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Benasutti et al.

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[54] **CABINET SLIDING PANEL AND TRACKING ARRANGEMENT**

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[73] Assignee: **General Motors Corporation,** Detriot, Mich.

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[52] **U.S. Cl.** ..... **312/138 R,** 49/127, 49/130, 312/116, 312/138 A, 312/350

[51] **Int. Cl.** **A47f 3/00**

[58] **Field of Search** ..... 49/125, 127, 128, 130; 312/138 R, 138 A, 214, 116, 350

[56] **References Cited**

UNITED STATES PATENTS

2,545,749	3/1951	Pusch	312/116 X
2,899,252	8/1959	Rolfe	312/138 R
2,992,460	7/1961	Hentges	49/130

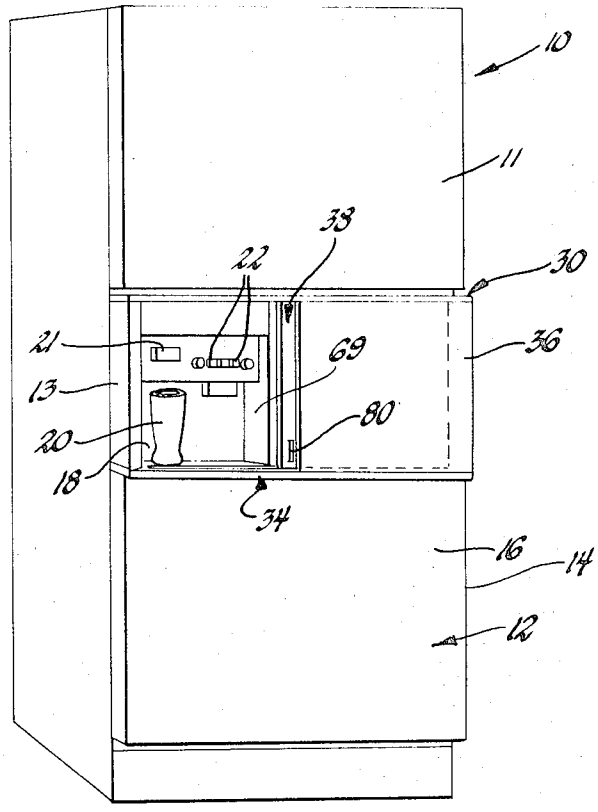
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[57] **ABSTRACT**

A sliding panel assembly for closing a refrigerator door exterior service area having a through-the-door ice or juice dispensing means in the area. One of a pair of plastic panels is fixed while the movable panel assumes a closed position in side-by-side relationship with the fixed panel with the panel faces substantially flush with the door outer shell to present an overall flush appearance. The movable panel has an inwardly offset side flange having inner follower means for travel in first pitched guide track grooves provided with offset end portions while the outer edge of the movable panel has follower means movable in second substantially linear guide track grooves whereby the movable panel is slidable to a position behind the fixed panel.

3 Claims, 6 Drawing Figures



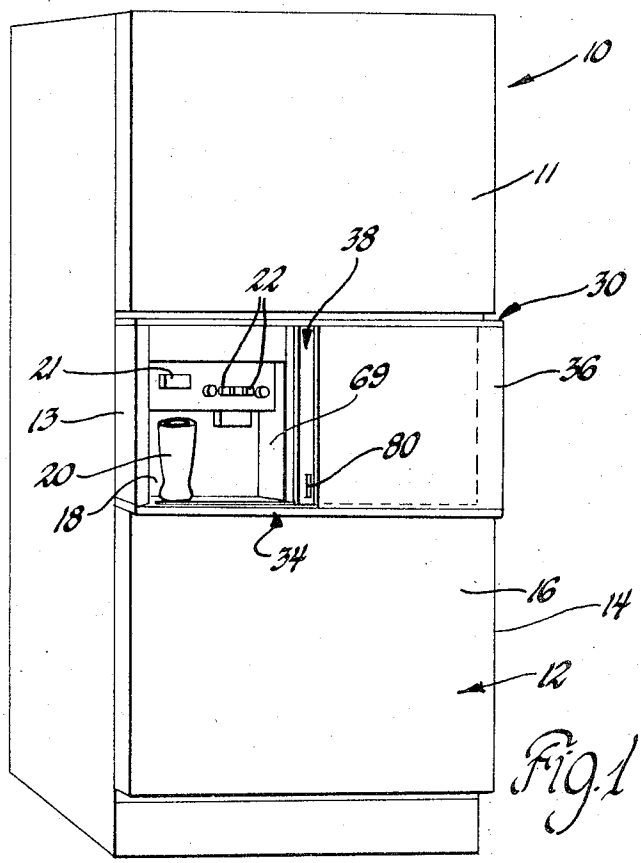

10
11
38
22
30
21
69
36
13
80
20
18
34
16
14
12

Fig. 1

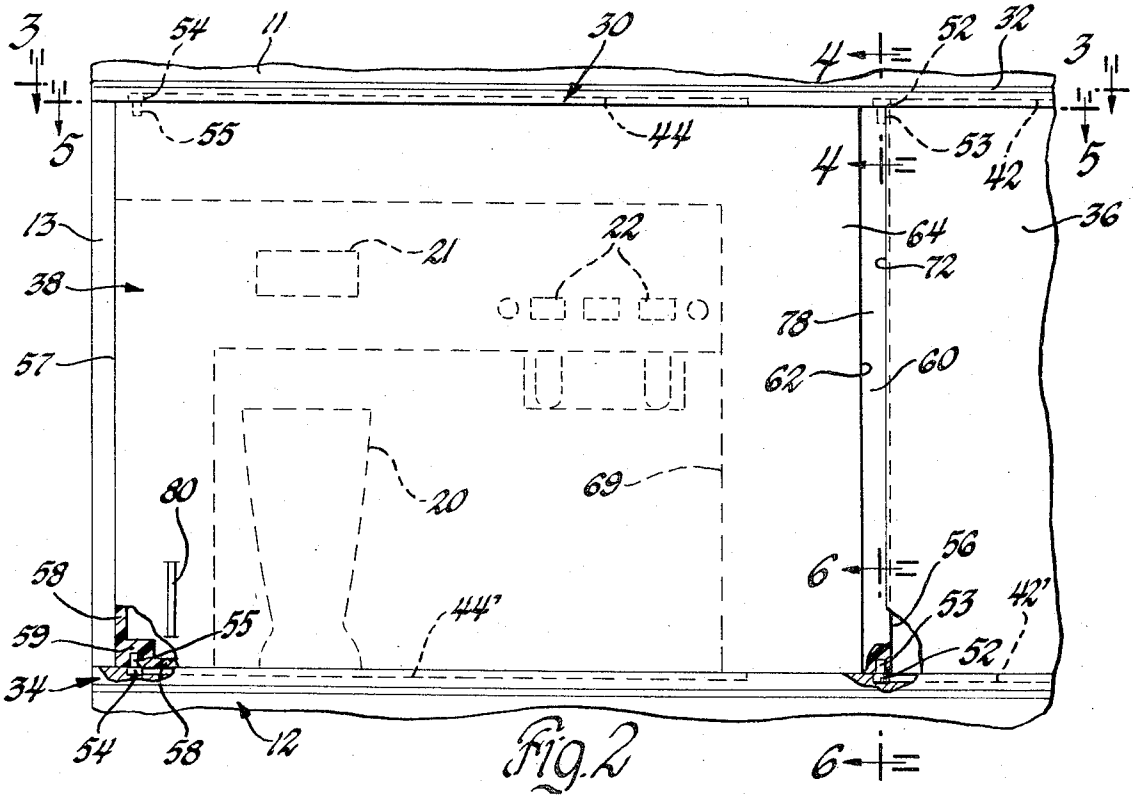
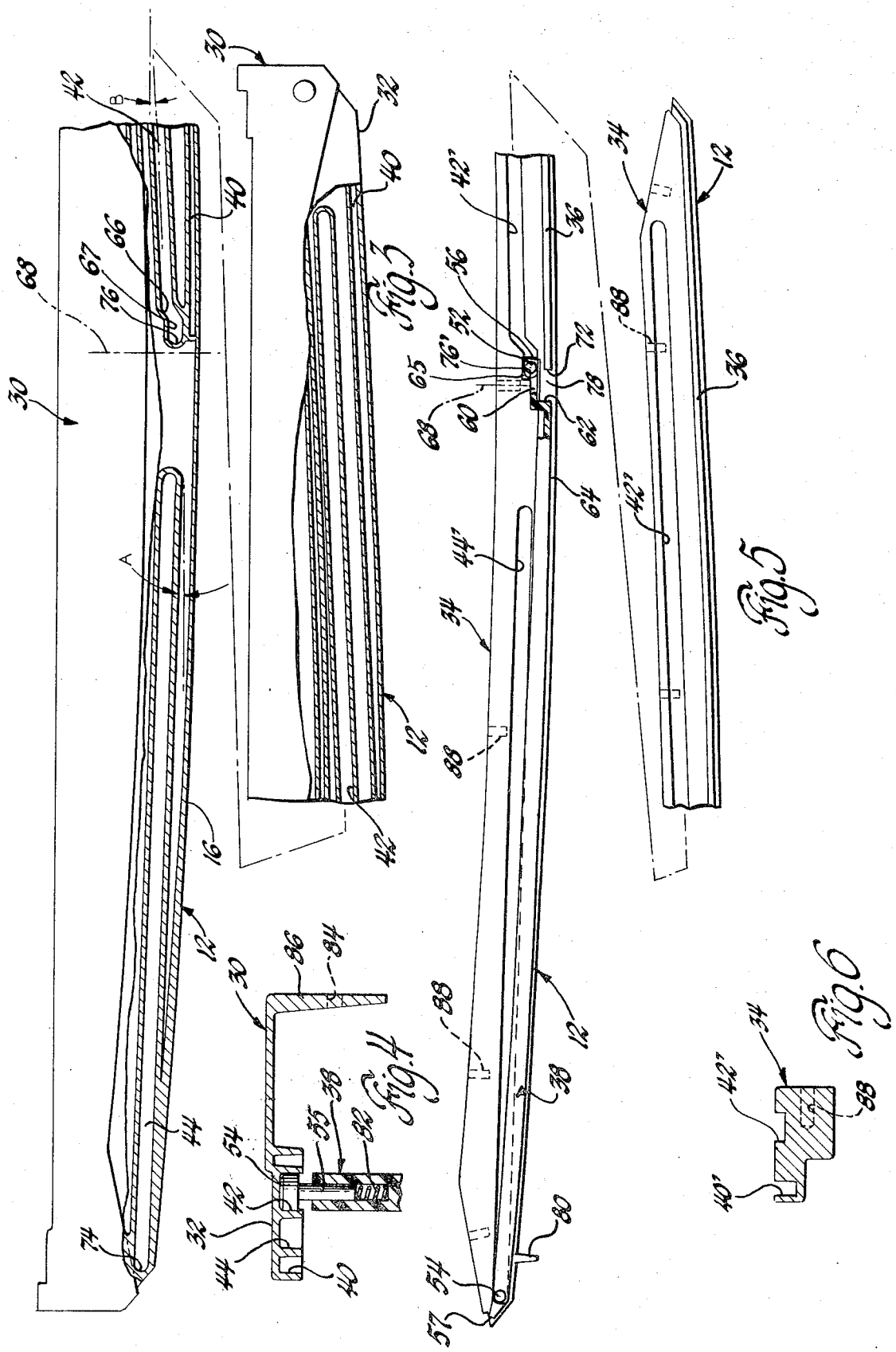

3
54
11
30
4
52
32
3
5
55
44
53
42
5
4
13
21
22
64
36
38
72
78
57
62
60
80
20
69
56
6
58
53
42'
59
55
44'
52
34
54
58
12
6

Fig. 2


30
42
B
32
40
68
67
66
76
A
16
12
74
44
54
42
32
40
Fig. 3
42'
36
56
52
72
76'
65
28
60
62
64
44'
34
12
88
Fig. 5
30
86
84
38
55
82
Fig. 4
88
12
38
80
57
54
Fig. 6
34
42'
88
40'

CABINET SLIDING PANEL AND TRACKING ARRANGEMENT

This invention relates to a cabinet sliding panel assembly and more particularly to a sliding panel for providing access to a recessed through-the-door service area in a refrigerator door.

It is an object of the present invention to provide a sliding panel assembly for providing access to a through-the-door service area in a refrigerator cabinet or the like including a pair of panels, one of which is slidable such that the panels are positioned in side-by-side relationship so as to provide a smooth and uninterrupted appearance with the refrigerator door outer shell when the panel is in its closed position; and means for guiding followers on the slidable panel rearwardly and behind the fixed panel by means of first track grooves outwardly and rearwardly pitched from inner offset end portions and second track grooves substantially aligned with the offset portions of the first track grooves.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the Drawings:

FIG. 1 is a perspective view of a refrigerator cabinet incorporating the present invention;

FIG. 2 is an enlarged fragmentary front elevational view of the lower door service area with the sliding panel in its closed position;

FIG. 3 is an enlarged view, partly in section, taken on the line 3—3 of FIG. 2;

FIG. 4 is an enlarged sectional view of the door top plate taken on line 4—4 of FIG. 2;

FIG. 5 is an enlarged sectional view taken on the line 5—5 of FIG. 2;

FIG. 6 is an enlarged sectional view of the panel door lower support taken on the line 6—6 of FIG. 2.

Referring now to the drawings, there is shown in FIG. 1 a refrigerator cabinet 10 having an upper freezer compartment closed by an upper insulated access door 11 and a lower fresh food compartment closed by a lower insulated access door 12. While it is understood that the instant invention may be used on different door or cabinet structures, the disclosed doors are of the "wing" design disclosed in U.S. Pat. No. 3,314,196 issued Apr. 18, 1967, to the same assignee as the present invention, wherein one or both of the left and right hand structural side members 13 and 14 respectively, are shaped to serve as a handle for opening the door. The lower access door 12 includes an outer shell or wall 16 having a recessed compartment or service area 18 therein which in the disclosed form provides a combined through-the-door ice cube, water and beverage concentrate dispensing area such that a suitable receptacle such as glass 20 may be positioned on the shelf of the service area for receiving ice cubes by depressing actuator 21 and either chilled water or a beverage concentrate by depressing suitable button 22. The ice cube dispensing portion of the service area is shown and described in copending U.S. patent application Ser. No. 309,935 now U.S. Pat. No. 3,789,620 assigned to the assignee of the instant application, the disclosure of which is incorporated by reference herein.

As seen in FIG. 2, the service area 18 has a rectangular configuration and extends from the left hand side

member 13 of the lower refrigerator door 12 to a point approximately midway between the side members 13 and 14 of the door. The service area 18 is bounded on its upper end by a laterally extending door top plate 30 including upper rail member 32 which caps the upper edge of the lower door 12. The lower boundary of the service area 18 is defined by a lower rail member 34 coextensive with the upper rail member 32 and parallel therewith.

With reference to FIG. 1, a panel assembly is shown including a pair of rectangular panels 36 and 38 which are mounted between the upper and lower rail members 32 and 34. The first fixed panel 36 is located on the right hand side of the door while the second panel 38 is movably positioned in side-by-side relationship with the first fixed panel 36 and is operative for closing the service area 18 by moving the second sliding panel 38 from its open position underlying the fixed panel 36 to its closed position of FIG. 2 where panel 38 is located substantially flush with the outer shell 16 of the refrigerator door. In the preferred embodiment the first and second panels are formed of plastic material such as Plexiglas having a thickness of the order of 0.125 inches and appropriately colored such as by a bronze tint.

The track configuration on the upper and lower rails are formed in an identical mirror image manner for supporting the movable panel 38 and accordingly only the track configuration of the upper rail 32 will be described in detail. As seen in FIG. 3, integral groove means 40 are provided on the undersurface of the upper rail 32 for retaining the upper edge of the right hand plastic panel 36, with a matching groove on lower rail 34, such that panel 36 is held in fixed relation adjacent the front edge of the rail members. The track configuration includes first and second upper track grooves indicated at 42 and 44 respectively, in FIG. 3.

Inner 52 and outer 54 pairs of pins are carried on the upper and lower edges of the left hand movable panel 38 and adjacent the end thereof are adapted for sliding movement in the first 42 and second 44 tracks, respectively, by means of pins 52 and 54. As seen in FIG. 2, the stems 55 of outer pins 54 are positioned at the top and bottom of the movable panel 38 and adjacent the outer edge 57 thereof with their stem portion 55 positioned in apertures or bores in the panel allowing their enlarged heads to be received in the upper and lower second tracks 44 for sliding movement therein. The panel 38, which is shown outwardly curved in FIG. 5 to conform with shell 16, has a thickened peripheral edge strip 58 including corner blocks 59 on the inner face thereof providing bores for mounting the stems 55 of the pins therein.

As best seen in FIG. 5, the movable panel 38 is provided with an inwardly offset integral flange 60 located at its inner vertical edge 62 and coextensive therewith. In the disclosed form the offset flange 60 has a thickness substantially equal to the thickness of the panel 38. The flange 60 is rearwardly offset an amount of about twice the thickness of the panel 38 or approximately 0.25 inches from the outer face 64 of the panel 38. The lateral dimension of the flange 60 is of the order of 0.75 inches while the overall width and height dimensions of the panel 38 are approximately 15.6 and 12.8 inches, respectively. It should be noted that the inner thickened edge strip 58 of panel 38 is about 0.125

in thickness such that the overall front to back dimension of panel **38** is about 0.250 inches. The inner pins **52** are similarly located adjacent the free edge **56** of the offset flange **60** with their shank portions inserted in integrally molded bores in the vertical edge strip **65** of flange **60** with the heads of the pins dimensioned to be slidably received in the upper and lower first tracks **42.**

As seen in FIG. **3,** the first upper main track **42** has a diagonal or dog-leg end portion **66** forming an angle of about 45° with the closed offset flange **60** and forwardly offset portion **67** substantially parallel to the closed position of offset flange **60.** It will be noted that the second track groove **44** extends inwardly and forwardly from the door left hand side member **13** at a pitched angle A of about 2° so as to be in substantial alignment with the offset portion **67.** It will also be noted that the track grooves **44** and **44'** are substantially coextensive with the opening of the service area or chamber **18** so as to extend just beyond the inner side wall **69.**

In this way when the movable panel **38** is in its closed position, the outer pins **54** engage the end **74** of the second track **44** terminating the sliding movement of the panel **38** before inner pins **52** contact the end **76** of offset parallel portions **67** of tracks **42,** thereby locating the fixed and movable pair of panels in side-by-side relationship. This closed panel arrangement provides a defined vertically extending space **78** between the panel inner edges **62** and **72** such that the inwardly offset flange **60** is coextensive with space **78** so as to underlie the fixed panel inner edge **72** and provide an uninterrupted frontal coverage appearance by the panels.

Initial sliding movement of the movable panel **38** by means of pressure exerted inwardly on the handle member **80** causes the inner pins **52** to move from the offset track portion **67** through the 45° diagonal track portion **66** to kick-away or clear the panel edge **62** from the fixed panel edge **72.** The diagonal track portion makes connection with first main track section **42** which extends in substantially parallel relation to groove means **40** for locating panel **38** in spaced inward relation behind the fixed panel **36.** By virtue of the first main track **42** being pitched inwardly and rearwardly at an angle B of about 5° with respect to an imaginary vertical transverse plane it will be seen that the outer face **64** of the panel **38** is caused to keep falling away from the fixed edge **72** to enable the panel **38** to be moved rearwardly and behind the fixed panel **36.** During closing of the movable panel **38** the reverse action takes place with the pitched track grooves **44** acting to smoothly slide the inner pins **52** back through the offset track groove portions **66** and **67.**

While the embodiment of the present invention constitutes a preferred form, it is to be understood that other forms might be adopted.

We claim:

1. In a refrigerator cabinet having an insulated door for closing a compartment therein, said insulated door having a recessed chamber in the outer shell thereof, a pair of vertically spaced horizontally extending top and bottom structural members extending between the side edges of said door so as to define the upper and lower extremities of said chamber, a fixed panel and a movable panel located in side-by-side relation between said structural members such that said panels have their opposed inner edges spaced apart a defined distance, said movable panel normally closing said chamber, means for mounting said movable panel for horizontal sliding movement between its chamber closed position and an open position in which it underlies said fixed panel, said mounting means comprising first and second pairs of mirror image track grooves in each of said structural members, said movable panel including an integral inwardly offset flange formed along its inner edge and coextensive therewith so as to underlie said fixed panel inner edge whereby said offset flange bridges the space between said fixed and movable panels, said movable panel having outer follower means carried by the upper and lower edges thereof for movement in said second track grooves, said offset flange having inner follower means carried by the upper and lower edges thereof for movement in said first track grooves, said first track grooves having outwardly offset ends adjacent said fixed panel inner edge for receiving said offset flange follower means when said movable panel is in its closed position, said first track grooves positioned in spaced relation rearwardly of said fixed panel and pitched at a predetermined angle outwardly and rearwardly from said first track grooves outwardly offset ends, whereby upon initial sliding movement of said movable panel to its service area open position said inner follower means move from said offset ends of said first track grooves causing said movable panel inner edge to clear said fixed panel inner edge, and whereby upon continued sliding movement the pitched angle of said first track grooves allows said movable panel to clear said fixed panel inner edge and slide in an uninterrupted manner to its open position behind said fixed panel.

2. In a refrigerator cabinet having an insulated door comprising an outer shell and an inner liner with the spaced there-between filled with insulating material for closing a compartment of the refrigerator, said insulating door having a plurality of walls forming a chamber providing a recessed service area, said insulating door having an opening in its outer shell providing access to said chamber, said chamber having one side adjacent one edge of said access door, a pair of vertically spaced horizontally extending top and bottom track rails extending between the side edges of said door so as to define the upper and lower extremities of said chamber, a fixed panel and a movable panel located in side-by-side position between said rails with said panels having their inner opposed vertically extending edges spaced apart a defined distance, said movable panel normally closing said chamber opening, means for mounting said movable panel for sliding movement between its normally closed position and its open position behind said fixed panel, said mounting means comprising first and second track grooves in each of said top and bottom track rails in opposed mirror image symmetry formed in said rails, said first track grooves positioned in spaced relation behind said fixed panel and pitched at a predetermined angle of about 5° inwardly and rearwardly from said fixed panel inner edge, said second track grooves positioned behind said movable panel front face in its closed position so as to be in alignment with said offset portion, said movable panel including an integral inwardly offset flange formed along said movable panel inner vertical edge and coextensive therewith so as to underlie said fixed panel inner edge whereby said offset flange bridges the space between said fixed and movable panel inner edges, said movable

panel having outer pins carried by the upper and lower edges thereof for movement in said second track grooves, said movable panel offset flange having inner pins carried by the upper and lower edges thereof for sliding movement in said first track grooves, said first track grooves having outwardly offset ends adjacent said fixed panel inner edge for receiving said inner flange pins when said movable panel is in its closed position, whereby upon initial sliding of said movable panel to said chamber open position said inner pins move from said offset ends into said first track grooves causing said movable panel inner vertical edge to clear said fixed panel inner vertical edge, and whereby upon continued sliding movement the pitched angle of said first track grooves allows said movable panel to slide in an uninterrupted manner to its open position behind said fixed panel.

3. In a refrigerator cabinet having an insulating door comprising an outer outwardly curved shell and an inner liner with the space therebetween filled with insulating material for closing a compartment of the refrigerator, said insulating door having a plurality of walls forming a chamber providing a recessed service area, said door having an opening in its outer shell providing access to said chamber, said chamber having its outer side adjacent one outer edge of said access door and said chamber having its opposite inner side positioned intermediate said chamber outer edge and the vertical centerline of said insulated door, a pair of vertically spaced horizontally extending top and bottom track rails extending between the side edges of said door so as to define the upper and lower extremities of said chamber, a fixed panel and a movable panel located in side-by-side position between said rails with said panels having their inner opposed vertically extending edges spaced apart a defined distance, said movable panel being outwardly curved to substantially conform with said outwardly curved shell, said movable panel normally closing said chamber opening, means for mounting said movable panel for sliding movement between its normally closed position and its open position behind said fixed panel, said mounting means comprising first and second linear track grooves in each of said top and bottom track rails in opposed mirror image symmetry in said rails, said first track grooves positioned in spaced relation behind said fixed panel and pitched at a predetermined angle of about 5° outwardly and rearwardly with respect to said fixed panel inner edge, said second track grooves pitched at a predetermined angle inwardly and forwardly with respect to said door outer edge so as to be in alignment with the offset portion of said first track grooves; said movable panel including an integral inwardly offset flange formed along said movable panel inner vertical edge and coextensive therewith so as to underlie said fixed panel inner edge whereby said offset flange bridges the space between said fixed and movable panel inner edges, said movable panel having outer pins carried by the upper and lower edges thereof for movement in said second track grooves, said movable panel offset flange having inner pins carried by the upper and lower edges thereof for sliding movement in said first track grooves, said first track grooves having outwardly offset ends adjacent said fixed panel inner edge for receiving said inner flange pins when said movable panel is in its closed position, whereby upon initial sliding of said movable panel to said chamber open position said inner pins move from said offset ends into said first track grooves causing said movable panel inner vertical edge to clear said fixed panel inner vertical edge, and whereby upon continued sliding movement said pitched angle of said first track grooves allows the outer face of said curved movable panel to clear said fixed panel inner edge and slide in an uninterrupted manner to its open position behind said fixed panel.

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