June 5, 1934.

G. J. HOPKINS

1,961,495

REFRIGERATOR CASE

Filed June 2, 1933

3 Sheets-Sheet 1

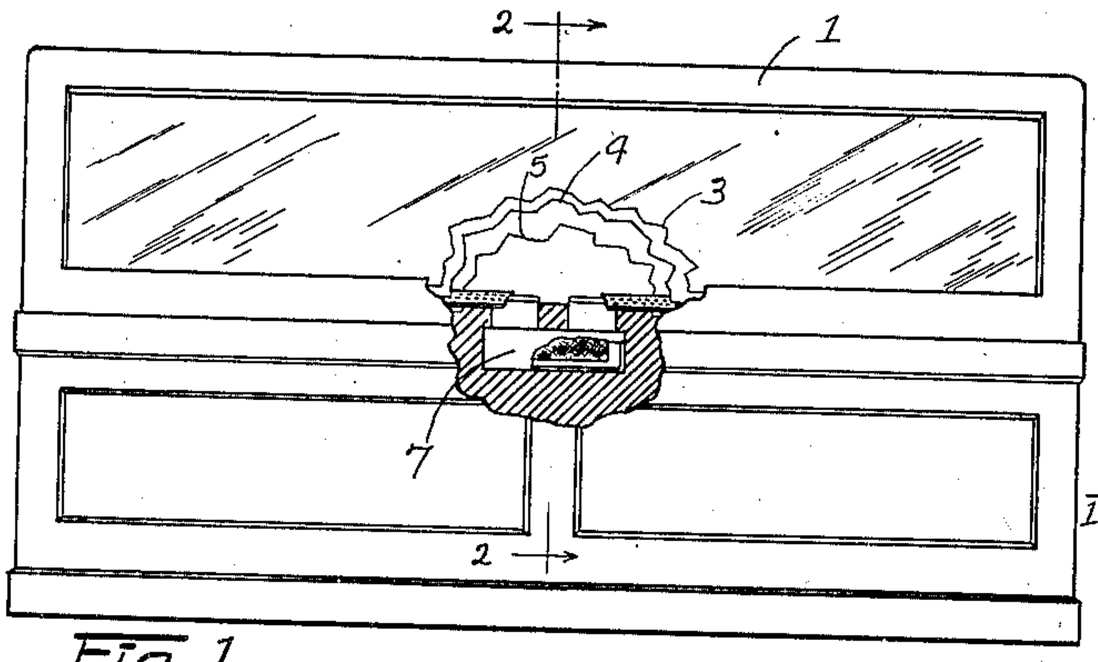

Fig. 1

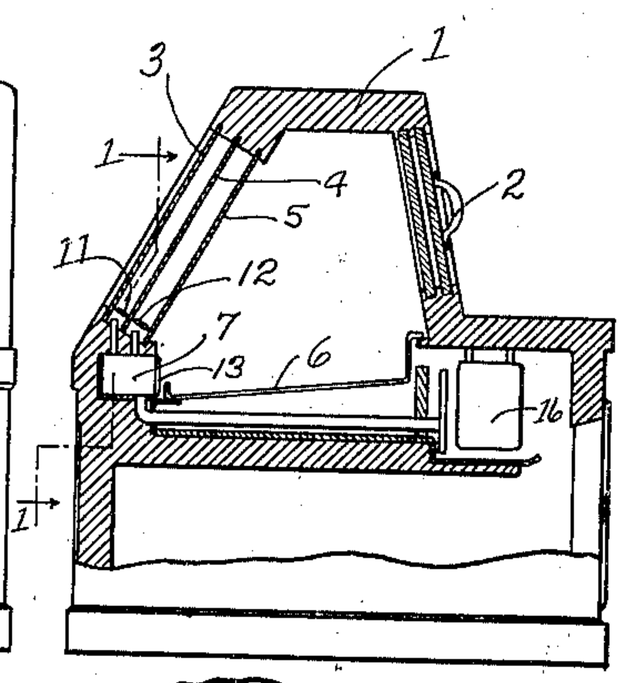

Fig. 2

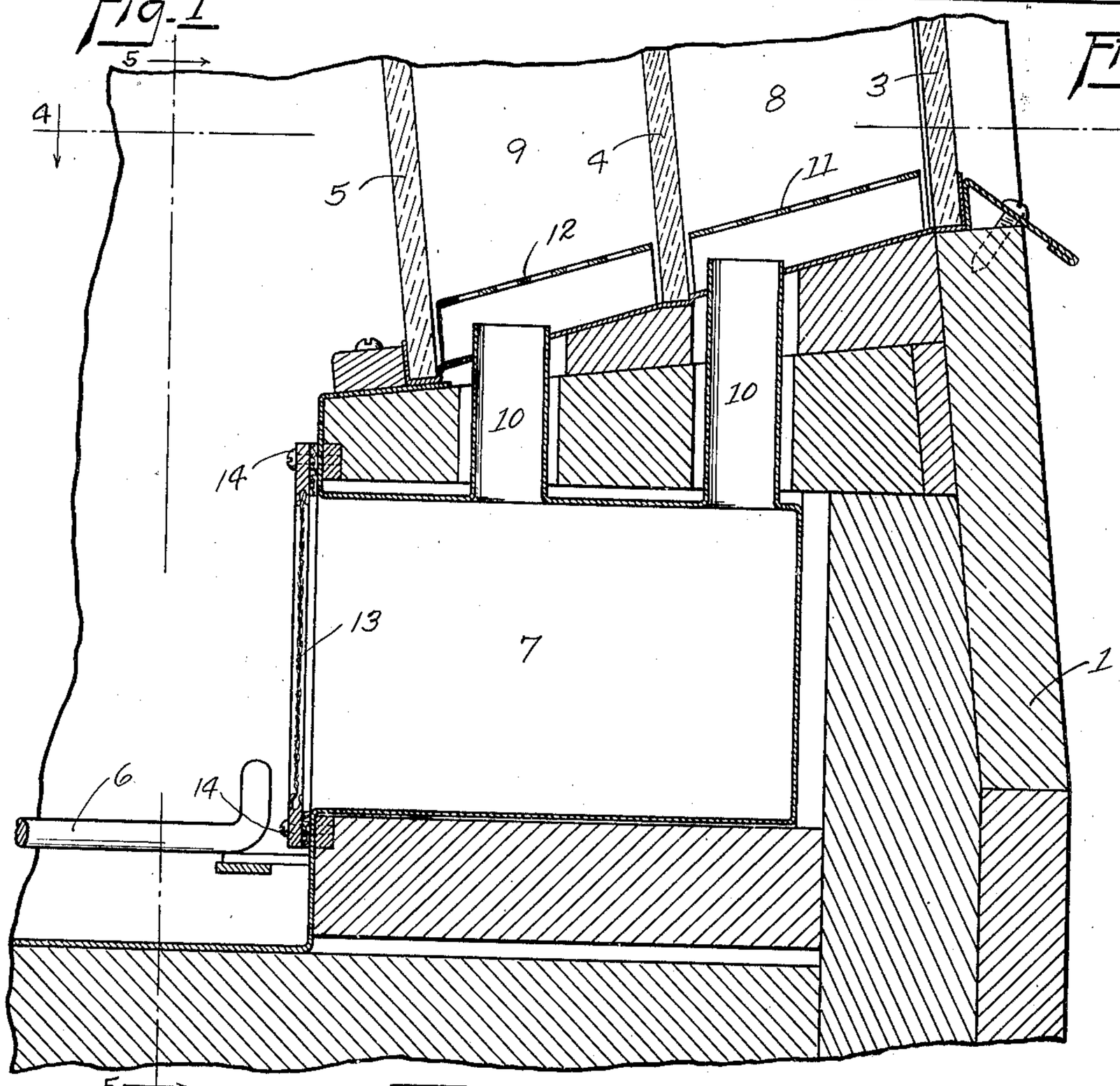

Fig. 3

Witness:
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3 Sheets-Sheet 2

Fig. 4

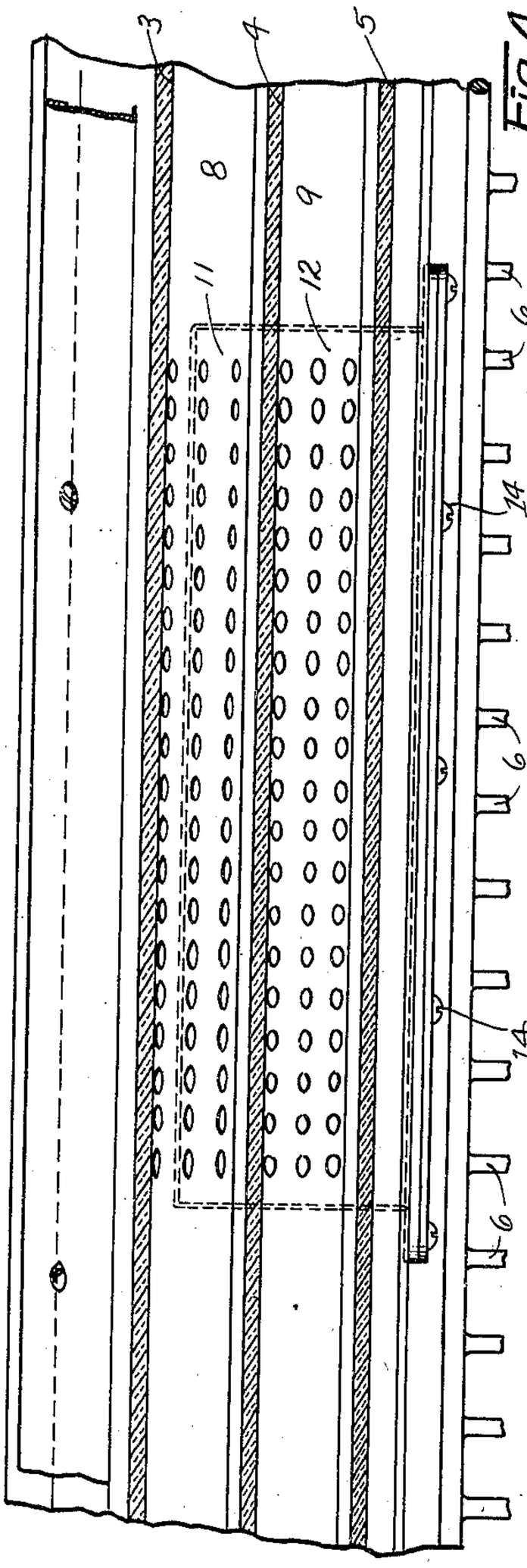
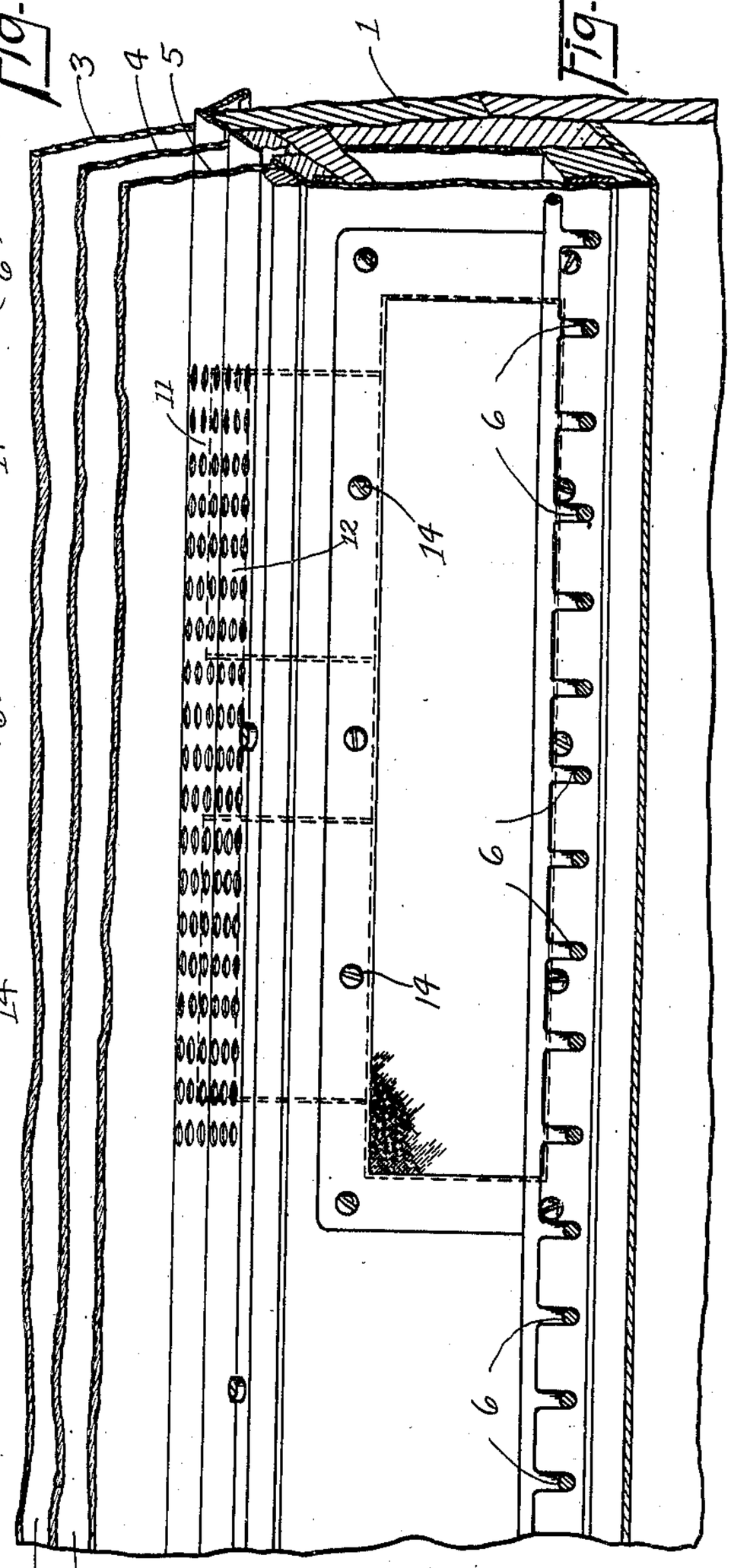


Fig. 5



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REFRIGERATOR CASE

Filed June 2, 1933 3 Sheets-Sheet 3

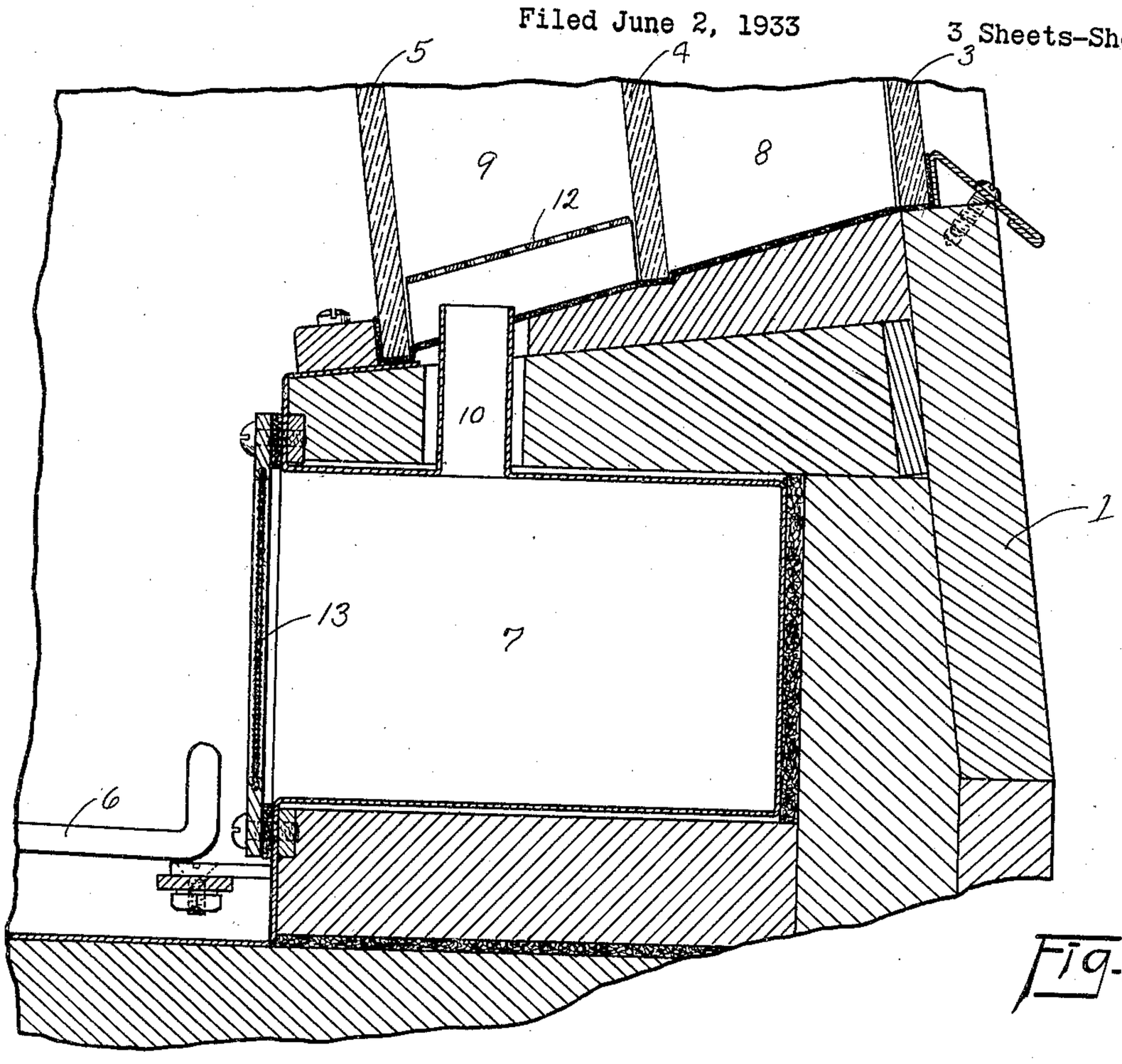

Fig. 6

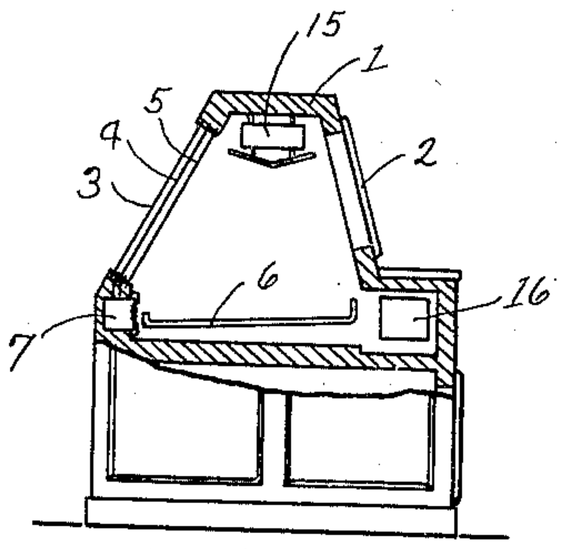

Fig. 7

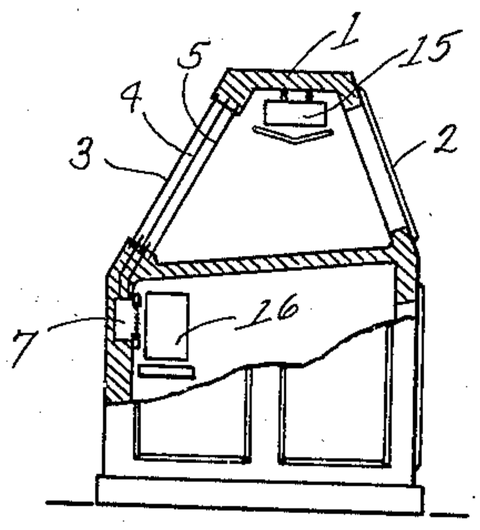

Fig. 8

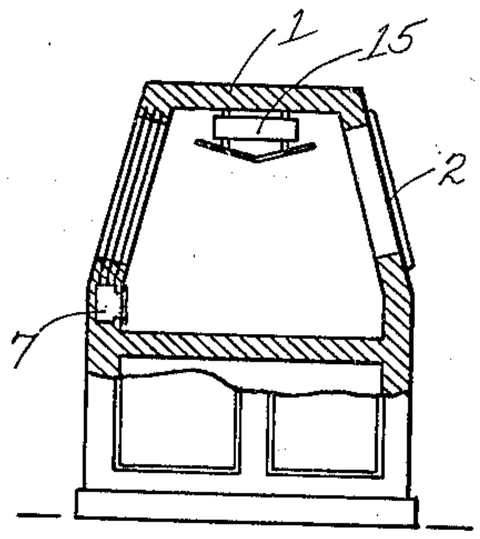

Fig. 9

Witness:
Geo. L. Chapel

George J. Hopkins Inventor

By Rice and Rice Attorneys

Patented June 5, 1934 1,961,495

UNITED STATES PATENT OFFICE

1,961,495

REFRIGERATOR CASE

George J. Hopkins, Kendallville, Ind., assignor to McCray Refrigerator Company, Kendallville, Ind., a corporation of Indiana

Application June 2, 1933, Serial No. 674,075

2 Claims. (Cl. 62—89.5)

The present invention relates to refrigerator cases and more particularly to such refrigerators having insulating spaced multiple panes of glass for permitting observation of food products within the refrigerator by prospective customers or purchasers thereof.

The main objects of the invention are to provide a display refrigeration case of the character above indicated whose spaced multiple panes of glass are maintained free from moisture condensation; to provide such a refrigerator whose cooling system maintains the spaced panes of glass free from moisture condensation; to provide such a refrigerator whose inter-glass spaces are in communication with the interior of the refrigerator whereby differential of vapor tension removes the moisture laden air from the inter-glass space; and, to provide such a refrigerator employing a porous moisture absorbing medium interposed between the inter-glass space and the interior of the refrigerator.

Illustrative embodiments of the invention are shown in the accompanying drawings wherein:

Figure 1 is a front elevational view of a conventional type of display refrigerator case, a portion thereof being broken away as on line 1—1 of Figure 2;

Figure 2 is a sectional view thereof on line 2—2 of Figure 1;

Figure 3 is an enlarged fragmentary sectional view illustrating one embodiment of the invention presently to be described;

Figure 4 is a fragmentary sectional view on line 4—4 of Figure 3;

Figure 5 is a fragmentary sectional view in perspective on line 5—5 of Figure 3;

Figure 6 is a fragmentary sectional view illustrating a modified embodiment of the invention; and

Figures 7, 8 and 9 are sectional views of modified types of display refrigerator cases, each differing from each other and from the type shown in Figure 2 in that the cooling coils are disposed in different relative positions with the refrigerator.

Referring to the drawings in which like parts are designated by the same numerals in the several views, the refrigerator case 1 is of the conventional display type, here shown as provided with sliding doors 2 giving access to the interior thereof and having insulating triple spaced panes of glass 3, 4, 5 to enable prospective customers and purchasers to view the food displayed therein upon the racks 6. The refrigerators herein shown are provided with triple glass panes but it will be understood that dual glass panes may be used if desired.

A reservoir 7 is preferably though not necessarily provided and is disposed below the inter-glass spaces 8, 9 defined by the multiple spaced panes of glass 3, 4 and 5 respectively and a pair of tubes 10 as shown in Figure 3 or a single tube 10 as shown in Figure 6 provide ports affording communication between the inter-glass spaces and the reservoir. Experience has shown that the inter-glass space 8 defined by the panes 3, 4 does not easily cloud since the difference between the outside or atmospheric temperature and the temperature of the inter-glass space 8 is not usually sufficient to cause moisture condensation. Grilled or perforated plates 11, 12 of metal or other suitable material may be disposed within the inter-glass spaces 8, 9 over the upper ends of the tube ports if desired to cover the tube openings and thus provide a more finished appearance.

The reservoir is in communication with the interior of the refrigerator but a porous moisture absorbing medium 13 of any suitable material such as a fabric mounted upon a screen is preferably disposed between the reservoir and the interior of the refrigerator as by the screws 14 running through the screen frame and secured adjacent the open side of the reservoir.

Conventional refrigerating means, thermically intermittently operated or otherwise, is provided within the interior of the refrigerator as illustrated in Figures 2, 7, 8 and 9 which show coils 15 either suspended from the top of the refrigerator case and/or supported or suspended coils 16 at any other suitable place therein.

In operation as will be understood by those familiar with the refrigeration art, the coldest place in the refrigerator is the refrigerating means. Air adjacent the refrigerating coils is thus cooled by convection and since cold air is unable to retain as much moisture as warmer air, the moisture retained thereby is caused to be deposited upon the coils to the point of saturation for the resulting temperature. Thus as the temperature within the interior of the refrigerator becomes colder, convection air currents are set up therein in which the colder and more dry air falls and the warmer moisture laden air rises.

As this convection continues, the warmer air at points more remote from the refrigerating coils and having a greater vapor tension is replaced by colder air which has less moisture content and a lesser vapor tension. There is thus a difference in vapor tension between the warmer air and the

colder air which causes a flow of water vapor toward the refrigerating coils upon which it is deposited since the coils are the coldest place in the refrigerator.

Since the warmer inter-glass space is in communication with the coils in the interior of the refrigerator and since the warmer air therein is gradually cooled by the convection currents thus set up, the moisture flows toward the coils and will condense thereon rather than upon the spaced panes of glass to cloud them and thereby prevent a clear view of the food displayed within the refrigerator.

A reservoir is preferably though not necessarily provided and is purposely disposed below the inter-glass spaces and in communication therewith since the lowest point of the inter-glass space is the coldest point therein and there is thus a tendency for moisture to condense. This reservoir as heretofore explained is likewise in communication with the interior of the refrigerator and the disposition of the porous moisture absorbing medium serves a dual function in that it prevents the flow of dust or other foreign material into the inter-glass space to cloud the glass panes and likewise establishes a slight difference in temperature between the reservoir and the interior of the refrigerator. This moisture absorbing medium is thus a condensation point and where the absorbing medium is of a suitable fabric, there is a "wicking" action through moisture condensation thereon due to capillarity of the fibres which establish it. The interior of the refrigerator being somewhat colder and therefore more dry, causes the moisture to be re-evaporated which in turn promotes a flow of colder air into the reservoir and into the inter-glass spaces.

This construction and the theory of its operation differs from that of the patents to Bonaccolta No. 1,610,244 and to Peacock No. 1,629,408 in that each of the latter are provided with ports at both the upper and lower sides of the inter-glass spaces through which there is a definite circulation of air to carry off the moisture laden warmer air through the upper ports upon entry of the colder air through the lower ports. The insulating property of the inter-glass space in such prior constructions is thus less efficient than in the instance of the present invention wherein the lower side of the inter-glass space only is in communication with the interior of the refrigerator. The differential in vapor tension within the interior of the refrigerator and the inter-glass spaces rather than a circulation of air in its literal sense causes a flow of the water vapor from the inter-glass spaces to the interior of the refrigerator.

Moisture condensation on the insulating glass panes is thus effectively prevented, and while but several embodiments of this invention have been herein shown and described, it will be understood that numerous details of the constructions shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:

1. In a display refrigerator case having dual spaced panes of glass defining an inter-glass space, frame work forming a reservoir below the inter-glass space and in communication with the interior of the refrigerator, communicating means between the lower side only of the inter-glass space and the reservoir whereby the differential in vapor tension effects a flow of air to the interior of the refrigerator, and refrigerating means within the refrigerator.

2. In a display refrigerator case having dual spaced panes of glass defining an inter-glass space, frame work forming a reservoir below the inter-glass space and in communication with the interior of the refrigerator, a porous moisture absorbing medium interposed between the reservoir and the interior of the refrigerator, communicating means between the lower side only of the inter-glass space and the reservoir whereby the differential in vapor tension effects a flow of air to the interior of the refrigerator, and refrigerating means within the refrigerator.

GEORGE J. HOPKINS.