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DEFROSTING COOLING UNIT

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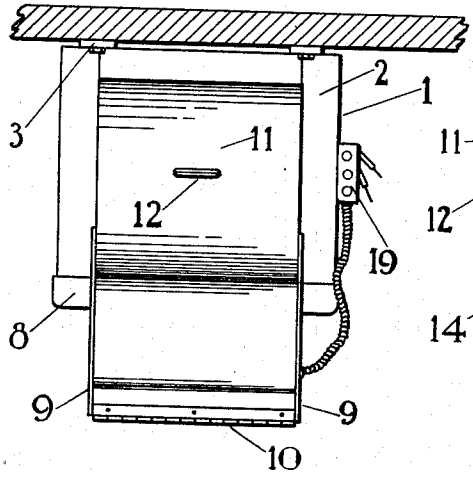


Fig. 1

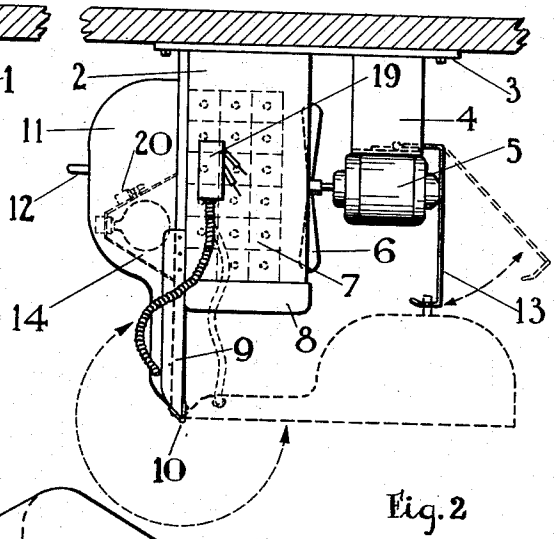


Fig. 2

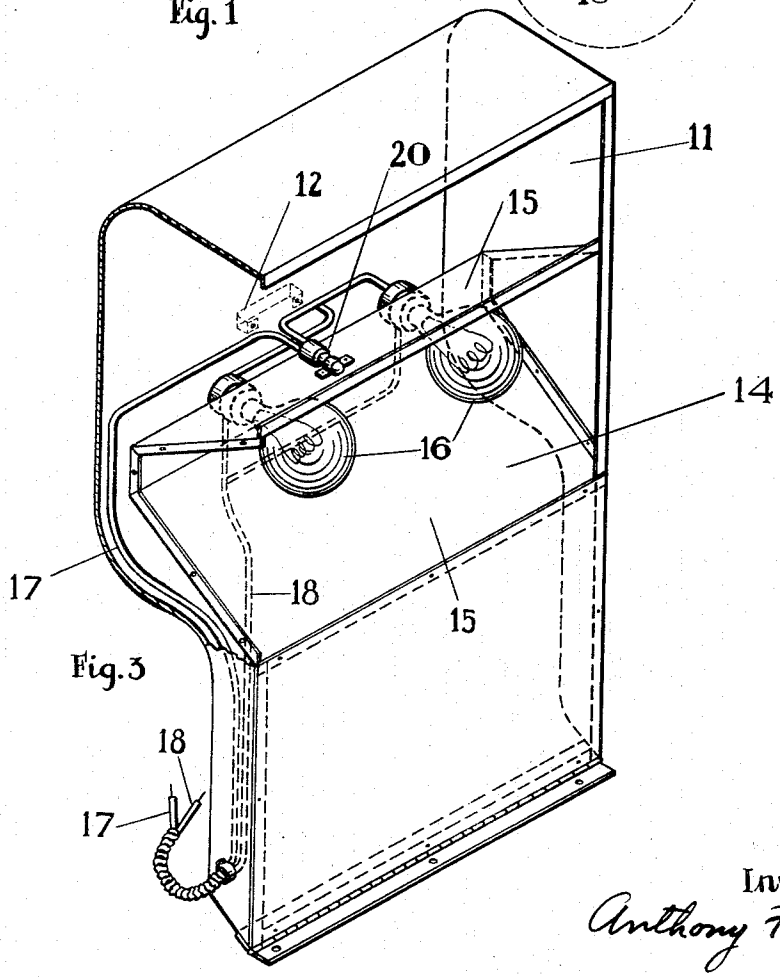


Fig. 3

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DEFROSTING COOLING UNIT

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3 Claims. (Cl. 62—1)

The present invention relates to cooling units used for maintaining compartment temperatures below 34° F., and in which frost progressively accumulates upon the cooling unit surfaces; therefore necessitating periodical defrosting of these surfaces in order to keep the heat absorption capacity of the cooling unit above that of such cooling unit capacity when completely frosted.

While it is recognized that there have been, in the past, cooling units equipped with electrical defrosting means, in which the electrically generated heat was absorbed purely by conduction, these particular systems generally necessitate a higher wattage of electrical current in order to accomplish the same results as are accomplished with my present invention. These former electrically operated defrosting units generally comprised electrical resistance units fabricated directly into the cooling unit; and, whenever, due to circumstances, these particular heating units burned out, it was necessary to practically rebuild the cooling unit in order to replace these heating units.

One of the objects of the present invention is to reduce the amount of electrical current, necessary for defrosting, within a given period, to a minimum.

Another object of the invention is to provide an electrical defrosting system in which it is not necessary to insulate the current carrying conductors and the heat generating surfaces from the effects of moisture dripping from the cooling unit surfaces.

A further object of the invention is to provide a defrosting system using radiant heat energy generated by means of electrical lamps which can be easily replaced whenever necessary.

Other desirable objects shall be pointed out in the following specification and claims.

In the drawing:

Figure 1 is an elevational front view of a cooling unit equipped with the invention.

Figure 2 is a side elevational view of Figure 1.

Figure 3 is an isometric view of the defrosting hood, and showing the various details thereof.

In Figures 1 and 2, the cooling unit 1 comprises a casing 2 fastened to hanger supports 3, from which are suspended motor brackets 4 supporting a fan motor 5, driving a fan 6 which circulates air over the cooling coil 7, through which is circulated a refrigerant during the operation of the fan motor 5. Beneath the cooling coil 7 is disposed a drip collector pan 8, which may be connected to a sewer or removably attached to the casing 2. In general, I prefer to make the drip collector pan 8 removably attached to the casing 2, so that, after the defrosting operation has taken place, it is possible to remove the pan and dump the collected condensate.

The extension bracket 9 is fastened to the casing 2 and has one leaf of the hinge 10 fastened thereto. The other leaf of the hinge 10 is fastened to the defrosting hood 11, which allows the defrosting hood 11 to be swung into the off position, as indicated by means of the arrows.

The defrosting hood 11 has a handle 12 which, when the defrosting hood is in its off position, is caught by a hook 13 and held in that position. The hook 13 is hingedly mounted to the motor bracket 4, and can be swung in and out of position, as indicated by the arrows, in order to move the defrosting hood 11 into the off and on positions.

The defrosting hood 11 contains a heat reflector assembly shown in detail in Figure 3.

Referring to Figure 3, the defrosting hood 11 contains the heat reflector assembly 14, comprising a surface which is highly efficient in radiating heat therefrom and is energized by means of the heating lamps 16, which are connected in parallel to electrical circuit conductors 17 and 18, which terminate in junction box 19 of Figure 2 and from which they connect to a suitable source of electrical energy.

The conductor 17 is connected to a mercury tube switch 20, fastened to the radiant heat reflectors 15 in such position that, whenever the defrosting hood 11 is in the defrosting position, as shown in full lines in Figures 1 and 2, the electrical circuit is completed and the heating lamps 16 re-energized. Whenever the defrosting hood 11 is in the off position, as shown by the dotted lines, Figure 2, the mercury tube switch 20 breaks the electrical circuit and the lamps 16 are then de-energized.

During the operation of the cooling unit, refrigerant is circulated through the conduits of the cooling coil 7, and the fan motor 5 rotates the fan 6 and circulates air over the outer surfaces of the cooling coil 7. Eventually the outer surfaces of the cooling coil 7 becomes frosted and, after the frost has reached a certain limit of accumulation, the operator then stops the refrigerant flow and pulls the hook 13 from the handle 12, as shown by the dotted lines, and swings the defrosting hood 11 into operating position.

During the movement of the defrosting hood 11, the mercury tube switch 20 establishes the circuit in the electrical conductor 17 and the

heating lamps 16 become energized. The heat rays impinging upon the radiant heat reflector surfaces 15 are then reflected upon the surfaces of the cooling coil 7. In time, these surfaces attain a temperature of 32° F. and more, during which the accumulated frost then melts and drips into the drip collector pan 8. After a sufficient period of time has elapsed, by which time all of the frost has been melted off of the cooling coil surfaces, the defrosting hood 11 is then swung back into the dotted line position of Figure 2, and the hook 13 is engaged with the handle 12.

During the operating time of the cooling coil 7, the fan motor 5 is in operation, also the refrigerant is circulated; but, during the defrosting time, it is preferable to close down the fan motor 5 but it is necessary to close down the circulation of refrigerant.

While the cooling coil 7, shown in Figure 2, is of the conventional type comprising square fins mounted in heat transfer contact with their associated refrigerant conduit, the present invention is particularly effective when used with cooling coils comprised of refrigerant conduit having spines raised upon the surfaces thereof, since with these latter type of cooling coils there are no long flat surfaces parallel with the heat rays radiated from the radiant heat reflectors 15. Therefore, the coil section, farthest from the defrosting hood 11, will receive practically equal amounts of radiant heat as the coil section closest to the radiant heat reflectors 15.

From the foregoing description, it will be evident that I have provided a cooling unit defrosting means which is simple in operation and comparatively inexpensive to operate and maintain.

While the present drawing shows a forced air circulation over the cooling unit, the present invention may also be used for defrosting convection circulation cooling units, when properly applied.

It is conceded that there may be many modifications of the details shown in the drawing, without departing from the spirit and scope of the invention, which is intended to be limited only by the following claims.

I claim:

1. In a system for cooling air below 32° F., the combination of a cooling unit for the circulation of a refrigerant therein and air over the exterior surfaces thereof, and upon which surfaces frost progressively accumulates, a radiant heat defroster, electrically energized and capable of impinging radiant heat rays upon the exterior surfaces of such cooling unit whenever the accumulated frost necessitates such defrosting, such radiant heat defroster comprising electrical lamps and said electrical lamps being surrounded by a radiant heat reflector open to the said surfaces of the cooling unit.

2. In a system for cooling air below 32° F., the combination of a cooling unit for the circulation of a refrigerant therein and air over the exterior surfaces thereof, and upon which surfaces frost progressively accumulates, a radiant heat defroster, electrically energized and capable of impinging radiant heat rays upon the exterior surfaces of such cooling unit whenever the accumulated frost necessitates such defrosting, such radiant heat defroster comprising electrical lamps, contained within a hood, which can be moved into and out of operating position, and serving, while in operating position, to both reflect the radiant heat toward the cooling unit surfaces and obstruct the normal air flow thereover, and switch means, within said hood, energizing said lamps whenever said hood is moved into operating position, said switch means deenergizing said lamps whenever said hood is moved into non-operative position.

3. In a system for cooling air below 32° F., the combination of a cooling unit within a casing, means to force humid air through the said casing and over the surfaces of said cooling unit, upon which surfaces the air surrenders some of its moisture in the form of frost, manually operated means capable of closing the air exit side of said casing, defrosting heat means mounted upon said air closure means, and means starting the operation of said heat means responsive to the closure positioning of said air closure means.

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