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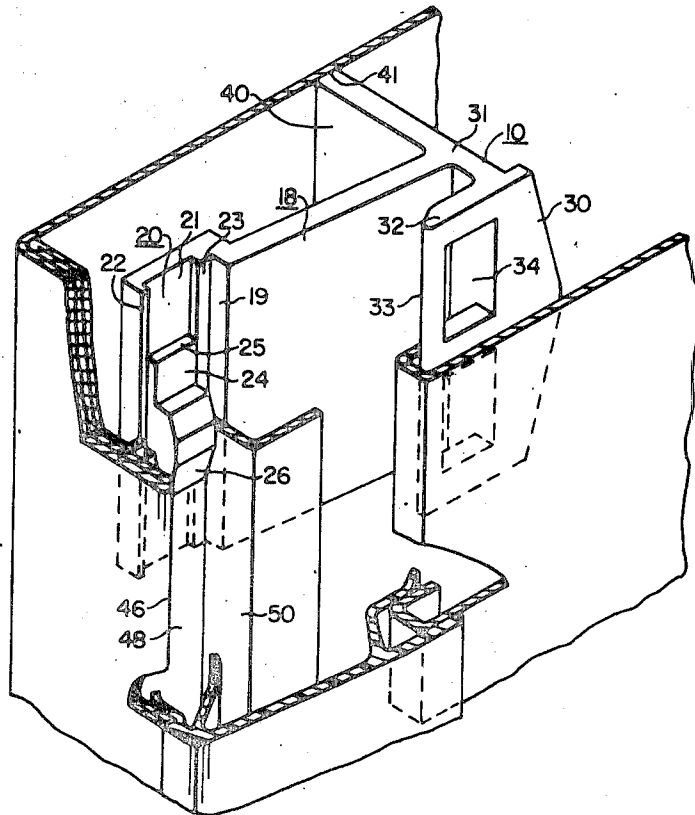
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[54] **REFRIGERATOR INNER LINER SUPPORT**
 10 Claims, 5 Drawing Figs.

[52] U.S. Cl..... 220/14,
 220/15
 [51] Int. Cl..... B65d 25/02
 [50] Field of Search..... 220/9 R, 9
 G, 14, 15, 9 F; 52/619, 620

[56] **References Cited**
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ABSTRACT: A molded plastic support for securing the inner liner of a refrigeration unit in proper disposition within the outer shell prior to being placed in a fixture for foamed-in-place insulation. The support is clipped through an aperture in the hat portion of the outer shell, and a shoulder on the support locks the clip in position. The support also has an up-standing leg portion for receiving a J-flange on the inner liner. The J-flange is crimped by a special tool into an aperture in the leg of the support so that the inner liner is securely supported in the outer shell prior to foaming.



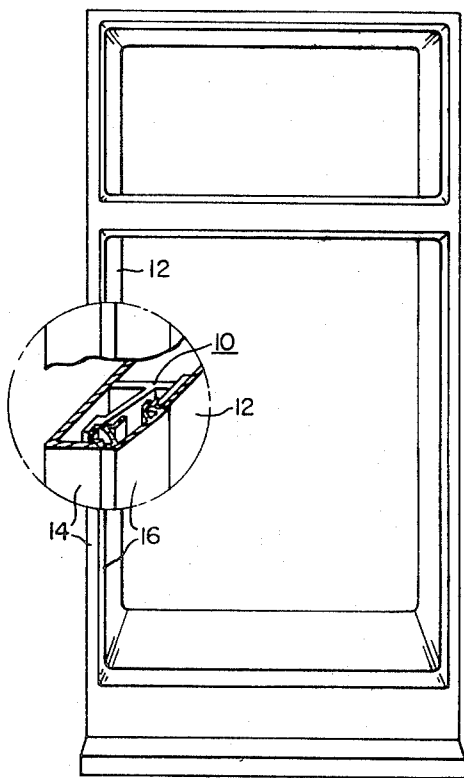


FIG. 1.

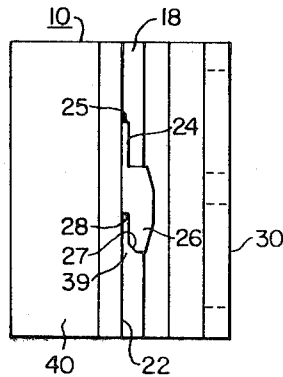


FIG. 4.

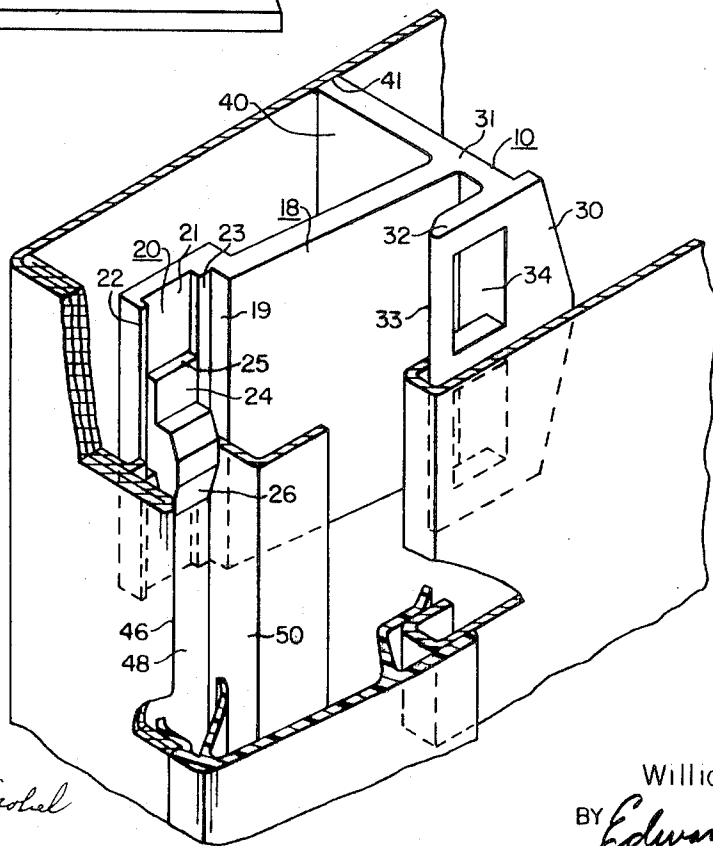


FIG. 5.

WITNESSES

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FIG. 2.

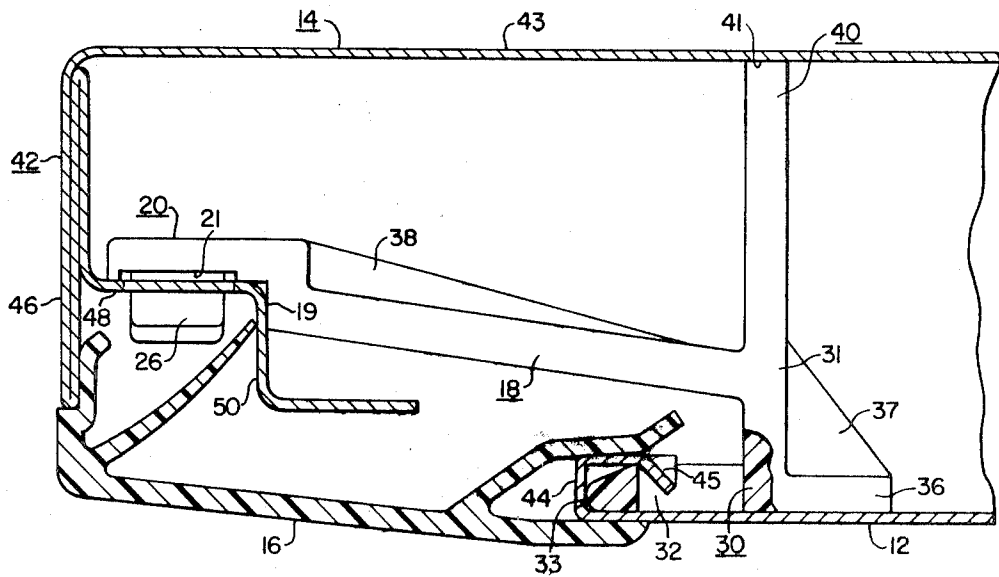
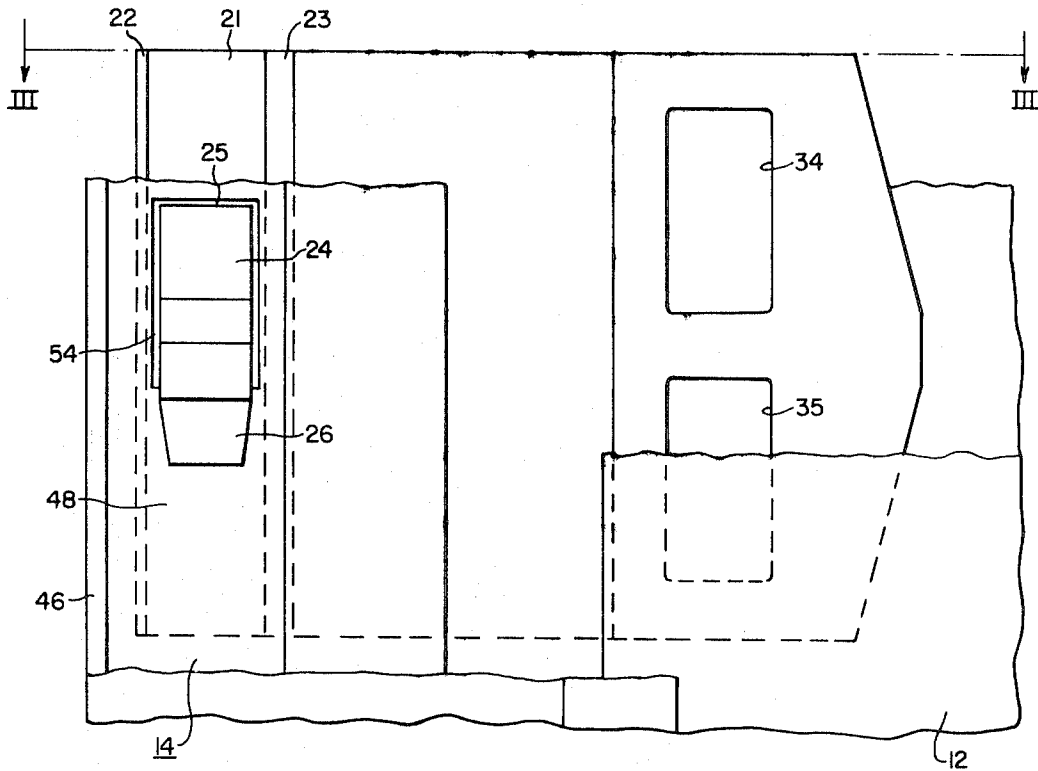


FIG. 3.

REFRIGERATOR INNER LINER SUPPORT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a support structure in a foamed-in-place refrigerator cabinet for positioning and securing the inner liner in the proper position within the outer shell prior to placing the cabinet assembly in a fixture for injecting the foam insulation.

2. Description of the Prior Art

In assembling a refrigerator as disclosed by U.S. Pat. No. 3,373,478, support means are employed to properly position and support the inner liner within the outer shell so that other components can be properly installed and the thermal breaker strips attached, completing the assembly prior to the foaming operation. After the foamed-in-place insulation has cured, it provides support for the inner liner. However, since the support is then embedded in the cured insulation it is not practical to remove the support elements. Therefore, one requirement of such a support is that it is thermally insulating so that it does not conduct the heat of the outer shell through the insulation to the refrigerated inner liner. Further, since the inner liner is initially nested within the outer shell as it lies on its back, but is subsequently placed in the upright position as it proceeds along the assembly before being placed in the foaming fixture, the support must hold the liner securely during each different position of the assembled unit.

Although other supports have been taught, such as in U.S. Pat. No. 2,997,353, the support structure that has been used by applicant's assignee has been a molded plastic support that is bolted to the hat portion of the outer shell and the flange portion of the inner liner. Such a support, although meeting the above general requirements, has been found undesirable because it requires a relatively wide flange on the inner liner to receive the bolt. The thin-walled construction of a refrigeration unit permitted by using foamed-in-place insulation requires the flanges on the inner liner to be relatively thin. Also, bolting the support in position requires holes in the liner for receiving the bolt and adds a further machining operation. Therefore, in addition to the general requirements of such supports it is a further object of the present invention to provide a support that can be used in the refrigeration unit of thin-walled construction permitting the use of thin flanges on the inner liner. Another object is to provide a support that can be securely held in place without requiring bolts or similar fastening means thereby eliminating the necessity of aligning holes in the respective flanges of the outer shell and inner liner. A further object is to provide an economical support that can be securely held on the flange on either side of the outer shell and which can quickly and easily be so attached without chance of improper assembly.

SUMMARY OF THE INVENTION

The present invention comprises a molded plastic support of low thermal conductivity which can be securely attached to the outer shell of a refrigerator cabinet through an aperture therein by clipping means at one end of the support. A shoulder on the support, adjacent the clip means, also fits within the aperture and abuts therewith to prevent inadvertent removal of the clip. A web extending inwardly from the clip means of the support terminates at the other end in an upturned leg having apertures therein. The upturned leg in assembled position, receives a narrow J-flange on the inner liner to support it in proper position. The inner liner is secured thereto by deforming those portions of the narrow flange adjacent the apertures to extend into the apertures and grip the support.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of an assembled refrigeration unit with the breaker strip partly broken away and enlarged at one point to reveal the support;

FIG. 2 is an enlarged plan view of the assembled support of FIG. 1 with portions of the liner partially broken away;

FIG. 3 is a fragmentary view of a fragmentary view of a section along line III—III of FIG. 2 showing the breaker strip in assembled position;

FIG. 4 is a top view of the support; and,

FIG. 5 is an isometric view of the support in assembled position.

10 DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, a refrigeration unit 8 is shown in assembled position prior to being placed in a fixture for injecting the plastic material for foamed-in-place insulation in a manner such as disclosed in U.S. Pat. No. 3,373,478 of common assignee. As such, the inner liner 12 is securely nested and properly positioned in the outer shell 14 by a support 10 of the present invention, the breaker strip 16 being broken away to reveal only one such support; however, a plurality of supports 10 are employed and spaced at predetermined intervals along the vertical flange sections of the inner liner 12 and outer shell 14.

The support 10 is best described with reference to FIGS. 3 and 5 and preferably comprises a molded plastic member of integrally joined parts which combine in the general configuration of the letter "J" with the base extending on both sides of the upright shank portion.

The support 10 can generally be divided into the following four sections: (1) the outer shell engaging section 20 on the upper portion of the shank; (2) the remaining portion of the shank forming connecting web means 18; (3) the inner liner supporting section 30 comprising the forwardly extending base and short upturned leg; and (4) spacing means 40 comprising the rearwardly extending base.

The outer shell engaging section 20 has a flat planar surface 21 with ribs 22 and 23 raised therefrom and extending along the surface 21 on either side of a rectangular base member 24 projecting outwardly from generally the center of surface 21 a greater distance than the height of ribs 22 and 23. Base 24 has an end wall 25 and a front wall 28 the purposes of which will be discussed later.

A portion of the base member 24 supports a tab 26 projecting over the planar surface 21 as seen in FIG. 4. The face 27 of the tab 26 adjacent the surface 21 is also spaced above ribs 22 and 23 a predetermined distance. Also, as seen in FIG. 4, face 27 is chamfered slightly providing a wider space between the top surface of the ribs 22 and 23 and the tab member 26 that generally decreases in height to a space 39 of constant height that continues to the front wall 28 of the base member 24. The sides of the tab 26 are also tapered providing a relatively narrow leading tip.

The outer shell engaging portion 20 terminates in a shoulder 19 generally perpendicular to the planar surface 21 and from which the web means 18 extend in a plane forming a small acute angle with the planar surface 21, thereby projecting the inner line supporting section 30 away from the planar surface 21. The inner liner supporting section 30 comprises a short flange 31 extending from the web means 18 in a plane generally parallel to the plane of shoulder 19, and short upstanding leg 32 adjacent the web means 18 terminating in a generally rounded upper surface 33 which is also parallel to shoulder 19. Leg 32 has a plurality of apertures 34 and 35 therethrough for reasons to be discussed later.

A rearward extension of the short flange 31 provides a spacing means 40 having a rear shoulder 41 whose function also will be discussed later. Strengthening ribs such as portion 36 of the upstanding leg 32 which extends below the short flange 31 and ribs 37 and 38 as shown in FIG. 3 are appropriately placed to give greater rigidity to the support 10.

FIGS. 2 and 3 show the support 10 in assembled position securing the inner liner 12 nested in the outer shell 14 and further show the hat portion 42 and sidewall 43 of the outer shell and the narrow J-flange 44 of the inner liner. The hat

portion 42 has a front flange 46 with a support flange 48 extending inwardly (in the direction of the inner liner) and generally perpendicular to the flange 46. Support flange 48 is further bent approximately at a right angle to form another short flange 50. Support flange 48 has rectangular apertures 54, having dimensions generally coextensive with the base member 24 of the support 10, spaced at appropriate intervals along the length thereof. Support 10 is placed in assembled position by inserting the tab 26 as facilitated by the chamfered leading tip, into aperture 54 such that the back side of flange 48 is contacting base member 24, and rear shoulder 41 of spacing means 40 is contacting the inner surface of sidewall 43. Also, shoulder 19 of the support 10 bears against short flange 50 so that support 10 is properly aligned to be moved along the support flange 48 in the direction of the projection of the tab 26. Flange 48 is cammed by the chamfered tip of tab 26 into the space 39, between face 27 of the tab 26 and ribs 22 and 23 projecting from surface 21 such that the flange 48 abuts the front wall 28 of the base member 24. At this point the height of the space 29 has narrowed to the thickness of the flange 48 and the end wall 25 of the base member 24 is aligned with aperture 54 and forced into it by the clipping action between the tab 26 and the ribs 22 and 23 on surface 21. The abutment of end wall 25 of base member 24 within the aperture 54 provides a locking shoulder limiting the movement of the support 10 in the aperture while the tab 26 and ribs 22 and 23 clip the support on the flange 48. It should be noted that ribs 22 and 23 are merely provided as an expedient in molding the support 10 to obtain the proper spacing between the tab and adjacent backing means which just as well could be the planar surface 21 if the tolerance required could be economically obtained in the mold to provide the narrow space required. However, it has been found easier and just as satisfactory to provide a relatively large space between the tab 26 and surface 21 and provide effective clipping space between the tab 26 and a backing means by ribs projecting from the surface 21 a proper distance.

The support 10 as clipped in the aperture 54 of flange 48 has its shoulder 19 bearing against short flange 50 and shoulder 41 on the spacing means 40 bearing against the inner surface of sidewalls 43.

After a sufficient number of supports have been inserted as above described, the inner liner 12 can be placed in the outer shell 14 with the narrow J-flange 44 of the liner hooking the upstanding leg 32 of the liner supporting section 30 as shown in FIG. 3. A special plier-type tool (not shown) is used to crimp those portions of the J-flange 44 overlying the apertures 34 and 35 in the leg 32 as at 45 to retain the liner on the support 10. The spacing means 40 of the support maintains the inner liner 12 a proper distance from the outer shell 14.

After securing the inner liner 12 the assembled unit can be raised to standing position for further assembly of parts prior to being placed in the insulation fixture. In such position the direction of forced on the support 10 from the weight of the inner liner changes but the support 10 is still retained on the flange 48 by clipping action between the tab 26 and backing means, in this case the ribs 22 and 23 and surface 21, and the abutment of the locking shoulder of the base member within the coextensive aperture 54 of flange 48 so that the tab can be pointed either upwardly or downwardly, permitting the support to be used on either side of the unit, and yet is securely retained in the flange 48. Also, the crimped J-flange of the inner liner 12 retains the inner liner securely on the support in standing position.

The shoulder 19 of the support bearing against the short flange 50 prevents any tendency of the support 10 to twist or rotate about the base member 24 as it supports the weight of the inner liner in the upright position, and thus eliminates any stresses from torque on the base member 24.

Thus, an inexpensive thermally insulating support is provided which securely holds the inner liner nested in the outer shell in any position encountered during assembly and which is easy to use and attach with a minimum of tools and time, and which permits the use of relatively narrow flanges for thin-walled construction of the refrigeration unit.

The support of the present invention lends itself to several modifications which do not affect its function as described. Thus the number of apertures in the short upstanding leg could be varied or indentations could be substituted for receiving the crimped flange of the inner liner rather than the apertures. Further, the base member 24 could be separated into a tab supporting front portion and a boss providing the locking shoulder. Also, the shape and placement of the strengthening ribs could be altered as desired, and, as previously discussed the backing member could be a planar surface without the raised ribs 22 and 23 of the preferred embodiment.

What is claimed is:

1. In a refrigeration unit having an outer shell and an inner liner secured therein in proper position for receiving foam insulation in the space between the walls of said shell and liner, support means for holding said inner liner in said position, said support means comprising:

clip means for engaging said outer shell;
locking means adjacent said clip means for retaining said clip means in engagement with said outer shell when said support is properly attached thereto;
inner liner supporting means for engaging a flange on said inner liner;
means in said inner liner supporting means for receiving indentations of said inner flange to retain said liner on said support; and
web means connecting said clip means to said inner liner support means.

2. The support of claim 1 wherein said clip means comprises:

backing means providing one leg of said clip;
base means projecting from said backing means; and,
tab means extending over said backing means from said base means and in a plane generally parallel to the plane of said backing means.

3. A support according to claim 2 wherein said locking means comprises:

a shoulder projecting from said backing means.

4. A support according to claim 1 wherein said inner liner supporting means comprises:

a flange extending from said web;
a leg upstanding from said flange; and,
wherein said means for receiving indentations of said inner liner flange comprises an aperture in said leg.

5. The support of claim 1 including spacer means extending from said web means for spacing said inner liner supporting means from said outer shell.

6. The support according to claim 1 comprising shoulder means adjacent said clip means for preventing rotational stress from reaching said clip means when said support is assembled in said outer shell.

7. The support according to claim 6 wherein said shoulder means joins said clip means to said web means.

8. The support means according to claim 4 comprising shoulder means adjacent the clip means for preventing rotational stress on said clip means when said support is assembled in said outer shell.

9. The support according to claim 8 wherein said shoulder connects said clip means to said web means.

10. The support of claim 9 including spacer means extending from said web means for spacing said inner liner supporting means from said outer shell.

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