Nov. 10, 1953 F. R. ECK 2,658,727

SHELF AND CONTAINER FOR REFRIGERATOR CABINETS

Filed July 16, 1951 2 Sheets-Sheet 1

FIG. 1

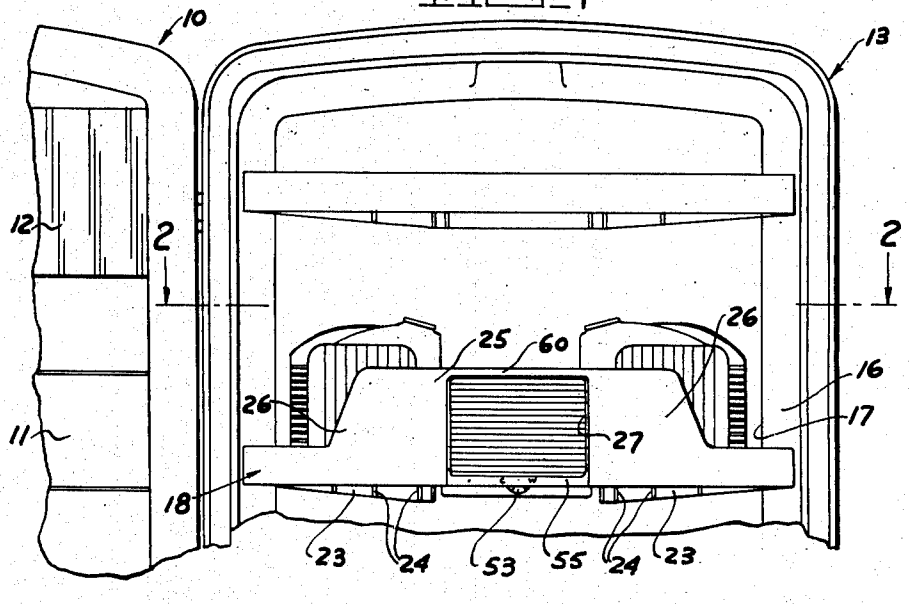


FIG. 8

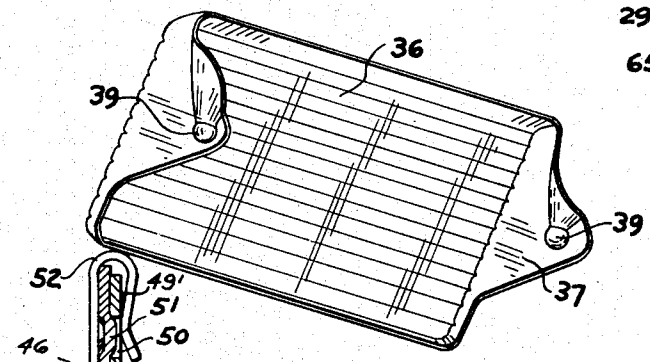
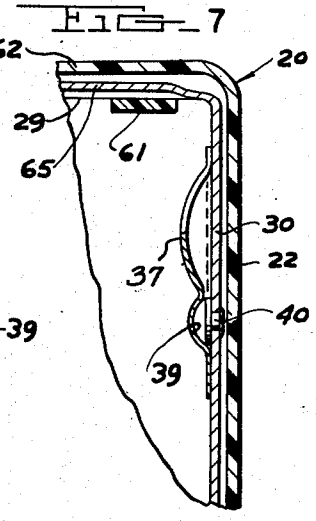


FIG. 7



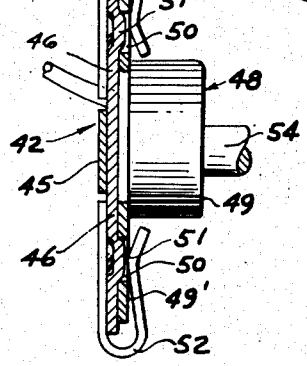
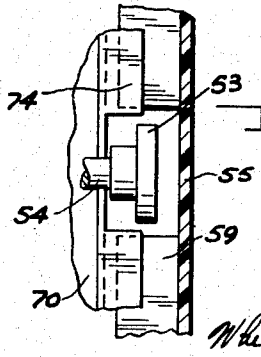


FIG. 6

FIG. 5



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SHELF AND CONTAINER FOR REFRIGERATOR CABINETS

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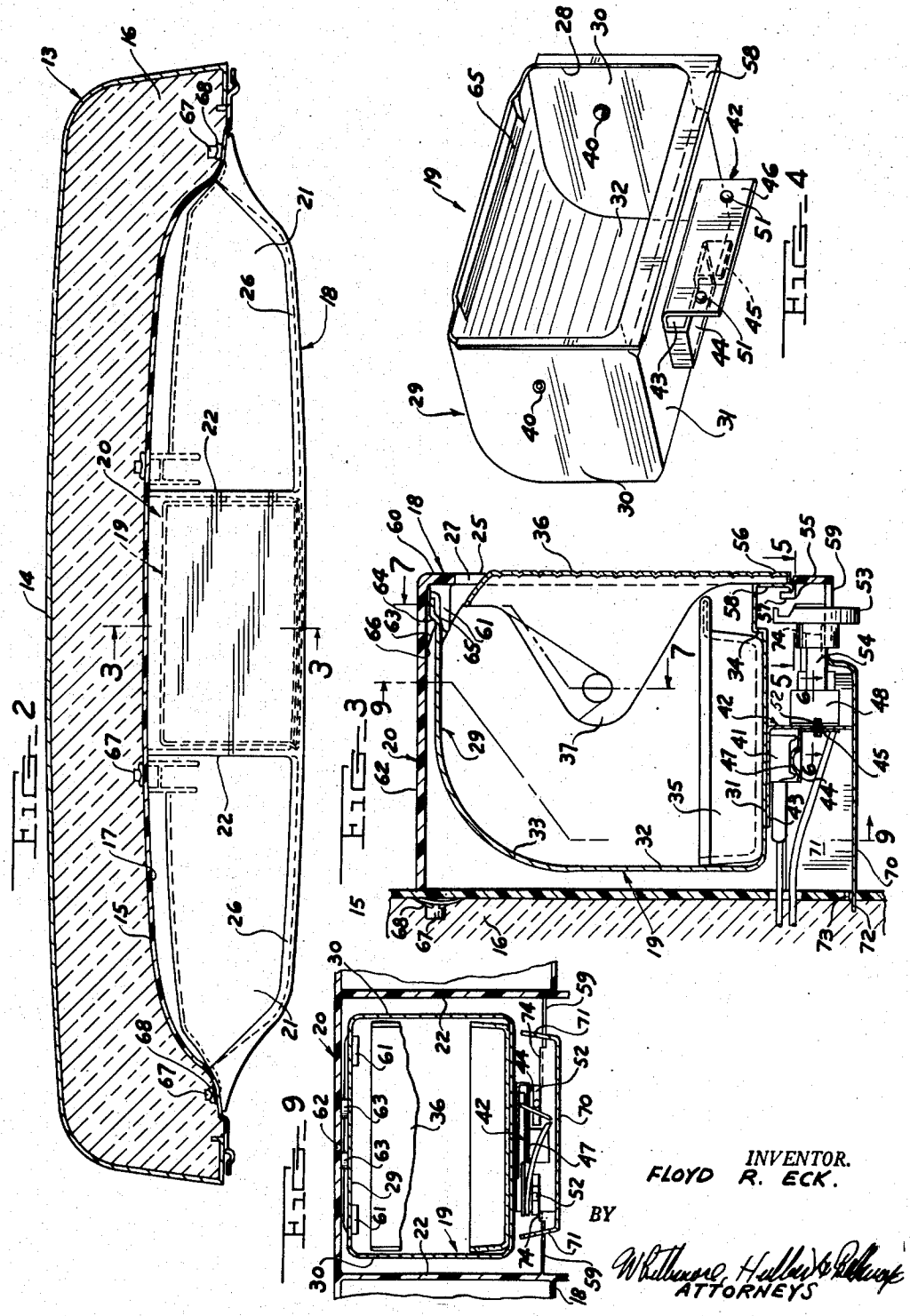


FIG 2

FIG 4

FIG 3

FIG 9

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SHELF AND CONTAINER FOR REFRIGERATOR CABINETS

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13 Claims. (Cl. 257—3)

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This invention relates generally to refrigerator cabinets of the type having a door and a refrigerated compartment.

It is an object of this invention to locate within the refrigerated compartment of the cabinet a container having provision for maintaining the contents thereof at a predetermined temperature above that existing within the refrigerated compartment. Thus for example butter may be maintained at the preferred spreading temperature even though the temperature within the refrigerated compartment is maintained far below the spreading temperature.

It is another object of this invention to support the container on a shelf having an inverted substantially U-shaped portion for receiving the container and having horizontal portions on which articles to be cooled may be supported.

It is still another object of this invention to provide an upstanding wall at the front edge of the shelf having an opening providing clearance for the closure of the container and constructed to serve as a retainer to maintain articles on the shelf.

It is a further object of this invention to support the shelf on the inner door panel which may be bowed in a direction toward the outer panel of the door to provide a recess for receiving at least a portion of the shelf.

It is a still further object of the invention to provide a shelf of the above general type molded or otherwise produced in one piece from a suitable plastic, for example.

It is another object of this invention to removably support the container within the inverted U-shaped portion of the shelf on the inner door panel in a manner such that air in the refrigerated compartment may pass upwardly through the open bottom of the U-shaped portion and circulate around the container.

It is still a further object of this invention to support a thermostatically controlled heater and regulating means therefor on the bottom wall of the container.

The foregoing as well as other objects will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is a fragmentary front elevational view of a refrigerator cabinet structure showing the door in its open position;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

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Figure 3 is a cross sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a perspective view of the container or butter conditioner employed in the refrigerator cabinet;

Figures 5, 6 and 7 are respectively sectional views taken on the lines 5—5, 6—6, and 7—7 of Figure 3;

Figure 8 is a perspective view of the closure provided for the access opening in the butter conditioner or container; and

Figure 9 is a sectional view taken substantially on the plane indicated by the line 9—9 of Figure 3.

The numeral 10 in Figure 1 of the drawings indicates a part of a refrigerator cabinet having a storage compartment 11 and an evaporator 12 supported within the compartment 11 adjacent the top of the latter in a position to cool air circulating within the compartment 11. Refrigerant is supplied to the evaporator 12 by apparatus well known in the art, and not shown herein. The cabinet 10 has an access opening in the front wall and a door 13 is hinged at one side edge to the cabinet for closing the access opening. As shown in Figure 2 of the drawings the door 13 has an outer panel 14, an inner panel 15 spaced laterally from the outer panel, and heat insulating material 16 housed within the space between the panels. The inner panel 15 is preferably formed of a plastic heat insulating material, and is embossed in a direction toward the outer panel 14 to form a recess 17 having a width approximating the width of the door 13 and having a length approximating the length of the door.

Supported within the refrigerated compartment 11 at a convenient elevation is a shelf 18 and a closed container 19. The shelf 18 is molded or otherwise formed in one piece from a suitable plastic material, and the container 19 is preferably formed of sheet metal.

As shown particularly in Figures 2 and 9 of the drawings, the shelf 18 has an inverted substantially U-shaped portion 20 intermediate the ends thereof and has horizontal article supporting portions 21 extending laterally from the bottom edges of opposite side walls 22 of the inverted U-shaped portion 20. It will be noted from Figure 1 of the drawings that the shelf portions 21 are turned downwardly along the rear edges thereof to provide reinforcing flanges 23, and the latter are connected at spaced points to the undersides of the shelf portions 21 by trans-

versely extending reinforcing ribs 24. A wall 25 extends upwardly from the front edge of the shelf 18, and the central part of this wall has a height approximating the height of the U-shaped portion 20. The portions of the wall 25 at opposite sides of the inverted U-shaped portion 20 form retainer rails 26 which serve to hold articles in place on the shelf portion 21, and are reduced somewhat in height at opposite ends of the shelf 18, as clearly shown in Figure 1 of the drawings. The bottom of the shelf 18 between the opposite side walls 22 of the inverted U-shaped portion is open to permit free passage of air into the U-shaped portion 20, and the front wall 25 of the shelf has an opening 27 therethrough in registration with the front side of the U-shaped portion 20.

The container 19 has an access opening 28 through the front wall and is provided with top, side, bottom and rear walls 29, 30, 31 and 32 respectively. The top wall 29 is shown in Figure 3 of the drawings as connected to the rear wall 32 by a curved section 33, and the bottom wall 31 is embossed to provide a shoulder 34 adjacent the access opening 28. The portion of the bottom wall 31 rearwardly of the shoulder 34 serves as a support for a butter dish 35, and the purpose of the shoulder is to prevent accidental movement of the butter dish out of the container.

The access opening 28 in the front wall of the container 19 is closed by a sheet metal door 36 supported on the container for pivotal movement to open and closed positions. As shown in Figure 8 of the drawings, ears 37 project rearwardly from opposite side edges of the closure 36 and extend into the container 19 through the access opening 28. The rear ends of the ears 37 are embossed laterally inwardly to provide spherically shaped recesses 39, and pins 40 are respectively secured to opposite side walls 30 of the container 19 in positions to register with the recesses 39. The inner ends of the pins 40 are spherically shaped and seat within the recesses 39 formed in the ears 37. The recesses 39 and the associated pins 40 are in alignment in order to provide a pivotal connection for the closure 38. The arrangement is such that when the door 36 is swung to its open position, the top edge of the door 36 swings rearwardly into the upper portion of the container 19, and the bottom edge swings forwardly beyond the front wall of the container. Thus when the door 36 is in its open position, the dish 35 is readily accessible and may be removed from the container 19 through the access opening 28.

In order to heat the interior of the container 19, a thermostatically controlled electric heating element 41 is provided. The heating element 41 is secured to the bottom wall 31 of the container 19 by a bracket 42 having a flange 43 welded or otherwise suitably secured to the bottom wall 31. As shown particularly in Figure 4 of the drawings, one side edge of the flange 43 is turned downwardly and then laterally to provide a flange 44 which overlies the flange 43 in vertical spaced relationship. The free end of the flange 44 is turned downwardly to provide a lug 45, and this lug is welded to a flange 46 which extends downwardly from the front edge of the flange 43. Referring now to Figures 3 and 9 of the drawings, it will be noted that the flange 44 has a portion embossed upwardly to provide a spherically shaped button 47 which coacts with the thermostatically controlled heating element 41 to removably hold the latter in position between the flanges 43 and 44 respectively.

The thermostatically controlled heating element 41 is regulated to obtain various predetermined temperatures within the container 19 by a thermostat 48. As shown in Figure 6 of the drawings the housing 49 of the thermostat 48 has lateral flanges 49' which is engageable with the front side of the flange 46 of the bracket 42, and has openings 50 at opposite ends respectively registering with suitable buttons 51 embossed forwardly from the flange 46. The buttons 51 project into the openings 50 and the two plates are held in this position by spring clips 52. The clips 52 are generally U-shaped in construction and respectively straddle opposite edges of the flanges 49' and flange 46 to prevent accidental disengagement of the latter. However removal of the thermostat may be readily accomplished by merely detaching the spring clips 52. The thermostat is adjusted by a control knob 53 supported adjacent the front side of the container 19 below the bottom wall 31 and connected to the thermostat 48 by a shaft 54. Thus it will be noted that the interior of the container 19 may be heated to and maintained at a predetermined temperature above that existing in the refrigerated storage compartment 11.

The overall dimensions of the container 19 are predetermined to permit supporting the container within the confines of the inverted U-shaped portion 20 on the shelf 18. In this connection it will be noted that when the container is in position within the inverted U-shaped portion 20, the door 36 registers with the opening 27 in the front wall 25 on the shelf 18, and this opening is of sufficient dimension to permit unobstructed movement of the door 36. It will also be noted particularly from Figure 3 of the drawings that the portion 55 of the wall 25 which extends across the bottom of the opening 27 is stepped rearwardly to provide a shoulder 56 and an upstanding flange 57. The bottom wall 31 of the container 19 has a downturned flange 58 which extends along the front side of the flange 57 and seats on the shoulder 56. It will also be noted that the portion 55 has a reinforcing flange 59 which extends rearwardly from the bottom edge thereof and is slotted to provide clearance for the control knob 53 of the thermostat.

Referring again to Figure 3 of the drawings, it will be noted that the portion 60 of the front wall 25 extending across the top of the opening 27 has rearwardly extending lugs 61 spaced below the top wall 62 of the U-shaped portion 20. The lugs 61 are spaced laterally from each other and cooperate with the top wall 62 to receive the front edge portion of the top wall 29 of the container 19. The container 19 is frictionally held in position by projections 63 extending downwardly from the top wall 62 between the lugs 61 and spaced laterally from each other. The projections 63 have shoulders 64 facing the front wall of the shelf 18 and engageable with a rib 65 formed on the top wall 29 of the container adjacent the front edge thereof. The portions 66 of the projections 63 are tapered to facilitate engagement of the rib 65 with the shoulder 64. Thus the container 19 has, in effect, a removable snap engagement with the shelf 18.

The shelf 18 with the container 19 may be assembled in various different positions within the refrigerator cabinet 10. However in the present instance the shelf 18 is shown as secured

to the inner panel 15 of the door 13, and it will be noted from Figure 2 of the drawings that a substantial portion of this shelf is accommodated by the recess 17 formed in the inner panel 15 of the door. For securing the shelf to the door a plurality of projections are formed on the rear side of the shelf, and these projections extend through registering openings in the inner door panel 15. Suitable friction nuts 68 cooperate with the projections 67 to rigidly clamp the shelf 18 in place.

When the shelf 18, together with the container, is mounted on the inner panel 15 of the door, it will be noted that the rear wall 32 of the container is spaced some distance from the inner door panel 15. Also the top and side walls of the container 19 are respectively spaced laterally from the top and side walls of the inverted U-shaped portion 20. As pointed out above the bottom of the shelf is open below the inverted U-shaped portion 20 so that refrigerated air in the storage compartment may circulate over the walls of the container 19.

In order to protect the electrical terminals employed for the heating unit 41, a plate 70 is secured to the inner door panel 15 directly below the container 19. It will be noted from Figure 9 that the plate 70 has the opposite ends 71 turned upwardly to form an effective shield for the electrical apparatus. However the plate 70 has an overall length less than the width of the container 19 so as not to interefere with the flow of refrigerated air upwardly around the container 19. Referring again to Figure 3 of the drawings, it will be noted that the rear end of the plate 70 has a projection 72 which extends through a slot 73 in the inner door panel 15. The front edge of the plate 70 is turned upwardly and forwardly to provide a flange 74 which seats on the flange 59, and is slotted to provide clearance for the thermostat control knob 53.

What I claim as my invention is:

1. In a refrigerator cabinet having a refrigerated compartment and having a wall forming one wall of the compartment, a shelf supported on said wall and extending into the compartment, said shelf having a vertically extending inverted U-shaped part open at the bottom of the shelf to admit air circulating within said compartment and also open at the side of the shelf facing the interior of the compartment, a container supported by the shelf within the U-shaped part and having an access opening registering with the open side of the U-shaped part, a closure for the access opening mounted on the container for movement to open and closed positions, and means for varying the temperature of the atmosphere within said container.

2. The structure defined in claim 1 wherein said shelf has article supporting portions projecting laterally from opposite sides of the inverted U-shaped part adjacent the bottom of the latter.

3. The structure defined in claim 1 wherein the container has a bottom wall extending across the open bottom of the inverted U-shaped part and wherein the temperature varying means comprises a heater supported in heat transfer relationship to the bottom wall, and a thermostat for controlling the operation of said heater.

4. The structure defined in claim 1 wherein the container has side and top walls spaced from the corresponding walls of the inverted U-shaped part to provide a passage for air around said container.

5. The structure defined in claim 1 wherein the container is insertable into the inverted U-shaped part through the open side of the latter and means removably securing the container within the inverted U-shaped part.

6. The structure defined in claim 2 wherein said shelf is of one-piece plastic material and has a wall extending upwardly from the inner edge at opposite sides of the inverted U-shaped part for retaining articles in position on said horizontal portions.

7. In a refrigerator cabinet, a storage compartment having cooling means supported therein adjacent the top thereof and having an access opening, a door for the access opening and having an inner wall, a shelf supported on said wall and extending into the storage compartment below the cooling means, said shelf having a vertically extending inverted substantially U-shaped part open at the bottom of the shelf to receive air passing upwardly toward the cooling means and also open at the side of the shelf facing the interior of the storage compartment, a closed container supported by the shelf within the U-shaped part and having an access opening registering with the open side of the U-shaped part, and a closure for the access opening in said container mounted on the container for movement to open and closed positions.

8. The structure defined in claim 7 wherein the shelf extends transversely of the door and has horizontal article supporting portions which extend laterally outwardly from opposite sides of the inverted U-shaped part at the bottom of the latter.

9. The structure defined in claim 7 wherein the container has an outer wall spaced laterally from the inner wall of the door and also has top and side walls spaced from the adjacent walls of the inverted U-shaped part to provide a passage for air around the container.

10. The structure defined in claim 8 comprising a wall extending upwardly from the inner edge of the shelf at opposite sides of the inverted U-shaped part to form guards for retaining articles in position on the horizontal portions of the shelf.

11. In a refrigerator cabinet, a refrigerated storage compartment having an access opening and having a door for the access opening, a supporting member mounted on the inner side of the door and having a vertically extending inverted U-shaped part projecting into the storage compartment into the closed position of the door, said inverted U-shaped part being open at the bottom and also being open at the inner side facing the interior of the compartment, a closed container removably mounted on the supporting member within the inverted U-shaped part and having an access opening at the inner side registering with the open inner side of the inverted U-shaped part, a closure for the access opening mounted on the container for movement to open and closed positions, and means for maintaining the temperature within the container above the temperature within the refrigerated compartment.

12. The structure defined in claim 11 wherein the container has top and side walls respectively spaced laterally from the adjacent walls of the inverted U-shaped part to provide a passage for air around the container.

13. The structure defined in claim 11 wherein the outer wall of the container is spaced lat-

erally from the adjacent inner side of the door to provide an air space which communicates with the space provided at the sides and top of the container.

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