Feb. 6, 1945. E. F. HUBACKER 2,368,837

REFRIGERATOR CABINET CONSTRUCTION

Filed Feb. 9, 1942 2 Sheets-Sheet 1

Fig. 1

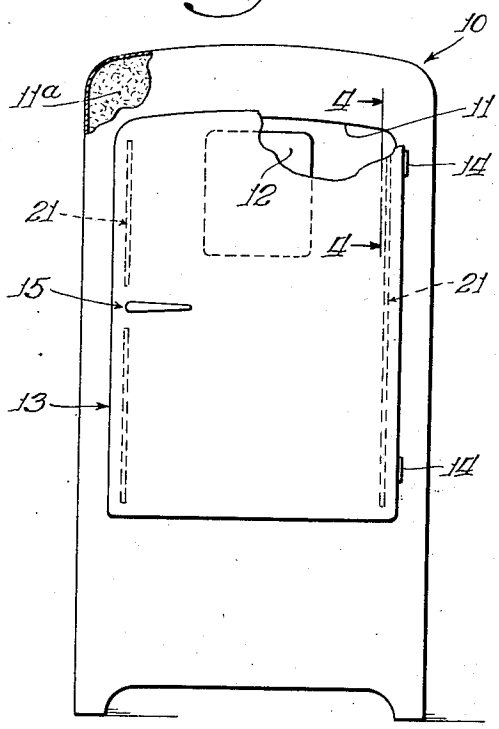


Fig. 6

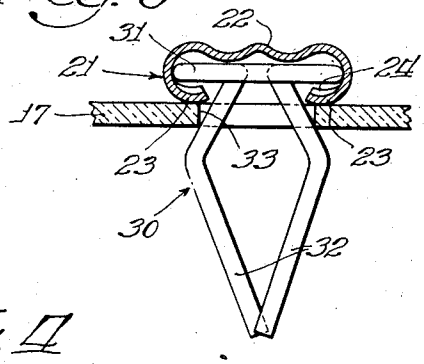


Fig. 4

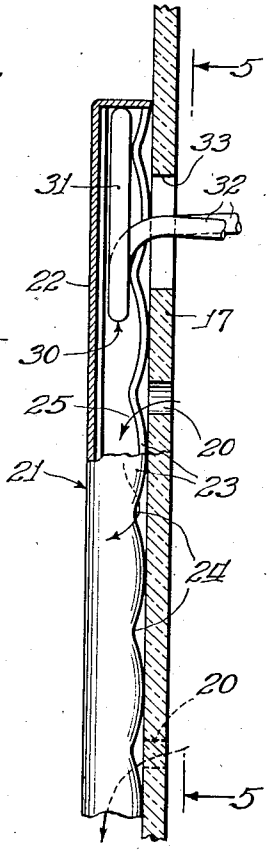


Fig. 5

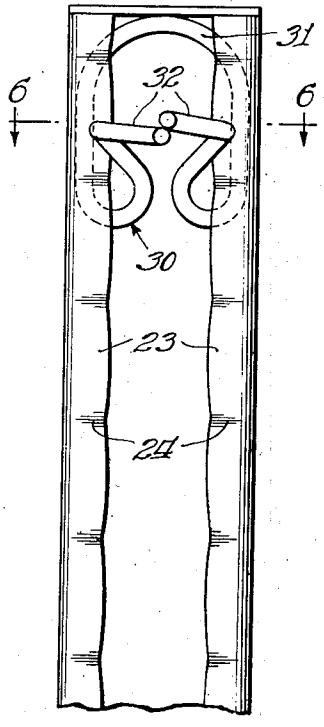
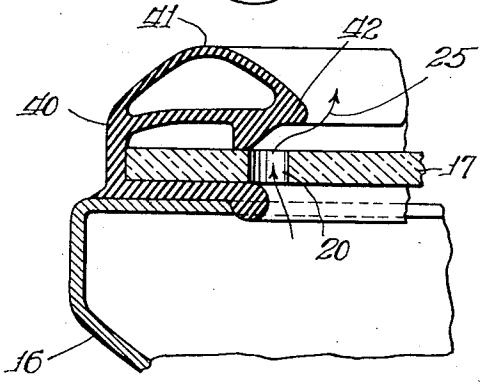


Fig. 7



Inventor:
Earl F. Hubacker
By:
Edward C. Gritzbaugh
Atty.

Feb. 6, 1945. E. F. HUBACKER 2,368,837

REFRIGERATOR CABINET CONSTRUCTION

Filed Feb. 9, 1942 2 Sheets-Sheet 2

Fig. 3

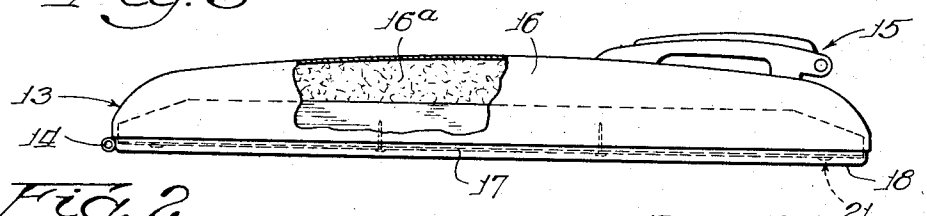
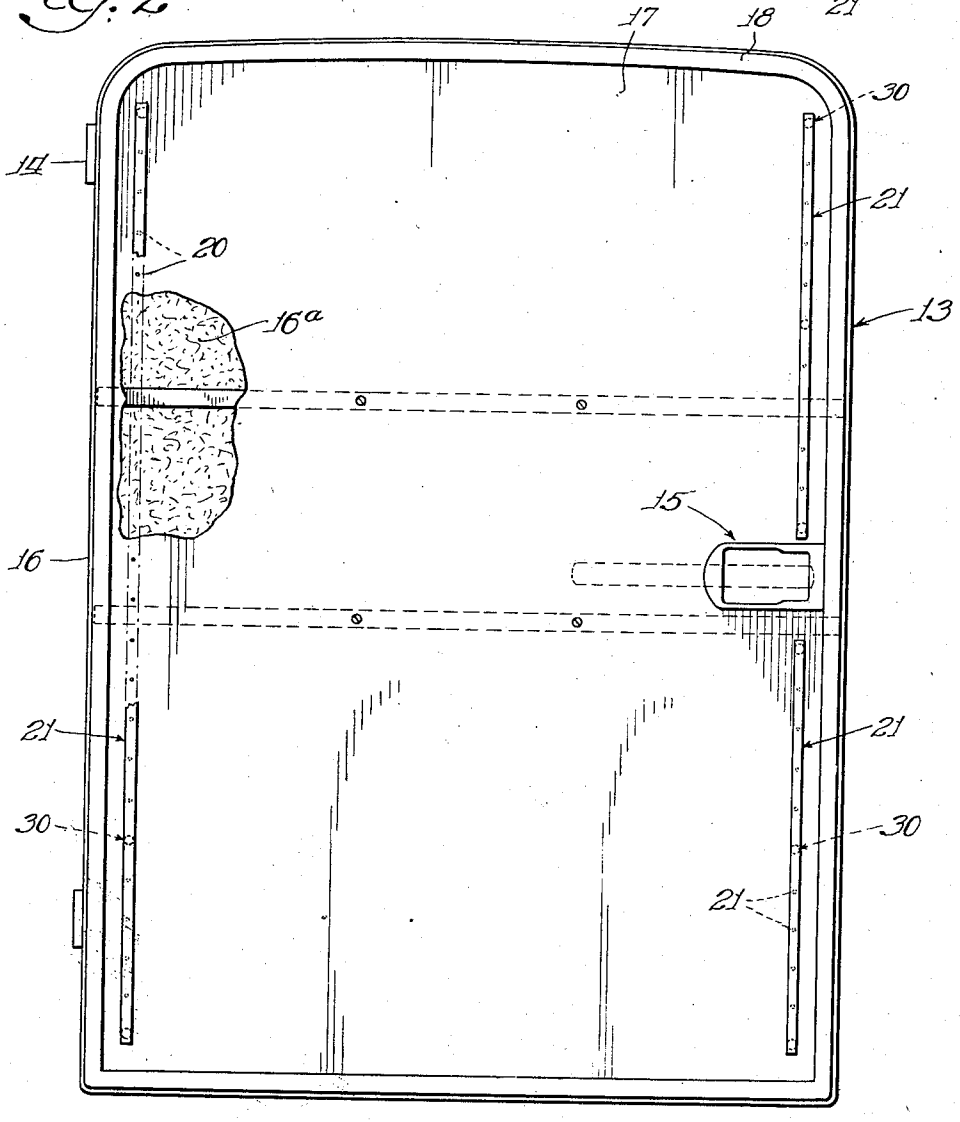


Fig. 2



Inventor:
Earl F. Hubacker
By:
Edward C. Fitzhugh
Atty.

Patented Feb. 6, 1945

2,368,837

UNITED STATES PATENT OFFICE

2,368,837

REFRIGERATOR CABINET CONSTRUCTION

Earl F. Hubacker, Highland Park, Mich., assignor to Borg-Warner Corporation, Chicago, Ill., a corporation of Illinois

Application February 9, 1942, Serial No. 430,022

2 Claims. (Cl. 62—89)

This invention relates to refrigerator cabinets, and particularly to an improved construction directed to the prevention of deterioration normally caused by moisture accumulation within the refrigerator wall structure.

It has been found that within the practical limits of modern assembly line fabrication of refrigerator cabinet structures, particularly refrigerator doors, there is unavoidably incorporated therein a certain small percentage of open space. Because of the temperature gradient or difference between the room and the interior of the refrigerator cabinet, there results a vapor pressure tending to force air into the interior of the structure through these minute imperfections or unavoidable tolerances between the component parts thereof. The problem is particularly significant as to a refrigerator door composed of a sheet metal outer door panel and a separate inner door panel, the two panels being fastened about the peripheries thereof in as nearly a sealed relation as is commercially practicable. Some leakage of air laden moisture about the area of juncture between the two panels is unavoidable, and this condition is even more aggravated in the area of attachment of the hinges and the lock mechanism.

It has been recognized for a long time by those familiar with the service life of refrigerator cabinets that this unavoidable moisture results in deterioration and breakdown of the interior construction of imperfectly sealed cabinets and particularly door structures requiring either the rebuilding of the box or the discarding thereof.

This problem has become additionally aggravated as manufacturers have been constantly striving for further economies and increased efficiencies, while at the same time placing particular emphasis on making satisfactory substitutes for metal where practicable. One very important step that has been tried extensively in this direction is the employment of commercially available composition board for the inner door panel, this board being variously procured under such names as "pressed gypsum board," "masonite tempered pressed board" and others. The serious difficulty encountered in the attempts to use this material has been its property of deteriorating due to moisture which is characterized for example by the peeling off of the enamel coating as well as the occurrence of offensive and destructive bulges therein due to changes in the dimensions thereof caused by increased moisture content.

I have discovered, and it is the object of the present invention to disclose a relatively simple, inexpensive, but novel and efficient structure and arrangement, which by taking advantage of one of the normally disadvantageous or undesirable characteristics of the refrigerating mechanism proper results in solving this entire problem.

It is a further detailed object to provide the herein disclosed specific and novel construction incorporating the invention.

Other and more specific objects, advantages and uses of my invention will become apparent from a reading of the following specification taken in connection with the appended drawings forming a part thereof and wherein:

Fig. 1 is a schematic elevational view showing a refrigerator cabinet with a door assembly incorporating my invention;

Fig. 2 is an enlarged partially broken-away elevational view of the inside of the refrigerator door indicating the preferred location of the breather or dehydrating ports and ventilating shields or screens cooperating therewith;

Fig. 3 is a plan view of the door shown in Fig. 2 with a section broken away for the purpose of showing to advantage the inner construction and arrangement;

Fig. 4 is a broken-away cross-sectional view taken substantially on the line 4—4 of Fig. 1 and showing to advantage one preferred arrangement of the dehydrating or breather ports formed in the inner door panel and the ventilating shield or screen cooperating therewith;

Fig. 5 is a view taken substantially on the line 5—5 of Fig. 4 showing the underside of the ventilating shield or screen as well as the arrangement of the attaching clips for fastening the same to the inner door panel;

Fig 6. is a cross-sectional view taken substantially on the line 6—6 of Fig. 5 except that the inner door panel is shown in position; and

Fig. 7 is a cross-sectional view through another alternative embodiment wherein the door seal gasket is formed to have the additional function of a shield or screen for the dehydrating or breather ports in the inner door panel.

Referring in greater detail to the figures of the drawings, numeral 10 indicates a refrigerator cabinet assembly preferably of the type composed of an outer sheet metal housing enclosing the usual tank 11 defining a food compartment provided with refrigeration by an evaporator 12, the food compartment or tank 11 being arranged to be closed by refrigerator door 13.

While the present invention is equally applicable to the dehydration or removal of moisture from the area between the cabinet housing proper and the tank 11 wherein the usual insulation 11a is located, the same will be herein illustrated and described with particular reference to the removal of moisture from the door structure 13 as the problem is aggravated in the case of the door due especially to the difficulty of effecting a complete seal about the hinges 14 and the lock mechanism 15 and to a lesser degree to the difficulty in effecting a seal in the area of juncture between the outer door panel and the inner door panel.

Turning particularly to Figs. 2 and 3, the door 13 is illustrated as being composed of a sheet metal outer door panel 16 dished to provide considerable depth, receiving insulation 16a, and closed on the inner side with an inner door panel 17, the two panels being attached about the periphery thereof with a door seal gasket 18 which effects as complete a seal as is commercially practicable of accomplishment under modern assembly lines manufacturing conditions. However, a certain limited amount of moisture does find its way into the interior of door structure 13 and if allowed to remain there would result in the deterioration of this inner structure, which includes the insulation as well as the inner surfaces of the panels themselves.

In one of the more specific aspects of the present invention it is contemplated that instead of inner door panel 17 being made of a relatively expensive and less available metal, that the same be fabricated of pressed fiber board in any one of the several forms commercially available under such names as "pressed gypsum board" or "masonite tempered pressed board" and others. This pressed fiber board when used as the inner door panel has the further disadvantage as compared to metals of absorbing moisture with the result that the dimensions of the panel become enlarged, which condition is accompanied by bulging and the related objections and disadvantages.

As a solution to the above and related problems, I have discovered that the normally objectionable dehydrating property or characteristic of the evaporator 12 may be taken advantage of to remove the moisture from the interior of door assembly 13 by providing the necessary breather or dehydrating ports in the door structure for placing the interior thereof in communication with the evaporator 12, thus enabling the evaporator to remove from the door structure such moisture as unavoidably finds its way therein due to the differences in vapor pressure between the interior and exterior, and the imperfection in the sealing arrangement. The most critical areas have been determined to be along the side containing the hinges 14 and along the side containing the lock mechanism 15. I have found that a satisfactory removal of moisture can be effected by forming a plurality of holes or ports 20 in the inner door panel 17 in two vertical rows spaced a short distance inwardly of the door edges. There will of course be a general relationship between the total area of ports 20 and the amount of moisture that must be removed therethrough, although this relationship is not of a critical character so long as the capacity of the ports is sufficiently large and the size and disposition thereof are both maintained within limits pleasing to the eye of the user.

As a further important feature of the present invention, the dehydrating ports 20 are disposed in alignment, and thus readily shielded or screened from being observed, by means of a ventilating shield or screen 21. One preferred embodiment of this shield is shown in Figs. 4 to 6 as comprising a generally channel-shaped member 21 having a back portion 22 connecting opposed inturned side portions 23 arranged to extend over and cover breather ports 20, the side portions 23 being additionally formed with indentations 24 serving to allow free communication between the evaporator 12 and the ports 20 as indicated by arrows 25. Ventilating shields 21 may be made of any suitable material such for example as an available metal or preferably a condensation product, the exact composition of which forms no particular part of the present invention. The shield 21 may be readily fastened in position by means of spring clips 30 which include a head portion 31 confined within shield 21 and protruding leg portions 32, which may be pressed together sufficiently to permit of passage through an opening 33 in panel 17, but which open up again due to the resiliency thereof and function to restrain the withdrawal of leg portions 32 from the opening.

It will be apparent that the shield or screen for the breather port may take a number of different forms coming within the broad concept of my invention so long as the same prevents direct observation of the holes in the inner door panels while at the same time permitting free communication between the door interior and the evaporator. Such an alternative construction is the embodiment shown in Fig. 7 wherein the door seal gasket 40 which functions as a fairly complete seal connection between the outer door panel 16 and the inner door panel 17, is further formed with a gasket portion proper 41 for engagement between the door 13 and the refrigerator housing about the door opening and still further with an inwardly extending overhanging lip portion 42 performing the important function of shielding or screening the ports 20 from direct observation.

While I have disclosed my invention in connection with certain specific embodiments thereof, it is to be understood that the same is by way of example rather than by way of limitation, and it is intended that the scope of my invention be defined by the appended claims.

I claim:

1. In a refrigerator cabinet assembly of the type including a hollow housing defined by spaced walls containing insulating material, said housing having a door providing access thereto likewise defined by spaced walls containing insulated material, said housing being provided with an evaporator for cooling the interior thereof, and at least one of said interior walls being formed with a plurality of perforations whereby said evaporator may dehydrate therethrough any moisture that may be contained within the associated spaced walls, and means defining a shield for covering said perforations, said means being formed to provide communication between said perforations and said evaporator.

2. In a sheet metal exterior housing type of refrigerator cabinet including a door providing access to the interior thereof and an evaporator therein for cooling the same, said door being defined in part by a sheet metal outer panel and a pressed fiber board inner panel spaced therefrom and separated by insulating material, said arrangement being particularly characterized by

the formation in said inner door panel of a plurality of ports located a relatively short distance from at least one of the peripheral edges of said panel adjacent the area where said inner and outer panels are joined together, whereby said evaporator may be effective to remove moisture from between said panels through said ports, and means defining a shield for covering said ports from normal observation, said means including a general channel-shaped strip having a relatively thin back wall portion and a pair of opposed inturned side wall portions arranged to engage said panel and to overlap the peripheral portions of said ports, said side wall portions being further formed with indentations providing communication through said ports to said evaporator.

EARL F. HUBACKER.