating system is provided from the relatively warm machinery compartment 22 through a duct 46 to the wick 44. The duct 46 opens into the wick chamber 47 which is provided with a spiral partition 48 which provides a spiral air flow around the wick 44 for removing moisture therefrom. The air leaves the wick chamber 47 through a second duct 49 which extends up into the machinery compartment. It should be noted that no air is permitted to escape from the duct means and the wick chamber since the wick prevents the escape through the only opening in this means whether the pan 41 is filled with water or whether the pan is empty. In this way the wick 44 effectively seals the chamber for preventing the leakage of air but at the same time permits moisture to enter therein. The ducts 46 and 49 are each provided with insulating flexible connections 51 and 52 which prevent the conduction of heat through the duct means. These flexible connections also facilitate the removal of the pan from beneath the evaporator 30 for cleaning purposes.

The air flow through the ducts 46 and 49 and the wick chamber 47 is actuated by a Venturi means 53 which has the duct 49 connected to its restricted portion. The Venturi means 53 is connected to the centrifugal fan 34 so that an air current is drawn through the Venturi means 53 by the centrifugal fan. The reduction in pressure at the restricted portion of the Venturi means causes air to be drawn from the machinery compartment through the duct 46 into the wick chamber 47 where it removes moisture from the wick 44 and up through the duct 49 into the Venturi means 53 from which point it is carried through the Venturi means to the centrifugal fan 34 which causes it to be distributed into the air in the room. As the moisture is drawn into the air in the wick chamber 47, more moisture is removed from the pan 41 to take its place. In this way the pan 41 is kept free from moisture during the operation of the refrigerating apparatus. One of the advantages of my invention is that it operates without care upon the part of the household. It also promotes the purity of the air within the food compartment 21 by removing the drip from the evaporator within a short time.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Refrigerating apparatus including a cabinet having a food compartment therein and a machinery compartment above the food compartment and insulated therefrom, a refrigerating system including a refrigerant liquefying apparatus in the machinery compartment and a refrigerant evaporator in the food compartment, a receptacle in the food compartment for collecting moisture dripping from the evaporator, and means including a wick for removing the moisture from the receptacle and discharging the moisture in the machinery compartment.

2. Refrigerating apparatus including a cabinet having a food compartment therein and a machinery compartment above the food compartment and insulated therefrom, a refrigerating system including an air cooled refrigerant liquefying apparatus in the machinery compartment and an evaporator in the food compartment, a receptacle in the food compartment for collecting moisture dripping from the evaporator, fan means for circulating air over the refrigerant liquefying apparatus, and means dependent upon the fan means for providing a circulation of air from the machinery compartment to the receptacle and from the receptacle to the external air for removing moisture from the receptacle.

3. Refrigerating apparatus including a cabinet having a food compartment therein and a machinery compartment above the food compartment and insulated therefrom, a refrigerating system including a refrigerant liquefying apparatus in the machinery compartment and an evaporator in the food compartment, a receptacle in the food compartment for collecting moisture dripping from the evaporator, a wick means having a portion in the receptacle for drawing moisture upwardly of the receptacle, and means for circulating air through the machinery compartment and over the refrigerant liquefying apparatus for cooling same, said means also circulating air in contact with the wick means for removing moisture from the wick means and from the receptacle.

4. Refrigerating apparatus including a cabinet having a food compartment therein and a machinery compartment above the food compartment and insulated therefrom, a refrigerating system including a refrigerant liquefying apparatus in the machinery compartment and a refrigerant evaporator in the food compartment, a receptacle in the food compartment for collecting moisture dripping from the evaporator, conduit means extending from the machinery compartment to the receptacle, evaporating means at the lower portion of said conduit means for removing moisture from the receptacle, and means for circulating air through the conduit means.

5. Refrigerating apparatus including a cabinet having a food compartment therein and a machinery compartment above the food compartment and insulated therefrom, a refrigerating system including a refrigerant liquefying apparatus in the machinery compartment and a refrigerant evaporator in the food compartment, a receptacle in the food compartment for collecting moisture dripping from the evaporator, conduit means extending from the machinery compartment to the receptacle for conducting air from the machinery compartment to and from the receptacle, and evaporating means at the lower portion of said conduit means for evaporating the moisture in the receptacle into the air flowing through the conduit means, said evaporating means including means for preventing the leakage of air from the conduit means into the food compartment.

6. Refrigerating apparatus including a cabinet having a food compartment therein and a machinery compartment above the food compartment and insulated therefrom, a refrigerating

system including a refrigerant liquefying apparatus in the machinery compartment and a refrigerant evaporator in the food compartment, a receptacle in the food compartment for collecting moisture dripping from the evaporator, and means for conducting a current of air from the machinery compartment to the receptacle in the food compartment for removing moisture from the receptacle and then conducting the air back to the machinery compartment and means for preventing leakage of the air into the food compartment when the receptacle is without moisture.

7. Refrigerating apparatus including a insulated cabinet having a food compartment therein, and a machinery compartment above the food compartment and insulated therefrom, a refrigerating system including a refrigerant liquefying means in the machinery compartment and an evaporating means in the food compartment adapted to collect moisture and to have moisture dripping therefrom, and means for evaporating the moisture collected by the evaporator within the food compartment and conducting the evaporated moisture out of the food compartment to the machinery compartment.

8. A refrigerating apparatus comprising in combination, means for cooling air adapted to flow thereover, means for circulating a cooling fluid through said air cooling means, said air cooling means being adapted to collect moisture thereon and to have moisture dripping therefrom, means for collecting the drip water from said air cooling means, capillary means for conveying the drip water upwardly of said collecting means, and fan means for circulating air over said capillary means to cause evaporation of the elevated water and flow thereof from the apparatus, said fan means being rendered effective by operation of said cooling fluid circulating means.

9. An apparatus comprising in combination, means for cooling air adapted to flow thereover, means operatively connected with said first named means for circulating a refrigerating medium therethrough, means for creating a circulation of air over said refrigerating medium circulating means, said first named means being adapted to collect moisture thereon and to have moisture dripping therefrom, means for catching the drip water from said first named means, and means for conveying the drip water upwardly of said catching means and for causing evaporation of the elevated water, said last named means being rendered effective by air circulated over said refrigerant circulating means by said third named means.

10. An apparatus comprising in combination, a unit which dehumidifies air, means for circulating a medium through said unit to cause said dehumidification of the air, means for collecting moisture dripping from said unit, means for conveying the drip water upwardly of said collecting means, and means rendered effective by operation of said medium circulating means for causing evaporation of the elevated water.

11. An apparatus comprising in combination, a unit which dehumidifies air, means for circulating a medium through said unit to cause said dehumidification of the air, means for collecting moisture dripping from said unit, and means rendered effective by operation of said medium circulating means for raising the drip water upwardly of said collecting means and for causing evaporation of the elevated water.

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