Oct. 15, 1968 J. W. PULASKI 3,405,987

REFRIGERATOR CABINET CONSTRUCTION

Filed June 23, 1967

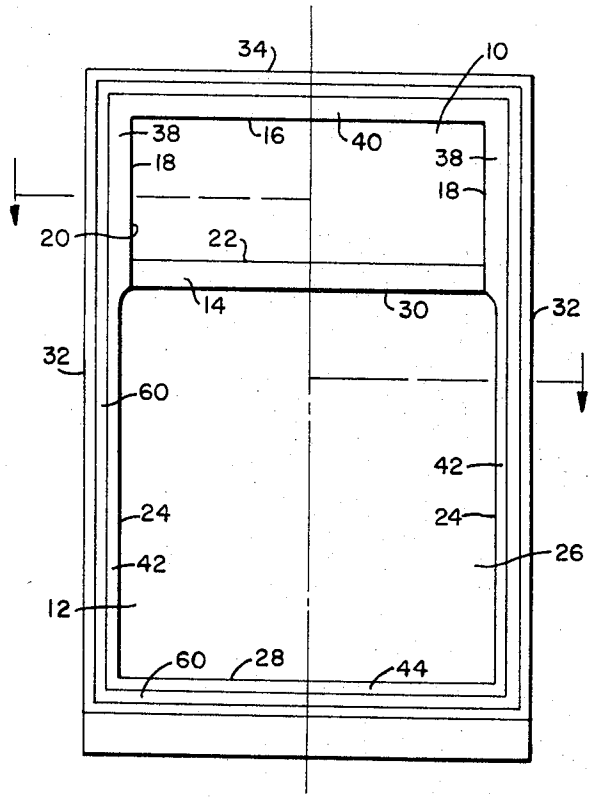


FIG. 1

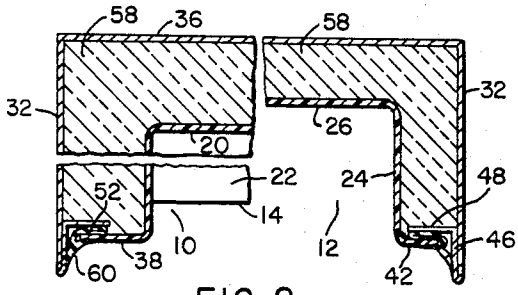


FIG. 2

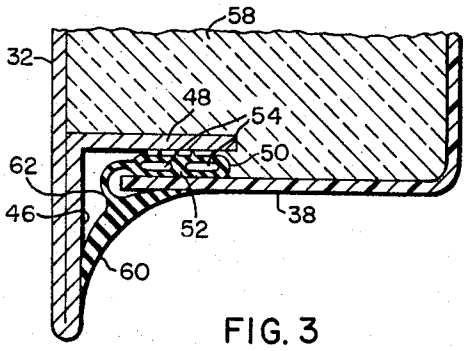


FIG. 3

WITNESSES

Helen M. Farkas

James F. Young

INVENTOR

John W. Pulaski

BY Edward C. Arens

ATTORNEY

United States Patent Office 3,405,987 Patented Oct. 15, 1968

3,405,987

REFRIGERATOR CABINET CONSTRUCTION

John W. Pulaski, Columbus, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

Filed June 23, 1967, Ser. No. 648,287
5 Claims. (Cl. 312—214)

ABSTRACT OF THE DISCLOSURE

Refrigerator cabinet structure having foamed-in-place thermal insulation, and in which an inner plastic liner has outwardly-directed peripheral flanges on its open face which serve as integral breaker strips, the flanges overlapping, in forwardly-spaced relation, inwardly-directed flanges on the outer metal shell front face, the lapping space receiving a resilient seal which compresses and effects a seal against foam leakage generally proportional to the pressure developed by the foam insulation during the foaming step.

Background of the invention

Field of the invention.—The invention pertains to the art of refrigerator cabinet structure of the type having foamed-in-place thermal insulation.

Description of the prior art

Most of the currently marketed refrigerator cabinets are built with an inner food liner nested in an outer metallic shell, both having forwardly open faces, with the gap between the forward edges of the liner and shell being closed by a series of separate thermal breaker strips. The breaker strips, typically of a plastic material to provide a relatively low rate of thermal conductivity, hide the raw edges of the liner and shell. Considerable difficulty has been experienced with leakage of the foam through the various joints when the material is foamed-in-place, which is the currently preferred mode of fabricating these cabinets.

Summary of the invention

The gist of this invention is to provide a refrigerator cabinet construction in which the liner and shell are provided with integral flange means, positioned relative to each other and resilient sealing means between the flanges, so that the degree of sealing against foam leakage is related to the pressure developed by the foam operating against the flange and sealing structure. This is obtained through lapping outwardly-directed flanges on the front face of the liner over inwardly-directed flanges on the front face of the shell, with the space between the lapping flanges receiving a resilient sealing strip, which is initially compressed to a degree by the foaming fixtures as applied. Then, as foam pressure develops in the flange area pressing the shell flange towards the lapping liner flange, the sealing strip is correspondingly compressed to effect a tighter seal. Since separate breaker strips are not used, all such joints are avoided.

The position of the integral flanges on the liner and shell and the sealing arrangement according to the invention also lends itself to a multi-compartment structure in which the insulated wall space for the freezer compartment may be thicker than that of the refrigerator compartment without the introduction of the additional joints typically encountered with a separate breaker strip system.

Drawing description

FIGURE 1 is a front elevational view of a refrigerator cabinet embodying the invention;

FIG. 2 is a broken horizontal section corresponding to one taken along the offset cutting plane II—II of FIG. 1; and

FIG. 3 is an enlarged horizontal section of a front vertical edge of the freezer compartment, this front edge being representative of all the other front edges of the cabinet.

Description of the preferred embodiment

In FIGURE 1 the front face of the refrigerator cabinet presented when the door (not shown) is opened is shown. The illustrated cabinet has an upper freezer compartment **10** and a lower refrigerator compartment **12** separated by a horizontal insulated mullion **14** which may be separate or integrally molded with the liner. The freezer and refrigerator spaces **10** and **12** are generally defined by a plastic inner liner having the general shape of a rectangular box open on the front face. The liner is nested within the outer, generally rectangular, box-shaped outer shell. The hollow spaces defined between the facing walls of the liner and shell are subsequently filled with thermal insulating material.

The walls of the freezer compartment **10** are numerically identified as top wall **16**, opposite side walls **18**, rear wall **20**, and the mullion top wall **22**. The walls of the refrigerator compartment are numerically identified as opposite sidewalls **24**, rear wall **26**, bottom wall **28** and the mullion bottom wall **30**. The outer shell walls are numerically identified as opposite sidewalls **32**, top wall **34** and rear wall **36** (FIG. 2). As shown, the liner is formed so that the freezer compartment **10** is narrower than the refrigerator compartment **12** and the hollow walls about the freezer compartment can accommodate more thermal insulation than the hollow wall space about the refrigerator compartment.

In accordance with the invention, the front edges of the liner and shell are specially formed to provide cooperating flange structure which, with the sealing means, prevents the leakage of foamed-in-place thermal insulation. To that end, the inner liner is provided with outwardly-directed flange means peripherally framing the front open face of the liner. The flange structure of the liner associated with the freezer compartment includes the opposite side flanges **38**, and the top flange **40**. The liner flanges associated with the refrigerator compartment at its sides include the narrower flanges **42** on opposite sides, and the bottom flange **44**. Each of the liner front flanges is integral with the adjacent compartment defining wall of the liner so that in the final construction these front flanges of the liner serve as breaker strips in the sense that no separate breaker strips are required.

The flange structure peripherally defining the open front face of the outer shell is formed, as best seen in FIGS. 2 and 3, to include a reversely-directed leg **46**, and an inwardly-directed leg **48** along both sides and the top and bottom. These legs **46** and **48** together define a substantially right angle inset corner which is forwardly and inwardly open.

The shell and liner are sized so that when the liner is nested within the shell with the proper spacing between the rear wall of the shell and liner, a narrow space is provided between the lapping members. FIG. 3 shows this narrow space **50** defined between liner flange **38** and shell leg **48** along a vertical edge of the freezer compartment. A similar lapping gap is defined between each of the other liner flanges and facing shell legs at the other side and top and bottom of the cabinet.

The lapping space **50** accommodates the resilient sealing means which preferably takes the form of a strip **52** provided with one or more lengthwise extending hollow cores **54** in the strip. The exterior of the sealing member

which engages either or both of the shell legs **48** or liner flanges **38** may be provided with a series of ridges **56** transverse to the direction of leakage flow. The strip is shown in substantially uncompressed form in FIG. 3 to better illustrate its structure. In addition to sealing, the strip also prevents facing contact between the legs and flanges to provide an additional thermal break.

After the inner liner has been nested in the outer shell with the seal **52** in place, between the forwardly lapping liner flange and the rearwardly lapping inwardly-directed leg of the shell, the thermal insulation **58** is foamed-in-place in the hollow wall space between the liner and shell walls. It will be understood that during the foaming and curing process the shell and liner are backed up by foaming fixtures which abut substantially all of the exposed faces of the liner and shell to prevent their deformation. The thermal insulation foams and expands to fill all of the available space between the walls, and accordingly develops substantial pressures during this process. As the foam pressure develops, the foam presses against the flange structure. Since the front face of the flange **38** is backed up, the developing pressure pushing the leg **48** toward the flange **38** results in the sealing member **52** being squeezed to provide a tighter seal. Accordingly, to the extent that foam would tend to leak in accordance with the pressure developed, this same pressure tends to tighten the seal.

It is desirable that the gap between the outer edge of the liner flange, and the face of the rearwardly directed leg of the shell be closed for the purpose of appearance. A trim gasket **60** with the cross-sectional shape shown in FIGS. 2 and 3, for example, and integrally formed with the seal member **52** may conveniently be used so that placement may be accomplished in a single step. The exemplary trim gasket there shown has a flexible section **62** integrally connecting the seal **52** to the winged portion of the gasket engaging the leg **46** and flange **38**. Of course it will be appreciated that the seal and trim gasket may, in other forms, be separate members. Further the gasket may vary considerably in shape and in its means for being secured to cover the gap between liner flange and the shell legs.

The invention is applicable to refrigerator and freezer cabinets taking various forms, irrespective of whether they are provided with separate freezer and refrigerator compartments. The representative version of FIG. 1, in which the hollow wall spaces about the freezer compartment are greater than about the refrigerator compartment, is selected because the invention lends itself admirably to this sort of structure, which normally would complicate the breaker strip system.

I claim as my invention:

1. Refrigerator cabinet construction comprising:

an outer shell including a forward open face peripherally defined by forward edge flange structure integral with said shell, said flange structure including a reversely-directed leg and an inwardly-directed leg forming an inset corner which is forwardly and inwardly open;

an inner liner nested in said shell, said liner including a forward open face peripherally framed by outwardly-directed integral flange means extending outwardly sufficiently to forwardly lap the front face of said inwardly-directed leg of said shell flange structure;

foamed-in-place thermal insulation, of the type developing substantial pressure during foaming, in the hollow wall space defined between said shell and liner; and

resilient seal means, disposed in the lapping space between said shell inwardly-directed leg and said liner flange, for effecting a seal against said foam escape in accordance with the force exerted by said foam against said flange and leg structure.

2. Refrigerator cabinet construction according to claim **1** including:

trim gasket means extending along the corner formed by said reversely-directed leg of said flange structure and the forward face of said liner flange.

3. Refrigerator cabinet construction according to claim **2** wherein:

said trim gasket means comprises an integral extension of said seal means.

4. Refrigerator cabinet construction according to claim **1** wherein:

said seal means comprises a partly hollow member.

5. Refrigerator cabinet construction according to claim **1** wherein:

said liner includes first and second compartment forming sections, said first section being of narrow width and shallower depth than said second section to serve as a freezer compartment with a substantially greater volume to receive said thermal insulation in the space between the first section liner and shell walls, than the space between the second section liner and shell walls.

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CASMIR A. NUNBERG, *Primary Examiner.*