REFRIGERATOR DOOR WITH REMOVABLY MOUNTED RADIO

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ABSTRACT

A refrigerator insulated door has a rectangular shaped opening and an insert in the form of a housing installed within the opening for removably mounting an add-on accessory in a recessed manner therein. The accessory, which may be a battery powered radio or the like, is retained in an inwardly canted over-center position by virtue of the housing base being sloped outwardly to a horizontal camming rib. The radio may be readily removed for servicing by exerting a force inwardly at the bottom of its casing, causing the upper portion thereof to be projected beyond the face of the door to a position whereby the top of the radio is exposed for grasping and lifting over lower abutment means of the housing for removal therefrom.

3 Claims, 5 Drawing Figures
This invention relates generally to appliance cabinet construction and particularly to a domestic refrigerator door having a housing insert in its outer face for removably retaining an add-on appliance such as a radio or the like therein.

It is an object of the present invention to provide a supporting structure insert for a cabinet to enable the over-center recessed support of an article therein, this being accomplished by the base of the supporting structure being canted forwardly to camming means whereby the article may be readily removed by exerting a force inwardly at its bottom portion such that the top of the article may be grasped and lifted from the structure for servicing or the like.

It is another object of the invention to provide a housing insert for a refrigerator door for removably mounting a radio or the like in over-center recessed canted fashion therein, this being accomplished by the base of the housing being sloped outwardly and downwardly to a horizontal camming rib integral with the lower half of the base with the base being sloped inwardly therefrom to allow a force on the radio below the rib to cause the top of the radio to move outwardly from the face of the door for grasping and lifting thereof over lower abutment means of the housing for removal therefrom.

These and other objects and advantages of the invention will be apparent from the following description of a preferred embodiment thereof, together with the accompanying drawings wherein:

FIG. 1 is a perspective view of a side-by-side three door refrigerator cabinet showing a radio mounted in the upper small door thereof;

FIG. 2 is an enlarged fragmentary front elevational view of the mounting structure retaining a radio in the small door;

FIG. 3 is an enlarged side view of the small door with a broken-away cross section of the housing taken on line 3-3 of FIG. 2;

FIG. 4 is an enlarged fragmentary cross-sectional view taken on line 4-4 of FIG. 2 of the upper retaining means;

FIG. 5 is an enlarged fragmentary cross-sectional view of the lower retaining means shown in FIG. 3.

The side-by-side refrigerator freezer 10 shown in FIG. 1 includes a refrigerator section closed by a right-hand access door assembly 12 having a side edge handle 13 and a freezer section closed by upper 14 and lower 15 left-hand door assemblies having side edge handles 16 and 17, respectively. The freezer side space is divided into upper and lower spaces with the smaller upper space providing an ice making compartment preferably containing either an automatic ice maker or conventional ice cube freezing trays and a storage bin.

The present invention is directed to the upper small freezer door assembly 14 including a supporting structure insert for supporting an article therein. In accordance with conventional practice, the door structure 14 has an outer wall or shell 18 and an inner wall or liner 20 spaced laterally from the shell to provide a space of generous depth for accommodating insulating material. It will be noted that whereas conventional refrigerator doors are provided with trays of shelves on their interior sides, in the present invention the inner liner 20 is formed without shelves to provide a maximum hollow wall space defined between the liner 20 and the outer shell 18, such space being filled with a core of suitable thermal insulation which in the preferred embodiment is shown at 21 as foamed-in-place plastic material.

As best seen in FIG. 2, the outer shell 18 has a vertically elongated retainer opening 22 therethrough and an insert member in the form of a pan-like rectangular housing 24 preferably of molded plastic material is installed within the opening. The insert housing member 24 has a base portion, including an upper base wall 25a and a lower base wall 25b positioned intermediate the outer shell 18 and inner liner 20. The housing 24 includes side walls, represented by top and bottom side walls 26 and 27 respectively, which extend forwardly to generally Z-shaped flange members at the periphery of the housing side walls.

As seen in FIG. 3, the opening 22 has in the upper door outer shell 18 a rearwardly directed peripheral flange 28. The upper double L-sectioned flange member of the housing 24 is shaped to provide first 31 and second 32 outwardly directed flange legs connected by horizontal forwardly projecting web portion 34 such that the web 34 and flange leg 32 are sealed with a sealing compound 35 around the shell flange 28 of the door opening.

A rectangular escutcheon frame member 36 is located with the rim 38 of its L-section molding contacting the outer surface of the shell 18, providing a bright or chrome-like molding around the insert housing 24. It will thus be seen that the base portion of the insert housing 24 forms an effective continuation of the outer shell 18 of the door structure. The frame member 36 is retained in the door shell opening 22 by upper securing means in the form of a pair of bullet-head fasteners 40 on housing flange leg 31 which project through holes 41 in the frame upper recessed flange 42 for engagement by slide catches 44 (FIG. 2) riveted on flange 42. As seen in FIG. 5, lower frame resilient securing means in the form of spring catches 46 slip over the shell flange 28 while the catch saw-tooth stem 48 is retained in slotted bosses 52 molded on the inner wall of frame lower recessed flange 43.

FIG. 3 shows removably supported within the housing insert 24 an add-on accessory unit or article for the refrigerator which in the disclosed form is a battery powered combination radio cassette tape recorder 60. The lower side wall 27 of the housing is provided with an upwardly extending rounded lip or barrier portion 62. Thus, with the frame 36 removed a lower rest portion of the article is inserted into the housing behind the lip portion 62 after which the upper portion of the article is moved inwardly into the housing cavity 64 to an over-center inwardly sloped position with the front face 66 of the article inwardly recessed from the face of the door. In the preferred form the article is a radio 69 and the lower rest is a radio handle 67 positioned on a resilient bushing or pad 68.

To fac the over-center location of the radio 69, the housing base portion has its upper base wall 25a sloped forwardly and downwardly from the horizontal junction 72 of the mitered corner 74 whereby base wall 25a extends about two-thirds of the overall height of the housing cavity 64 to a horizontal camming or fulcrum rib 76 which engages the back wall 77 of the radio at
a location below the midpoint thereof and preferably about one-third the vertical distance from its lower rest or handle 67. From the rib 76 the housing base wall 25b is sloped downwardly and inwardly at a defined angle with the vertical of about 8° to join the housing bottom side wall 27 at a smoothly curved fillet portion 78. It will be noted that the angle from the vertical of the upper base wall 25a is of the order of 5°. By virtue of this arrangement, it will be seen in FIG. 3 that the outer face 66 of the radio 60 is inclined rearwardly at an angle substantially equal to that of the upper base wall 25a of the housing whereby the radio center of gravity is positioned to prevent outward movement from the housing, by virtue of its over-center position.

With reference to FIG. 4 there is shown an upper radio securing means in the form of a clip member 82 having an apertured head portion for reception of knurled cylinder-head bolt 84 extending through an aligned hole in the door first flange 31 and threadably received in the door by suitable means such as the “pop rivet” fastener shown at 86. The L-shaped clip leg 87 has a foot portion 88 which engages the chamfered surface 89 of the radio casing for securely retaining the radio in the recessed cavity. Upon the removal of the frame 36 the radio retaining clip member 82 is exposed such that when the bolt 84 is loosened and the clip 82 is rotated about 90° the radio is ready to be removed for servicing. This is accomplished by exerting a force inwardly at the bottom of the radio casing, causing the upper portion thereof to be cammed forward about fulcrum rib 76 for projection beyond the face 18 of the door to a position whereby the top of the radio is exposed for ready gripping and lifting over the lower abutment means 62 for removal from the door cavity 64. It will be noted that upper and lower embossments 92 are provided on the radio rear wall 77 such that the upper embossments 92 engage the upper base wall 25a which together with the curved or arcuate camming rib 76 position the wall 77 in substantial parallel spaced relation to the base wall 25a.

As seen in FIG. 3 the deep web 94 of the frame 36 has an angle member 96 secured thereto such that its depending flange 97 provides a finger hold for gripping and removing the frame while serving to conceal from view the frame securing members 40 and bolt 84. Also perforations 98 are formed in lower recessed flange 43 to provide sound ports communicating with the speaker portion of the radio.

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

We claim:

1. A cabinet door structure having a removable appliance therein, said door comprising; an outer shell and an inner liner having insulating material sandwiched therebetween, said outer shell having a rectangular shaped opening formed therein, a recess in said insulating material coextensive with said opening, a box-shaped housing member disposed in said recess, said housing having an open front and bounded by top, side and bottom walls, and a rear base wall positioned intermediate said outer shell and said inner liner, said base wall including laterally extending upper and lower wall portions, said upper wall portion being sloped forwardly and downwardly at a defined angle away from the vertical to a horizontally disposed camming rib vertically spaced from said housing top wall, said lower base wall portion being sloped rearwardly and downwardly from said horizontal camming rib at a defined angle toward the vertical, said housing member being of the size to permit insertion of an appliance therein the rear wall of which contacts said camming rib and said upper wall portion for positioning the appliance at a rearwardly inclined angle substantially equal to the slope of said base wall upper portion whereby the appliance is supported on said housing bottom wall in an over-center position for retention in said housing member, removable retaining means positioned around the periphery of said door opening for securing the appliance in said housing member, said camming rib providing a fulcrum operative upon a force being applied inwardly adjacent the lower portion of the appliance results in the appliance lower portion being rocked rearwardly to a position whereby the appliance upper portion extends beyond the face of said door outer shell to a predetermined position wherein the top of the appliance is opened for grasping and lifting such that the appliance may be removed from the door for servicing or the like.

2. A cabinet door structure for supporting a removable appliance therein, said door comprising; an outer shell and an inner liner having insulating material sandwiched therebetween, said outer shell having a rectangular shaped opening formed therein, a recess in said insulating material coextensive with said opening, a box-shaped housing member disposed in said recess, said housing having an open front and bounded by top, side and bottom walls; and a rear base wall positioned intermediate said outer shell and said inner liner, said base wall including laterally extending upper and lower wall portions, said upper wall portion being sloped forwardly and downwardly at a defined first angle away from the vertical to a horizontally disposed camming rib vertically spaced from said housing top wall a distance of about two-thirds the overall height thereof, said lower base wall portion being sloped rearwardly and downwardly from said horizontal camming rib at a defined second angle to the vertical greater than said first angle to an area where it joins said housing bottom wall in a smoothly curved juncture, said housing member being of the size to permit insertion of an appliance therein for positioning the appliance at a rearwardly inclined angle substantially equal to the slope of said base wall upper portion whereby the appliance is supported rearward of abutment means on said housing bottom wall in an over-center position resisting outward movement from said housing, removable retaining means for securing the appliance in said housing member, said camming rib contacting the appliance rear wall and operatively to provide a fulcrum such that when a force is applied inwardly adjacent the lower portion of the appliance the appliance lower portion rocks rearwardly to a position whereby the appliance upper portion extends beyond the face of said door outer shell to a predetermined position wherein the top of the appliance is opened for grasping and lifting allowing the appliance to be lifted over said bottom wall abutment means and removed from the door for servicing or the like.

3. A refrigerator door structure for supporting a removable battery powered radio therein, said door comprising; an outer shell and an inner liner having insulating material sandwiched therebetween, said outer shell having a rectangular shaped opening formed therein including a rearwardly directed shell flange around the
periphery of said opening, a recess in said insulating material conextensive with said opening, a box-shaped housing member disposed in said recess, said housing having an open front and bounded by top, side and bottom walls, and a rear base wall positioned intermediate said outer shell and said inner liner; said housing having double L-shaped flanges around the periphery thereof providing first and second outwardly directed flanges, said second flanges being in sealed abutment with the inner surface of said outer shell, said base wall including laterally extending upper and lower wall portions, said upper wall portion being sloped forwardly and downwardly at a defined first angle of about $5^\circ$ away from the vertical to a horizontally disposed camming rib vertically spaced from said housing top wall a distance of about two-thirds the overall height thereof, said lower base wall portion being sloped rearwardly and downwardly from said horizontal camming rib at a defined second angle of about $8^\circ$ to the vertical to an area where it joins said housing bottom wall in a smoothly curved juncture, said housing member being of the size to permit insertion of the radio therein for positioning the radio at a rearwardly inclined angle substantially equal to the slope of said base wall upper portion whereby the radio is supported on said housing bottom wall in an over-center position resisting outward movement from said housing, a removable rectangular frame nested within said housing first flange for framing the radio in said housing member, removable retaining means for securing the radio in said housing member, said camming rib contacting the appliance rear wall and operative to provide a fulcrum such that when a force is applied inwardly adjacent the lower portion of the radio the upper portion of the radio rocks rearwardly whereby the radio upper portion extends beyond the face of said door outer shell to a predetermined position wherein the top of the radio is opened for grasping and lifting allowing the radio to be removed from the refrigerator door for servicing or the like.

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