

[54] **REFRIGERATOR CONSTRUCTION**  
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 [22] Filed: **Sept. 28, 1973**  
 [21] Appl. No.: **401,829**

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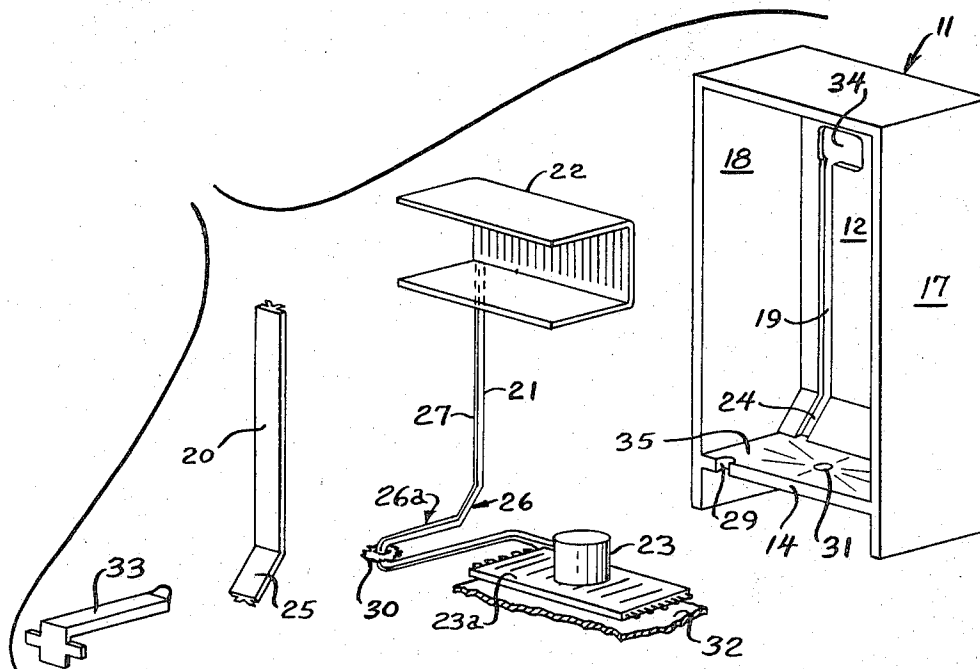
[52] U.S. Cl. .... 62/285, 62/451, 312/214  
 [51] Int. Cl. .... **F25d 21/14**  
 [58] Field of Search ..... 312/214, 236; 62/451; 220/9 F

[57] **ABSTRACT**

A refrigerator comprising a cabinet having side, bottom and top walls, foamed insulation and a refrigeration system comprising an evaporator positioned at the top of one of the side walls, a molded in place groove opening toward the interior of the cabinet in which is located refrigerant lines leading to the compressor and condenser positioned beneath the bottom wall, a cover strip closing the groove on the interior side thereof for enclosing the refrigerant lines, an opening in the bottom wall through which the refrigerant lines extend to the compressor and a fluid tight seal means sealing the refrigerant lines to the bottom wall at this opening.

[56] **References Cited**  
**UNITED STATES PATENTS**  
 2,449,824 9/1948 Shoemaker ..... 62/451 X  
 3,405,986 10/1968 Cannon ..... 312/214  
 3,674,359 7/1972 Crowe ..... 312/214

9 Claims, 3 Drawing Figures



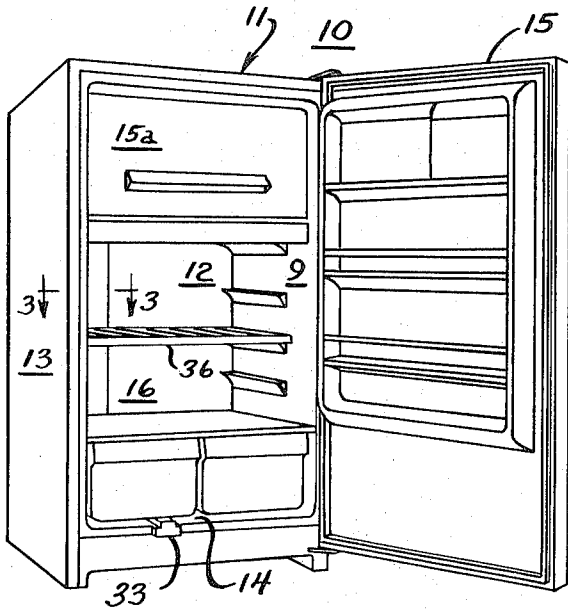


Fig. 1

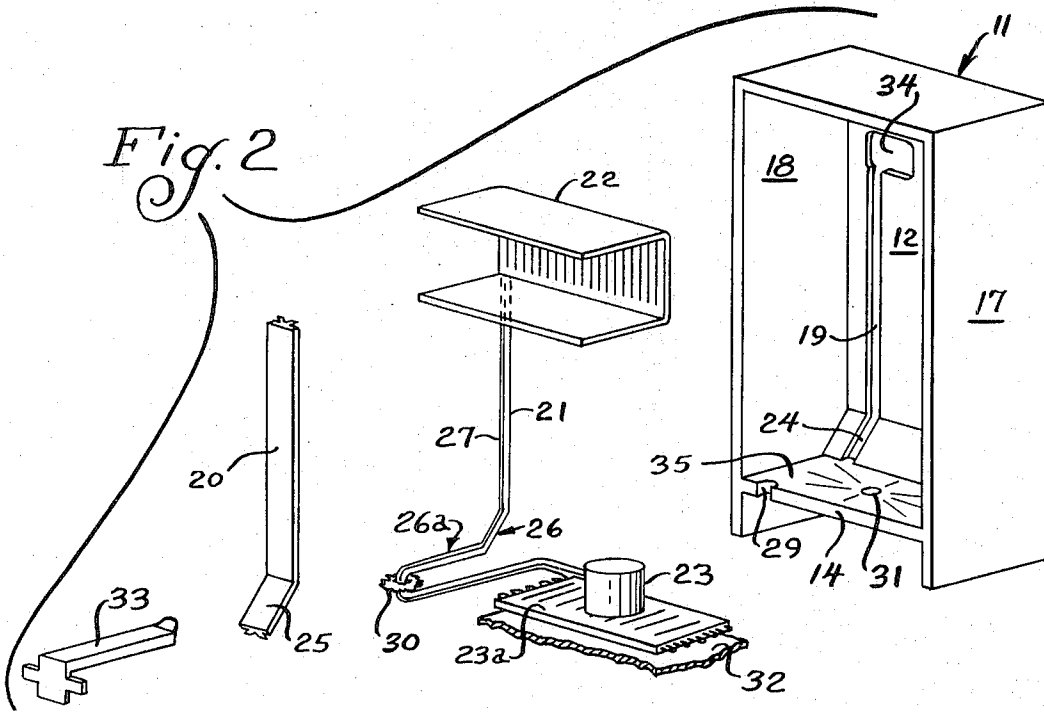


Fig. 2

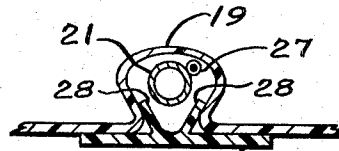


Fig. 3

## REFRIGERATOR CONSTRUCTION

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

This invention relates to cabinet constructions and in particular to cabinets having an inner liner that receives refrigerant lines within the refrigerated compartment.

#### 2. Description of the Prior Art

The most pertinent prior art of which applicant is aware are U.S. Pat. Nos. 2,449,824, 3,520,581 and 3,674,359, each of which discloses refrigerator constructions but none of which discloses the improved refrigerator construction of this invention.

### SUMMARY OF THE INVENTION

One of the features of this invention is to provide an improved refrigerator construction with foamed-in-place insulation and an interior liner having side and bottom walls, one of the side walls has a molded in groove for receiving the parts of the refrigeration system and particularly the refrigerant lines connecting the evaporator, condenser and compressor.

More specifically, the improved construction comprises a cabinet having an interior defined by walls including side and bottom walls, insulation in the cabinet, a refrigerant system including an evaporator, a condenser, a compressor, and refrigerant lines interconnecting the evaporator, condenser and compressor. A groove means in which the refrigerant lines are located is provided in the side wall opening toward the interior and a cover strip closing the groove is provided to enclose the groove and lines.

Further, means forming an opening in the bottom wall may be provided for passage of the refrigerant lines therethrough for connection to the compressor and condenser. Additionally, a second cover may be provided for the refrigerant lines that extend across the top of the bottom wall to the opening on the bottom wall.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a refrigerator embodying the invention with the front access door open.

FIG. 2 is an exploded view of the refrigeration system and the cabinet.

FIG. 3 is a horizontal sectional view taken substantially along line 3—3 of FIG. 1.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

In the illustrated embodiment the refrigerator 10 comprises a cabinet 11 having exterior steel walls 13. A customary hinged front access door 15 is provided that can be opened as shown in FIG. 1 for providing access to the interior 16 of the cabinet. A door 15a is provided within the interior 16 for access to a freezer compartment. As will be obvious to those skilled in the art, any form of such cabinet configuration is comprehended by the invention, the refrigerator cabinet configuration shown being exemplary only.

The cabinet 11 comprises a foamed-in-place insulation 17 such as solid polyurethane foam provided with a plastic inner liner 18 having side walls and a bottom wall 14. One of the side walls 12, which in this embodiment is a rear wall of the cabinet 11, is provided with a generally vertical groove 19 which is molded in place

during the molding formation of the liner 18. A recess 34 is provided above the groove 19 to allow space for the connection of the refrigeration lines to the evaporator 22. This groove 19 is adapted to be covered on the side facing the interior 16 by a vertical cover strip 20 to enclose refrigerant lines including a generally vertical suction line 21 and a capillary line 27 which form a part of the refrigeration system comprising an upper evaporator 22, the suction line 21, the capillary line 27, a compressor 23 and a condenser 23a.

As can be seen in FIG. 2 the bottom end 24 of the generally vertical groove 19 is sloped forwardly to the bottom wall 14 and the corresponding portions 25 of the cover strip 20 and 26 of the suction line and capillary line are similarly sloped so that the groove receives throughout its full vertical length the cover strip and the refrigerant line 21 and 27.

As is shown in FIG. 3 the suction line 21 and the capillary line 27 are in contact with each other within the groove 19 and therefore form a heat exchanger for reducing the temperature of the liquid refrigerant in the capillary tube 27. Also as shown in FIG. 3 the cover strip 20 contains on its inner side deformable locking strips 28 for releasably locking the cover strip in position.

The suction line 21 and capillary tube 27 extend generally horizontally beyond portion 26 as shown at 26a across the top surface of the bottom wall 14 to a front edge notch or opening 29 through which the refrigerant lines extend to the compressor 23 and condenser 23a that are located beneath this bottom wall 14. The refrigerant lines 21 and 27 are sealed at opening 29 to the bottom wall 14 with a gum sealer 30 or the like.

The bottom wall 14 is provided with a drain opening 31 with the top surface of the bottom wall 14 being sloped from the bottom of the groove portion 24 to the bottom opening 31 so that liquid condensate or liquid from the defrosting may drain toward and through the opening 31. As is shown in FIG. 2 the compressor 23 is supported in the usual manner by a bottom section 32 of the cabinet 11.

The portion 26a of the refrigerant lines which extends across the top surface of the bottom wall 14 is adapted to be enclosed by a cover 33.

The refrigerator construction of this invention has a number of new and unobvious advantages that not only provide a superior construction but one of greatly decreased cost. Thus this invention provides a foamed-in-place insulation with a plastic liner cabinet preshaped to receive a processed and sealed refrigeration system by providing a molded-in recess or groove 19 and 24 to receive the refrigerant lines and an easily installed cover strip 20 to enclose these portions 19 and 24. This not only provides very efficient mounting for the refrigeration system but also results in improved refrigerator efficiency due to the location of the heat exchanger formed by the refrigerant lines 21 and 27 within the refrigerated space or interior 16.

This invention also permits using a refrigeration system of this type without requiring removable breaker members or large access holes in the rear of the cabinet and liner. Both the removable breaker members and the large access holes of the prior structures created problems in sealing the refrigeration structure against moisture.

Another advantage is that the water vapor pressure of the refrigerator of this invention produces the de-

sired moisture migration from the heat exchanger 21 to the evaporator 22 so that the refrigerant lines are maintained dry.

The bottom wall cover or liner 35 is easily shaped to direct flowing water to a drain such as the drain opening 31 or to other disposal locations.

The refrigerator of this invention also avoids exposed liner-foam insulation-cabinet interface portions which can form the location for the collection of bacteria.

Another advantage is that the refrigerator of this invention provides a substantially smooth rear liner wall 12 so that shelving 36 can be easily installed without interference.

Having described my invention as related to the embodiment shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description, unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the appended claims.

Having described the invention, the embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A refrigerator comprising: a cabinet having an interior defined by walls including a side wall and a bottom wall, said cabinet having foamed insulation; a refrigeration system comprising an evaporator, a condenser, a compressor and refrigerant lines interconnecting said evaporator, condenser and compressor; groove means forming a generally vertical groove integral with said side wall, said groove having an open side at said interior with said refrigerant lines located in said groove; a cover strip closing said open side of the groove at said interior and enclosing said refrigerant lines; means locating said compressor beneath said bottom wall; means forming an opening in said bottom wall through which said refrigerant lines extend; and means both closing said opening and sealing said refrigerant lines to said bottom wall at said opening.

2. The refrigerator of claim 1 wherein the refrigerant lines extend across the top of said bottom wall to said opening therein and there is provided a separate cover

strip covering the portion of the refrigerant lines on said bottom wall.

3. The refrigerator of claim 1 wherein said groove has a top end adjacent the top of said side wall and in which is located a recess adjacent to which is positioned said evaporator.

4. The refrigerator of claim 1 wherein said bottom wall is provided with a drain opening adjacent said compressor with the surface of the bottom wall facing said interior being sloped from the groove toward said drain opening.

5. The refrigerator of claim 1 wherein a plastic interior liner is provided; said foamed insulation is formed in place; and said groove comprises a molded in recess in said plastic liner.

6. In a refrigerator having a cabinet; a liner within said cabinet and having a side wall and a bottom wall; insulation between said cabinet and said liner; and a processed and sealed refrigeration system including an evaporator located in said liner, a compressor and condenser located outside of said liner and a heat exchanger including a suction line and capillary line connecting said evaporator, condenser and compressor; the improvement comprising: a recess formed in the side wall of said liner dimensioned to receive said heat exchanger; a first cover means to close said recess; and a second cover means to cooperate with said first cover and said liner bottom to enclose said heat exchanger along said liner bottom wall.

7. The improvement of claim 6 wherein said liner is plastic and said side wall comprises the rear wall of said liner.

8. The improvement of claim 6 wherein said first cover means has deformable locking strip means for locking said cover in said recess.

9. The improvement of claim 6 wherein means forming an opening in said bottom wall are provided through which said heat exchanger extends; and seal means are provided for sealing said heat exchanger at said opening.

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