May 1, 1956 R. J. RENAUD ET AL 2,744,191

DOWNLIGHT AND HINGE ASSEMBLY THEREFOR

Filed May 11, 1953 3 Sheets-Sheet 1

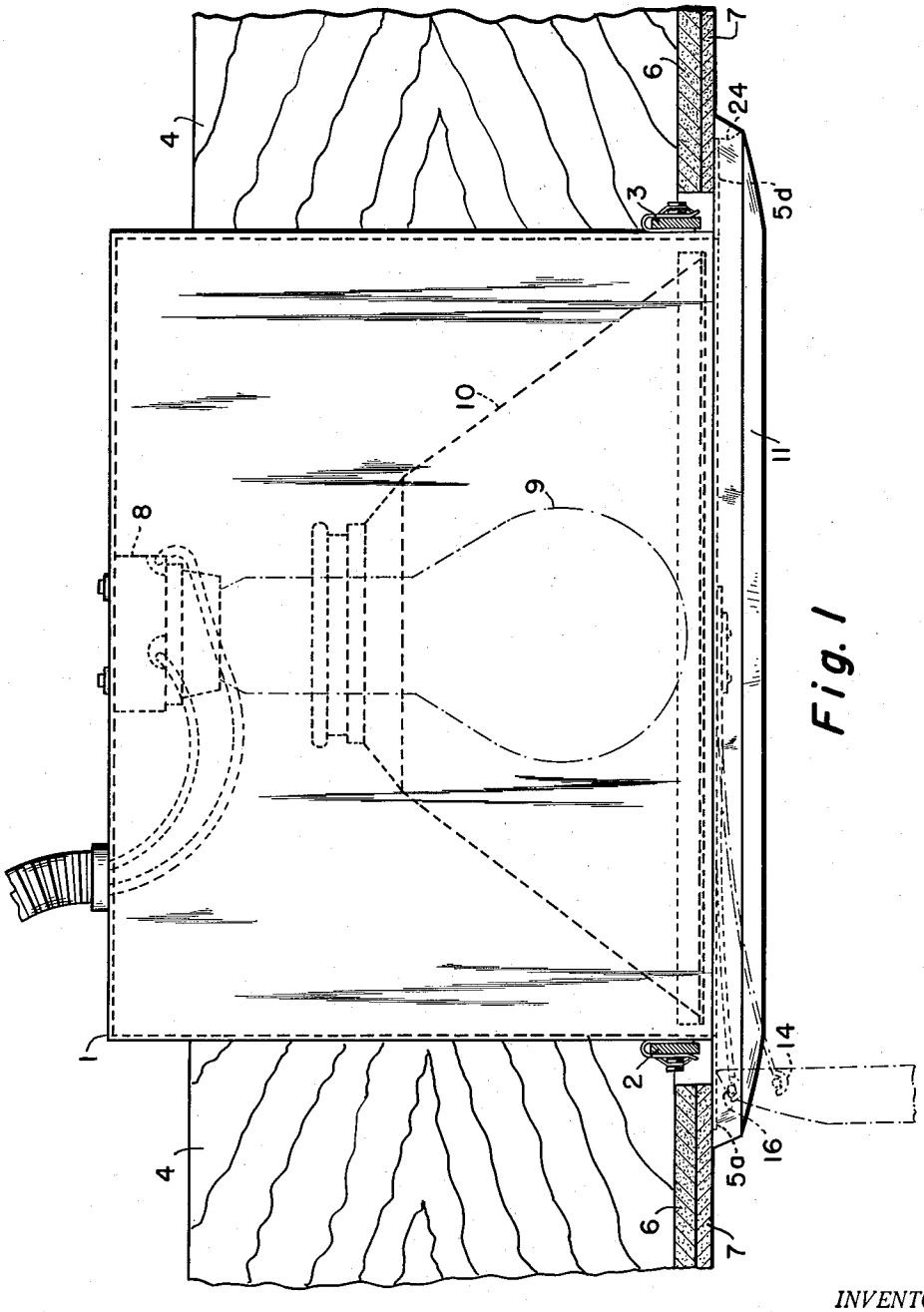


Fig. 1

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Filed May 11, 1953 3 Sheets-Sheet 2

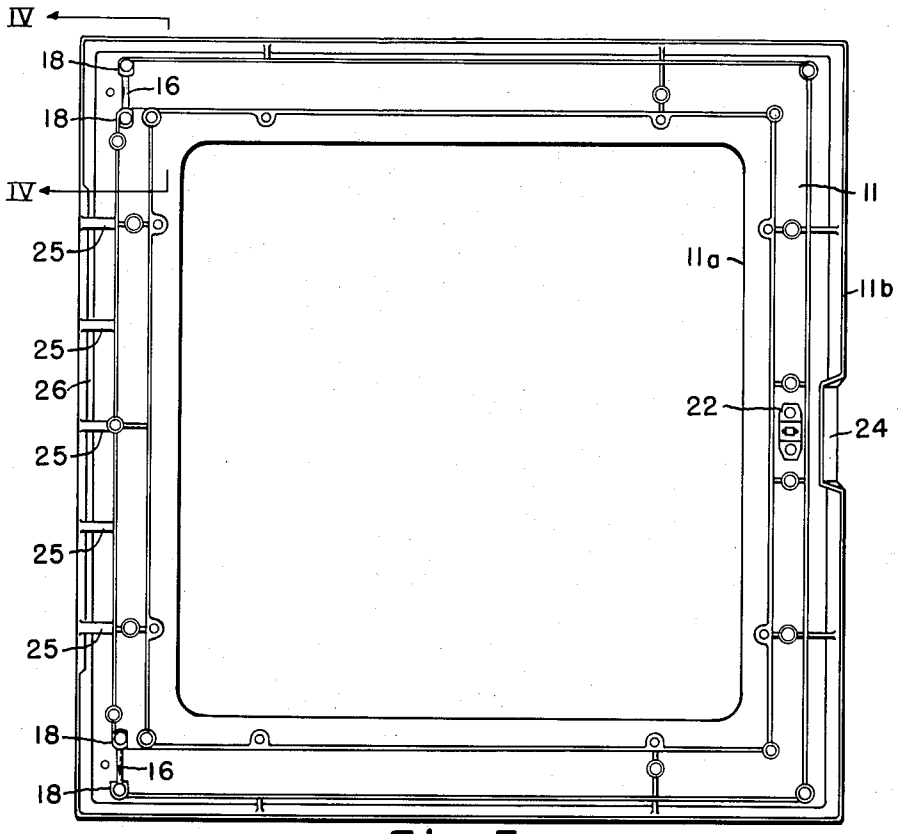


Fig. 3

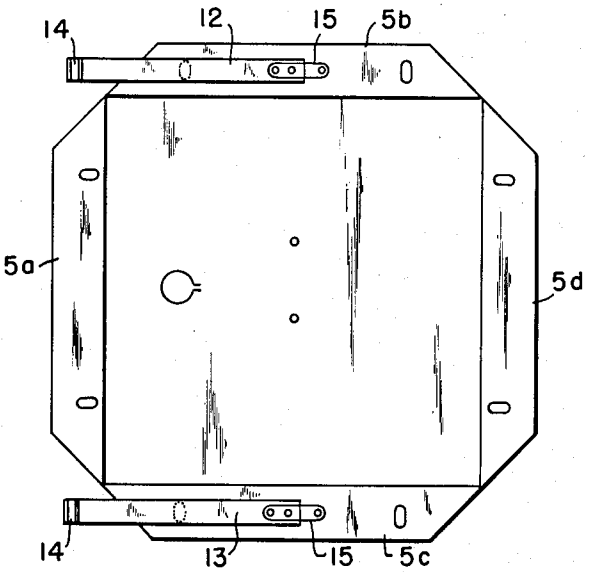


Fig. 2

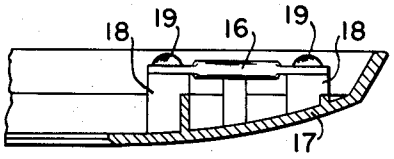


Fig. 4

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DOWNLIGHT AND HINGE ASSEMBLY THEREFOR

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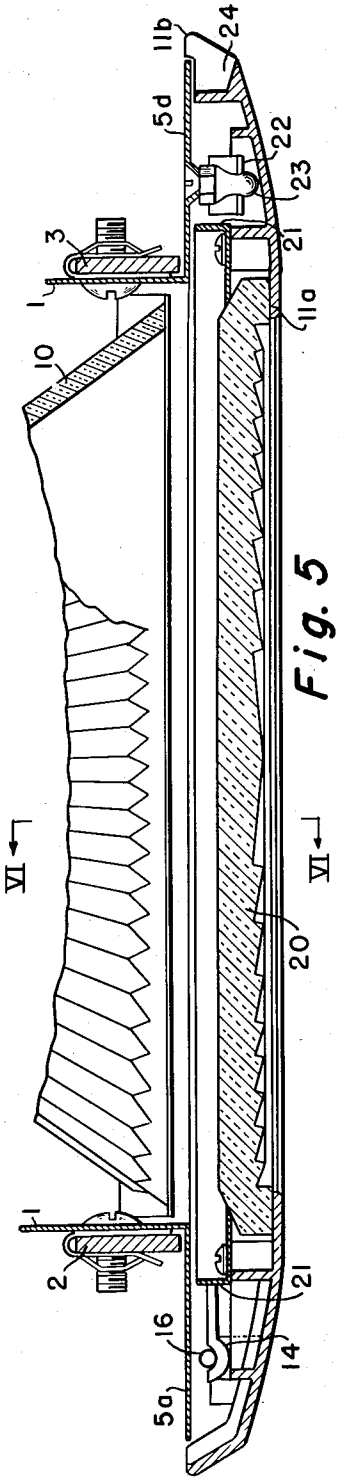


Fig. 5

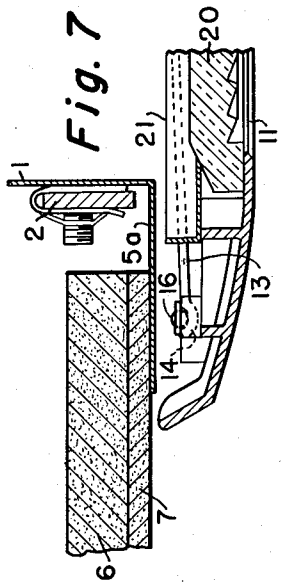


Fig. 7

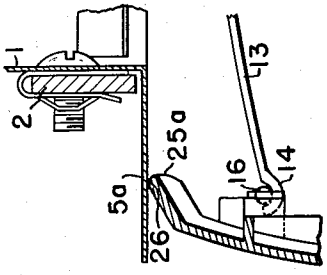


Fig. 9

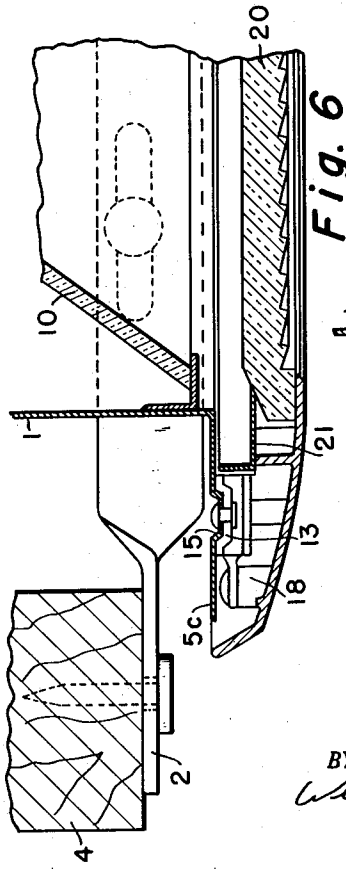


Fig. 6

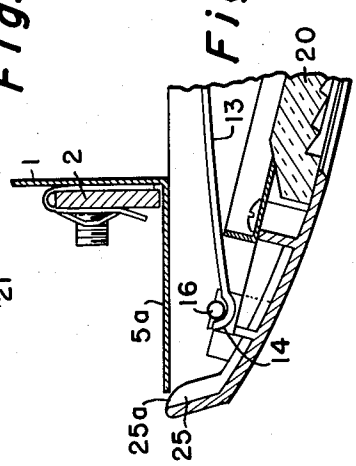


Fig. 8

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DOWNLIGHT AND HINGE ASSEMBLY THEREFOR

Robert J. Renaud and William Mack, Pittsburgh, Pa., assignors to Pittsburgh Reflector Company, Pittsburgh, Pa., a corporation of New Jersey

Application May 11, 1953, Serial No. 354,198

3 Claims. (Cl. 240—78)

This application relates to a downlight and hinge assembly therefor, particularly a downlight of the type which is recessed in ceilings. Such downlights have a housing which extends upwardly between the joists of the ceiling and which contains a source of light and a reflector. Beneath the light bulb and the reflector there is a light diffusing lens which lies approximately in the plane of the ceiling. A frame secured to the housing supports the lens.

Since the downlight is recessed in the ceiling, access to the housing for cleaning and replacement of parts can be obtained only by removing the lens frame. Various expedients have heretofore been used to provide a quick and easy way to remove the frame and lens, such as hinges connecting the frame to the housing along one edge of the frame and thumb screws adjacent the edge of the frame opposite to the hinges, four thumb screws equidistantly spaced around the frame, etc. Such arrangements have not been altogether satisfactory, first, because it is still necessary for a person to reach up to the ceiling and unscrew at least two thumb screws, and, second, the hinges, thumb screws, etc. are rather unsightly in that they break up the smooth appearance of the ceiling in spite of all attempts at making them as inconspicuous as possible. The problem has been aggravated by current demands for downlights having lens frames which come flat up against the plaster of the ceiling.

We have invented a downlight having a lens frame which can be brought up against the plaster of the ceiling, can be easily assembled and can be opened by a simple pull on an inconspicuous fingerhold. There are no hinges or thumb screws to mar the appearance of the frame and it is not necessary to turn any screws. In the accompanying drawings, we have illustrated a present preferred embodiment of our inventions, in which—

Figure 1 is a side elevation of our downlight in position in a ceiling;

Figure 2 is a bottom view of the housing of the downlight;

Figure 3 is a plan view of the lens frame;

Figure 4 is a section along the lines IV—IV of Figure 3;

Figure 5 is a partial central vertical section;

Figure 6 is a section along the lines VI—VI of Figure 5; and

Figures 7, 8 and 9 are partial vertical sections showing the action of the lens frame and its support when the downlight is opened.

Figure 1 of the drawings shows a downlight embodying our invention as installed in a ceiling. The downlight is supported between two joists, one of which has been removed so as to show the downlight. The downlight comprises a housing **1** made of sheet metal and generally rectangular in shape extending from a point beneath the joists up above the joists. It is supported by two straps **2** and **3** which are bolted to two sides of the housing adjacent its lower end and which in turn are nailed to the bottoms of the joists **4** (see Figure 6).

The lower end of the housing is open and flanges *5a*, *5b*, *5c* and *5d* extend at right angles from each side of the housing at the open end. It will be noted from Figure 1 that the flanges are below the joists 4, the usual plasterboard **6** and the plaster **7** of the ceiling, and lie flat against the plaster.

The housing **1** supports a socket **8** for a light bulb **9** and a reflector **10**. A lens frame **11** at the open end of the housing **1** covers the open end and extends beyond the flanges **5**. It will be noted that the edges of the lens frame **11** are up against the plaster **7** and that there are no hinges, thumb screws, etc. for holding the frame. To obtain access to the interior of the housing, the frame is pivoted along one edge until it hangs in the position shown in chain lines in Figure 1.

The lens frame is held to the housing by two flat leaf springs **12** and **13** (see Figure 2) which are riveted at one of their ends to two flanges *5b* and *5c* of the housing and extend parallel to these flanges. The other ends of the springs are bent to form hooks **14** in which pivot pins **16** carried by the lens frame are held.

As is shown in Figure 2, the flanges **5** to which the springs **12** and **13** are riveted have elongated embossings **15** formed therein. The ends of the springs adjacent the rivets have similar embossings and nest with the embossings on the flanges (see Figure 6), and thereby keep the springs **12** and **13** in correct alignment when they are being riveted to the flanges.

Figures 3 and 4 show the construction of the lens frame and the mounting of the pivot pins **16** which rest in the hooks **14** on the springs. The lens frame is in the form of a hollow square having a sloping bottom **17** so that the frame decreases in thickness from its inner edge *11a* towards its outer edge *11b* where it merges with the plaster of the ceiling (see Figure 1). Within the frame there are studs or bosses **18** to which the pivot pins are held by screws **19** passing through flattened ends of the pivot pins. As shown in Figure 3, the pins are in two adjacent corners of the frame and extend parallel to each other and to one edge of the frame. They should be spaced from the edge a distance which is less than half the length of the frame and, preferably, are quite close to the edge.

Figures 5 and 6 show how the lens frame supports a lens **20**. The lens rests on the inner edges *11a* of the frame and angles **21** bolted to the frame extend around the edges of the lens and press it against the inner edges of the frame.

Figure 5 also shows how the pivot pins **16** rest in the hooks **14** formed in the springs **12** and **13**. As appears in Figures 1, 2 and 5, the springs **12** and **13** are secured to the flanges **5** at approximately the center of the flanges and extend almost, but not quite, to the edge of the flange *5a* which is at right angles to the springs and is near the pins **16**. The springs **12** and **13** thus support the frame and press it towards the housing **1** by pressing upwardly (viewing Figure 5) on the pins **16**.

The springs **12** and **13** can be made sufficiently stiff to support the lens frame by themselves. We prefer, however, to use a catch adjacent the edge of the frame opposite to the pivot pins **16** to hold a portion of the weight of the frame and lens. Figures 3 and 5 show a suitable catch. It comprises a spring catch **22** secured to the frame adjacent the edge of the frame opposite to the pivot pins **16** and a ball stud **23** mounted on flange *5d* in line with the catch **22**. When the frame is closed, the catch **22** snaps over the ball stud **23** and assists in holding the frame up against the plaster of the ceiling.

Figures 7, 8 and 9 show the action of the springs **12**, **13**, the frame **11** and the flange *5a* when the lens frame is pivoted to open it. To open the downlight, a person grasps the frame **11** by the small fingerhold **24** formed

in the edge of the frame adjacent the spring catch **22** and pulls downwardly to pull the spring catch **22** over the ball stud **23**. This throws all of the weight of the lens frame and lens onto the springs **12** and **13** so that, as shown in Figure 7, the frame drops downwardly a short distance from the plaster **7** and from the flange **5***a*. The frame then pivots on the pivot pins **16** as shown in Figure 8. When the frame turns on the pins **16**, webs **25** extending inwardly from the edge of the frame and having a curved top bearing surface **25***a* strike the outer edge of the flange **5***a*. As the frame continues to turn on the pivot pins **16**, the bearing surfaces **25***a* of the webs **25** ride up over the edge of the flange **5***a* and thereby force the frame downwardly. The frame is turned until it is substantially vertical as shown in Figure 9, in which position it is held by the springs **12** and **13** with the extreme outer edge of the frame pressing against the flange **5***a*. The edge of the frame which rides up over the flange **5***a* is reinforced by increasing its thickness as shown at **26** in Figure 3.

From the foregoing, it is apparent that we have invented a recessed downlight having a lens frame which is flush with the plaster of the ceiling in which it is recessed. The frame has a smooth unbroken appearance with no hinges, catches or thumb screws showing, and it can be pivoted away from the housing to provide access to the housing simply by pulling on one edge of the frame. The hinge assembly which we have invented, while wholly effective, is of simple construction and is easily manufactured.

While we have described certain present preferred embodiments of our inventions, it is to be understood that they may be otherwise embodied within the scope of the following claims.

We claim:

1. A downlight comprising a housing having an open end, a lens frame at the open end of the housing, two leaf springs spaced from each other and extending generally parallel to each other and each secured at one end to said housing adjacent the bottom of the housing when the downlight is installed for use, the other ends of said springs extending in the same direction from the fixed ends and beneath and pivotally engaging portions of the lens frame spaced inwardly from an edge of the frame.

2. A downlight comprising a housing having an open end, said housing having a flange extending outwardly from the housing at said open end, a lens frame adapted to cover said flange, two leaf springs spaced from each other and each secured at one end to the housing, the other ends of said springs extending in the same direction from the fixed ends and beneath and pivotally engaging portions of said frame adjacent to and spaced inwardly from an edge of the frame and outside the open end of the housing, the pivot points of the frame being so spaced from the edge of the frame that when the frame is turned to open the downlight the edge of the frame engages and rides over the flange on the housing.

3. A downlight comprising a housing having an open end, said housing having a flange extending outwardly from the housing at said open end, a lens frame adapted to cover said flange, two leaf springs spaced from and extending parallel to each other and secured at one of their ends to the flange and having hooks at their other ends engaging pivot pins in the frame, said hooks extending from the fixed ends in the same direction, said springs resiliently pressing the frame towards the housing, said pins being positioned on the frame between an edge of the frame and the open end of the housing, bearing surfaces on the frame extending inwardly from the edge of the frame adjacent the pins, said bearing surfaces contacting and riding over the portion of the flange adjacent the pivot pins when the frame is pivoted about the end of the spring.

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