

DESCRIPTION

Door Handle Structure in Refrigerators

TECHNICAL FIELD

The present invention generally relates to refrigerators and, more particularly, to a door handle structure including a door handle accessible to the user of a refrigerator for selectively opening and closing an access opening leading to the interior of the refrigerator.

BACKGROUND ART

As is well known to those skilled in the art, the refrigerator includes at least one access door hingedly supported for selectively opening and closing a refrigerating chamber. Particularly, the refrigerator for home use has not only a refrigerating chamber, but also a freezer compartment and even this type of refrigerator includes a door for each of the compartments. As a matter of course, the door is provided with a handle accessible to the user for manipulating the door.

The Japanese Laid-open Patent Publication No. 8-121943 discloses a door handle for the refrigerator door which is secured to the refrigerator door in a manner as shown in Fig. 7. Referring to Fig. 7, the refrigerator door 29 which may be used to selectively open and close the access opening leading to the refrigerating compartment is of a double-walled structure including a front panel 30 facing outside the refrigerator, a rear panel opposite to the front panel and facing the refrigerating compartment and a generally rectangular-shaped peripheral wall which is integral with the front panel 30. The front panel 30 and the peripheral wall are prepared from a single steel sheet plate by the use of a press work. A heat insulating foam 31 is filled in between the front and rear panels.

A portion of the front panel 30 adjacent one of the opposite side wall segments of the peripheral wall remote from the hinge axis about which the refrigerator door pivots between opened and closed positions is inwardly recessed to define a clearance pocket 32. A door handle 33 comprised of a handle body and a decorative covering is fixedly secured to the front panel 30 so as to overhang the clearance pocket 32 so that the user can insert his or her hand in between the bottom of the clearance pocket 32 and that overhanging portion of the door handle 33 when the door handle 33 is to be pulled to open the refrigerator door.

The illustrated prior art handle structure has some problems. In the first place, the freedom of access to the door handle is so limited that the user when trying to open the refrigerator door may often be forced to pose in an awkward position. Also, the prior art handle structure has so small a grip region that the maneuverability of the handle tends to be sacrificed. In addition, the handle structure is so complicated in shape as to reduce the ease of cleaning and, therefore, the refrigerator compartment is difficult to keep clean.

DISCLOSURE OF INVENTION

Accordingly, the present invention has been devised to substantially eliminate the above discussed problems inherent in the prior art door handle structure and is intended to provide an improved door handle structure for a refrigerator which can provide a relatively wide freedom of access, having a grip regions so large as to enhance the maneuverability of the refrigerator door.

Another important object of the present invention is to provide an improved door handle structure of the type referred to above, which includes a handle fixedly secured at one end to the refrigerator door so as to extend in one direction widthwise of the refrigerator door from one side region

of the refrigerator door remote from the hinge axis about which the refrigerator door pivots.

A further important object of the present invention is to provide an improved door handle structure of the type referred to above, wherein the
5 grip region of the door handle can be accessible from all directions, particularly from above, below and laterally of the refrigerator door, and which is easy to clean.

In order to accomplish these and other objects of the present invention, there is provided a door handle structure for a refrigerator of a type
10 including at least one access door hingedly supported at one side portion so as to move between opened and closed positions about a hinge axis to thereby selectively open and close an opening leading to a refrigerator compartment. The access door includes a front panel, a rear panel confronting the refrigerator compartment and upper and lower frame members and
15 also includes a heat insulating material filled in a space delimited by the front and rear panels and the upper and lower frame members. The door handle structure includes a generally elongated handle rigidly secured at one end to an opposite side portion of the access door remote from the hinge axis. This handle has a grip area extending widthwise of the access door.

20 In this structure, considering that the grip area of the handle extends in a direction widthwise of the access door, access to the handle can be made from above, below and laterally of the access door.

Preferably, a portion of the front panel aligned with the grip area is inwardly recessed to define a clearance pocket, to thereby minimize
25 protrusion of the handle outwardly from the front panel. This design enhances the access to the handle from above, below and laterally of the access door.

To facilitate a rigid securement of the handle to the access door, one end of the handle is designed so as to be inserted in the lower frame member on one hand and, on the other hand, a handle backing plate is

positioned inside the access door for inserted in the lower frame member. In such case, an iron plate may be engaged in a screw fitting portion.

Again preferably, a surface of that one end of the handle which is held in contact with the iron plate may be formed with a grid pattern of reinforcement ribs. Also, the handle may be treated with an anti-fungus agent
5 to keep the handle hygienically sanitary.

If desired, a surface of the grip area of the handle which confronts the front panel may be formed with surface flicks to minimize any possible slippage between the handle and the user's hand.

10 BRIEF DESCRIPTION OF DRAWINGS

The present invention will become readily understood from the following description of preferred embodiments thereof made with reference to the accompanying drawings, in which like parts are designated by like reference numeral and in which:

15 Fig. 1 is a front elevational view of a refrigerator to which the present invention is applicable;

Fig. 2 is a fragmentary sectional view, on an enlarged scale as viewed from top, of a portion of a refrigerator door showing a handle structure according to the present invention;

20 Fig. 3 is a front elevational view of the handle structure shown in Fig. 2;

Figs. 4A to 4C are rear, top and front plan views of the handle structure, respectively;

25 Figs. 5A and 5B are top and front plan view of a decorative covering fitted to the handle structure in aesthetic terms;

Fig. 6A is a fragmentary sectional view showing the manner in which a reinforcement plate for reinforcing fixture of the handle shown in Fig. 2 is fitted to a frame of the refrigerator door;

Fig. 6B is a cross-sectional view taken along the line A-A in Fig. 2; and

Fig. 7 is a fragmentary sectional view, similar to Fig. 2, showing the prior art handle structure.

5 BEST MODE FOR CARRYING OUT THE INVENTION

Referring first to Fig. 1, there is shown a home-use refrigerator of an upright design including a generally rectangular box-like casing 1, the interior of which is divided into a plurality of compartments. The illustrated refrigerator has a top compartment, a bottom compartment and two intermediate compartments. While the two intermediate compartments and the bottom compartments accommodate therein respective sliding drawer boxes and each sliding drawer box has a front panel assembly 22a, 22b or 23, the top compartment is closed by a refrigerator door 2 of a generally rectangular configuration.

15 The refrigerator door 2 has a right side portion hinged to the box-like casing 1 for selectively opening and closing an access opening leading to the top compartment and includes top and bottom door frame members 3a and 3b, a door panel assembly generally comprised of a front panel 4 and a rear panel, and a heat insulating material 5 filled in a space between the front panel 4 and the rear panel. This refrigerator door 2 has a generally elongated handle 6 rigidly secured to a bottom left corner area of the refrigerator door 2 so as to extend a predetermined distance substantially horizontally in a direction widthwise of the refrigerator door 2 from a position adjacent the left side portion thereof towards the right side portion thereof. In a manner as will
20 subsequently be described, except for one end of the handle 6 which is secured to the refrigerator door 2, the handle 6 overhangs a clearance pocket 21 defined by inwardly recessing a bottom left corner area of the front panel
25

4 which is remote from the hinge axis, shown by the phantom line H, about which the refrigerator door 2 pivots.

As best shown in Figs. 2 to 6B, the elongated handle 6 has a generally square fixing area 8 defined at that end thereof and adapted to be rigidly secured to that bottom left corner area of the front panel 4 by means of a plurality of set screws 7, a mount 9 adapted to be rigidly secured to a left portion of the lower door frame member 3b and a grip area 10 extending horizontally from the fixing area 8. This elongated handle 6 is made of a hard synthetic resin added, or otherwise coated, with an anti-fungus agent. The fixing area 8 of the handle 6 has one surface formed with a grid pattern of reinforcement ribs 12 and also formed with a plurality of, for example, two, screw holes 11 defined therein and a positioning boss 13 protruding therefrom in a direction facing the rear panel of the refrigerator door panel assembly.

To secure a distance between the set screws 7, by which the handle 6 is fitted to the refrigerator door 2 in the manner which is described subsequently, within a limited space represented by the square fixing area 8 at one end of the handle, the screw holes 11 are positioned spaced diagonally within the fixing area 8 as best shown in Fig. 4C. The mount 9 is, as shown in Figs. 3 and 4C, made up of a stay 14 for temporary mounting, which protrudes downwardly, and a mounting rib 15 positioned between the fixing area 8 of the handle and the downwardly protruding stay 14 and is adapted to be snugly received in a socket 26 defined in the lower door frame member 3b as shown in Fig. 6B. The grip area 10 of the handle 6 has minute surface indentations or surface flecks 16 formed on one of opposite surfaces (that is, a rear surface) thereof confronting the front panel 4 as shown in Fig. 4A.

Reference numeral 17 represents a screw fastening iron plate disposed in the set screws 7 of the handle 6. Reference numeral 18 represents a handle backing plate made of iron. This handle backing plate 18 includes, as best shown in Figs. 6A and 6B, a temporarily mounting rib 19 and

flat tongue 20, both of which are adapted to be received snugly in a socket defined in the lower door frame member 3b as will be described later.

As shown in Fig. 1, the front panel assemblies 22a, 22b and 23 of the sliding drawer boxes have respective handles generally identified by 24.

5 These handles 24 are positioned intermediate of the width thereof so as to lie in the same vertical plane generally parallel to the plane of openings of the refrigerator compartments. When the handle 6 is secured to the refrigerator door 2, the handle 6 is also so positioned as to lie in the same vertical plane in which the handles 24 lie.

10 Hereinafter, the manner by and in which the handle 6 is rigidly secured to the refrigerator door 2 will be described.

The backing plate 18 is temporarily mounted on the lower door frame member 3b with the tongue 20 thereof inserted in the lower door frame 3b and with the mounting rib 19 engaged with a pawl 26 rigid or integral with the lower door frame 3b, followed by filling of the heat insulating material 5 in the space between the front panel 4 and the rear panel of the door pane assembly. On the other hand, the handle 6 is temporarily fitted with the stay 14 inserted into the socket 26 in the lower door frame 3b and, thereafter, the screw fastening iron plate 17 is temporarily fitted to the fixing area 8 of the handle by means of the positioning boss 13. After this temporary mounting, the handle 6 is rigidly secured to the refrigerator door 2 by means of the set screws 7 which pass through the iron plate 17 and are, after having traversed the thickness of the fixing area 8, firmly fastened to the backing plate 18.

25 In the condition in which the handle 6 is rigidly secured to the refrigerator door 2 at the definite location, the handle 6, particularly the fixing area 8 thereof, and the front panel 4 are firmly sandwiched between the iron plate 17 and the backing plate 18 as clearly shown in Fig. 2.

Finally, a decorative covering 27 shown in Figs. 5A and 5B is fitted to a front surface of the handle 6 with engagement ribs 38 at its opposite

ends firmly engaged to associated end portions of the handle 6. After or before the fitting of the decorative covering 27, the refrigerator door 2 is hinged to the refrigerator casing 1 to thereby complete the refrigerator.

Considering that the grip area 10 of the handle 6 overhangs the clearance pocket 21 in the refrigerator door 2 while extending substantially horizontally, access to the handle 6 can be made from above, below and laterally of the refrigerator door 2. Even though when the refrigerator door 2 is selectively opened or closed, a tensile force may act on the fixing area 8 of the handle 6 and the set screw 7 and a shearing force may also act from above or below, the handle structure according to the present invention is so designed as to allow the iron plate 17 to receive the tensile force and as to allow the mounting rib 15 and the lower door frame 3b to receive the shearing force. Thus, it is clear that the handle structure of the present invention provides a relatively wide freedom of access to the handle and is easy to clean the handle.

In addition since the handle protrudes a minimized amount outwardly from the front panel of the refrigerator door and lies in the same vertical plane in which the handles 24 lie, not only is there no possibility that the angle of pivot of the refrigerator door between the opened and closed positions may be narrowed, but also there is no possibility of the user's clothing being caught by the handle. The formation of the minute surface indentations or flecks 16 on the rear surface of the grip area 10 of the handle 6 is effective to minimize the possibility of slippage to thereby enhance the maneuverability of the refrigerator door.

The addition of the anti-fungus agent to the handle 6 is effective to keep the handle hygienically sanitary.

Also, considering that the handle structure according to the present invention is so designed and so structured that the mounting rib 15 can be inserted in the lower door frame 3b, not only can the refrigerator door

be prevented from undergoing a rattling motion in a vertical direction, but also a sufficient physical strength can be secured. In addition, with respect to the tensile strength which would act on the fixing area of the handle during selective opening or closure of the refrigerator door, the reinforcing iron plate
5 17 is fastened in contact with the reinforcement ribs 12 by means of the set screws 7 so that not only can the surface area to be fastened be considerably increased to thereby increase the physical strength, but also the possibility of the set screws 7 being sunk into the resinous material forming the handle and/or being loosened can be avoided.

10 Although the present invention has been described in connection with the preferred embodiments thereof, it should be noted that various changes and modifications are apparent to those skilled in the art. Accordingly, such changes and modifications so far as encompassed by the appended claims are to be understood as included within the scope of the
15 present invention.



CLAIMS

1. A door handle structure for a refrigerator of a type including at least one access door (2) hingedly supported at one side portion so as to move between opened and closed positions about a hinge axis (H) to thereby
5 selectively open and close an opening leading to a refrigerator compartment, said access door (2) including a front panel (4), a rear panel confronting the refrigerator compartment and upper and lower frame members (3a, 3b) and also including a heat insulating material (5) filled in a space delimited by the front and rear panels and the upper and lower frame members (3a, 3b), said
10 door handle structure comprising:
a generally elongated handle (6) rigidly secured at one end to an opposite side portion of the access door (2) remote from the hinge axis (H), said handle (6) having a grip area (10) extending widthwise of the access door (2).
- 15 2. The door handle structure as claimed in Claim 1, wherein a portion of the front panel (4) aligned with the grip area (10) is inwardly recessed to define a clearance pocket (21), to thereby minimize protrusion of the handle (6) outwardly from the front panel (4).
3. The door handle structure as claimed in Claim 1, wherein said
20 one end (8) of the handle is designed so as to be inserted in the lower frame member (3b).
4. The door handle structure as claimed in Claim 1, further comprising an iron plate (17) engaged in a screw fitting portion and wherein a surface of said one end of the handle (6) which is held in contact with the iron
25 plate (17) is formed with a grid pattern of reinforcement ribs (12).



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5. The door handle structure as claimed in Claim 1, further comprising a handle backing plate (18) positioned inside the access door (2) and designed to be inserted in the lower frame member (3b).
6. The door handle structure as claimed in Claim 1, wherein the
5 handle (6) is treated with an anti-fungus agent.
7. The door handle structure as claimed in Claim 1, wherein a surface of the grip area (10) of the handle (6) which confronts the front panel (4) is formed with surface flecks (16).

Fig. 1

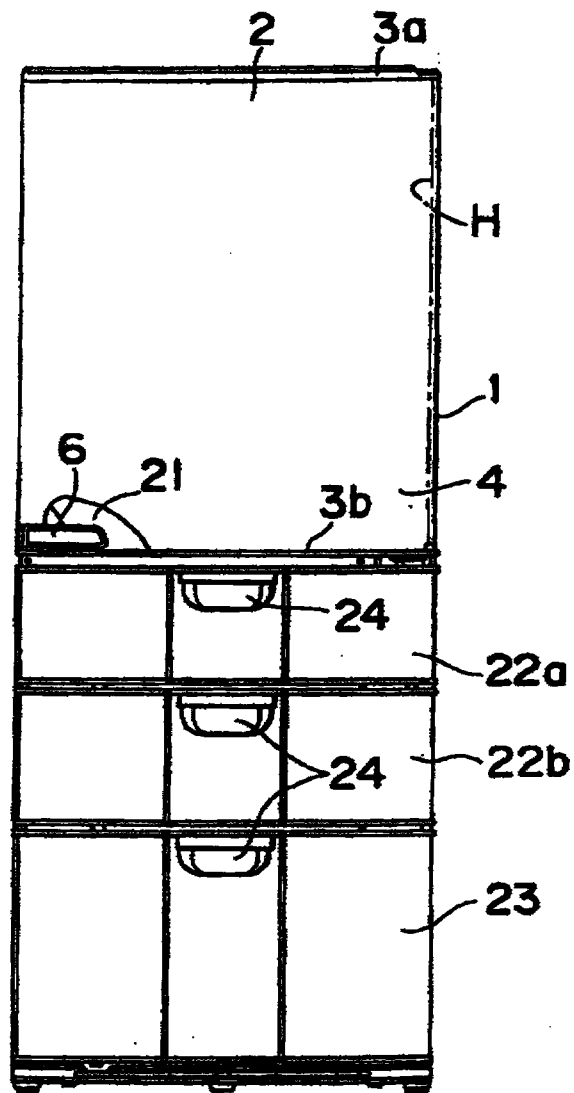


Fig. 2

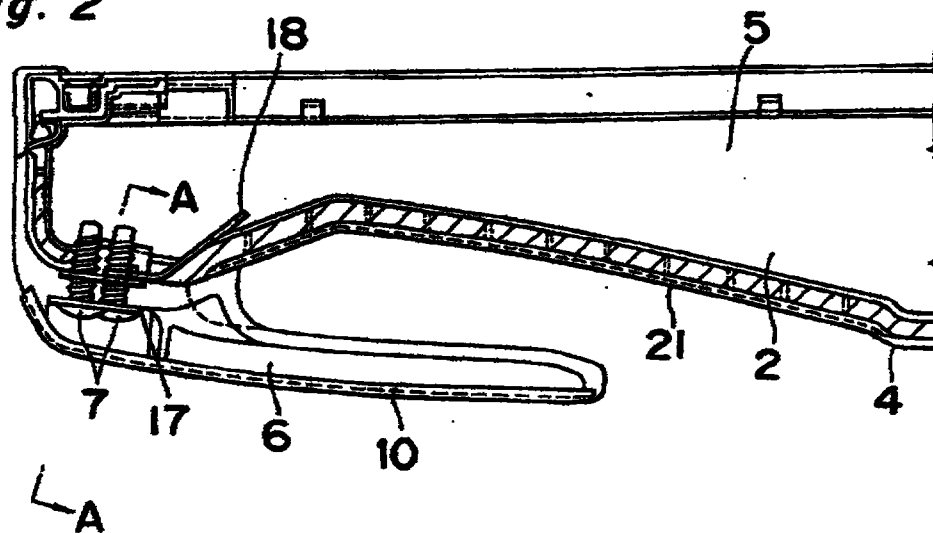


Fig. 3

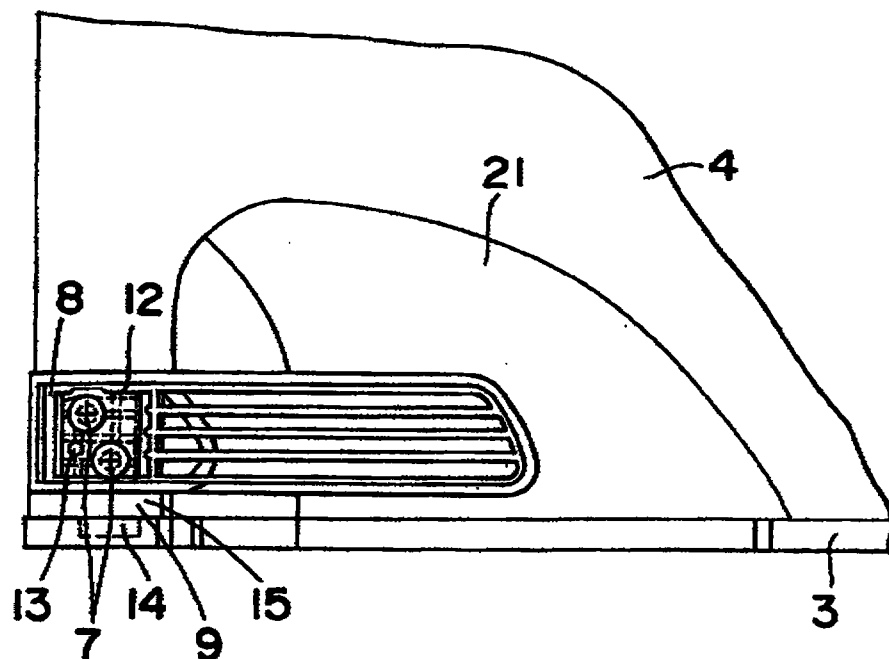


Fig. 4A

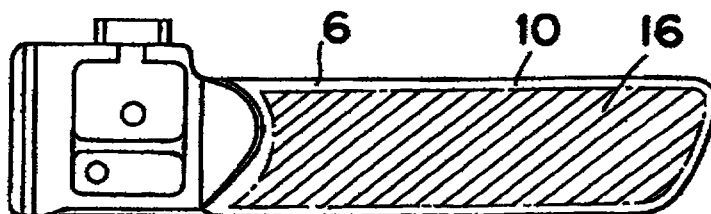


Fig. 4B

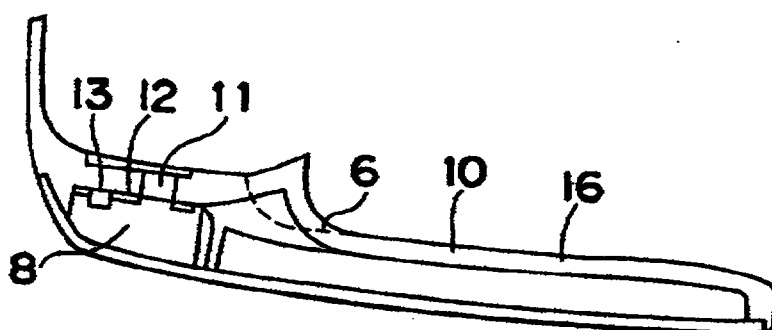


Fig. 4C

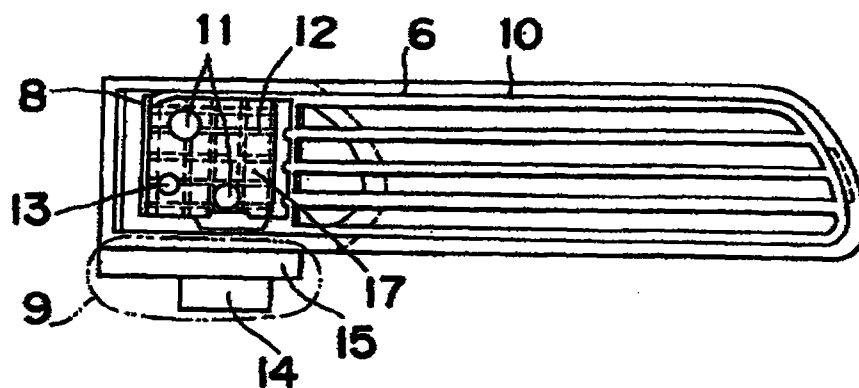


Fig. 5A

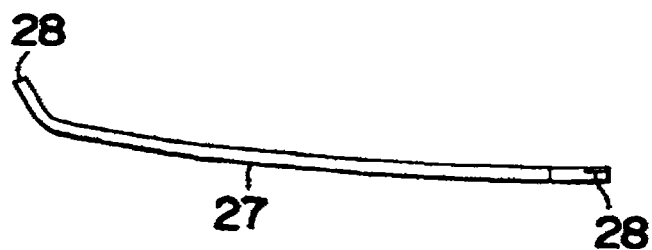


Fig. 5B

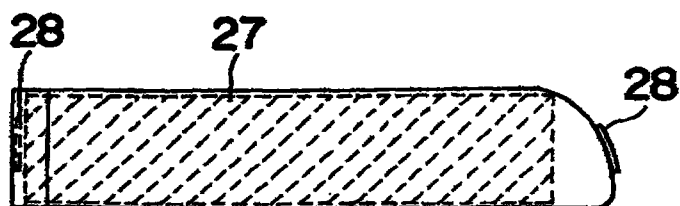


Fig. 6A

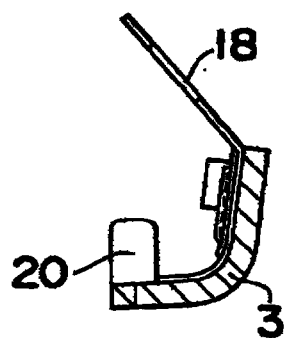


Fig. 6B

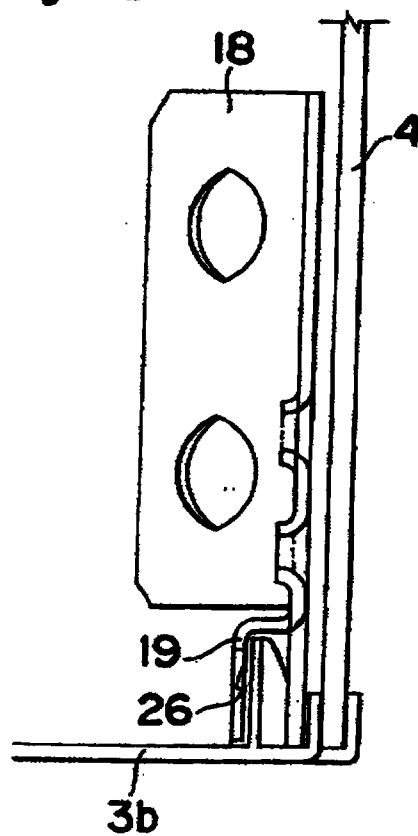
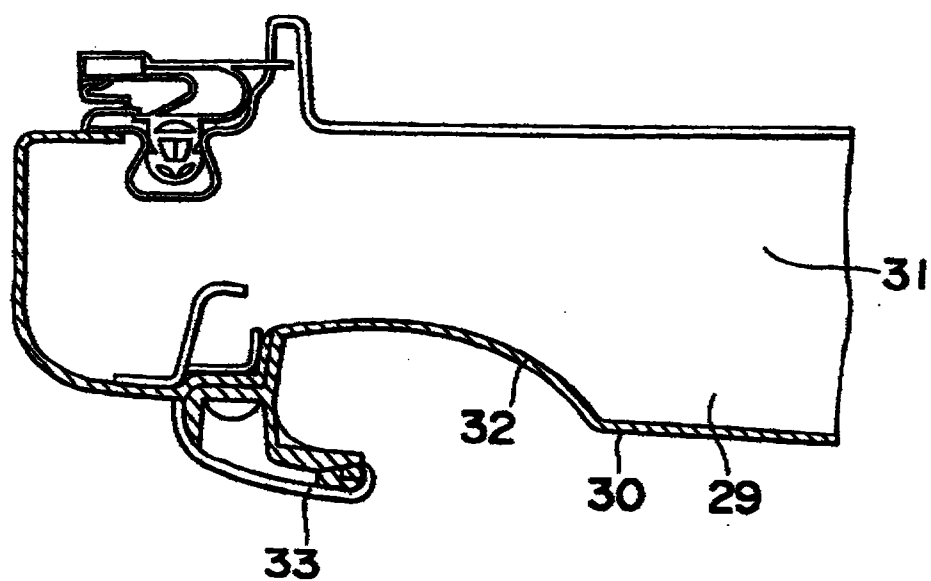


Fig. 7





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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : F25D 23/02	A1	(11) International Publication Number: ✓WO 98/05908 (43) International Publication Date: 12 February 1998 (12.02.98)
(21) International Application Number: ✓ PCT/JP97/02736 (22) International Filing Date: ✓ 6 August 1997 (06.08.97) (30) Priority Data: 8/208154 ✓ 7 August 1996 (07.08.96) JP (71) Applicant (for all designated States except US): MAT-SUSHITA REFRIGERATION COMPANY [JP/JP]; 2-5, Takaidahondori 4-chome, Higashiosaka-shi, Osaka 577 (JP). ✓ (72) Inventors; and (75) Inventors/Applicants (for US only): KUROSHIMA, Atsushi [JP/JP]; 4-9, Nojihigashi 3-chome, Kusatsu-shi, Shiga 525 (JP). KAWAMURA, Tadahiro [JP/JP]; 1295-6, Ishibe, Ishibe-cho, Koka-gun, Shiga 520-31 (JP). MORIMOTO, Katsuhiko [JP/JP]; 29-22, Wakabadai, Otsu-shi, Shiga 520 (JP). ADACHI, Tadashi [JP/JP]; 31-10, Ohira 2-chome, Otsu-shi, Shiga 520 (JP). MORIKIYO, Kazuhiro [JP/JP]; 3-5, Beppo 1-chome, Otsu-shi, Shiga 520 (JP). (74) Agents: AOYAMA, Tamotsu et al.; Aoyama & Partners, IMP Building, 3-7, Shiromi 1-chome, Chuo-ku, Osaka-shi, Osaka 540 (JP).		(81) Designated States: CN, KR, SG, US, VN. Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: DOOR HANDLE STRUCTURE IN REFRIGERATORS (57) Abstract A door handle structure for a refrigerator of a type including at least one access door (2) hingedly supported at one side portion so as to move between opened and closed positions about a hinge axis (H) to thereby selectively open and close an opening leading to a refrigerator compartment. The access door (2) includes a front panel (4), a rear panel confronting the refrigerator compartment and upper and lower frame members (3a, 3b) and also includes a heat insulating material (5) filled in a space delimited by the front and rear panels and the upper and lower frame members (3a, 3b). The door handle structure includes a generally elongated handle (6) rigidly secured at one end to an opposite side portion of the access door (2) remote from the hinge axis (H). This handle (6) has a grip area (10) extending widthwise of the access door (2).		