

May 14, 1946.

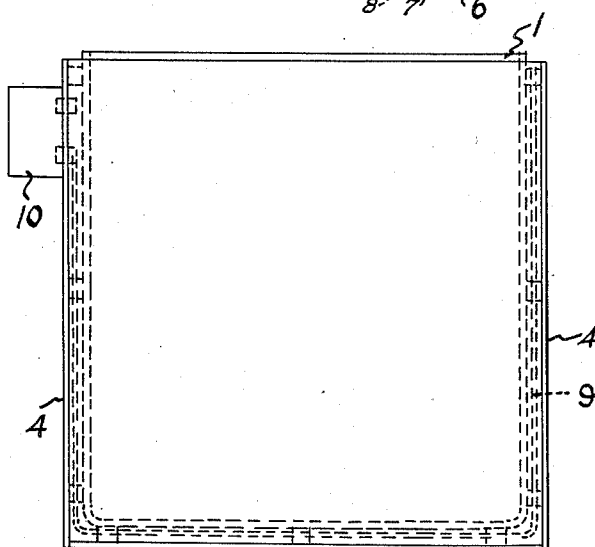
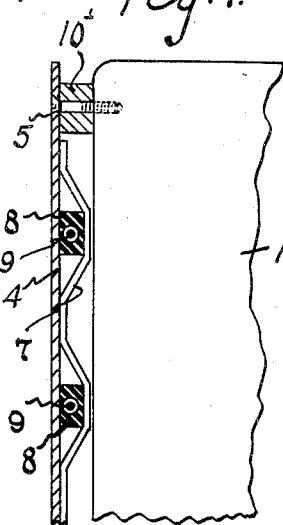
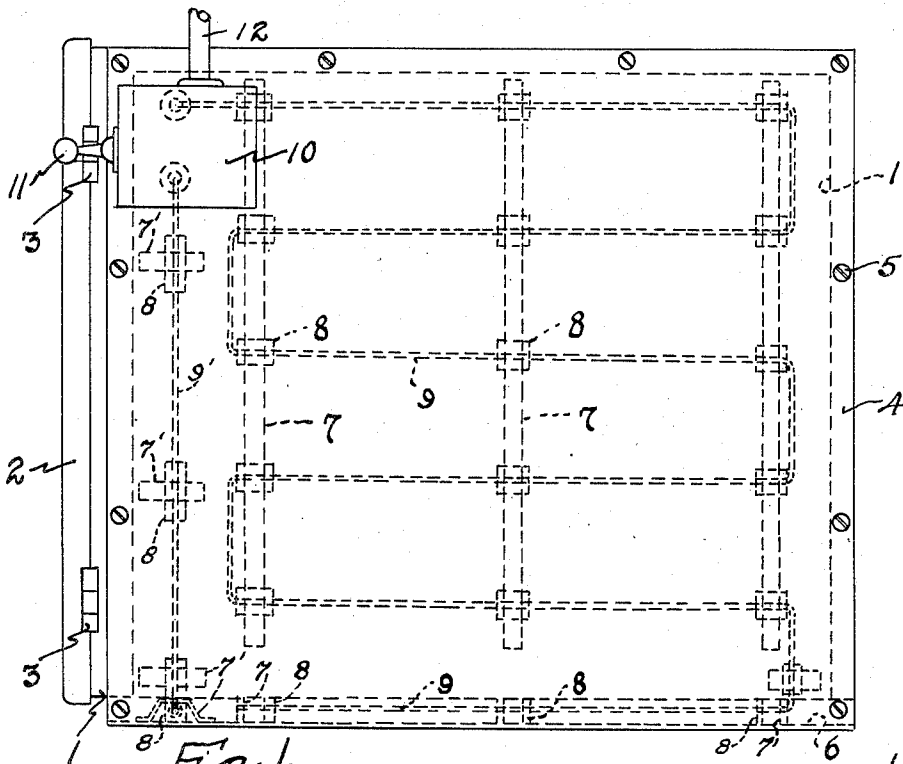
C. J. ROACH

2,400,168

REFRIGERATOR DEFROSTER

Filed March 24, 1942

2 Sheets-Sheet 1

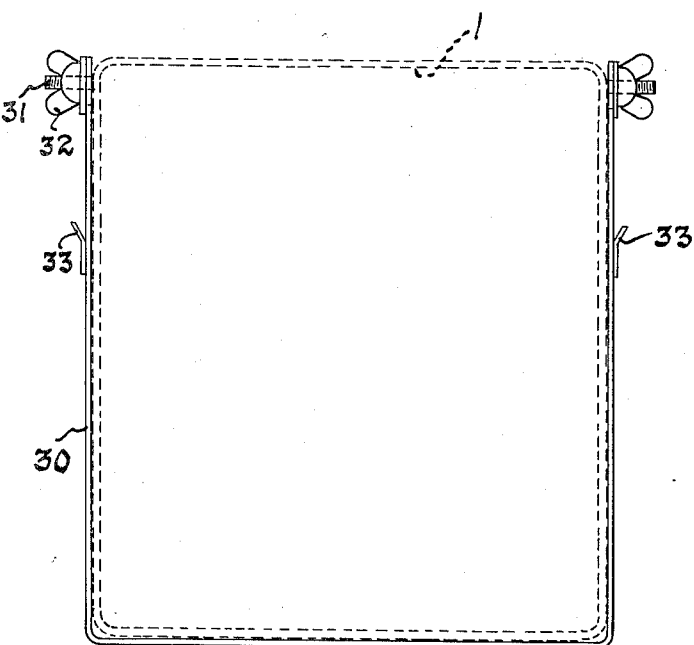
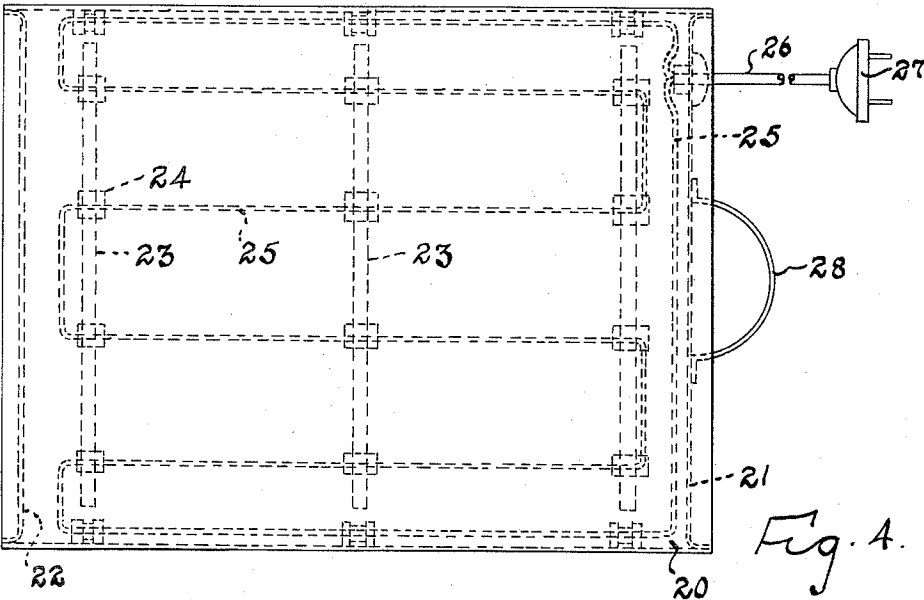


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2,400,168
2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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REFRIGERATOR DEFROSTER

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Application March 24, 1942, Serial No. 435,947

1 Claim. (Cl. 62-1)

This invention relates to improvements in devices by means of which refrigerators particularly of the household type may be quickly and easily defrosted without heating up the entire box by reason of the defrosting operation and by means of which the defrosting may be accomplished in but a few moments time.

In one form of the invention herein disclosed the portions of the refrigerating equipment upon which the vaporized moisture in the refrigerator space deposits and freezes is provided with heating coils by means of which the metal surface upon which the ice is deposited may be heated directly so as to loosen the ice and permit of its removal preferably in one piece.

In another form of the invention, a separate electrically heated device is provided for mounting in the ice cube tray space so as to warm the metal surface supporting the ice formation and thereby loosen it.

In another form of the invention, an auxiliary removable shell is provided to fit around the portions normally forming the ice coating so that the coating is formed on the shell which may be removed and warmed to loosen the ice.

All forms of this device are of such a nature that it is not necessary to turn down the refrigerating system during defrosting. Furthermore, the operation is so rapid that very little heat is generated in the box with the result that the temperature is not caused to fall seriously during the defrosting operation.

Other advantages and features of this invention will be apparent from the following detailed description of several embodiments thereof when taken in connection with the attached drawings.

This invention resides substantially in the combination, construction, arrangement and relative location of parts as will be described in detail below.

In the accompanying drawings,

Figure 1 is a side elevational view of one form of the invention.

Figure 2 is a rear end elevational view thereof.

Figure 3 is an enlarged detailed cross-sectional view through one of the said wall plates of the structure of the invention showing the relationship of the parts.

Figure 4 is a top plan view of a portable electric heating unit for use in the ice cube tray space.

Figure 5 is a front elevational view of the removable shell form of the invention.

It will be understood that the drawings forming part hereof are given in a diagrammatic sense in view of the fact that there are many specific

structural forms of household refrigerators, each of which would require modification of the physical shape of the subject matter of this invention in adapting it to them respectively. However, the disclosure in the drawings is adequate for a full understanding of the invention from which its adaptation to various types of refrigerators will be obvious to those skilled in the art.

Thus in Figures 1 to 3 inclusive, the ice chest portion of the refrigerating unit of a household refrigerator is diagrammatically illustrated as a rectangular box 1 which forms the ice cube forming space and within the walls of which are the refrigerant circulating coils or ducts. This cabinet is provided at one end with a door 2 hingedly mounted thereon by means of the hinges 3 so that access to the interior of the chest may be had, easily.

By way of example, there is shown in these figures a pair of side plates 4 and a bottom plate 6 preferably of heat conducting material, which are mounted on the sides and bottom of the chest by means of the screws 5 and spacers 10 so as to provide a space therebetween around the several sides of the chest. It is apparent, of course, that these plates may be extended to other sides and other portions of the equipment so as to include all parts of the refrigerating apparatus upon which condensation and freezing occurs. It is preferable that the space formed by the plates shall be sealed against the entrance of moisture and for this purpose the spacers 10 may be continuous bars which also act as gaskets to seal the space and thereby prevent the entry of moisture thereinto. Within the space is a suitably disposed electric heating coil or unit 8 which is held properly positioned by a series of insulators 9 which are secured to the plates 4 and 6 by means of straps 7 which may be welded thereto to hold them in place. The cable 9 comprising a leader connecting wire for the heating coil 8 is supported in a manner similar to that used in supporting the heating coil 8. At spaced intervals, as shown in Figure 1, the cable 9 passes through and is positioned by a series of insulators 9 like those used for supporting the heating coil (see Figure 3), which insulators are secured in place by means of short straps 7 which may be attached to the adjacent plate 4 by welding or in any other suitable way. On the exterior of the device is a switch box 10 to which the heating coil terminals extend in accordance with well known practice. At 11 is the handle for operating the switch positioned so as to make it easy to control the energization

of the heating coil. The cable 12 extends from the switch to any suitable source of current.

With this arrangement, it will be apparent that when ice forms on the plates 4 and 6, and any extensions thereof necessary to completely obtain the advantage of this invention, it can quickly be loosened by closing the switch 11 to supply energy to the heating coils 9 which being positioned close to the walls 4 and 6 will quickly loosen the ice. In some arrangements, the ice will be in the form of a U-shaped body which can easily be slid off the plates 4 and 6 for disposal. As will be illustrated later, the said plates 4 may be provided with ledges which will hold the U-shaped body of ice from falling downwardly when loosened so that it can easily be slid off the front. It will be apparent that the ice may be loosened in a very short time and that most of the heat generated by the heating coils will be used in melting the ice and breaking its bond with the metal plates so that very little heat will be freed within the refrigerating space. Thus instead of losing the advantage of the refrigerator for many hours, as in the present practice, very little additional refrigerating energy will be needed to compensate for the entry of heat into the refrigerator during the defrosting operation. With this arrangement it will take minutes as against hours to remove the ice easily. Furthermore, the operation is so simple that users will not hesitate to defrost their refrigerators more frequently thus insuring higher overall efficiency in the use of their refrigerators.

In some cases a portable defrosting device employing the principles of this invention may be desirable. One such device is illustrated in Figure 4. With this arrangement a rectangular heat conducting shell 20 is provided which is closed at the ends of the walls 21 and 22 to form a sealed enclosure within which a heating coil 25 is supported in the insulators 24 held by the straps 23 in a manner similar to that previously described. The terminals of the heating coil extend through a cable 26 to a plug connector 27. A handle 28 is provided by means of which this unit may be inserted into the ice cube chest in place of the ice cube pans during the defrosting period. This unit for any respective refrigerator will be so proportioned in shape so as to bring the walls thereof close to the walls to be warmed so that the ice thereon can be quickly loosened and removed. All the advantages previously described in connection with the first

modification are therefore obtained with this portable device.

The final modification illustrated herein does not employ heating coils. The outline of the ice cube chest or any other part of the refrigerating apparatus to be protected is indicated in outline by the reference numeral 1. The subject matter of this invention comprises a U-shaped or other suitably shaped metallic or heat conducting shell 30 which forms a sliding fit around the chest 1. The chest is provided with several threaded lugs 31 near the top and the shell is provided with slots in which will lie the lugs when the shell is in position as shown. Wing nuts 32 cooperating with the lugs serve to lock the shell in place. When it becomes desirable to defrost a refrigerator employing this form of structure, it is only necessary to loosen the wing nuts 32, drop the shell 30 a short distance and slide it forwardly from the chest taking with it the ice on its outer surface. If desired angle bars 33 may be secured at the sides of the shell to aid in holding the weight of the ice on the shell and as previously noted similar angle bars can be mounted on the sides of the plates 5 of the first modification so as to hold the ice shell up after it is loosened so that it may be slid off and removed as a single piece. After the shell 30, with its adhering ice, is removed, the ice can be loosened by running warm water on the inside of the shell after which it may be replaced and locked by the wing nuts in position. With this arrangement, it will be seen that no heat at all is released into the box and yet it is a simple matter to accomplish the equivalent of defrosting the box by simply removing the ice body in one piece.

Those skilled in the art will readily appreciate that the subject matter of the invention is capable of embodiment in other physical forms and I do not, therefore, desire to be strictly limited to the embodiments herein disclosed but rather to the full scope of the appended claim.

What is claimed is:

45 The combination with the cooling unit of a refrigerator of a plurality of metallic plates overlying the walls of said unit, heat insulating strips interposed between said unit and plates to form closed chambers between the side walls of said unit and plates, and electrically insulated heating coils in said chambers for heating said plates to remove frozen condensate therefrom.

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