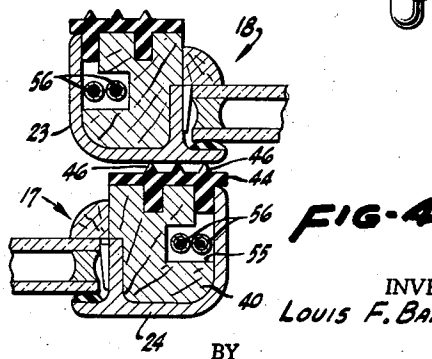
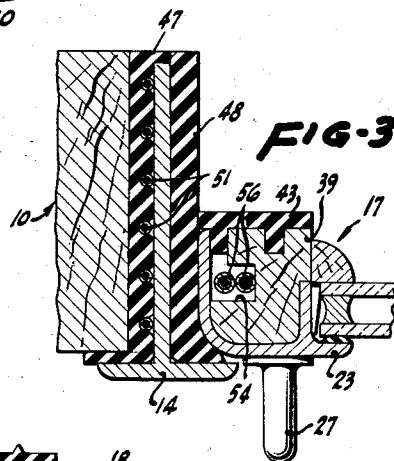
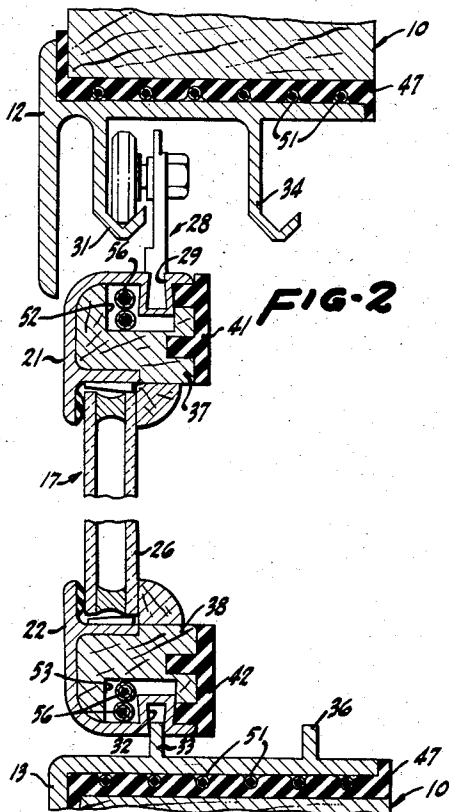
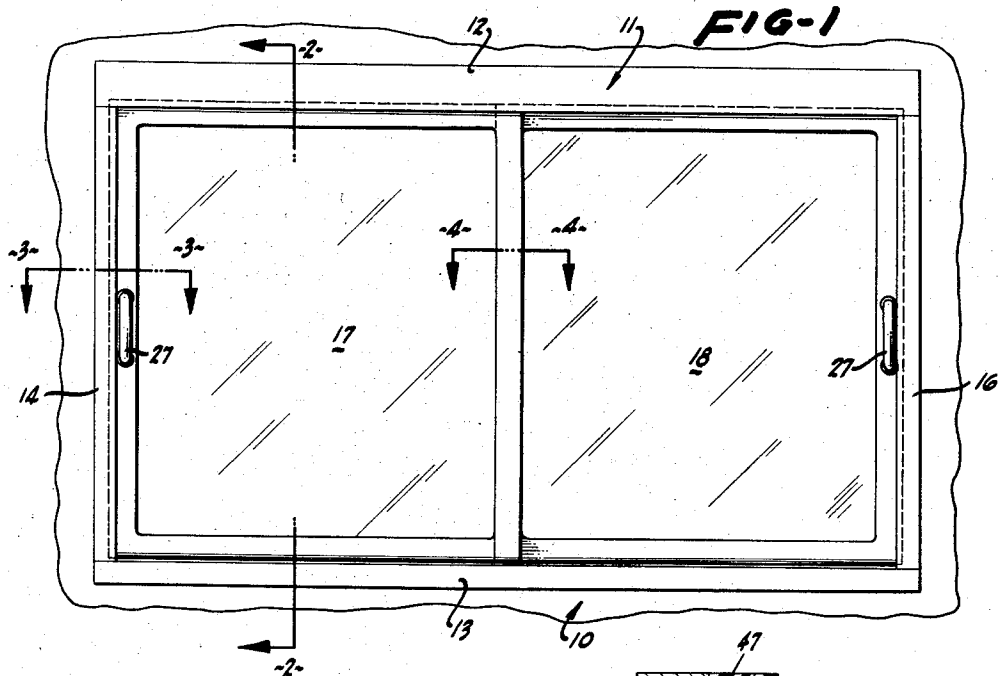


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REFRIGERATED FREEZER CABINETS HAVING HEATED
DOOR FRAMES AND DOORS THEREFOR
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REFRIGERATED FREEZER CABINETS HAVING HEATED DOOR FRAMES AND DOORS THEREFOR

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1 Claim. (Cl. 219—19)

This invention relates to refrigerated freezer cabinets and more particularly to a refrigerated freezer cabinet having heated doors and door frames.

Refrigerated freezer display cabinets have come into extensive use in grocery stores and the like for storage, display and sale of frozen foods. However, most such cabinets have been of the top opening variety rather than of an upright type with front opening doors, primarily because of the difficulty of maintaining the doors of such upright cabinets free from ice.

Although upright refrigerator cabinets with front opening doors have been used for years in the handling of non-frozen foods, it has been found that such an arrangement could not be effectively used when frozen foods are to be handled, because of the tendency for the doors to ice up and resist easy opening. I have found that such icing is a result of maintaining the inside of the cabinet at a temperature below freezing, and also that it is practically impossible to prevent air from leaking past the door edges into the cabinet. As a result, the relatively warm room air contacts portions of the door and door frame which are held below freezing by the low temperature inside the cabinet, and the incoming air cools to condense the water therein on the door and door frame, which water then freezes into ice, causing the door to stick to the door frame. This effect is noted to some extent in front opening cabinets having swinging doors, but is much more prevalent in sliding doors, as the doors are much harder to seal against air flow therepast. Furthermore, in sliding doors, ice will tend to form on the trackways and guides on which the doors slide, again preventing easy door opening.

I have found that the objectionable icing of vertically disposed freezer doors can be eliminated by embedding heating elements around the peripheries of the door frame and the doors to maintain the temperature of the contacting surfaces thereof above the freezing temperature of water. With these surfaces maintained above the freezing point, air leaking between the doors and door frames will not condense and freeze on the doors and door frames. With this problem eliminated, the primary drawback to the successful use of front opening freezer cabinets is removed.

It is the primary object of this invention to provide a vertically disposed freezer cabinet having a front opening door frame and door with means to heat the said frame and door to prevent icing therebetween.

It is a further object of the invention to provide a freezer cabinet having a door frame and a front opening door therefor with means to heat said frame and door around the peripheries thereof to prevent icing thereof by air leaking therepast.

Other objects and advantages will become apparent in the course of the following detailed description.

In the drawings, forming a portion of this application, and in which like parts are designated by like reference numerals throughout the same,

Fig. 1 is a front elevational view of a refrigerator

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cabinet and a door assembly embodying the principles of the invention.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 1.

Referring now to the drawings, the reference numeral 10 designates generally a vertically disposed refrigerated freezer cabinet in which door frame 11 is mounted in the front wall thereof. The vertically disposed door frame 11 is metallic, preferably aluminum, and comprises upper and lower frame members 12 and 13, and two side members 14 and 16. Two sliding doors 17 and 18 are mounted in door frame 11 for sliding movement relative thereto in a manner to be hereinafter described.

The sliding doors 17 and 18 are constructed generally in accordance with my prior Patent No. 2,701,395, entitled "Refrigerator Door," issued February 8, 1955, whereby each door has upper and lower channel members 21 and 22 and side channels 23 and 24, and a double paned glass window 26. The channel members 21, 22, 23 and 24 are metallic and preferably aluminum. A handle 27 is attached to each door to enable the doors to be opened.

A roller assembly 28 fits within a dovetailed groove 29 formed longitudinally in the upper door channel 21 and has its roller riding in a depending trackway 31 formed integrally with the upper frame member 12 of door frame 11, so that the door may slide open relative to the frame. Two such roller assemblies 28 are provided for each door, each roller assembly being disposed adjacent a side edge of the door. The lower door channel member 22 has a similar longitudinal groove 32 slidably embracing the longitudinally extending rib or track member 33 formed on the lower door frame member 13, to properly guide the door in its opening and closing movement. Door 18 is similarly suspended from trackway 34 and guided by rib 36.

Each of the door channel members 21, 22, 23 and 24 has therein a thermally non-conductive core, preferably a wood fillet, 37, 38, 39 and 40, respectively. Insulated sealing strips 41, 42, 43 and 44 are applied to the rear surfaces of these wooden fillets, as illustrated, with sealing strip 44 being provided with rearwardly extending ribs 46 to engage door 18 and seal off air flow therebetween when the doors are closed.

The door frame 11 is mounted to the cabinet 10 with a Z-shaped insulation strip 47 interposed therebetween. As shown in Fig. 3, an insulating strip 48 extends along the door frame member 14, to be engaged by door 17 when the latter is in closed position, to prevent air flow therebetween, and also to cushion the door upon closing thereof.

A plurality of electrical resistance heating elements 51 are wound around the periphery of the door frame 11 in generally parallel spaced relationship, these elements being held in heating contact or engagement with the door frame by the insulating strip 47. Although four such elements are shown in the drawing, it is contemplated that more or less than this number may be employed, if desired. The heating elements 51 can be connected in series or parallel arrangement, again as desired, and are then connected to a suitable electric power source by suitable means (not shown). It will be noted that all of the heat generated in these resistance elements will be absorbed by the door frame, as the insulating strip 47 will prevent heat flow from the heating elements 51 to the body of the cabinet 10.

The doors 17 and 18 are also provided with heating means embedded around the peripheries thereof. As will be seen in the drawings, the wooden fillets 37, 38, 39 and 40 have longitudinally extending grooves 52, 53, 54 and 55, respectively, therein adjacent the top, bottom and sides of the door channels 21, 22, 23 and 24, respectively,

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to receive the electrical resistance heating elements 56, which thus surround the door. Again, although two such resistance elements are shown, more or less than this number may be employed, if desired. The heating elements 56 are connected in parallel or series circuit, as desired, and are then connected by a flexible electrical cord (not shown) to a source of electrical power.

As will be seen in Fig. 2, the top frame member 12 will be heated by the heating elements 51, with the heat being conducted through the metal frame to heat the trackways 31 and 34. The heating elements 56 in the top channel 21 of the door will heat the channel 21, such heat being conducted upwardly to the roller assembly 28. This combined heating will then prevent any icing of the trackways or the rollers so that the door may be easily opened.

Similarly, the frame heating elements 51 associated with the lower frame member 13 will heat the guide ribs 33 and 36, while the door heating elements 56 will heat the lower door channel 22 to prevent any icing of the ribs or the door channel.

In like manner, the side frame member 14 and the side door channel 23 are both heated to prevent any ice from forming between the door and the frame which would prevent opening of the doors. Also, the side channel member 24 of door 17 and the side channel 23 of door 17 are both heated so that no ice may form therebetween when the doors are closed, again preventing the doors from freezing together when closed.

It is to be understood that the door frame and doors need not be heated to such a degree that it would impair the efficiency of the refrigerated freezer cabinet, as it is necessary only to maintain these elements at a temperature above the freezing temperature of water, so that ice cannot form thereon. It is also possible to prevent the objectionable icing by heating either the door frame, or the doors, alone, although the best results will be obtained by the heating of both.

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The form of the invention shown herein is a preferred embodiment of the same, and various changes may be made in the shape, size and arrangement of parts without departing from the spirit of the invention or the scope of the attached claim.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

A refrigerated freezer cabinet, a vertically disposed metallic door frame mounted in the front wall of said cabinet, a heat insulating strip disposed around said door frame and between said door frame and said front wall, upper and lower track members formed on said door frame, a pair of doors each having a metallic periphery and a longitudinal groove along the bottom side thereof, roller members carried by the upper sides of said doors, said doors being mounted in said door frame with said roller members engaging said upper track members and said groove embracing said lower track members for guided sliding movement of said doors in said door frame, an electrical resistance element disposed around the periphery of said door frame and between said door frame and said insulating strip to heat said door frame and said track members formed thereon, and an electrical resistance element embedded in each of said doors around the peripheries thereof in heating relation to said metallic peripheries, roller members and grooves.

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