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AUTOMATIC DEFROSTER ASSEMBLY

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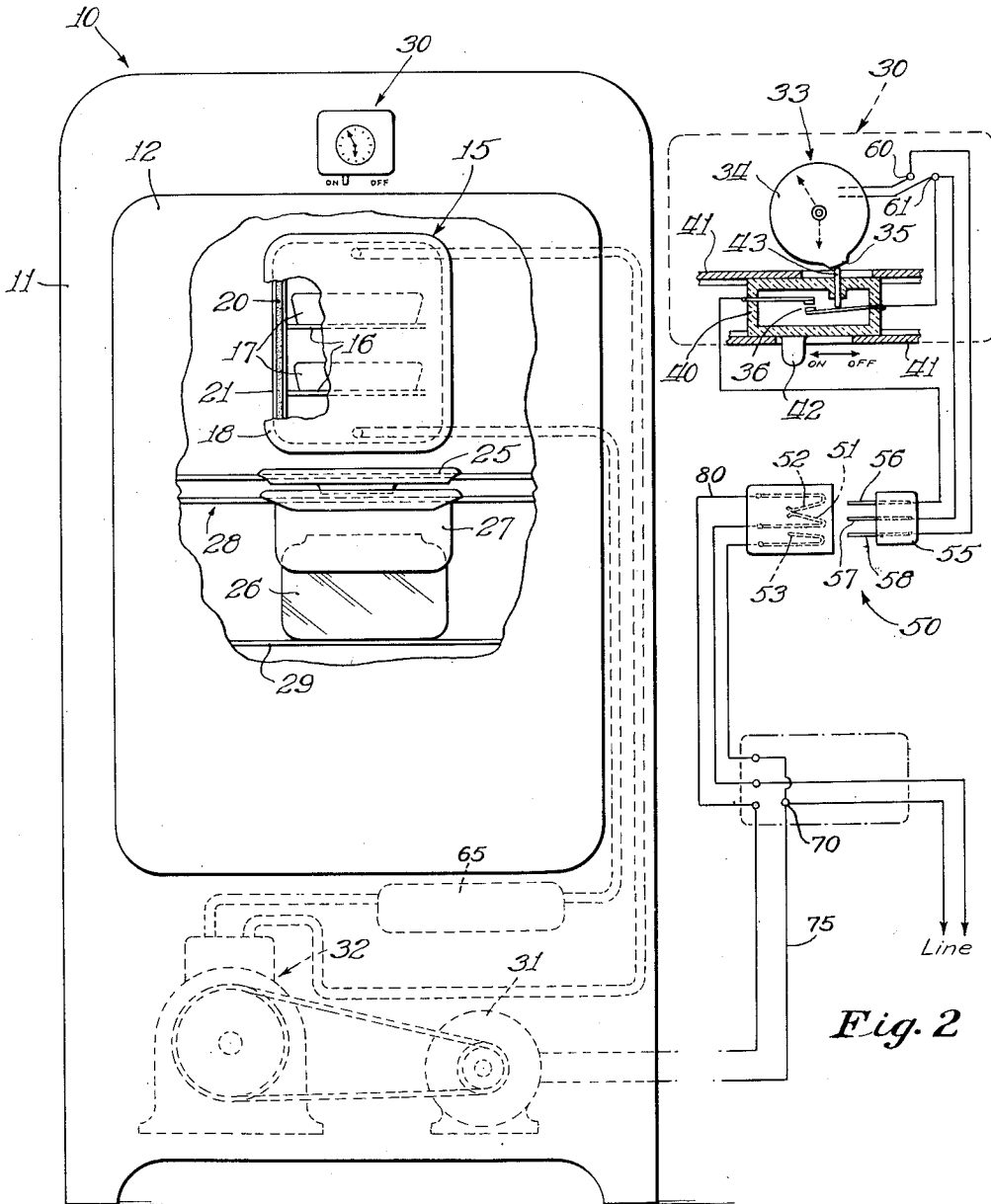


Fig. 1

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AUTOMATIC DEFROSTER ASSEMBLY

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This invention relates to refrigerators, and particularly to a refrigerating system therefor including an improved defrosting arrangement.

It is an object of this invention to provide an improved combination of ice cube freezing compartment, and system for cooling the same including means for periodically and selectively discontinuing the operation of the cooling means for the purpose of defrosting the exterior of said compartment.

A further particular object is the provision in combination with the above of an effective arrangement for collecting the drip from the exterior of the freezer compartment resulting from a plurality of automatic defrosting operations.

Still another detailed object is the provision in the above combination of a special arrangement for connecting the time operated mechanism into the refrigerator circuit and disconnecting the same therefrom, which arrangement requires no special adjustment in order to continue the operation of the refrigerator when said time mechanism has been removed.

A final detailed object is the provision of a time mechanism controlled cam operated switch for automatically effecting the defrosting operation, which mechanism includes a manually adjustable member shiftable into and out of the path of movement of said time operated cam for determining the on and off positions of said automatic defrosting mechanism.

The above and other objects, advantages and uses of the present invention will become apparent from a reading of the following specification taken in connection with the accompanying drawing, which forms a part thereof, and wherein:

Fig. 1 shows a schematic layout of a refrigerator incorporating a preferred embodiment of the invention.

Fig. 2 is a schematic diagram showing the timing mechanism and wiring diagram for the device of Fig. 1.

Referring to Figure 1 of the drawing, 10 indicates generally a refrigerator assembly embodying the invention and including an insulated cabinet 11 having a door 12 providing access thereto.

For cooling the interior of cabinet 11 there is provided an evaporator assembly indicated generally at 15 and including the usual conduit passages (not shown) within the wall thereof through which is passed a refrigerating medium, shelves 16 supporting ice cube trays 17 and door 18 for closing the evaporator 15. It is important to note the provision of a gasket 20, preferably

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formed of rubber or some suitable composition thereof, and functioning as a seal between the forward open end of evaporator wall 21 and evaporator door 18. There is no opening in the back or side walls of evaporator 15, the only opening being the front entrance opening with the important result that when door 18 is closed the flexible seal 20 prevents circulation of the air from the food compartment into the evaporator chamber or ice freezing compartment.

Located under evaporator assembly 15 for catching the drip from the exterior thereof when the same is defrosted, is a drip collecting tray 25 effective to direct the collected moisture to the rear portion of the refrigerator cabinet and into a relatively large capacity bottle 26 capable of holding the water resulting from a plurality of defrosting operations. The drip collecting tray 25 also functions as a cover for receptacle 27, both the tray and the receptacle being supported from shelf assembly 28 as set forth more particularly in Blood et al. Patent No. 2,223,947. Bottle 26 is preferably supported on a lower shelf 29 in the rear portion of the food cabinet where the same occupies a relatively unused portion of the cabinet.

In order to periodically effect defrosting of the evaporator 15 at such time as will cause the least inconvenience there is provided a time control mechanism indicated generally at 30 for opening the circuit to the electric motor 31 adapted to drive the compressor 32. A clock operated mechanism 33 drives a rotatable member 34 which may be formed with a cam 35 for opening and holding open the switch 36 in the control circuit of motor 31. It will be apparent that the height and circumferential dimensions of cam 35 may be varied to hold switch 36 open any desired length of time and this cam may be so located as to predetermine the time of the opening and closing of said switch such, for example, as during the early portion of the morning at which time the inconvenience will be at a minimum.

It will now appear that by thus automatically shutting off the current to motor 31 for a short period of time each twenty-four hours, frost will not build up on the exterior of the evaporator to any appreciable extent. The little frost that does accumulate will be quickly melted during each defrosting period. By virtue of the sealed construction of evaporator there is no accumulation of frost on the interior walls and hence no drip from the interior walls to the ice cubes during defrosting. The temperature within the evaporator freezing chamber never rises as high as in the surrounding food compartment during de-

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frosting, due to the sealed relation, and hence the ice is kept without substantial melting. This sealed arrangement prevents the entry into the evaporator of relatively warm air from the food cooling chamber during defrosting, which air would otherwise circulate into contact with the ice cubes causing contamination and increased melting.

While time mechanism 30 has been shown as located in the upper portion of the cabinet 11, it will be understood that the same may be positioned wherever desired for a particular installation.

Under certain circumstances it has been found advisable to temporarily suspend the automatic defrosting operation and to this end there is provided housing 40 adjustable in guide 41 by means of handle 42 by shifting the same to on or off position as indicated to move reciprocal pin 43 into or out of the path of rotation of cam 35.

In order that automatic time control mechanism 30 may be removed for repair or cleaning and reinserted when desired without interrupting the normal operation of the refrigerator, there is provided a special plug-in assembly indicated generally at 50. A pair of normally closed spring switch contacts 51 and 52 are placed in series with current supply line 80 to motor 31, while a third spring terminal 53 is connected to the line 75 through the binding post 70 as shown by the drawing. A plug member 55 has a pair of terminal prongs 56 and 57 connected in series with cam operated switch 36 and effective when inserted between elements 51 and 52 to separate the same, making electrical contact therewith respectively. A third terminal prong 58 engages in electrical contact with terminal prong 53 for supplying electrical current to one terminal 60 of the clock motor, not shown. The other terminal of the clock motor is connected to the opposite side of the line at 61. With plug assembly 55 in place, the control circuit to compressor motor 31 is subject to being opened periodically by means of clock operated switch 36 in series therewith. On the other hand, when plug assembly 55 is removed in order to clean or otherwise repair the mechanism, then spring terminals 51 and 52 automatically close in contact with one another to complete the normal circuit to compressor motor 31 in order that the same may operate in the absence of the clock mechanism.

It will be understood that in addition to the above described elements of structure there will be provided the usual conventional equipment such as the condenser 65 and other conventional equipment (not shown) in order to simplify the present disclosure and since the same does not form an essential part of the present invention.

While the invention has been disclosed in connection with a specific embodiment thereof, it is to be understood that this is by way of example rather than by way of limitation and that the appended claims should be given a construction as broad as permitted by the prior art.

We claim:

1. In an automatic refrigerator defrosting assembly for effecting periodic defrosting at selected intervals, means defining a compressor motor control circuit, means defining a time-operated switch mechanism including a second circuit and a switch therein periodically operated for opening said second circuit, and means for connecting said second circuit in series with said control circuit, said means being particularly characterized by the fact that the disconnection of said second

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circuit from said control circuit is effective to cause the closing of said control circuit in order that said refrigerator compressor may be operated when said time-operated mechanism is disconnected.

2. In an electric refrigerator comprising a freezing compartment defined in part by the wall of an evaporator and having a door providing an entrance to said compartment for sealing the interior thereof against the entry of the surrounding air while closed and means defining a motor compressor control circuit, a second circuit including a time-operated switch mechanism connected therein and automatically operated periodically for opening said second circuit, and means for connecting said second circuit in series with said control circuit, said time-operated switch mechanism normally being operable to open said second circuit to effect defrosting.

3. In an electric refrigerator comprising a freezing compartment defined in part by the wall of an evaporator and having a door providing an entrance to said compartment for sealing the interior thereof against the entry of the surrounding air while closed and means defining a motor compressor control circuit, a second circuit including a time-operated switch mechanism connected therein and automatically operated periodically for opening said second circuit, means for connecting said second circuit in series with said control circuit, said time-operated switch mechanism normally being operable to open said second circuit to effect defrosting, and means operable at will for suspending the operation of said time-operated switch mechanism to eliminate automatic defrosting.

4. In an electric refrigerator comprising a freezing compartment defined in part by the wall of an evaporator and having a door providing an entrance to said compartment for sealing the interior thereof against the entry of the surrounding air while closed and means defining a motor compressor control circuit, a second circuit including a time-operated switch mechanism connected therein and automatically operated periodically for opening said second circuit, and means for interrupting said control circuit at a given point while at the same time connecting said second circuit in series with said control circuit, said means being particularly characterized by the fact that the disconnection of said second circuit from said control circuit is effective to restore said control circuit by eliminating said interruption, said time-operated switch mechanism normally being operable to open said second circuit to effect defrosting.

5. In an electric refrigerator, an evaporator, a motor driven compressor for delivering refrigerant to said evaporator, a first circuit including said motor and a switch, and a second circuit including a time-operated switch mechanism and means connectable with said first circuit at said first-mentioned switch for interrupting said first circuit while at the same time connecting said second circuit in series with said first circuit, said time-operated switch mechanism being automatically operable periodically for opening said second circuit to effect defrosting.

6. In an electric refrigerator, comprising a compartment defined in part by the wall of an evaporator and having a door providing an entrance to said compartment for sealing the interior thereof against the entry of the surrounding air while closed, whereby to prevent the formation of any appreciable frost on the interior

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of the walls of said compartment during freezing, a motor driven compressor for delivering refrigerant to said evaporator to provide freezing temperatures in said compartment, a control circuit having said motor connected therein, a second circuit having a time-operated switch mechanism connected therein and automatically operated periodically for opening said second circuit, means for connecting said second circuit in series with said control circuit, said time-operated switch mechanism normally being operable to open said second circuit to discontinue operation of said motor driven compressor for a predetermined time to effect defrosting of the exterior of said evaporator, said sealing means being effective during automatic defrosting and while said door is closed to avoid drip within the compartment during said defrosting.

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