

Oct. 21, 1969

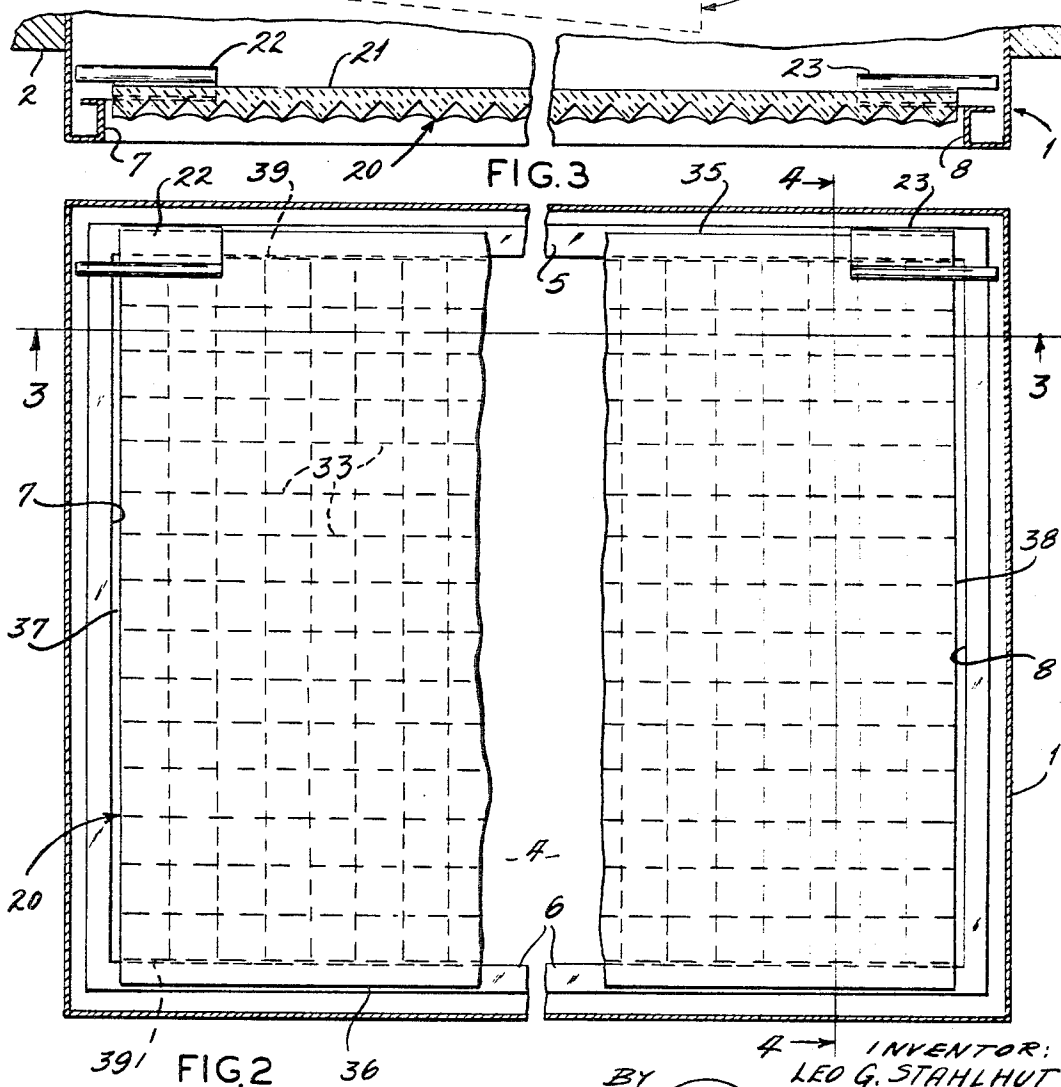
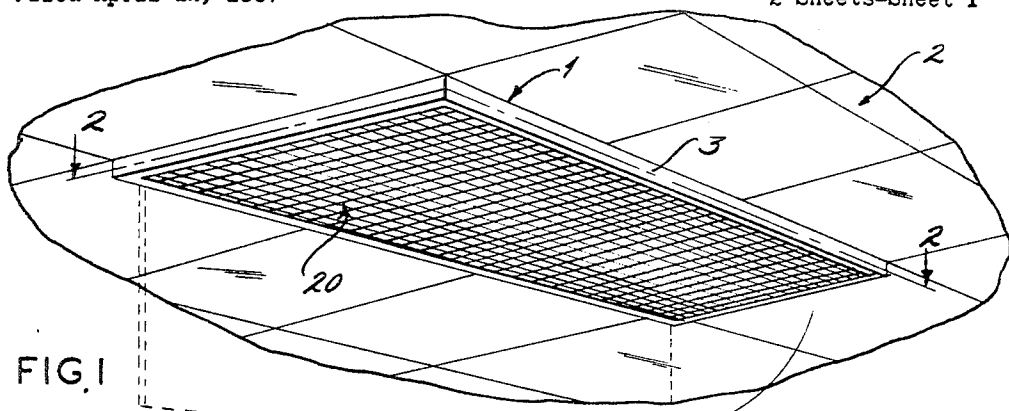
L. G. STAHLHUT

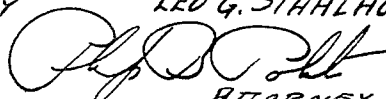
3,473,280

LAY-IN ENCLOSURE

Filed April 12, 1967

2 Sheets-Sheet 1



4 → INVENTOR:
LEO G. STAHLHUT
BY  ATTORNEY.

Oct. 21, 1969

L. G. STAHLHUT

3,473,280

LAY-IN ENCLOSURE

Filed April 12, 1967

2 Sheets-Sheet 2

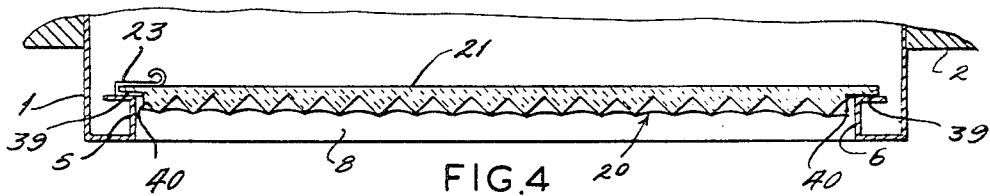


FIG. 4

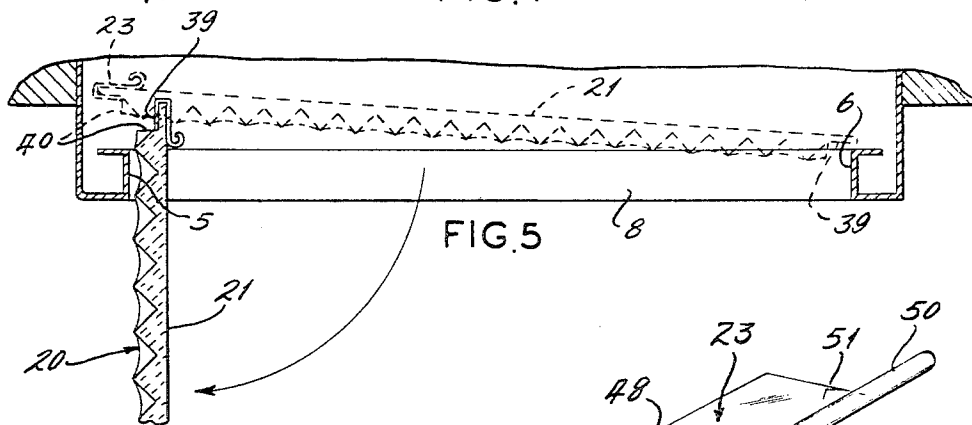


FIG. 5

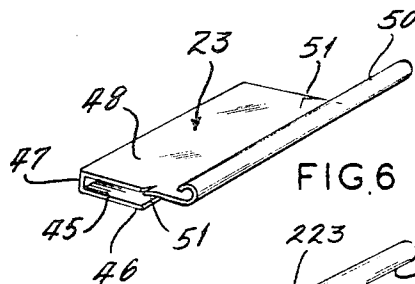


FIG. 6

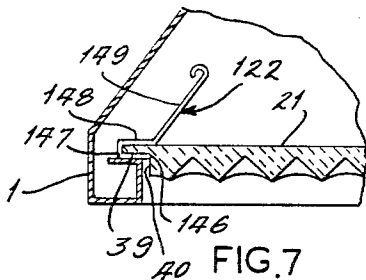


FIG. 7

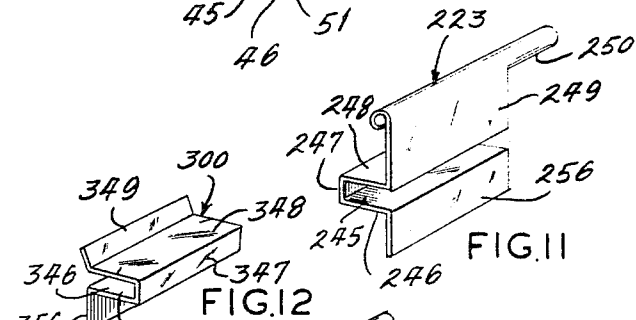


FIG. 12

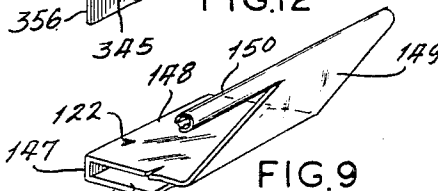


FIG. 9

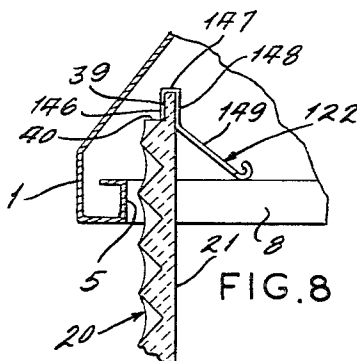


FIG. 8

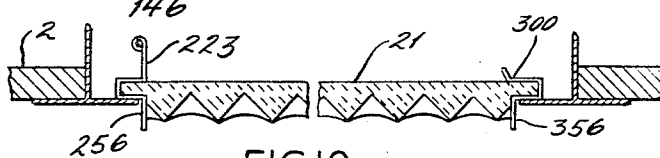


FIG. 10

INVENTOR:
LEO G. STAHLHUT
BY *[Signature]*
ATTORNEY,

1

3,473,280

LAY-IN ENCLOSURE

Leo G. Stahlhut, Kirkwood, Mo., assignor to K-S-A, Inc., St. Louis, Mo., a corporation of Missouri
 Filed Apr. 12, 1967, Ser. No. 630,348
 Int. Cl. E04b 5/62; F21v 5/02; E06b 3/54
 U.S. Cl. 52—475

8 Claims

ABSTRACT OF THE DISCLOSURE

A self-supporting frameless lay-in plastic panel with hinge clips mounted on an edge at or near opposite ends of the panel, and a shoulder below the edge on which the clips are mounted, for seating of the panel. The shoulder can be integral with the panel, integral with the hinge clip, or it may be defined by shoulders on both hinge clip and panel. A plastic lighting panel with female prisms embossed to provide rigidifying network of ribs with a height not less than one eighth of an inch.

BACKGROUND OF THE INVENTION

Lay-in panels have conventionally been provided with metal frames or else they have not been designed to swing down about a hinge piece. In the case of plastic lighting panels, frameless lay-in panels designed to hinge along one edge have been impractical because the long unsupported span at the ends, where clearance must be provided to permit the panel to swing, has aggravated the sagging problem of conventional prismatic lighting panels. Moreover, the frameless panel has had no effective, simple, centering and seating arrangements.

One of the objects of this invention is to provide a frameless, self-supporting lighting enclosure which can utilize a plastic panel, which is economical to make and is easy and safe to install and maintain.

Others objects will become apparent to those skilled in the art in the light of the following description and accompanying drawing.

SUMMARY OF THE INVENTION

In accordance with this invention, generally stated, a frameless lay-in lighting enclosure is provided which includes a lighting panel, hinge clips mounted on an edge of the panel, the hinge clips having a pintle part projecting laterally outward of two ends of the panel, and a shoulder or shoulders on the panel inboard of the edge of the panel along which the hinge clips are mounted. The enclosure is intended to be mounted in a lamp housing. Such lamp housings are conventionally rectangular, with ledges defining a rectangular opening. Two end ledges are spaced apart a distance greater than the length of the panel, and two sides ledges are spaced apart a distance less than the width of the panel. The distance between the outer ends of the hinge clip pintles is greater than the distance between the end ledges of the housing.

In the preferred embodiment of this invention, the panel is a prismatic plastic panel with female prisms embossed in one surface leaving a rigidifying network of ribs. The rigidity of the panel is a direct function of the least height of the ribs making up the rigidifying network. This height is not less than one eighth of an inch, when acrylic or styrene resins are used.

Also in the preferred embodiment, the panel is rabbeted along two parallel edges to define a plane seating area and a shoulder beneath the top surface of the panel with the respect to the lamp housing.

The hinge clips have a U-shaped part, with upper and lower legs and a connecting web. The legs embrace one rabbeted edge of the panel. The pintle is integral with the upper leg, and, preferably, a shoulder skirt is integral with

2

the lower leg, and depends below the shoulder of the rabbet, providing an extension of that shoulder. Preferably, also, a shoulder clip, or a plurality of shoulder clips, is provided along the other rabbeted edge. The shoulder clip has a U-shaped part, with an upper leg, a lower leg, and a connecting web, and a shoulder skirt integral with the lower leg and depending below the shoulder of the rabbet, forming an extension of that shoulder.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing, FIGURE 1 is a fragmentary view in perspective, from below, of a ceiling and a lighting fixture mounted in the ceiling, the lighting fixture including a lamp housing and one embodiment of frameless enclosure of this invention;

FIGURE 2 is a sectional view taken along the line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view taken along the line 3—3 of FIGURE 2;

FIGURE 4 is a sectional view taken along the line 4—4 of FIGURE 2;

FIGURE 5 is a sectional view corresponding to FIGURE 4 but showing the frameless lay-in enclosure in a hinged down position, and, in dotted lines, in an intermediate position;

FIGURE 6 is a view in perspective of one embodiment of hinged clip of this invention;

FIGURE 7 is a fragmentary sectional view showing another embodiment of hinge clip of this invention mounted on an edge of a lighting panel in place on a ledge of a lamp housing;

FIGURE 8 is a fragmentary sectional view corresponding to the view shown in FIGURE 7, with the panel in hinged down position;

FIGURE 9 is a view in perspective of the hinge clip shown in FIGURES 7 and 8, unmounted;

FIGURE 10 is a fragmentary sectional view showing still another embodiment of hinge clip of this invention mounted on the edge of the panel, in place of a T-rail;

FIGURE 11 is a view in perspective of the hinge clip shown in FIGURE 10; and

FIGURE 12 is a view in perspective of one embodiment of shoulder clip of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGURES 1—5 for one illustrative embodiment of enclosure of this invention, reference numeral 1 indicates a complete lighting fixture mounted in a ceiling 2. The lighting fixture 1 includes a lamp housing 3, elongatedly rectangular in shape, with a rectangular opening 4 defined by side ledges 5 and 6, and end ledges 7 and 8. In these, and all other respects, the lamp housing 1 can be a conventional lay-in type lamp housing.

An enclosure 20 is hingedly but removably mounted in the lamp housing. The enclosure 20 includes a plastic prismatic lighting panel 21, and hinge clips 22 and 23.

The panel 21 has one plane surface 31, and one prismatic surface 32, in which female prisms are embossed, leaving a network of rigidifying ribs 33. In such a panel, the effective thickness, as far as the rigidity of the panel is concerned, is the distance between the plane side 31 and the least projection of the ribs 33. Thus, if the panel is embossed during an extruding process and the plastic slumps, the effective thickness of the panel is likely to be the height of the rib above the plane surface in the center of the span between crests, as indicated in FIGURE 3. It has been found that for acrylic or styrene resin panels, an effective thickness of about three-sixteenths of an inch with a square rib pattern three-eighths of an inch on a side and embossed to within one-sixteenth of an inch

3

of the plane side is desirable to produce a rigidly self-supporting panel.

In the embodiment shown, the panel 21 has two long side edges 35 and 36 and two short end edges 37 and 38. The embossed side of the side edges 35 and 36 is rabbeted to produce a seating area 39 and a shoulder 40 along each of the long side edges of the panel.

The hinge clips 22 and 23 are mirror images of one another as viewed in FIGURES 2 and 3. Each has a U-shaped part 45 made up of a lower leg 46, an upper leg 48, and a connecting web 47. A pintle 50 projects laterally beyond the upper leg 48, and is integral with the free edge of the leg 48. The pintle 50 of the hinge clip 22 projects in the opposite direction from the pintle 50 of the hinge clip 23. Teeth 51 in the upper leg 48 are lanced a short distance downwardly toward the lower leg 46, to expose a sharp biting point.

The hinge clips 22 and 23 are mounted at opposite ends of the long side edge 35, with the lower leg 46 embracing the seat area 39, and the upper leg embracing a marginal part of the plane surface. The two pintles 50 project from and beyond the end edges 37 and 38 respectively of the panel.

As is best seen in FIGURE 2, the span between the two end edges 35 and 36 of the panel is greater than the distance between the side ledges 5 and 6 of the lamp housing. The span between the shoulders 40 is less than the span between the ledges 5 and 6 by an amount less than the difference in the span between the side edges of the panel and the side ledges of the housing. That is to say, the width of the seating area and position of the shoulder are such that if one shoulder abuts a vertical surface of a ledge of the housing, the seating area of the opposite side edge of the panel will overhang and rest upon the opposite ledge of the housing.

In the assembly of the enclosure of this embodiment, as well as the embodiments to be described, the hinge clips are merely forced manually onto the edge of the panel, to a position shown in FIGURES 1-4. The width of the hinge clip web 47 and the character of the clip, which is made of a springy metal, is such as to cause the legs 46 and 48 firmly to grip the opposite faces of the panel. The teeth 51, digging into the surface of the plastic, are added insurance against dislodgement of the clips, once they are in place.

The enclosure is put into the housing in the usual manner of a framed enclosure, and when centered, is seated along its two side edges on the seating area, with the shoulders 40, extending below the top of the ledges of the housing, serving to prevent lateral movement of the panel in one direction, while the end edges of the panel, dropped part way below the end edges of the housing by the effect of the rabbeting of the side edges, prevent lateral movement in the other direction.

Referring now to FIGURES 7, 8 and 9 for another embodiment of hinge clip of this invention, a hinge clip, 122, one of a mirror image pair, has a U-shaped part 145, including a lower leg 146, an upper leg 148, and a connecting web 147. The upper leg 148 has an upwardly sloping pintle extension part 149, on the outer edge of which is a pintle 150. The hinge clip 122 is mounted on the edge of a panel 21, in exactly the same manner as the hinge clip 22 is mounted on the panel 21 of the first embodiment. As is indicated in FIGURES 7 and 8, the hinge clip 122 has particular application to lamp housings with a sloping side wall. As in the case of the embodiment of the enclosure shown in FIGURES 1-5, once the enclosure has been seated, it can be hingedly unseated for access to the interior of the lamp housing, merely by raising the clip edge of the enclosure until the shoulder 40 of the panel clears the contiguous ledge, shifting it until the opposite edge clears the contiguous ledge, and swinging the enclosure down, the pintle, resting on the end ledges of the housing, serving as the hinge pin around which the enclosure swings.

4

Referring now to FIGURES 10 and 11 for still another, and in some respects, the preferred, embodiment of hinge clip of this invention, a hinge clip 223, one of a mirror image pair, has a U-shaped part 245, a lower leg 246, an upper leg 248, and a connecting rib 247. In this embodiment, a shoulder skirt 256, integral with the lower leg 246, is bent at right angles from the lower leg 246 in a direction away from the upper leg 248. A pintle extension 249 of the upper leg 248 is bent in a direction away from the lower leg 246, and has integral with its upper edge, a pintle 250. The shoulder skirt 256 provides an extension of the shoulder 40 of a panel on which the clip 223 is mounted, both in respect of the side ledges of the housing (or framework, as the case may be) and also by virtue of a contiguous end edge of the shoulder skirt 256, in respect of the end ledges (or framing pieces) as well. This shoulder extension is unobtrusive, but effective in providing more positive guidance and security in the seating of the enclosure than the shoulder 40 alone, particularly with relatively thin panels in which the shoulder must necessarily be thin. In FIGURE 10, the clip 223 is shown mounted on a panel forming an enclosure which rests on one of a pair of spaced parallel T-rails forming part of a supporting framework.

Referring to FIGURE 12, a shoulder clip 300 is illustrated. The shoulder clip 300 has a U-shaped part 345, including a lower leg 346, an upper leg 348, and a connecting web 347. An upwardly inclined lip 349 along the free edge of the upper edge 348, assists in mounting the clip. A shoulder skirt 356, integral with the lower leg 346, is bent at right angles from the leg 346 in a direction away from the upper leg 348. The shoulder clip 300 is intended to be mounted on the side edge of the panel opposite the side edge on which the hinge clips are mounted, and serves to provide an extension for the shoulder 40 of the panel on the side opposite the hinge clips. Again, if shoulder clips 300 are mounted at the two corners of the panel, the shoulder skirt 356 of each will form a shoulder extension with respect to both the contiguous side ledge and end ledge of the housing or frame, as the case may be.

Numerous variations in the construction of the enclosure of this invention, within the scope of the appended claims, will occur to those skilled in the art in the light of the following disclosure. For example, any of the illustrative embodiments of clip shown without a shoulder skirt may be provided with a shoulder skirt, or the embodiment of hinge clips shown in FIGURE 11 may be modified by removing the skirt. Any and all of the hinge clips can be made symmetrical, with the pintle projecting beyond both side edges of the upper leg, to simplify inventory and installation, the "extra" pintle merely overhanging the upper surface of the panel. The tooth 51 of the embodiments first described can be put into the lower leg, or the tooth in the embodiment of clip shown in FIGURE 11 can be put in the upper leg, or the teeth can be omitted, although they are preferably included. The configuration of the clip and various extensions can be changed. The shoulder skirt can be made longer or shorter than the leg to which it is connected. The clips can even be mounted on and at the ends of the seating area margin at right angles to the side edge, with a pintle projecting from the upper leg back over the web. These are merely illustrative.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. A frameless lay-in lighting enclosure comprising a lighting panel having a rabbeted edge having a long side and a short side defining a shoulder inboard of and parallel to said long side and defining a support area of the panel, sheet metal hinge clips mounted along said long side of said rabbeted edge, said hinge clips having integral legs with long edges parallel with the long side of the rabbeted edges, said legs frictionally engaging said panel in said support area and having an integral pintle part

5

projecting laterally outboard of two ends of said panel and parallel to said long edges of said legs.

2. The enclosure of claim 1 wherein a second shoulder is provided along a second edge spaced from and parallel to the edge along which the hinge clips are mounted.

3. The enclosure of claim 2 wherein the second shoulder includes a depending shoulder skirt part of a shoulder clip mounted on the said second edge of the panel.

4. The enclosure of claim 1 wherein the hinge clips have a U-shaped clip part with the upper and lower legs and a connecting web, said legs frictionally engaging opposite flat surfaces of said rabbeted edge and the said pintle being integral with and projecting laterally from the long edge of the said upper leg.

5. The enclosure of claim 1 wherein the hinge clips include an integral shoulder skirt.

6. The enclosure of claim 5 wherein the hinge clips have a U-shaped part with upper and lower legs and a connecting web, the pintle part being integral with and projecting laterally from the upper leg and the shoulder clip being integral with and projecting downwardly from the free end of the lower leg.

7. A frameless lay-in lighting enclosure for a lamp housing having two parallel end ledges and two parallel side ledges defining a rectangular opening and a rectangular panel mounted in said opening, said opening being of a span greater between the end ledges than the length of the panel and less between the side ledges than the width of the panel, said enclosure comprising a light-transmitting plastic prismatic panel having female prisms embossed to leave a rigidifying network of ribs, said panel having rabbets along first and second, parallel edges, said rabbets having a long side and a short side and forming shoulders spaced inboard of said edges and below the top surface of the panel with respect to the housing, the distance between said shoulders being a little less than the distance between the parallel side edges of the housing, and a sheet metal hinge clip mounted on the long side of said first rabbeted edge at each end thereof, said hinge clips having a U-shaped part with integral upper and lower legs and a connecting web, said legs embracing the said rabbeted edge and having a long edge par-

6

allel with the long edge of the rabbet and with said connecting web, and a pintle integral with the free edge of the upper leg and projecting laterally outboard of the leg and of the panel and parallel to said web, the span between the outer ends of the two pintles being greater than the span at the opening between the end ledges of the housing.

8. The enclosure of claim 7 wherein a shoulder skirt is provided integral with and depending from the free edge of the lower leg of the hinge clips and with a free edge projecting below a broad face of the panel and a shoulder clip is mounted on the second rabbeted edge, said shoulder clip having a U-shaped part with upper and lower legs and a connecting web, said legs embracing the rabbeted edge, and a shoulder skirt integral with and depending from the free end of the lower leg and with a free edge projecting below the said broad face of the panel, the span between the inboard edge of the said shoulder clip shoulder skirt and the line between the hinge clip shoulder skirts being a little less than the distance between the parallel side edges of the housing.

References Cited

UNITED STATES PATENTS

2,149,385	3/1939	Bendele	52—489
2,191,900	2/1940	Pariot	49—388
2,317,994	5/1943	Huff	49—64
2,978,575	4/1961	Cohen.	
3,129,895	4/1961	Franck.	
3,330,952	7/1967	Wince et al.	240—47
3,358,138	12/1967	Trantina	240—147
3,373,275	3/1968	High.	

FOREIGN PATENTS

546,354	4/1955	Canada.
---------	--------	---------

FRANK L. ABBOTT, Primary Examiner

JAMES L. RIDGILL, Jr., Assistant Examiner

U.S. Cl. X.R.

52—306; 240—9, 78, 106