April 5, 1949. C. J. ROACH 2,466,479

DEFROSTING APPLIANCE

Filed Dec. 7, 1946

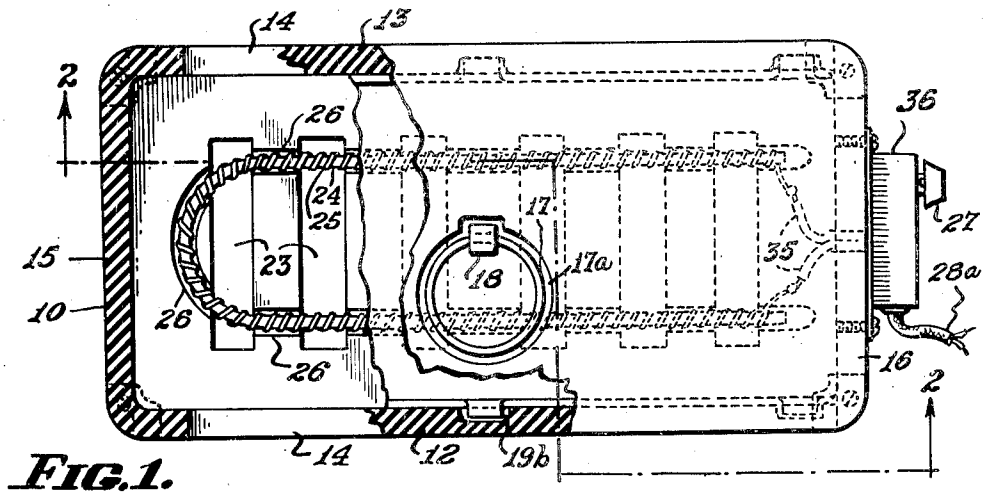


FIG. 1.

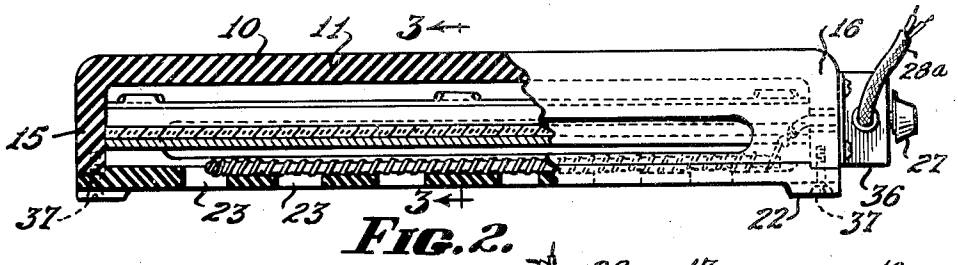


FIG. 2.

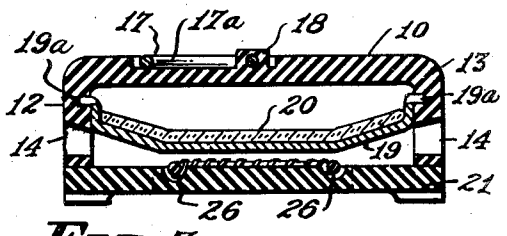


FIG. 3.

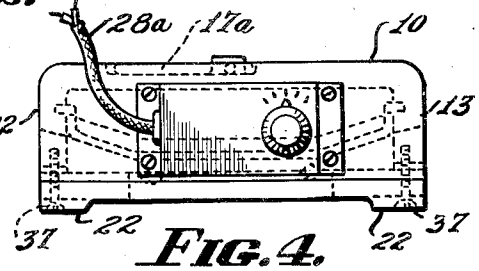


FIG. 4.

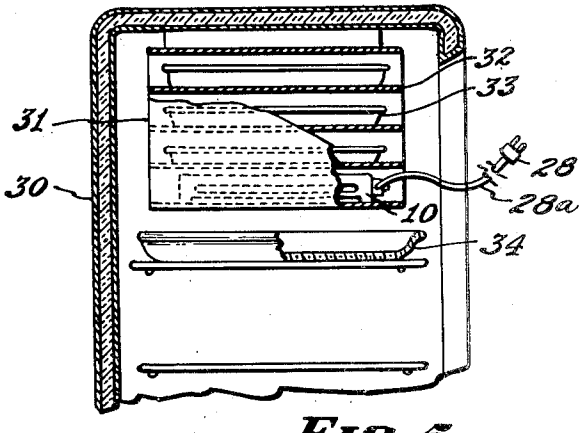


FIG. 5.

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Patented Apr. 5, 1949 2,466,479

UNITED STATES PATENT OFFICE

2,466,479

DEFROSTING APPLIANCE

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Application December 7, 1946, Serial No. 714,731

9 Claims. (Cl. 219—19)

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This invention relates to a defrosting appliance and more particularly to a device which may be used for defrosting the evaporator or freezing compartment of a refrigerator.

Substantially all refrigerators with which I am acquainted are provided with a cooling unit or evaporator with which is generally associated a freezing compartment. Such freezing compartment may be used for the storage of frozen food packages and it may also be used for the production of ice cubes.

Generally the walls of the freezing compartment carry tubing in which the refrigerant circulates during its evaporation stage, and the cooling is produced by the evaporation of the refrigerant. Since the evaporator walls are usually the coolest portion of the refrigerator, if there is any moisture within the atmosphere of the refrigerator, that moisture will condense out on the evaporator walls; and since walls of the evaporator are at a temperature below freezing, the condensed moisture freezes. After a period of time, depending upon the amount of humidity in the atmosphere, a thick coating of ice will have been formed. Such a coating of ice greatly impairs the efficiency of the refrigerator and must be periodically removed.

The ice layer is usually removed by a housewife by an operation known as defrosting, in which the refrigerator motor is turned off, and the box is opened to the atmosphere of the kitchen until the ice layer has melted off or has been removed by prying with a knife or other instrument. Such practices, of course, tend to injure the evaporator and besides foods may spoil, because of the length of time usually required for defrosting.

With the above difficulties in mind, it is an object of my invention to provide a device by means of which a refrigerator freezing compartment may be defrosted very rapidly and easily. It is another object of my invention to provide a device as outlined above, which will be relatively inexpensive, simple in use and which will have a long life. Further objects of my invention include the provision of a device as outlined, which will be safe and will remove the possibility of injury to the user.

These and other objects of my invention which will be pointed out hereinafter, or which will be apparent to one skilled in the art upon reading these specifications I accomplish by that certain construction and arrangement of parts of which I shall now describe an exemplary embodiment.

Reference is made to the drawings forming a part hereof and in which:

Fig. 1 is a plan view with parts in cross-section of a device according to my invention.

Fig. 2 is a side elevation thereof, with parts in cross-section on the line 2—2 of Fig. 1.

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Fig. 3 is a cross-sectional view taken on the line 3—3 of Figure 2.

Fig. 4 is an end elevation as seen from the right of Fig. 2.

Fig. 5 is a partial vertical cross sectional view through a refrigerator and the freezing compartment thereof showing the device in use.

Briefly in the practice of my invention I provide a vented housing within which I provide a heating element. The housing is preferably of the general proportions of the ice cube tray for the particular refrigerator with which it is to be used, and is preferably of nonconductive material such as one of the plastics, or is suitably insulated. Means are provided for connecting said heating element to a source of electric current. Preferably a time switch is incorporated into the device, so that the electric circuit to the heating element will automatically be interrupted after a relatively short interval of time, such as five minutes.

The housing protects the heating element from the drippings attendant upon a defrosting operation, but the housing is vented to the sides and bottom to permit circulation of heated air through the housing. The bottom cover is removable so that access may be had to the heating element for replacement or repair, and the cover element, when in closed position, prevents accidental injury which would result from touching the heating element.

Referring more particularly to the drawings, the device is indicated generally at 10 in the figures and comprises a housing having a top wall 11, which is imperforate, side walls 12 and 13, a rear end wall 15. The side walls 12 and 13 are provided with openings 14 which extend substantially the length of the device and which preferably flare upwardly as best seen in Fig. 3. The top wall 11 may be provided with some sort of handle arrangement such as the ring 17 pivotally mounted in a boss 18. A recess 17a may be provided in the member 11 to accommodate the ring 17 when it is not in use.

Within the housing I provide a baffle extending the entire length and width of the housing which baffle is preferably metallic and is highly reflective on its lower side. The baffle is indicated at 19 and is preferably shaped to lie fairly closely adjacent the heating element to be described hereinafter and thence to flare upwardly at the sides to the upper edges of the vents 14. The baffle 19 may be provided with a number of ears 19a which are seated in recesses 19b in the side walls 12 and 13 of the housing. Preferably also the baffle is backed with a layer of heat insulating material such as asbestos indicated at 20.

A bottom element is indicated at 21 and is provided with feet 22 at its four corners. A series of transverse slots 23 are provided for the cir-

culation of air to the heating element. The heating element itself may be of horseshoe shape and may comprise a ribbon of resistance wire **24** wound on an insulating core **25**. The heating element rests in grooves **26** formed in the bottom member **21** and the ends of the resistance wire are connected as by means of wires **35** to the time switch indicated generally at **36** which will be described hereinafter.

The bottom structure **21** is fastened to the housing **10** by means of screws **37** at the four corners.

Mounted upon the front panel is a time switch having a control indicated generally at **27**. Since the particular switch forms no part of my invention, I shall not describe it in detail, except that I prefer a switch which is settable to various time periods up to about five minutes. I have found in practice that a period of four or five minutes is adequate, as will be described hereinafter, and I prefer to have the heating element turned off at the end of the period so that if the housewife is called to the telephone or the like, it makes no difference if she forgets to disconnect the heating element.

Electrical current is supplied to the device by plugging the member **28** into a suitable floor or wall plug. It will be understood that when the electrical current is supplied to the heating element, air currents will be set up with air being drawn in through the slots **23** past the heating element, and out through the lateral slots **14**. This circulation is, of course, enhanced by the reflecting quality of the baffle **19**.

In Fig. 6 I have shown a more or less conventional refrigerator **30** having a freezing compartment indicated generally at **31**. The particular compartment shown has four shelves **32** for supporting ice cube trays which are indicated at **33**. The number of shelves in the freezing compartment forms no limitation on my invention, since I have used it successfully on various commercial refrigerators with various numbers of shelves. Conventionally, there is provided a large dish **34** immediately under the freezing unit **31** to collect any moisture drippings off the freezing unit.

In the drawing, I have shown my device in use in the lowermost shelf.

In practice, my device is inserted preferably in the lowermost shelf first and centrally of the freezing compartment, and the time switch is set for, say five minutes. As soon as the period is completed, the device is removed and placed in the next higher shelf and the cycle is repeated. Thus, in a freezing compartment, as shown, it would take at the most 20 minutes to defrost the freezing compartment. I have found the first operation will melt the ice from the bottom and the lower portions of the sides, and with each successive operation the defrosting is carried farther up the sides until the defrosting is complete. The melting ice is caught, of course, in the receptacle **34** and may easily be disposed of. It will be understood also that the refrigerator motor is turned off while the defrosting operation is in progress.

It will be seen that heat is supplied to the particular locations where it is needed and only long enough to loosen the ice layer from its contact with the walls of the freezing compartment. In many of the smaller commercial refrigerators only two shelves are provided and, of course, there the defrosting operation may be carried out still more rapidly. I prefer to use a flat electric cord **28a** so that the door of the refrigerator may be practically shut whereby entrance of warm air into the cabinet is largely prevented.

Thus, it will be seen that by the use of my device a refrigerator may be defrosted very rapidly and economically, because it will not be necessary to let the entire freezing unit and the entire interior of the refrigerator become warm. Therefore, when the defrosting operation is complete, the refrigerator motor may be turned on again, and there will have been very little loss in refrigeration.

It will be understood that numerous modifications may be made in my invention, and I therefore do not intend to limit myself except as pointed out in the claims which follow.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A device of the character described, comprising an insulated housing having the general proportions of an ice cube tray, said housing being provided with a plurality of air vents, a heating element mounted in said housing, said heating element being so positioned as to provide a relatively large air space within said housing, means for connecting said heating element to a source of electric current, and means for automatically disconnecting said heating element from said source of current after a predetermined time interval.

2. A device of the character described, comprising a hollow insulated shell member having the general proportions of an ice cube tray, vents in the side walls of said member, a closure member for said shell member, vents in said clousre member, feet at the corners of said closure member, means for releasably holding said closure member in position, a heating element mounted within said shell member, and means for connecting said heating element with a source of electric current.

3. A device according to claim 2 in which means are provided for interrupting said connection after a predetermined interval of time.

4. A device of the character described comprising a hollow non-conductive shell member having the general proportions of an ice cube tray, vents in the side walls of said member, a bottom closure for said shell member, said bottom closure being provided with feet and having vents to permit circulation of air, an electric heating element mounted on said bottom closure member and a reflective baffle mounted within said shell member above said heating element to cause air entering through the vents of said bottom closure to leave through the vents of said side walls and means for connecting said heating element to a source of electric current.

5. A device according to claim 4 in which said vents in the side walls flare outwardly and in which said baffle is inclined laterally to correspond with the flare of said vents.

6. A device according to claim 4 in which said vents in the side walls flare outwardly and in which said baffle is inclined laterally to correspond with the flare of said vents, and in which means are provided for interrupting said connection after a predetermined interval of time.

7. A device of the character described, comprising a hollow insulated shell member having the general proportions of an ice cube tray, vents in the side walls of said member, a bottom closure member for said shell member, vents in said closure member, means to hold said device

in spaced relation to a supporting surface so that air may reach the vents in said closure member, a heating element mounted within said shell member, and means for connecting said heating element with a source of electric current.

8. A device of the character described comprising a hollow insulated shell member having the general proportions of an ice cube tray, vents in the side walls of said shell member, vents in the bottom of said shell member, means to hold said device in spaced relation to a supporting surface so that air may reach the vents in the bottom of said shell member, a heating element mounted within said shell member, a reflective baffle mounted within said shell member above said heating element to cause air entering through the vents in the bottom of said shell member to leave through the vents of said side walls, and means for connecting said element to a source of electric current.

9. A defrosting device of the character described, comprising an insulated, inverted pan-shaped housing having a removable bottom and having the general proportions of an ice cube tray, said housing being provided with a plurality of air vents, said air vents being positioned only in the side walls and bottom of said housing, a heating element mounted in said housing so as to provide a relatively large air space within said housing, means for connecting said heating element to a source of electric current, and means to hold said device in spaced relation to a supporting surface so that air may reach the vents in the bottom of said housing.

CHARLES J. ROACH.

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