

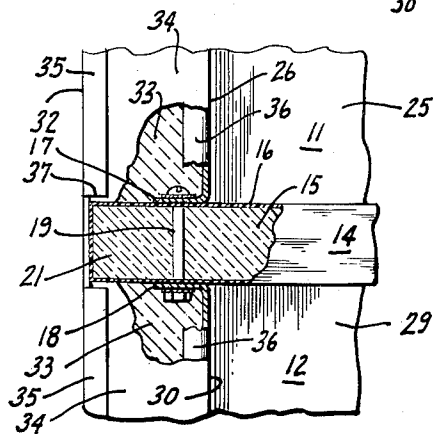
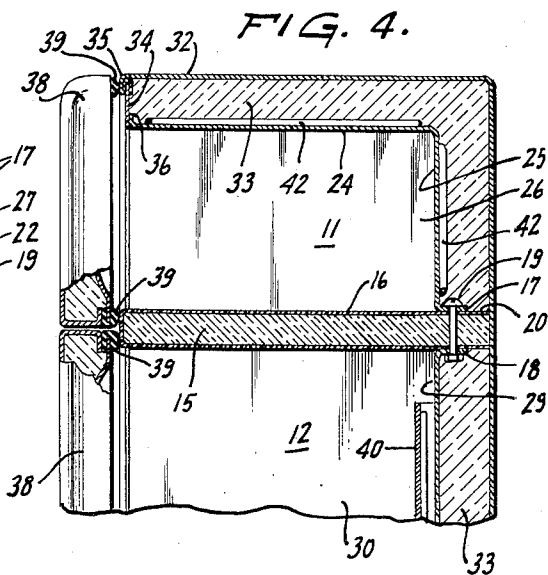
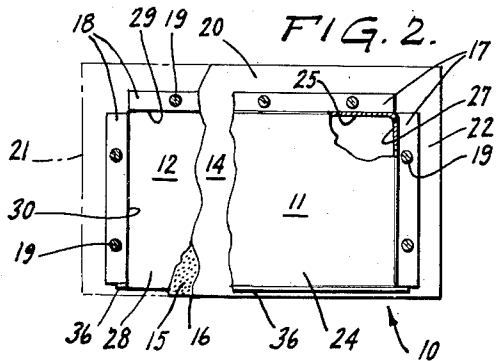
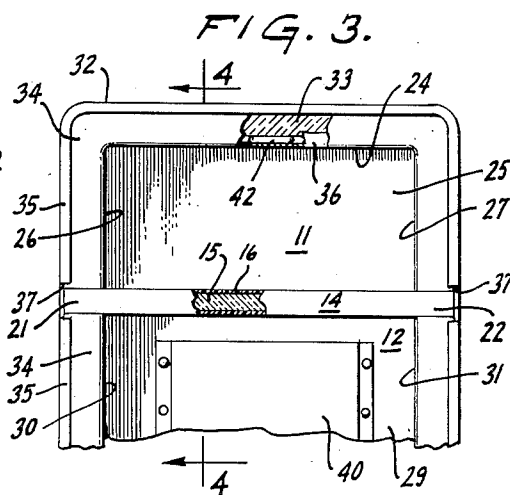
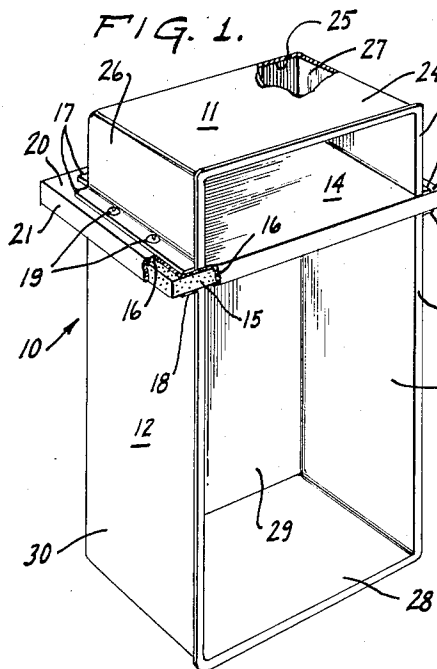
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INNER LINING ASSEMBLY FOR REFRIGERATOR CABINET

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INNER LINING ASSEMBLY FOR REFRIGERATOR CABINET

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3 Claims. (Cl. 312-214)

The present invention relates to refrigeration apparatus and, particularly, to domestic refrigerators of the general type in which provision is made for the storage and preservation of frozen food, as well as for the storage and preservation of non-frozen fresh food.

More specifically, the invention has to do with improvements in cabinet construction for domestic refrigerators of the variety mentioned above. These improvements principally reside in the provision of a novel inner liner structure adapted to outline the interior of a refrigerator cabinet and to define therein two separate and distinct refrigerating zones isolated from each other as to both thermal and vapor transfer.

To insure proper and adequate refrigeration of various kinds of foods, it is customary to provide the interior of a domestic refrigerator cabinet with a freezing compartment and with a non-freezing or cooling compartment. The freezing compartment is maintained within a sub-freezing temperature range (for example $+5^{\circ}$ to -10° F.) to provide a dry-cold zone in which food is frozen and kept in frozen condition. The cooling compartment is maintained within a non-freezing temperature range (for example $+34^{\circ}$ to $+40^{\circ}$ F.) to provide a moist-cold zone in which fresh food is refrigerated without freezing. The provision of these two compartments has brought about complications in the construction of the refrigerator cabinet. Moreover, the temperature-humidity difference which exists between said compartments has given rise to difficulties and problems especially with respect to adequately preventing migration of warmer moist air to the colder zone where moisture from such air accumulates in the form of frost on the walls of the freezing compartment and permeates the insulation surrounding the compartments.

It is a main object of the invention to overcome the above noted complications, difficulties and problems. To that end the invention provides an improved and novel structure adapted to define adjacent freezing and non-freezing compartments in a domestic refrigerator cabinet, and also capable of establishing a barrier to the flow of most air to the colder or freezing zone.

Broadly, the objectives and advantages of the invention are realized by dividing an inner liner for a refrigerator into separate complementary sections and by interposing a partition of moisture-impervious heat-insulative material between the confronting marginal portions of said sections. These liner sections and the partition therebetween are interconnected rigidly to constitute a unitary structure adapted for placement within the outer shell of a refrigerator cabinet.

According to the invention, one side of the partition forms a wall of the freezing compartment the remaining walls of which are provided by one of said sections, and the other side of the partition forms a wall of the non-freezing compartment the remaining sides of which are provided by the other of said sections. In the preferred embodiment, the partition projects beyond the walls of the liner sections and are extended to terminate adjacent the outer shell so that said partition further serves to isolate the space surrounding one of said sections from the space surrounding the other of said sections.

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The novel features of the invention and the manner in which the above noted and other objectives and advantages are best achieved, will clearly appear from the following description of the embodiment illustrated in the accompanying drawing, in which:

FIG. 1 is a perspective view of a lining unit constructed and assembled in accordance with the present invention, certain portions being broken away for purpose of illustration;

FIGURE 2 is a top plan view of the unit shown in FIGURE 1 with portions of said unit cut away to show cooperatively associated parts thereof;

FIGURE 3 is a front elevation of a portion of a domestic refrigerator cabinet incorporating the invention;

FIGURE 4 is a vertical sectional view on an enlarged scale, taken substantially on line 4-4 of FIGURE 3, and including the access doors which are shown partly in elevation and partly in section; and

FIGURE 5 is an enlarged fragmentary view of the cabinet portion illustrated in FIGURES 3 and 4.

Referring more particularly to the drawing, the structure which in accordance with the invention constitutes an inner liner for a refrigerator cabinet, is shown in greater detail in FIGURES 1 and 2. This structure comprises a generally rectangular box-like unit 10 which consists of two similarly shaped complementary sections 11 and 12, and a partition 14 in the form of a generally rectangular member interposed between said sections and cooperating therewith to define two separate and distinct refrigerating compartments. Both sections 11 and 12 are constructed of metal of high heat conductivity and preferably provide walls which can be chilled to cool the air within said compartments, whereas the partition 14 is constructed of a rectangular core 15 reinforced by a covering 16, said core consisting of a piece of impermeable insulative material such as foamed or expanded polystyrene, and said covering consisting of a sheet of plastic such as extruded polystyrene.

As seen in the drawing, the partition 14 constitutes a structural member of the lining structure and, as such, is rigidly clamped between confronting edge portions of the sections 11 and 12. For that purpose said sections 11 and 12 are provided with lateral flanges 17 and 18, respectively, and suitable fastening means, such as bolts 19 serve to draw said flanges tightly against the partition and to unite said partition and sections into a rigid unitary assembly. In this arrangement, one side of said partition forms a closing wall for the compartment outlined by the section 11, whereas the other side of said partition forms a closing wall for the compartment outlined by the other section 12.

When the assembled liner unit 10 is mounted within a refrigerator cabinet, the partition 14 also isolates the space surrounding the exterior of the section 11 from the space surrounding the exterior of the section 12. For that purpose, the partition 14 has three marginal edge portions 20, 21 and 22 which project laterally beyond the flanges 17 and 18 of said sections 11 and 12 to abut adjacent walls of the refrigerator cabinet.

It will be understood that an inner liner unit constructed in accordance with the present invention as described above, may be utilized to outline the interior of various types of two-temperature refrigerators, and that it is merely by way of example that the drawing illustrates an embodiment which utilizes such a liner in an upright open-front refrigerator wherein the frozen compartment is disposed above the non-frozen compartment. In this illustrated embodiment, the section 11 defines the upper freezing compartment and has a top wall 24, a rear wall 25 and two side walls 26 and 27, whereas the section 12 defines the lower non-freezing compartment and has a bot-

tom wall 28, a rear wall 29 and two side walls 30 and 31. As seen in the drawing the upwardly facing side of the partition 14 provides the bottom wall for the section 11, whereas the downwardly facing side of said partition provides the top wall for the section 12.

The cabinet of the illustrated refrigerator comprises an outer shell 32 into which the liner unit 10 is received. Suitable insulation 33 fills the space between said outer shell and the inner liner sections 11 and 12, the marginal edge portions 20, 21 and 22 of the partition 14 forming a barrier separating the insulation about the section 11 from the insulation about the section 12. Breaker strips 34 of low thermal conductivity bridge the gap between the outer shell 32 and the inner liner unit 10. As shown these breaker strips are retained in position through engagement with a reversely bent portion 35 about the forward edges of the outer shell and with a ledge 36 about the forward edges of the sections 11 and 12. In order to provide for passage of the laterally extended marginal portions 21 and 22 of the partition 14 into the outer shell 32, the bent portion 35 has cut-outs 37 (FIGURES 3 and 5) at the points where said portion would otherwise interfere with placement of the inner liner unit within said outer shell through the open front thereof. This open front which gives access to the two compartments defined by the sections 11 and 12, is closed by means of doors 38 of usual construction including gaskets 39 arranged to contact front edge portions of the outer shell and of the partition 14 thus to provide a seal between said doors and their associated compartments.

In the particular embodiment shown, the lower compartment defined by the liner section 12 is cooled and maintained at non-freezing temperatures by means of an evaporator plate 40 of the conventional design and supported in a vertical position on the rear wall 29 of said section 12, and the upper compartment defined by the liner section 11 is cooled and maintained at freezing temperatures by means of evaporator tubing 42 arranged in intimate heat exchange relation with the top wall 24 and also with the rear wall 25 and side walls 26 and 27 of said section 11.

From the foregoing description, it will be appreciated that the invention makes possible the provision of a simple two-temperature refrigerator cabinet wherein a structural element or member of the two-compartment liner serves as a barrier which not only prevents migration of moisture from the non-freezing moist-cold compartment to the freezing dry-cold compartment, but which also prevents migration of moisture from the space surrounding said moist-cold compartment to the space surrounding said dry-cold compartment.

Although a preferred embodiment has been shown and described, it will be understood that the invention is not limited to the specified structural details of this embodiment, but that the invention embraces such changes and modifications as may come within the scope of the sub-joined claims.

What I claim is:

1. In combination with a refrigerator outer shell having side and back walls, an inner lining assembly mountable in said outer shell to provide therein two separate insulated compartments adapted to be cooled at relatively different temperatures, said assembly comprising a generally rectangular partitioning member constructed of moisture-impervious heat-insulative material adapted to span the interior of said outer shell with marginal edges of said member lying adjacent the mentioned side and back walls of said outer shell, an inner liner section arranged on one side of said partitioning member and defining one of the mentioned compartments, another inner liner section arranged on the other side of said partitioning member and defining the other of the mentioned compartments, said sections being spaced inwardly from said edges of said partitioning member and being disposed in positions in cooperate with the outer shell walls aforesaid to define insulation receiving spaces between such walls and each of said sections, and securing means rigidly connecting said liner sections and partitioning member together for mounting, as a unitary structure, within said outer shell.

2. An inner lining assembly as set forth in claim 1, in which the mentioned partitioning member consists of a core of insulative foamed material having a re-enforcing covering of insulative sheet material.

3. An inner lining assembly as set forth in claim 1, in which the mentioned means includes lateral flanges on each of the mentioned liner sections, the mentioned partitioning member being sandwiched between said flanges, and fastening elements engaging said flanges and drawing the same into clamping engagement with said partitioning member.

References Cited in the file of this patent

UNITED STATES PATENTS

868,316	White	Oct. 15, 1907
2,133,951	Ashbaugh	Oct. 25, 1938
2,217,222	Hall	Oct. 8, 1940
2,481,616	Richard	Sept. 13, 1949
2,509,612	Philipp	May 30, 1950
2,725,271	Cunningham	Nov. 29, 1955
2,902,328	Aver	Sept. 1, 1959