

March 5, 1940.

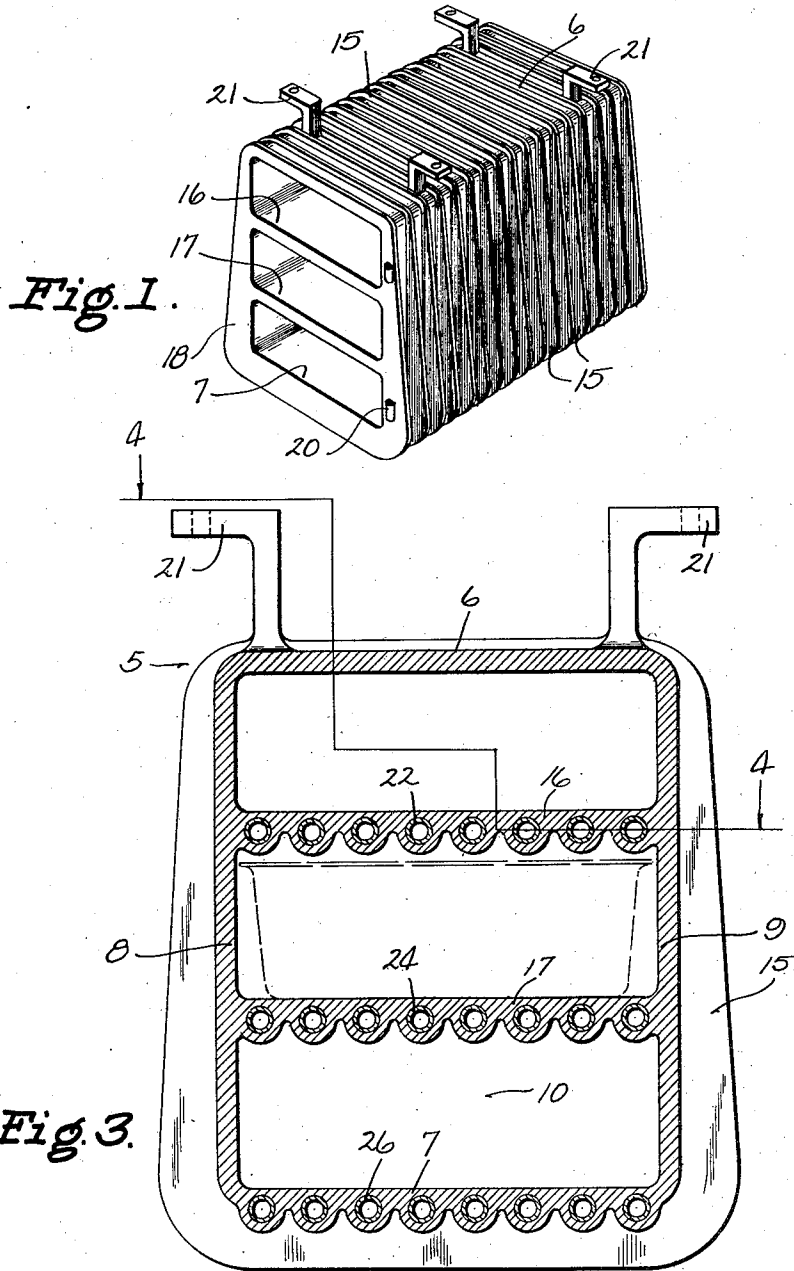
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2,192,431

EVAPORATOR FOR HOUSEHOLD REFRIGERATORS

Filed Sept. 6, 1938

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

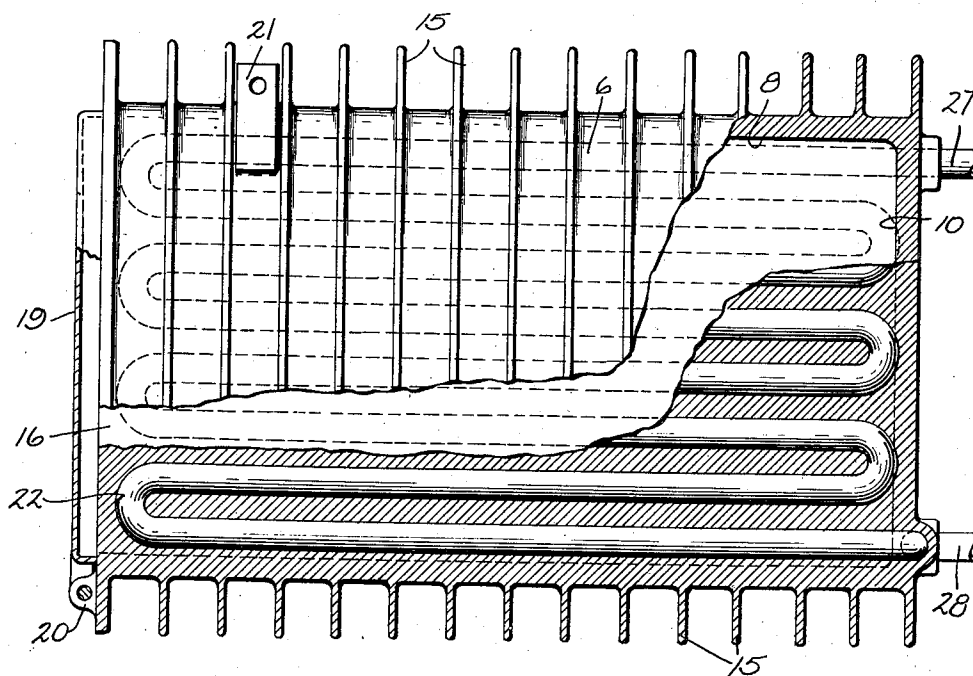


Fig. 4.

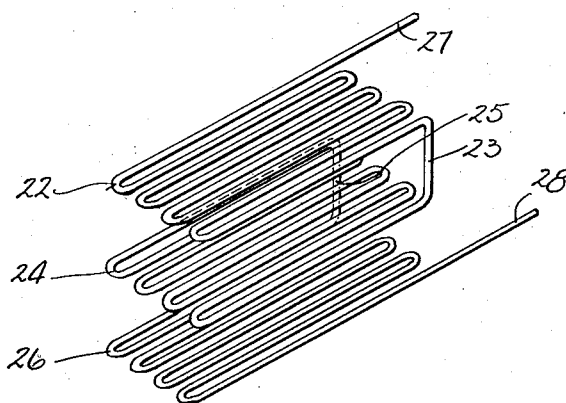


Fig. 2.

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EVAPORATOR FOR HOUSEHOLD REFRIG-
ERATORSStephen F. Briggs, Naples, Fla., assignor to Out-
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2 Claims. (Cl. 62—126)

This invention relates to improvements in evaporators for household refrigerators.

It is the primary object of the invention to provide a novel and inexpensive evaporator unit constituting a freezing chamber having a pre-formed evaporator coil embedded in its wall surfaces. It is a further object of the invention to provide a combined freezing chamber and evaporator in which the passages constituting the evaporator coil extend continuously within a chamber which is substantially closed against air circulation and which is provided with heat exchange surfaces on its external walls for the refrigeration of a food compartment by heat absorption and conduction to and through the material of the chamber as distinguished from the use of an exposed evaporator coil.

It is my further purpose preferably to remove the evaporator passages largely to the interior partitions of such a freezing chamber so as to produce a sharp temperature variation between the freezing chamber and the refrigerating compartment in which such a chamber is located, the major portion of the exposed surfaces of the refrigerating chamber being free of evaporator passages or coils whereby to minimize the formation of frost by condensation thereon.

Other objects will appear in more detail from the following disclosure.

In the drawings:

Figure 1 is a view in perspective of a completed freezing chamber and unitarily incorporated evaporator coil embodying this invention.

Figure 2 is a view in perspective of a pre-formed evaporator coil unit which is embedded by molding or otherwise in the completed chamber illustrated in Figure 1.

Figure 3 is a view on an enlarged scale showing in transverse section the completed unit illustrated in Figure 1.

Figure 4 is a view partially in plan and partially in horizontal section as indicated by line 4—4 of Figure 3.

Like parts are represented by the same reference characters throughout the several views.

My improved evaporator and refrigerating chamber unit comprises a cell or casing 5 which is die cast, molded or cast to provide in one single integral unit a top 6, a bottom 7, side walls 8 and 9 and a back 10. Externally, the top, the side walls and the bottom are encircled by closely adjacent ribs 15 which reenforce the wall structure and also provide a greatly increased heat absorption surface. Interiorly, cer-

tain of the walls, preferably the side walls 8 and 9 and the rear wall 10, are connected by partitions 16 and 17 which, together with the bottom 7, serve as supports for the usual freezing trays. Obviously, the resulting integral structure is extremely strong, even though the metal constituting its wall surfaces may be very light.

At the front of the unit, the partitions or shelves 16 and 17 and the several top, bottom and side walls 6, 7, 8 and 9 terminate in a preferably planeform finished surface at 18, against which the door 19 may tightly close. Such surface may be provided integrally with tiers 20 to receive the door hinge pintles. Also formed integrally with the unit I prefer to provide the supporting brackets 21 whereby the unit may be suspended for operation within the usual food compartment of the household type of refrigerator, it being intended that such food compartment shall be refrigerated by the absorption of heat therefrom through the flanges 15 and other exposed interior surfaces of the unit.

The interior of the one piece molded unit is provided in any desired manner with evaporator coil passages for the refrigerant. Such passages are preferably, however, limited largely to the partitions 16 and 17, the bottom wall 7 being also used if desired. By omitting coils or passages from the side and top walls, I can tend to prevent the formation of frost thereon, as the interior of the several compartments into which the freezing chamber is subdivided by partitions 16 and 17 can be maintained very cold without having the exterior of the unit fall appreciably, if at all, below the freezing point.

For economy of manufacture, it is preferred that these passages or coils be pre-formed of copper tubing or the like. In Figure 2, I have illustrated the pre-formed tube unit in which a single piece of tubing is bent to provide a stratum of convolutions at 22 connected by a vertical run 23 with a second stratum of convolutions at 24, this being in turn connected by a vertical run 25 with another stratum of convolutions at 26. The convolutions of the top and bottom strata 22 and 26 are respectively connected with the supply pipe 27 and the return pipe 28 which, in turn, will be connected to the usual reducing valve and the high and low pressure sides respectively of the refrigerating system.

The pre-formed coil, made in accordance with Figure 2 or otherwise, is inserted in a mold or die and the material used to make the chamber

5 is molded or cast about it. Metal such as the aluminum alloys used for die casting is preferred but plastic and other material, even including porcelain, may be used. If plastics are employed, the entire wall may be made transparent but, naturally, the conductivity will be somewhat lower than as if the material used is metal or porcelain. The under surfaces of the partitions 16 and 17 which serve as shelves are preferably corrugated in conformity with the tubing, as shown in Figure 3, to increase the heat absorption surface while, at the same time, reducing the amount of material required.

The resulting product is a very attractive but inexpensive evaporator chamber which is operable with exceptional efficiency because of the high temperature differentiation maintained between the interior of the chamber and the exterior food compartment in which the chamber is disposed in the refrigerator. Ice can be frozen speedily without unduly chilling the food in the refrigerator cabinet and the device will function over long periods without requiring defrosting.

I claim:

1. The combination with a pipe pre-formed to provide a plurality of series of convolutions disposed horizontally at different levels and provided with communicating sections extending between said levels at the ends of said series and serving to connect the several convolutions in sequence, of a chamber constituting material cast to provide integrally connected top, side, bottom

and end walls and at least one horizontal partition, the convolutions of said pipe at one of said levels being embedded in said partition and said communicating sections being embedded in said end wall respectively, the top, side and bottom walls of said chamber being provided integrally with external flanges and the side and top walls being substantially free of said pipe, whereby the interior of said chamber is primarily refrigerated, and air circulated by gravity over said chamber, and encountering flanges of the top and side walls of said chamber is refrigerated secondarily by conduction through the material of said walls.

2. The combination with a pipe pre-formed to provide a plurality of series of convolutions disposed horizontally at differing levels and provided with communicating sections extending between said levels and serving to connect the several convolutions in series, of a chamber constituting material cast to provide integrally connected top, side, bottom and end walls and at least one horizontal partition, differing convolutions of said pipe being embedded in a partition and bottom wall, respectively, the top, side and end walls of said chamber being substantially free of said pipe other than said communicating sections, whereby the interior of said chamber is primarily chilled, the air circulated by gravity and encountering the top and side walls of said chamber being chilled by conduction through the walls thereof.

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