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(71) Applicant: **Carroll, Francis Alfred**
"Nine Bean Rows"
Seafield Knocknahur County Sligo(IE)

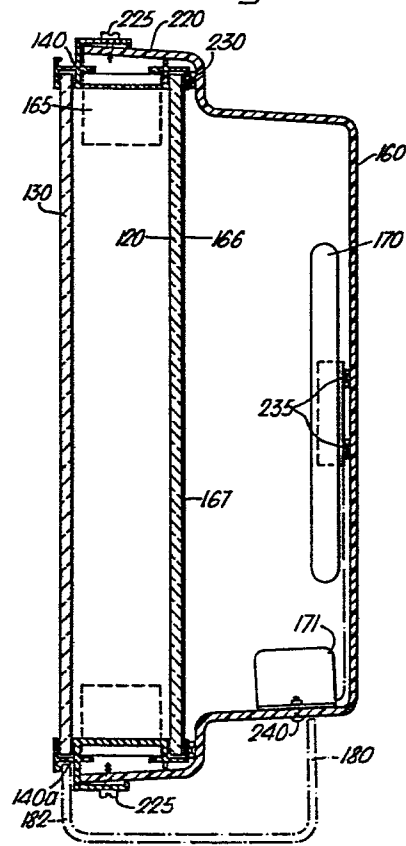
(72) Inventor: **Carroll, Francis Alfred**
"Nine Bean Rows"
Seafield Knocknahur County Sligo(IE)

(74) Representative: **Fisher, Bernard et al,**
Raworth, Moss & Cook 36 Sydenham Road
Croydon Surrey CR0 2EF(GB)

(54) **A display device.**

(57) A display device comprises a frame 150 supporting in parallel spaced apart relationship a sheet of reflective glass 130 and a mirror 120. The mirror 120 is etched to define the outline of matter to be displayed. A lighting unit 170 which is encased in a housing 160 fixed to the frame 150 is located on the side of the mirror 120 remote from the sheet of reflective glass 130. Light from the lighting unit 170 projects the matter to be displayed onto the sheet of reflective glass 130 so that when the display is viewed from the side of the sheet of reflective glass 130 remote from the mirror 120 there is produced a multiple reflection of matter to be displayed. A proportion of the matter to be displayed is printed onto a light diffuser sheet 167 provided between the mirror 120 and the lighting unit 170. A photographically produced colour transparency 166 of the remainder of the matter to be displayed is secured between the diffuser sheet 167 and the mirror 120.

Fig. 3.



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A DISPLAY DEVICE

The present invention relates to a display device, particularly to a display device for advertising material.

5 The invention provides a display device in which light from a light source projects matter to be displayed through a mirror, which has been etched or otherwise prepared to define the outline of matter to be displayed, onto a sheet of reflective glass so that when the display is viewed from the side of the sheet of
10 reflective glass remote from the mirror, there is produced a multiple reflection of the matter to be displayed, characterised in that the display device comprises a frame supporting in parallel spaced apart relationship the sheet of reflective glass and the
15 mirror facing the sheet of reflective glass, a light diffuser between the mirror and the light source, the light source being encased in a housing fixed to the frame and located on the side of the mirror remote from the sheet of reflective glass, and a carrier
20 bearing matter to be displayed located between the light diffuser and the mirror.

Preferably, the carrier comprises a transparency secured between the diffuser and the mirror. The transparency may be a photographically produced colour
25 transparency.

Conveniently, the light diffuser comprises a sheet of translucent material, the sheet bearing a portion of

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the matter to be displayed on the surface of the sheet remote from the light source.

Advantageously, the frame comprises a plurality of framing members, each framing member being fabricated from an elongate extrusion defining a pair of spaced apart mutually parallel U-shaped channels internally of the frame, one of the pair of channels in each framing member locating and supporting the mirror, and the other pair of channels in each framing member locating and supporting the sheet of reflective glass.

Advantageously, the frame is provided with attachment means comprising an elongate attachment channel on the other side of the extrusion, with the attachment channel being adapted to receive and retain the mouth of the housing.

Preferably, the attachment channel comprises a flange and a strut remote from the flange, the strut and the flange co-operating to resiliently engage the mouth of the housing.

A non-reflecting surface may be provided between the U-shaped channels, the non-reflecting surface comprising a surface of the extrusion having a plurality of grooves.

The invention also provides a method of manufacturing a display device, the method being characterised by the following steps:

fabricating a framing member from an elongate

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extrusion on one side of which are provided a pair of spaced apart, mutually parallel, U-shaped channels, each of the channels being adapted to receive and locate the edge of a mirror or a sheet of reflective glass, a
5 second side of the extrusion having an attachment channel the entry to which faces in a direction generally at right angles to the U-shaped channels;

joining together three framing members to form a U-shaped receiver;

10 locating a mirror which is etched or otherwise prepared to define the outline of matter to be displayed, and a sheet of reflective glass in spaced apart relationship in the U-shaped channels in the receiver;

15 fitting a fourth framing member as a cover onto the receiver;

locating a carrier bearing material to be displayed and a light diffuser against the rear of the reflecting surface of the mirror;

20 fitting into the attachment channels on the second sides of the four framing members the mouth of a housing in which is located a light source, the mouth of the housing being fitted in a direction at approximately right angles to the mirror and the sheet of reflective
25 glass, and securing the mouth of the housing in position.

The invention further provides a method of

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producing an illuminated display, the method being characterised by the following steps:-

preparing a mirror by etching clear areas corresponding to the outline of material to be displayed, holding the mirror in spaced apart relationship from a sheet of reflective glass, securing a transparency of material to be displayed against the rear of the mirror, positioning a diffuser sheet over the transparency and illuminating the diffuser sheet so that the image of the material on the transparency is projected through the clear areas of the mirror onto the sheet of reflective glass, so that when the display is viewed from the side of the sheet of reflective glass remote from the mirror, there is produced a multiple reflection of the display.

The invention will now be more particularly described with reference to the accompanying drawings which show, by way of example only, a preferred embodiment of the invention. In the drawings:

Figure 1 is a side elevation of a display device according to the invention;

Figure 2 is a part front elevation of the display device;

Figure 3 is a typical side elevational sectional view of the display device;

Figure 4 is a cross section of an extrusion used to form framing members for the display device;

Figure 5 is a plan view of a back panel or housing

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for the display device;

Figure 6 is a sectional view taken along AA' of Figure 5; and

Figure 7 is a section view taken along BB' of Figure 5.

Referring to the drawings, the display device comprises a plane mirror 120 and a sheet of reflective glass 130 held in spaced apart relationship at their edges by four framing members 140. Each framing member 140 is mitred at each end so that the framing members may be joined to form a rectangular frame 150 for the display device.

Positioned behind the mirror 120 is a back panel or housing 160 which contains a fluorescent lighting unit 170 and a transformer 171 for operating the lighting unit. The housing 160 is supported by the framing members 140. The display device is also provided with a stand 180 which is supported by the lower framing member 140a.

Referring to Figures 3 and 4, the framing members 140 are each formed from an elongate extrusion of high impact polyvinyl chloride (PVC). Integrally formed in the extrusion are U-shaped channels 142 and 143 which support respectively the sheet of reflective glass 130 and the mirror 120. Provided at the mouths of the U-shaped channels 142 and 143 are pairs of off-set gripping lips 144. Extending between the U-shaped

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channels 142 and 143 is a wall 145 which is provided with a plurality of grooves so as to provide a non-reflective surface between the mirror 120 and the sheet of reflective glass 130. The use of a black pigment in the PVC extrusion assists in making the wall 145 a non-reflecting surface. Also integrally formed on the extrusion as an element of each framing member 140 is a support channel 147 having an L-shaped lip 148 which is adapted to engage and disengage with leg 182 of the stand 180. The other face of the wall 145 together with two overhanging ridged grips 149 forms a slot 152 which is used in constructing the frame 150. Spaced from the slot 152 is a housing attachment channel 155 which is defined by a flange 156 having an inwardly facing verge 157, and a strut 158.

Figures 2 and 3 illustrate how the frame 150 is constructed from the framing members 140. A leg 165a of an aluminium angle corner piece 165 is inserted into the slot 152 at each mitred end of the lower framing member 140a. A light shim is attached to the inside of each leg of the corner pieces 165 using a double sided adhesive pad to ensure that the corner pieces are held in position by friction (the pads or shims are not shown in the drawings). A slot 152 of a framing member 140 is placed over the upstanding leg 165b of each corner piece 165 and pushed into engagement to form a U-shaped receiver. The mirror 120 and the sheet of reflective

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glass 130 are then positioned in the U-shaped channels 142 and 143 of the three framing members 140 of the U-shaped receiver. The frame is then completed using a fourth framing member 140 and two further corner pieces 165.

The constructional details of the housing 160 are shown in Figures 5 to 7. The housing 160 as shown in plan view is generally rectangular in shape. The back wall 200 of the housing 160 is provided with a keyhole slot 210 to enable the display device to be mounted on a wall by a screw or the like (not shown). The edge portion 220 of the housing is sloped at an angle for insertion into and co-operation with the attachment channels 155. When the edge portion 220 is underneath the flange 156 and pressing down on the strut 158, a self tapping screw 225 is screwed into the edge portion 220 from the flange 156 so as to secure the housing in position in the frame. A total of four screws 225 are used to secure the housing 160. A number of single sided adhesive sponge pads 230 are attached to the framing members 140 at the area of contact between the frame 150 and the main body of the housing 160 to assist in securing the back panel in position.

The lighting unit 170 is attached to the back wall 200 of the housing 160 by double sided adhesive pads 235 and the transformer 171 is attached to the housing by plastic pop rivets 240. The inner surface of the

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housing 160 is white so as to reflect the light from the fluorescent lighting unit 170 on to the rear of the mirror 120 which is chemically etched to define a display or the outline of a display. The outer surface of the housing 160 is dark coloured so as to provide a non-reflecting surface for stray light. To provide for the two different coloured surfaces, the housing 160 is vacuum formed from a laminate plastics material.

A light diffuser sheet 167 is secured to the rear of the reflecting surface of the etched mirror 120. The light diffuser sheet 167 is a sheet of translucent material (e.g. flexible P.V.C.) which is placed in front of the lighting unit 170 to achieve even distribution of light and to bear screen printing of matter to be displayed. The lighting unit 170 projects the display through the etched mirror 120 onto the sheet of reflective glass 130 which reflects the display back to the mirror 120 which in turn reflects the display back to the sheet of reflective glass and so on, thus achieving a multiple reflection of the display. Such a multiple reflection is known as "an infinity effect". The multiple reflection of the display is only achieved when the light to the rear of the sheet of reflective glass 130 (i.e. lighting unit 170) is more intense than the light to the front of the sheet of reflective glass 130.

The display device may be used as a point of sale

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advertising device or a decorative device and may be used for example, in hotels, lounges, clubs or homes.

The production of an illuminated display by the method just described is technically limited by the screen printing process used to reproduce the display material matter on the light diffuser sheet. A significantly better effect can be achieved by using a transparency 166 in place of all or a part of the screen printing.

10 A display device for advertising a product such as a liqueur would ideally contain (1) a mirror 120 etched to define the outline of the matter to be displayed, (2) a light diffuser sheet 167 screen printed to provide a proportion (e.g. lettering) of the display and (c) a
15 photographically produced colour transparency 166 of a bottle of liqueur. The transparency 166 is secured to the rear of the mirror 120 between the latter and the diffuser sheet 167. The screen printed display produces a bold clear display of the printed matter and the
20 transparency 166 produces a detailed image of the bottle of almost three dimensional clarity.

The above display arrangements can also be used with other display devices such as, for example, illuminated clocks.

25 The method of producing display images described is particularly suited for point of sale advertising devices, but has numerous other applications.

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CLAIMS:

1. A display device in which light from a light source (170) projects matter to be displayed through a mirror (120), which has been etched or otherwise prepared to
5 define the outline of matter to be displayed, onto a sheet of reflective glass (130) from which it is reflected onto the mirror and back onto the sheet of reflective glass, so that when the display is viewed
10 from the mirror, there is produced a multiple reflection of the matter to be displayed, characterised in that the display device comprises a frame (150) supporting in parallel spaced apart relationship the sheet of reflective glass and the mirror facing the sheet of
15 reflective glass, a light diffuser (167) between the mirror and the light source, the light source being encased in a housing fixed to the frame and located on the side of the mirror remote from the sheet of reflective glass, and a carrier (166) bearing matter
20 to be displayed located between the light diffuser and the mirror.
2. A display device as claimed in Claim 1, in which the carrier comprises a transparency secured between the diffuser and the mirror.
- 25 3. A display device as claimed in Claim 2, in which the transparency is a photographically produced colour transparency.

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4. A display device as claimed in any one of the preceding claims in which the light diffuser comprises a sheet of translucent material, the sheet bearing a portion of the matter to be displayed on the surface of the sheet remote from the light source.

5. A display device as claimed in any one of the preceding claims, in which the frame comprises a plurality of framing members (140), each framing member being fabricated from an elongate extrusion defining a pair of spaced apart mutually parallel U-shaped channels (142,143) internally of the frame, one of the pair of channels in each framing member locating and supporting the mirror, and the other pair of channels in each framing member locating and supporting the sheet of reflective glass.

6. A display device as claimed in Claim 5, including attachment means comprising an elongate attachment channel (155) on the other side of the extrusion, the attachment channel being adapted to receive and retain the mouth of the housing.

7. A display device as claimed in Claim 6, in which the attachment channel comprises a flange (156), and a strut (158) remote from the flange, the strut and the flange co-operating to resiliently engage the mouth of the housing.

8. A method of manufacturing a display device, the method being characterised by the following steps:-

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fabricating a framing member from an elongate extrusion on one side of which are provided a pair of spaced apart, mutually parallel, U-shaped channels, each of the channels being adapted to receive and locate the edge of a mirror or a sheet of reflective glass, a
5 second side of the extrusion having an attachment channel the entry to which faces in a direction generally at right angles to the U-shaped channels;

joining together three framing members to form a
10 U-shaped receiver;

locating a mirror which is etched or otherwise prepared to define the outline of matter to be displayed, and a sheet of reflective glass in spaced apart relationship in the U-shaped channels in the
15 receiver;

fitting a fourth framing member as a cover onto the receiver;

locating a carrier bearing material to be displayed and a light diffuser against the rear of the reflecting
20 surface of the mirror;

fitting into the attachment channels on the second side of the four framing members the mouth of a housing in which is located a light source, the mouth of the housing being fitted in a direction at approximately
25 right angles to the mirror and the sheet of reflective glass, and securing the mouth of the housing in position.

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9. A method of producing an illuminated display, the method being characterised by the following steps:-

preparing a mirror by etching clear areas corresponding to the outline of material to be displayed, holding the mirror in spaced apart relationship from a sheet of

reflective glass, securing a transparency of material to be displayed against the rear of the mirror, positioning

a diffuser sheet over the transparency and illuminating the diffuser sheet so that the image of the material on

the transparency is projected through the clear areas of the mirror onto the sheet of reflective glass, so that

when the display is viewed from the side of the sheet of reflective glass remote from the mirror, a multiple reflection of the display is produced.

Fig. 1.

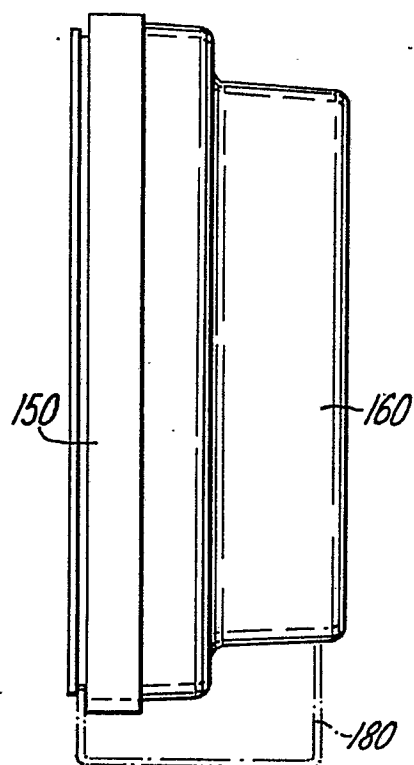


Fig. 2.

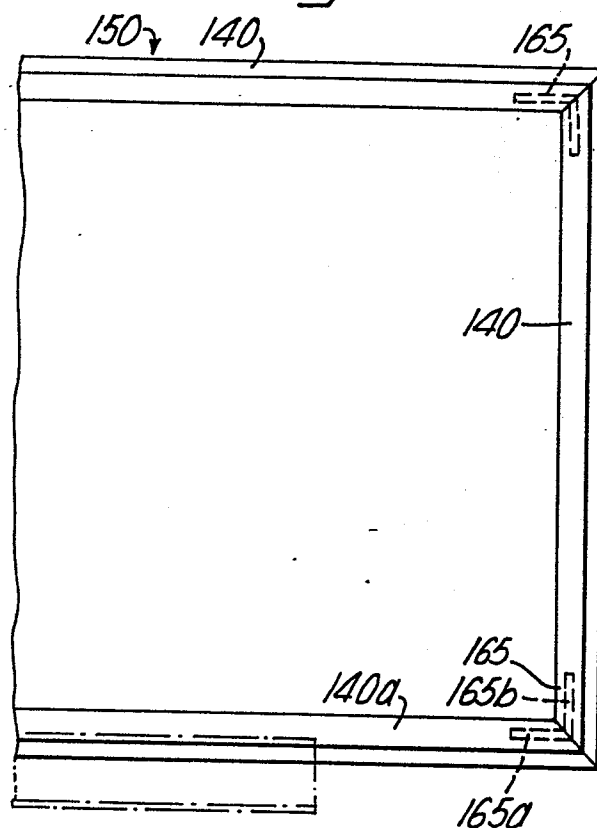
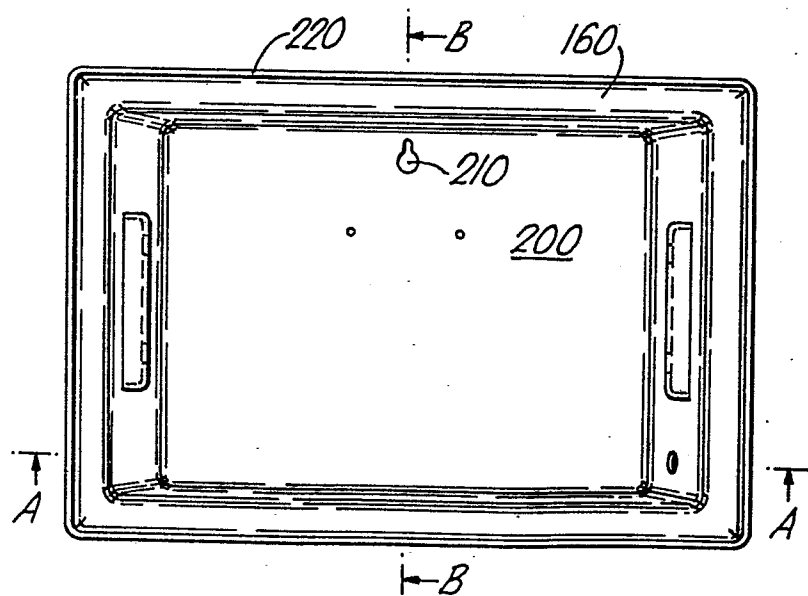
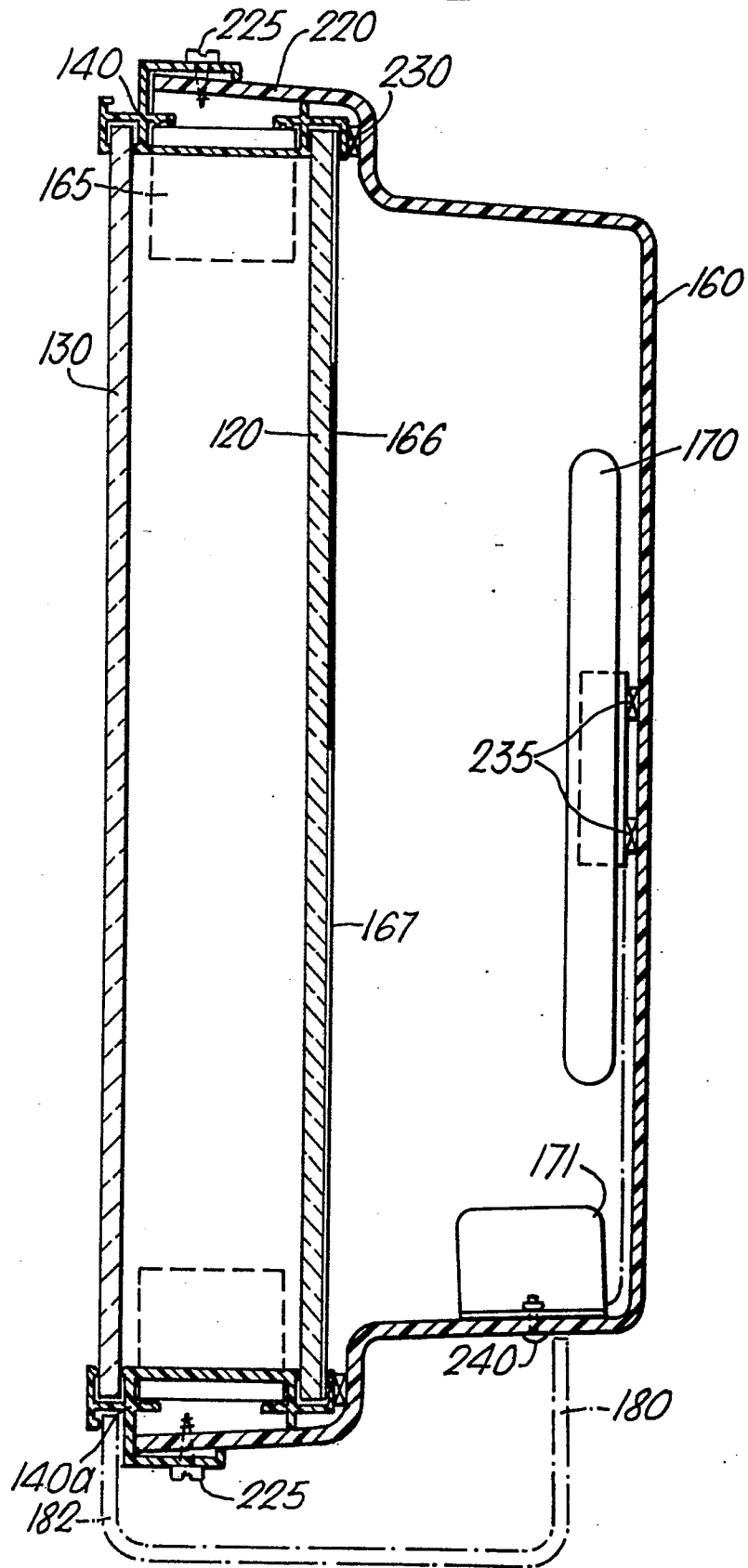


Fig. 5.

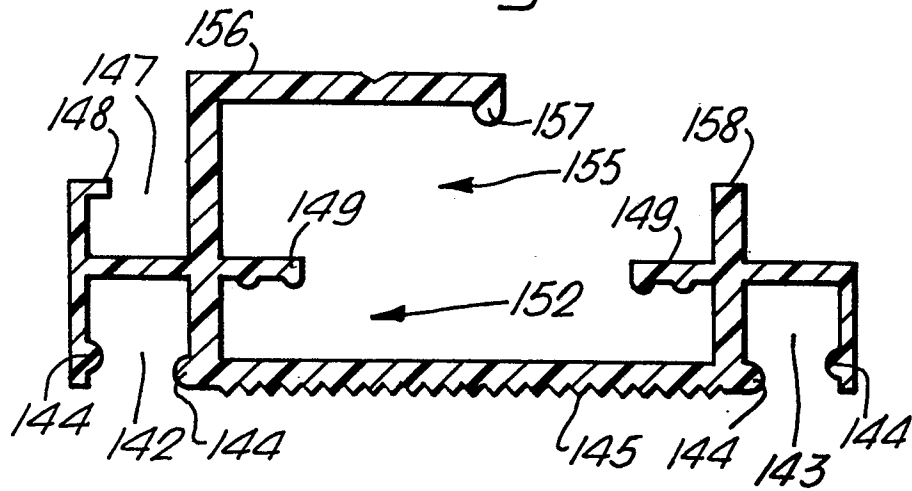
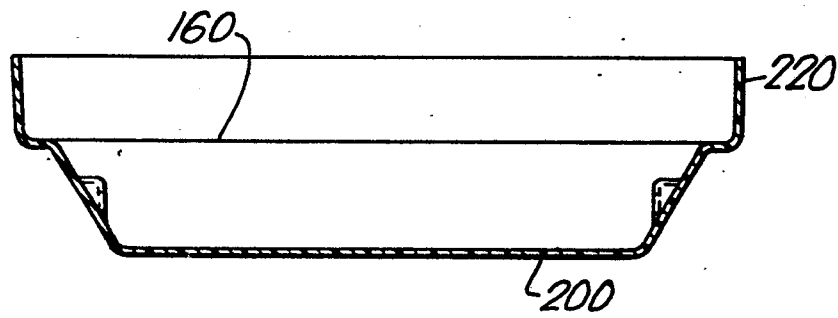


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Fig. 3.



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Fig. 4.*Fig. 6.**Fig. 7.*