

April 12, 1955

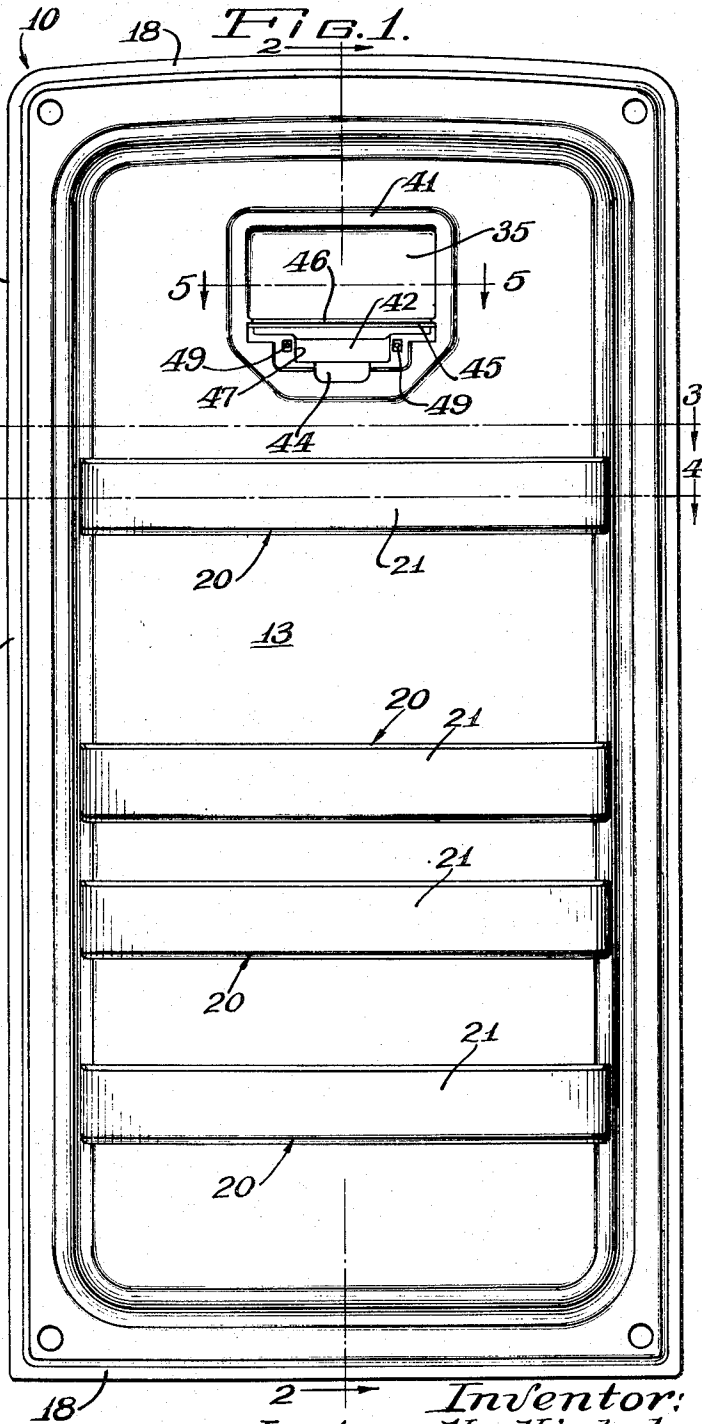
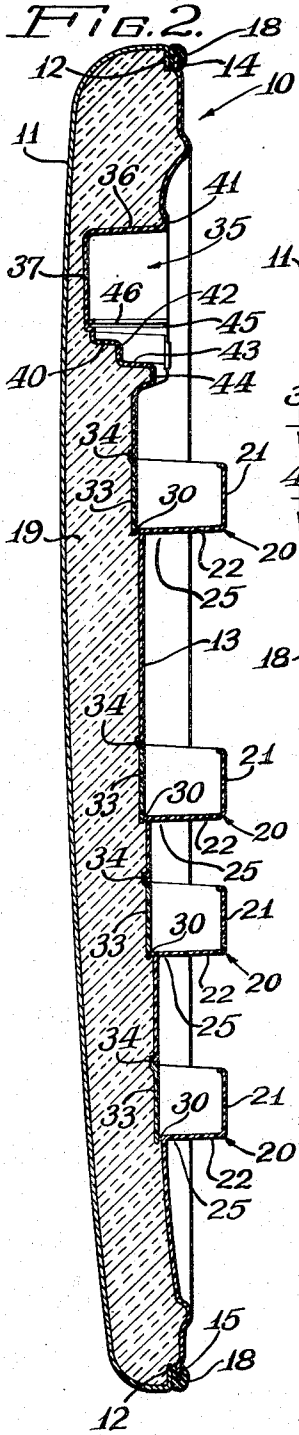
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2,706,140

INNER LINER FOR REFRIGERATOR DOOR

Filed May 3, 1952

3 Sheets-Sheet 1



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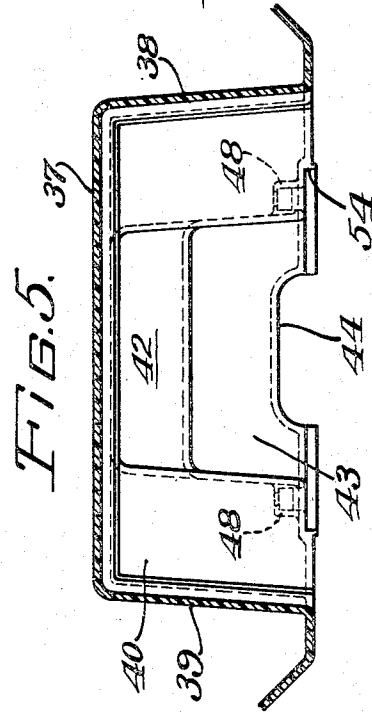
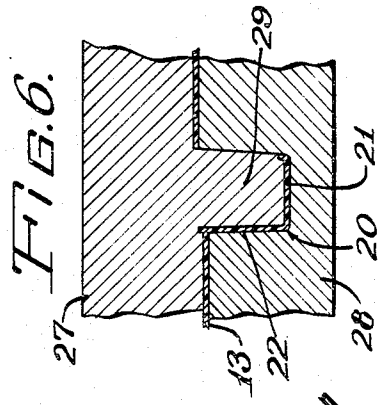
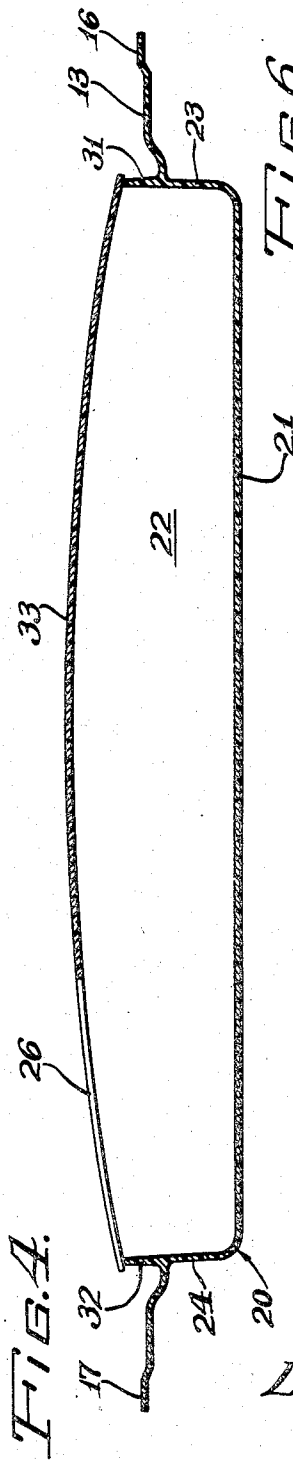
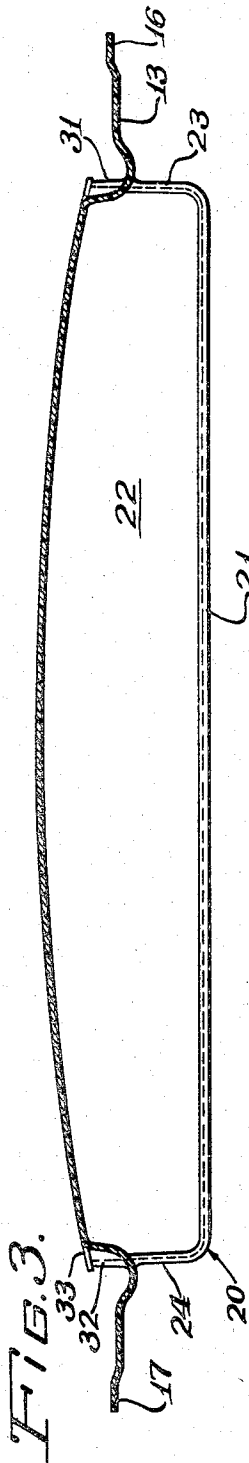
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INNER LINER FOR REFRIGERATOR DOOR

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3 Sheets-Sheet 2



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FIG. 7.

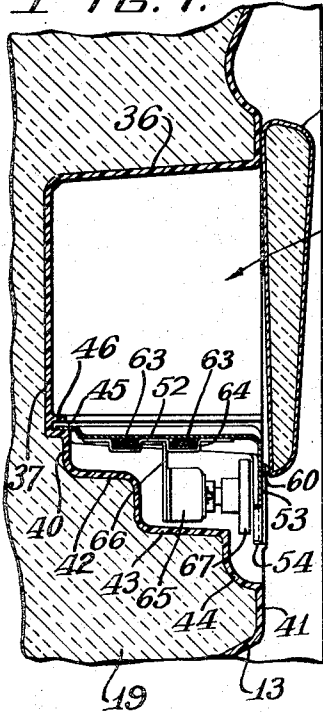


FIG. 8.

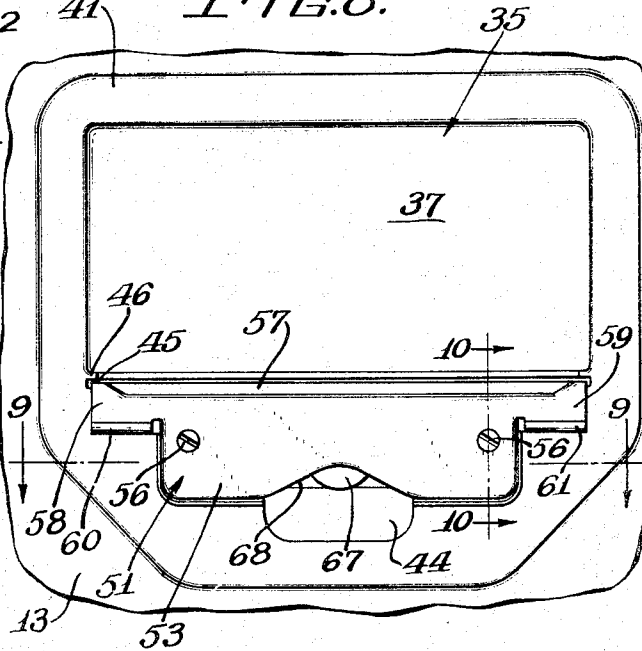


FIG. 10.

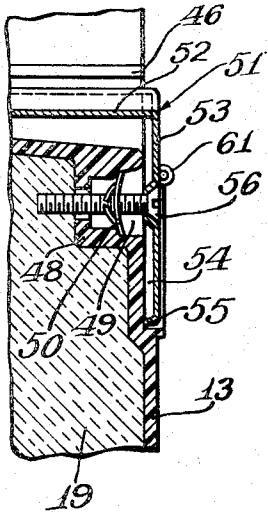
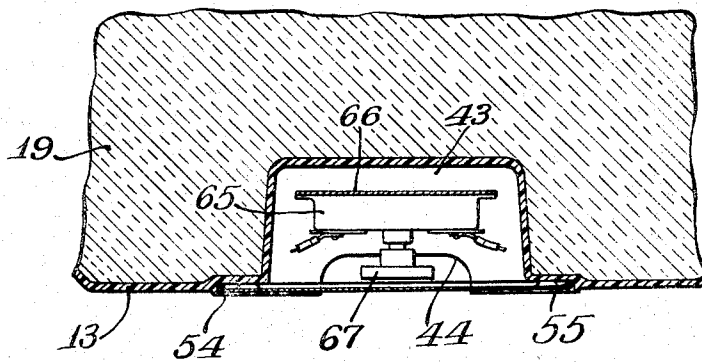


FIG. 9.



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INNER LINER FOR REFRIGERATOR DOOR

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2 Claims. (Cl. 312—214)

This invention relates generally to a door structure and more particularly to a door structure which is adaptable for use on a conventional type household refrigerator cabinet.

It is common in the art to provide the inner surface of a refrigerator compartment door with shelves on which food articles may be stored whereby they will be readily accessible for removal therefrom upon opening of the door. Another feature of the more up-to-date household refrigerators is a butter conditioner mounted on the inner surface of the refrigerator door. This door usually comprises an outer pan and an inner liner spaced therefrom with insulating material therebetween. The inner liner may be constructed from plastic, metal or other suitable material and the shelves and butter conditioner are generally fabricated separately and then fastened to the inner liner. Such a structure is expensive to manufacture and has been resorted to only because no better method has been devised for fabricating the door.

One object of the present invention is to provide a refrigerator door having food storage shelves and a butter conditioner disposed on the inner surface thereof.

Another object of the present invention is to provide a refrigerator door comprising an outer pan and an inner liner spaced therefrom with insulating material therebetween.

Another object of the present invention is to construct the inner liner with the shelves and butter conditioner formed on an integral part thereof.

Another object of the invention is to provide the inner liner with openings behind the food storage shelves so that the liner can be more easily fabricated by the use of simplified dies or jigs.

Another object of the invention is to provide inserts for covering the openings located in back of said shelves.

Another object of the invention is to provide the inner liner with a recessed portion which is adaptable for use as a butter conditioner.

Another object of the invention is to provide the recessed portion with a groove which is adapted to receive a plate to which a heating element may be attached for maintaining the recessed portion at a desired temperature.

Other objects and various features of novelty and invention will be hereinafter pointed out or will become apparent to those skilled in the art.

In the drawings, which show for illustrative purposes only a preferred form of the invention:

Fig. 1 is an elevational view of a refrigerator door embodying the present invention;

Fig. 2 is a vertical sectional view taken along line 2—2 of Fig. 1;

Fig. 3 is an enlarged horizontal sectional view taken along line 3—3 of Fig. 1;

Fig. 4 is an enlarged horizontal sectional view taken along line 4—4 of Fig. 1;

Fig. 5 is an enlarged horizontal sectional view of the butter compartment taken along line 5—5 of Fig. 1;

Fig. 6 is a cross sectional view of a portion of the dies used in forming a shelf of the inner liner of the door;

Fig. 7 is an enlarged vertical sectional view of the butter compartment with the elements thereof shown in assembled position;

Fig. 8 is a front elevational view of the butter compartment of Fig. 7 with the door thereof removed;

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Fig. 9 is a horizontal sectional view taken along line 9—9 of Fig. 8; and

Fig. 10 is an enlarged sectional view taken along line 10—10 of Fig. 8.

Referring to the drawings for a detailed description of the invention, Fig. 1 illustrates a rear view of a door 10 particularly adaptable for use in a vertical type household refrigerator cabinet. As viewed in Fig. 1, the observer sees the rear or inner portion of the door which would be located adjacent the cabinet when the door is in closed position. The door 10 comprises an outer wall or pan 11 which is preferably constructed from metal and is provided with bent in edge portions 12 along all four edges. An inner wall or liner 13 extends parallel to the vertical portion of outer pan 11 with the edges 14, 15, 16 and 17 thereof secured to the inturned edge portions 12 of the outer pan 11 by any suitable means. A sealing gasket 18 clips over the edges of the inner liner 13 and functions to seal around the door 10 when it is in closed position. The space formed between the outer pan 11 and inner liner 13 is filled with an insulating material 19.

The inner liner 13 is curved inwardly from the edges thereof toward the outer pan 11 and is provided with four spaced apart shelves 20. Each shelf comprises a front wall 21, bottom wall 22 and side walls 23 and 24. A strengthening rib 25 may be formed between the bottom wall 22 and the vertical portion of the inner liner 13 in order to give the shelves 20 added rigidity and strength.

It is common in the art to construct such inner liners from sheet metal or a plastic material. The plastic inner liners are generally preferable in that they are more economical to manufacture and present a better appearance. It is contemplated that the inner liner 13 of the present invention be molded from plastic by the use of molding dies. In order to provide an inner liner which will be economical to manufacture, it is desirable to form the shelves 20 as an integral part thereof. Of course, if the inner liner 13 were made solid with the shelves 20 projecting therefrom a complicated die insert would be required for the formation of each shelf. The illustrated inner liner 13 is formed with a longitudinal hole or slot 26 located rearwardly of each shelf 20 whereby a portion of one of the dies for forming the shelf may project therethrough. Fig. 6 illustrates a pair of molding dies 27 and 28 between which the inner liner 13 may be molded. The upper die 27 is provided with a projecting portion 29 which extends into a pocket provided in lower die 28 and which cooperates therewith to form the shelf 20. This eliminates the necessity of die inserts and permits the inner liner to be molded by the use of simplified dies.

The slots 26 located rearwardly of each shelf 20 are generally rectangular in shape and are substantially the same size as the projected area of the inner side of the front wall 21 of each shelf 20. A portion of the panel 33 is shown as removed in Figure 4 to show a portion of one slot 26. A horizontal rib 30 and two vertical ribs 31 and 32 project from the inner side of the inner liner 13 oppositely from bottom wall 22 and side walls 23 and 24 respectively. The inner edges of these ribs are located in a common vertical plane which is an extension of the outer surface of the inner liner immediately above each shelf 20. A panel or insert 33 is positioned over each slot 26 with an offset upper edge 34 fitting over the top edge of the slot and the other edges thereof abutting the projecting ribs 30, 31 and 32. Each insert 33 is permanently attached thereto by a suitable cement or other appropriate means. The inserts 33 are contoured to blend in with the general shape of the inner liner 13 whereby they provide a finished appearance to the inner liner.

Spaced above the top shelf 20 is a butter conditioner or compartment designated generally by reference figure 35. Figures 1, 2 and 5 show the compartment 35 before the elements comprising the completed conditioner are assembled therein. It is contemplated that the inner liner 13 be molded with the compartment 35 an integral part thereof. The compartment 35 comprises an upper wall 36, rear wall 37, side walls 38 and 39, and a bottom

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wall 40. The inner liner 13 is provided with a raised portion 41 which extends completely around the compartment 35. The central portion of the bottom wall 40 is provided with a stepped portion 42, a horizontal base portion 43 and a depressed vertical portion 44 which extends below the base portion 43. A groove 45 is formed between an upper rib 46 and bottom wall 40 and extends along side walls 38 and 39 and rear wall 37. A slot 47 is provided in inner liner 13 which conforms with the width of base portion 43. Projections 48 are spaced along each side of slot 47 and extend outwardly from the inner side of the inner liner 13 as seen in Fig. 10. Each projection is provided with an opening 49 therethrough in which a fastener 50 is secured.

A metallic plate 51 having a horizontal portion 52 and a downwardly extending vertical portion 53 is assembled in the compartment 35 as best seen in Figures 7-10. The rear edge and side edges of the horizontal portion 52 are received within the groove 45 with the vertical portion 53 extending over a recessed portion 54 of the inner liner 13. The vertical portion 53 is provided with inturned edges 55 which abut the recessed portion 54 and two spaced apart screws 56 extend through the vertical portion 53 and thread into the fasteners 50 whereby the plate 51 is held securely in position. The horizontal portion 52 has a downwardly extending depressed portion 57 on which a tray or container may be positioned. The vertical portion 53 of the plate 51 is provided with extensions 58 and 59 along each edge thereof. The lower edge of each of the extensions 58 and 59 is provided with hinge butts 60 and 61 respectively to which a door 62 is adapted to be rotatively secured. Electric heating elements 63 are secured to the under side of plate 51 by suitable clip means 64. A control element or rheostat 65 is fastened to the plate 51 by an L shaped bracket 66 and is provided with a control knob 67. The lower edge 68 of the vertical portion 53 is curved upwardly whereby the lower portion of the knob 67 is exposed. It is contemplated that heating elements 63 and control element 65 be connected to a power source by a suitable electrical circuit (not shown).

The heating elements 63 and control element 65 may be assembled to the plate 51 prior to the insertion of the edges of the plate 51 into the groove 45. If servicing of these elements is required after the door has been put into use, the plate 51 can be easily removed by simply loosening the screws 56 and sliding the plate from the groove 45. Thus it can be seen that the structure is one that can be quickly and easily assembled and disassembled.

The heating elements 63 will heat the plate 51 whereby the compartment 35 will be maintained within a desired temperature range. The control mechanism 65 will operate to regulate the flow of current to the heating elements 63 so that the proper amount of heat will be transferred to the compartment 35. The knob 67 can be easily set by an operator placing a finger into depressed portion 44 and rotating the knob to a desired position. Details of the control mechanism 65 are not shown but it is to be understood that it could be any one of the temperature responsive type controls which are available on the market today. Butter which is to be stored within compartment 35 may be placed directly

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on the horizontal portion 52 of the plate 51 or may be inserted in any suitable container which is then placed within the compartment 35. The compartment door 62 will seal the butter compartment 35 from the refrigerator cabinet and prevent transfer of heat therebetween.

From the foregoing it can be seen that a refrigerator door is provided in which several novel features are incorporated. By constructing the inner liner 13 with the slots 26 behind the shelves 20, it is possible to mold the liner without the use of complicated die inserts. The butter conditioner compartment 35 is formed as an integral part of the inner liner 13 and the other elements of the butter conditioner can be assembled therein with a minimum amount of labor. The inner liner is neat in appearance and is particularly adaptable for a refrigerator cabinet. Although only one preferred form of the invention has been shown and described in detail, it will be apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. In a refrigerator door structure, an inner liner having a storage shelf formed as an integral part thereof and projecting from the outer side thereof, said shelf comprising a bottom wall and a front wall which is spaced from said inner liner, said inner liner being formed to have an opening rearwardly of said front wall, said opening having an upper edge, a lower edge and side edges, ribs formed as an integral part of and projecting from the inner side of said inner liner adjacent said side edges and said lower edge, said ribs terminating in a plane common to the outer side of said inner liner immediately above said opening, a panel positioned over said opening with the edges thereof abutting said ribs, said panel being provided with an offset portion which overlaps the upper edge of said opening, and means for securing said panel to said ribs and said upper edge.

2. In a refrigerator door structure, an inner liner which is adapted to be fabricated between simple dies, said inner liner comprising a panel having an opening formed therethrough, a shelf integrally formed on said panel and having a bottom wall, a front wall and a pair of end walls, the upper surface of said bottom wall positioned along the lower marginal edge of said opening and normal to said panel, the inner surfaces of said end walls being positioned along the end marginal edges of said opening and normal to said panel, said pair of end walls and said front wall formed to have a height no greater than the height of said opening, ribs projecting from the rear side of said inner liner adjacent the edges of said opening, and a second panel covering said opening and secured at the edges thereof to said ribs.

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