April 4, 1939. W. J. HARBERS 2,152,691

REFRIGERATING APPARATUS

Filed Feb. 28, 1936

Fig. 1

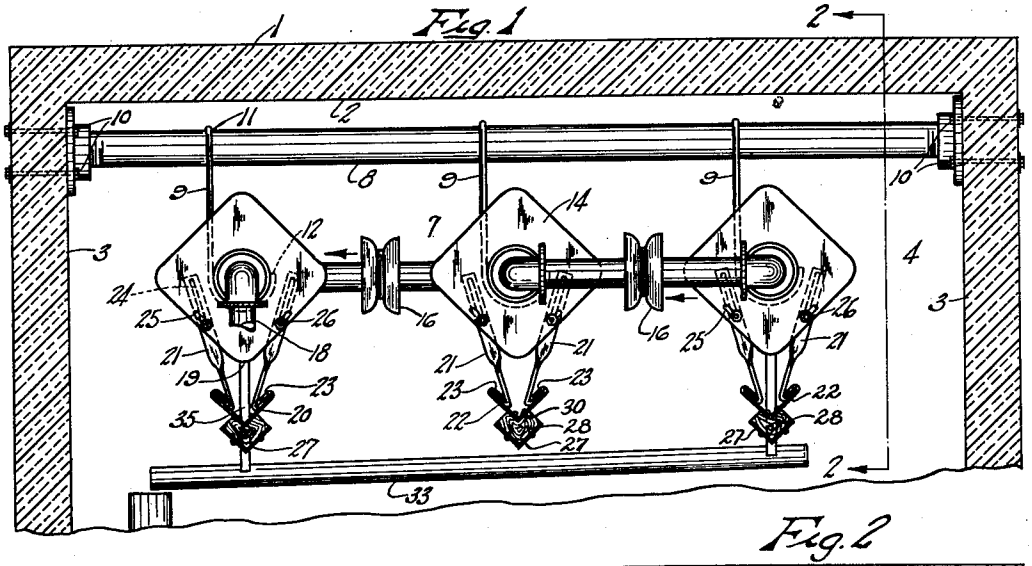


Fig. 2

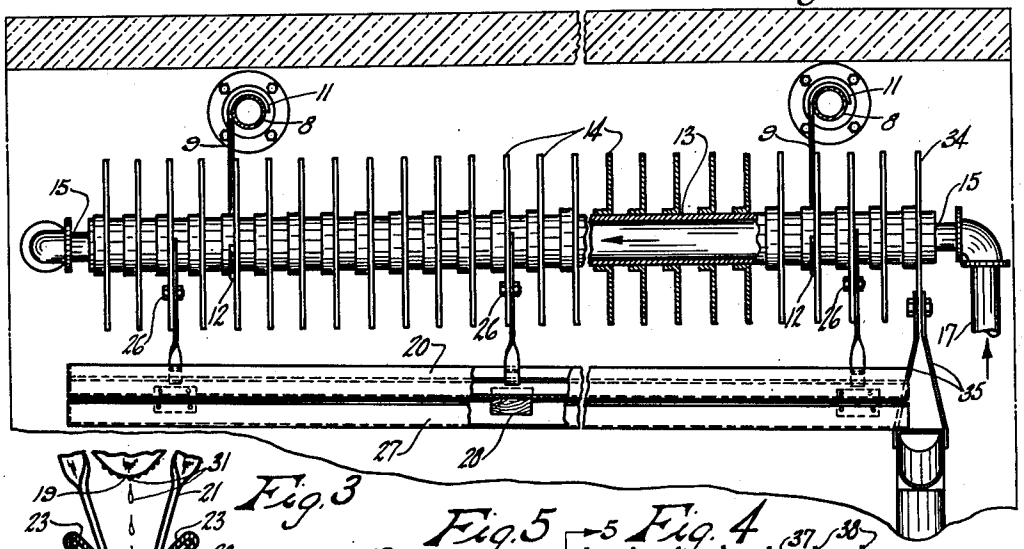


Fig. 3

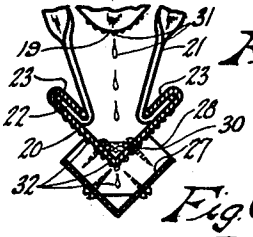


Fig. 5

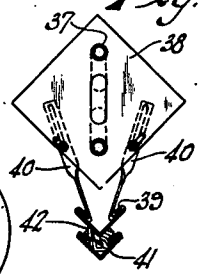


Fig. 4

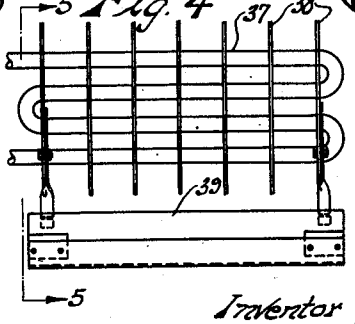
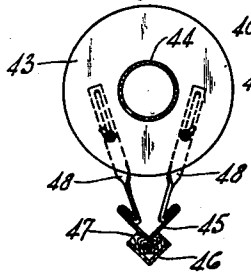


Fig. 6



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REFRIGERATING APPARATUS

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3 Claims. (Cl. 62—103)

This invention relates to refrigerating apparatus, and more particularly to the refrigerant-conducting coils and drip gutters associated with such apparatus.

In refrigerating systems it is customary to provide drip gutters to prevent the moisture condensing on the coils from dripping onto the floor or foodstuffs stored in the refrigerated chambers. These gutters are usually constructed of metal and the moisture dripping therein from the coils lowers the temperature of the walls thereof below that of the air circulating in the chamber. As a result a considerable quantity of moisture condenses on the outer wall surfaces of these drip gutters which finally drips to the floor or upon the foodstuffs stored in the chamber. This not only produces an undesirably damp condition in the refrigerator, but often damages the foodstuffs stored therein.

One object of the present invention is to provide means which effectively collects the moisture dripping from the coils and gutters, and thereby prevents damage to the foodstuffs stored in the refrigerator.

Another object is to provide an arrangement of drip gutters which will not obstruct, to any material degree, the free circulation of air throughout the refrigerator.

A more specific object is to provide in refrigerators of the stated character a pair of superimposed drip gutters arranged in spaced relation and insulated from each other for each refrigerant-conducting coil, the upper gutter being provided to receive the moisture dripping from the coils, while the lower drip gutter receives the moisture dripping from the outer walls of the upper drip gutter.

Other and further objects of the invention will become apparent as the description thereof progresses.

Of the drawing:

Fig. 1 is a sectional elevational view taken through a refrigerator showing the arrangement of the refrigerant-conducting coils and the drip gutters associated therewith.

Fig. 2 is an elevational view partly in section taken substantially along line 2—2 of Fig. 1.

Fig. 3 is an enlarged fragmentary view partly in section of the drip gutters.

Fig. 4 is a fragmentary side elevational view of a modified construction.

Fig. 5 is an end view taken substantially along line 5—5 of Fig. 4, and

Fig. 6 is an end view of a further modified construction showing circular fins instead of the rectangular ones illustrated in Figs. 1 to 5.

Referring to the drawing, numeral 1 designates generally a refrigerator, having a ceiling 2, and side and end walls 3 and 4 respectively, constructed of any suitably insulating material. Mounted near the top of the refrigerator and extending substantially the entire length thereof is a bank of finned refrigerating coils 7. This bank of coils is suspended from a pair of supporting rods 8 in any suitable manner, such as by a series of rods 9. Rods 8 may be secured to the side walls 3 by any suitable means, such as by bolts 10. Each rod 9 is provided with an upper hook 11 which engages over a rod 8 and a lower hook 12, which engages a coil, as shown in Figs. 1 and 2.

Each coil 7 comprises a tubular portion 13 through which the refrigerant is circulated, and a series of transverse, substantially rectangular fins 14. The fins 14 are pressed tightly into intimate thermal contact with the tubes 13, and consequently the fins, as well as the tubes, are maintained relatively cold by the refrigerant.

As shown in Figs. 1 and 2, suitable piping 15 extends from the opposite ends of each coil, and to facilitate the connection of several coils into banks, couplings 16 are provided in the piping between adjacent sections. In the present instance the coils 7 are connected in series, the refrigerant entering the same through a pipe 17 and flowing in the direction of the arrows shown in Figs. 1 and 2, and discharging from the coils through a pipe 18. As shown more particularly in Figs. 1 and 3, the coil sections 7 are supported on edge. By this arrangement the moisture condensing on the fins will flow to the lowermost corners 19 thereof, and consequently relatively narrow drip gutters 20 may be employed to receive this moisture. Each drip gutter 20 is suspended from the fins of a coil section by a pair of sheet metal bars 21. The lower ends of these bars are provided with hooks 22 which engage under the flanges 23 provided along the upper edges of the gutter 20.

A longitudinally extending slot 24 is provided near the upper end of each bar 21 which in assembly registers with a slot 25 provided near the lower side edges of the fins 14. A bolt 26 having a nut engaging the threaded end thereof extends through these slots and upon tightening these nuts the bars 21 are effectively secured to the fins. The elongated slots 24 provided in the bars 21 enable vertical adjustment of the gutters 20 to the desired position beneath the coils.

Mounted in spaced relation with gutter 20 is a second gutter 27. These gutters are spaced from each other by a series of notched blocks 28, preferably constructed of any suitable insulating material, such as wood. The gutters 20 and 27 are secured to these blocks by means of screws 29, or any other suitable fastening means. The upper end of each block 29 is notched, as shown at 30, to receive the upper gutter 20, while the side edges thereof incline downwardly and inwardly so as to lie in abutting relation with the upper sides of the lower gutter. The lower end of each block is spaced from the bottom of the lower gutter to permit the moisture to drain therefrom, as shown more clearly in Fig. 3.

Referring to Fig. 3, it is seen that particles of moisture 31 adhering to the fins will drip into gutter 20, while the particles of moisture 32 adhering to the outer walls of gutter 20 will drip into the lower gutter 27. The temperature of the moisture dripping into gutter 27 is slightly above that of the air circulating in the refrigerator, and consequently no moisture will condense on the outer walls of said gutter. As shown in Fig. 2, the gutters 20 and 27 incline slightly from a horizontal plane, and communicate with a transverse gutter 33 provided at one end of the refrigerator. Gutter 33 is suspended from the end fins 34 of the side coil section by straps 35 or any other suitable means, and also inclines slightly from a horizontal plane. The lower end of gutter 33 communicates with a spout 36 which in turn communicates with the main drain of the refrigerator.

Figs. 4 and 5 show a somewhat modified construction wherein a series of refrigerant-conducting tubes 37 are passed through the fins 38 of each coil section. To insure a minimum of interference with the circulation of air in the refrigerator, these tubes are disposed in a vertical plane and a narrow drip gutter 39 is mounted directly therebeneath. Drip gutter 39 may be suspended from the fins 38 by a pair of bars 40 in the same manner as the gutters 20 and 27, shown in Figs. 1 to 3, or by any other suitable means, such as by means directly connected to the tubes. In this construction also a second drip gutter 41 is disposed beneath gutter 39 and is insulated therefrom by a series of spaced blocks 42.

Fig. 6 shows a still further modification wherein a series of circular fins 43 are secured to each fluid-conducting tube 44. In this construction also a pair of drip gutters 45 and 46 are disposed beneath the fins 43 and are insulated from each other by a series of spaced blocks 47 of any suitable insulating material. In this construction also a pair of bars 48 may be employed to suspend the drip gutters 45 and 46 from the fins.

From the foregoing description it is apparent that highly efficient means has been provided for collecting all of the moisture dripping from the coil sections, as well as from the outer walls of the main drip gutter. The refrigerator is thus maintained relatively dry and damage to the foodstuffs is prevented.

It will be noted that the lower drip gutters in each of the constructions just described are somewhat narrower than the upper drip gutters, it being apparent that the relative sizes of these gutters may be varied to best suit the conditions under which the refrigerator is to operate. In most installations, however, it is preferable to employ an arrangement of drip gutters of the type illustrated in the drawing so that the upper gutter will shield the lower one to a certain extent from direct contact with the cold air circulating in the refrigerator.

The various embodiments herein described have been presented merely for the purpose of illustration, it being apparent that they are subject to modification and change without departing from the spirit of the invention. For example, different types of supporting means for the drip gutter may be provided; also semi-circular or rectangular gutters may be employed if so desired. The invention therefore is to be limited only by the scope of the claims which follow.

What is claimed is:

1. In a device of the class described, the combination of a refrigerating section comprising, a fluid conducting tube and a series of fins secured to said tube and making intimate thermal contact therewith, said fins having slots provided therein near the outer edges thereof, a gutter disposed beneath said section for collecting the moisture dripping therefrom, means comprising a plurality of bars for suspending said gutter from said fins, each of said bars having securing means provided at the lower end thereof adapted to engage said gutter and an elongated slot provided near its upper end, and securing means extending through the said slots in said fins and bars, said securing means being so constructed as to permit vertical adjustment of said bars and gutter.

2. In a device of the class described, the combination of a refrigerating system comprising one or more refrigerating sections, each of said sections comprising one or more refrigerant conducting tubes, and a series of fins secured thereto, a relatively narrow drip gutter disposed beneath each of said sections and extending longitudinally thereof for collecting the moisture dripping therefrom, a second longitudinally extending drip gutter disposed beneath said first mentioned gutter for collecting the moisture dripping from the outer walls of said first mentioned gutter, said second mentioned gutter being narrower than said first mentioned gutter whereby the latter shields the former from the chilled air descending from said sections, and spacing means disposed between said gutters.

3. A drip gutter construction adapted for assembly beneath the coils of a refrigerating section, said drip gutter construction comprising an upper, relatively narrow metallic trough, a second trough disposed beneath said first mentioned trough, said second trough being narrower than said first mentioned trough whereby the latter shields the former from the chilled air descending from said sections, insulating means disposed between said troughs at spaced intervals, and means for securing said troughs to said insulating means.

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