# United States Patent

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**Original application Sept. 22, 1967, Ser. No. 688,284, now Patent No. 3,480,246, which is a division of application Ser. No. 464,122, June 15, 1967, now Patent No. 3,368,070. Divided and this application Jan. 6, 1969, Ser. No. 789,146**


[54] **HANGER ASSEMBLY FOR MODULAR PANELS**
**8 Claims, 10 Drawing Figs.**


[52] **U.S. Cl.** ..... **240/78 LK, 240/9 R**
[51] **Int. Cl.** ..... **F21s 1/06**
[50] **Field of Search** ..... 240/9, 51.11, 78, 78 LD, 92, 93, 96; 248/343, 327



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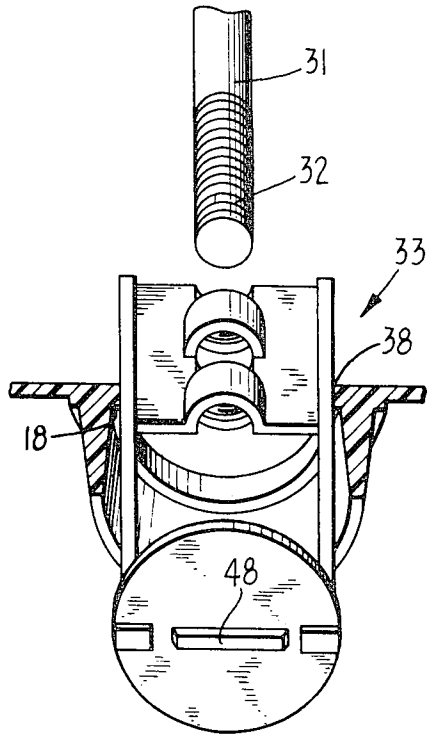
**ABSTRACT:** A hanger assembly for supporting a light-transmitting panel in vertically spaced positions relative to a hanger rod in which legs depend from said rods through an aperture in the panel and a retaining disk is inserted between the legs to spread them into an operative panel supporting position.

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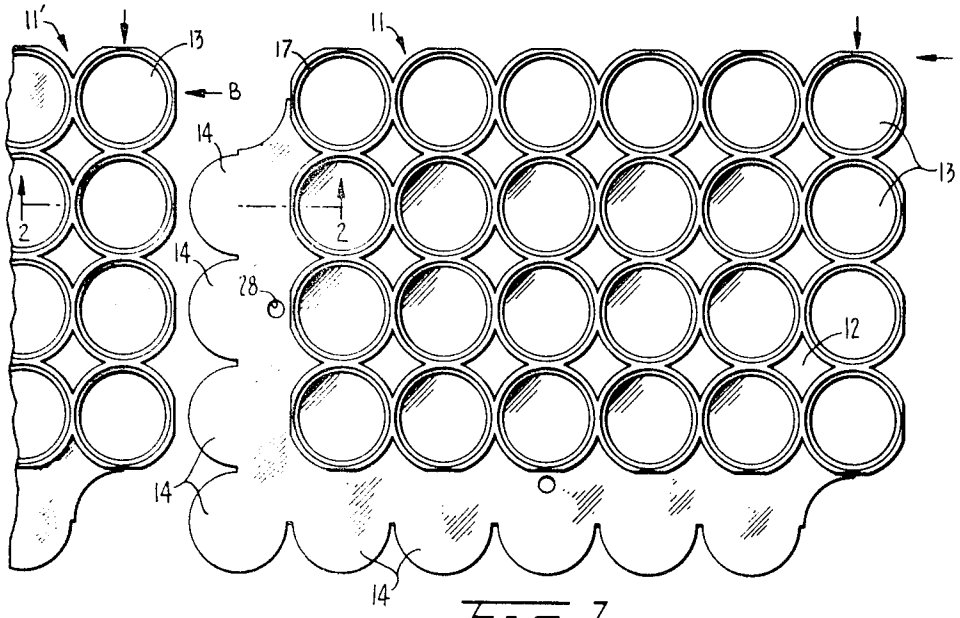



Fig. 1

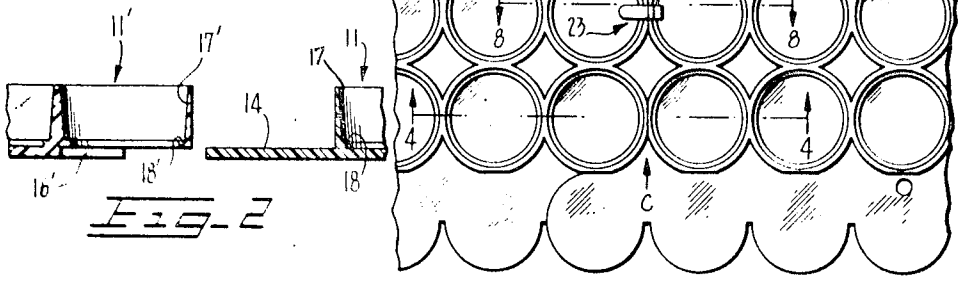



Fig. 2

Fig. 3

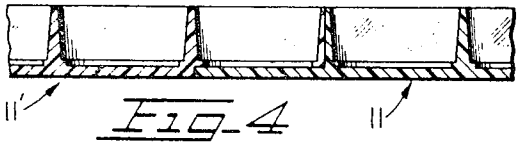



Fig. 4

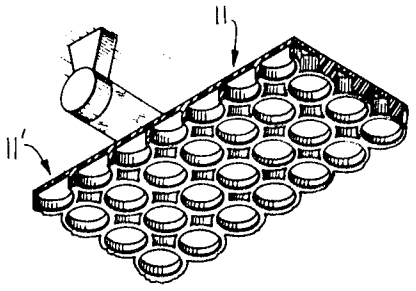
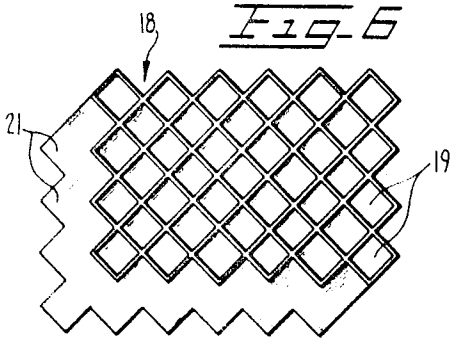



Fig. 5

Fig. 6

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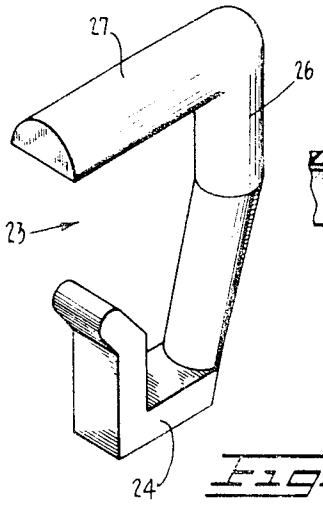


Fig. 7

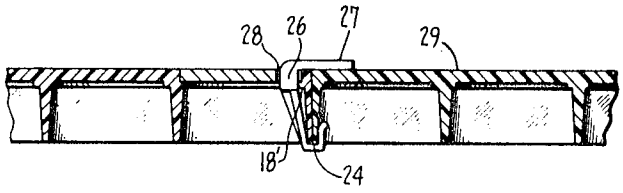


Fig. 8

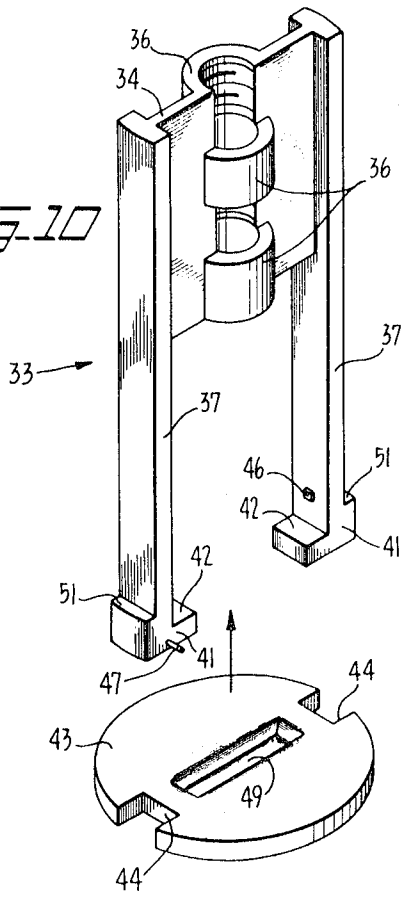


Fig. 10

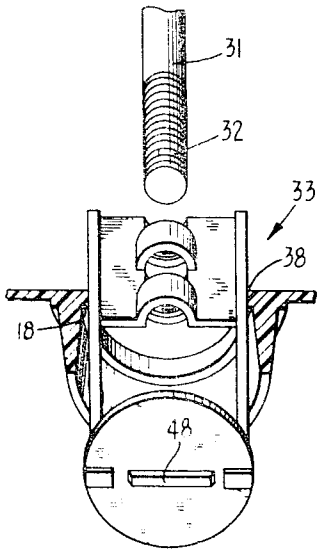


Fig. 9

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# HANGER ASSEMBLY FOR MODULAR PANELS

## CROSS-REFERENCES TO RELATED APPLICATIONS

This is a division of a copending application Ser. No. 688,284 filed Sept. 22, 1967 now U.S. Pat. No. 3,480,246, which is in turn a division of application Ser. No. 464,122, filed June 15, 1967, now U.S. Pat. No. 3,368,070, issued Feb. 6, 1968.

This invention relates to louvered panel systems of the type used as light-transmitting media such as in the ceiling or walls of a room, and more particularly, to an improved modular panel of this type, and a hanger and attachment clip therefor.

In the lighting of rooms, particularly larger rooms such as are found in office and industrial buildings, it is now common to provide a "false" ceiling below light fixtures to provide, in effect, a luminous ceiling. These false ceilings are often in the form of open grillwork or louver panels which, when the ceiling is viewed at an angle, act to reduce the brightness of the light and shield or hide the light fixtures from view while permitting direct passage of light to the room below. For many installations, though, it is more desirable to utilize a closed louver panel system for the ceiling wherein a transparent or translucent backing sheet or membrane is provided on the upper side of the louver panels in order to diffuse or refract the light reaching the room to be illuminated. Such closed louver panels provide a ceiling in which the light fixtures are completely hidden from view to provide a true luminous ceiling effect, and by which, by proper design of the sheet backing, the intensity and quality of the light can be closely controlled.

In general, however, closed louver panel ceilings have not been accepted by the art since, with present designs, the joints between adjoining panels have not been sufficiently good to prevent the leakage of direct light to the area being illuminated. This leakage of light makes the joints highly noticeable and visible. In order to reduce this undesirable leakage of direct light, closed louver panels have in the past been made in unusually large sizes to thereby reduce the number of joints. However, besides not completely eliminating the existence of points and the resulting leakage of light, the large panels are not as versatile as smaller ones in the provision of ceilings of different dimensions and shapes. In another presently employed method of eliminating the leakage or passage of direct light through joints, a metal lattice or grid structure is provided upon which the panels are laid with the grid structure covering the joints. Besides being expensive, though, these grids structures are themselves unsightly and give the ceiling a sectional appearance.

The instant invention provides a modular closed louver panel capable of being assembled with a plurality of like modular panels to provide a larger continuous panel having no visible joints and through which no direct light is permitted to pass. Further, the modular panel interlocks with adjacent panels to assure proper and stable assembly of a plurality of the panels. Clip means are also provided for securing adjoining modular panels together, and hanger means are provided to facilitate hanging the resulting closed louver ceiling below light fixtures. Both the clip means and the hanger means are especially adapted to prevent the direct passage of light thereabout through the ceiling.

Accordingly, an object of the invention is to provide a modular closed louver panel which is especially designed to be easily assembled with a plurality of like modular panels into a large continuous panel having no visible joints.

A further object of the invention is to provide a modular closed louver panel which can be assembled with a plurality of like panels into larger panels of various dimension and peripheral shapes.

Another object of the invention is to provide such a modular closed louver panel which is adapted to transmit light and which can be assembled with similar panels to provide a larger continuous light-transmitting panel having no visible joints between the panels and no other apertures through which direct light can pass.



A still further object of the invention is to provide an improved clip for securing adjoining closed louver panels together in an efficacious and simple manner and which is designed to not permit direct passage of light through the panels at their point of securance.

And still another object of the invention is to provide a hanger system capable of hanging a closed louver panel beneath a light fixture without causing an undesirable aperture to result in the panel through which light from the light fixture can directly pass.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by said drawings and description may be adopted within the scope of the invention as set forth in the claims.

Referring to the drawings:

FIG. 1 is a plan view of a modular closed louver panel of the invention positioned for engagement with a similar modular panel which is only fragmentarily shown;

FIG. 2 is an enlarged sectional view of the panels depicted in FIG. 1, taken on a plane indicated by the line 2—2;

FIG. 3 is a fragmentary plan view of the panels of FIG. 1 after having been joined to form a larger, continuous panel;

FIG. 4 is a sectional view of the panels of FIG. 3 taken along a plane indicated by the line 4—4 of FIG. 3 and depicting the joint between the panels;

FIG. 5 is a reduced perspective view of panels of the invention secured together and supported beneath a light fixture;

FIG. 6 is a reduced plan view of another embodiment of a modular panel of the invention having a different louver or grillwork configuration.

FIG. 7 is an enlarged perspective view of a clip especially designed to facilitate securing adjoining modular panels together to form a continuous larger panel;

FIG. 8 is an enlarged sectional view of the adjoining panels of FIG. 3 taken on a plane indicated by the line 8—8 of FIG. 3 and depicting a clip of the invention securing two modular panels together;

FIG. 9 is an enlarged perspective view of a hanger system for supporting a closed louver panel beneath a lighting fixture, and depicting its relationship to a panel;

FIG. 10 is an enlarged perspective view of the hanger of FIG. 9.

A modular closed louver panel of the invention is generally indicated in FIG. 1 by the reference numeral 11. Such panel comprises a membrane or sheet backing 12 having a decorative grillwork or louver structure on the side thereof to be exposed to the room being lighted. In the embodiment depicted in FIG. 1, the louver comprises a plurality of adjacent and adjoining cylindrical cells 13. Backing 12 and cells 13 are desirably molded integrally as one piece and can be of any of the materials commonly utilized as louver or light panel structures. For example, they can be of transparent or translucent plastic. While backing 12 is depicted as being a flat planar sheet, it is to be appreciated that it can be of other forms, such as a prismatic sheet.

As mentioned before, closed louver panels of the general type to which the invention relates are known. However, in the past, it has not been possible to join adjacent panels together with assurance that the joints will not leak light or otherwise be visible. The instant modular panel, however, is especially adapted to have similar panels joined to every edge thereof to form a larger continuous panel without the joints being visible. Because of this, the modular panel can be made of a size much smaller than the size that most panels are, and thus, the modular panel of the invention affords great versatility in providing continuous panels of desired shapes and sizes. To provide the desired joining of panel 11 to similar panels, such panel has extensions 14 protruding from two adjacent edges of the panel which generally conform to the pattern of the louvers of the panels to which it is to be joined. In the em-

bodiment described, these extensions are actually continuations of the backing 12 and their configurations generally conform to the cylindrical cell pattern 13. That is, the extensions 14 have convex semicircular configurations which are adapted to mate with concave semicircular recesses 16' in another identical panel 11'. As best seen from FIG. 2, the edge portions of the recesses 16' will be directly above the mid point of the inside cylindrical walls 17' of the exterior cells 13' of panel 11' when the cell is arranged beneath a light fixture. Thus, when the panel 11 is adjoined to panel 11' with extensions 14 mating with recesses 16' the joints between the extension 14 and the recesses 16' are shielded by the cylindrical cell walls 17'. If the joint itself is not completely opaque, therefore, the cell walls 17' prevent light from passing directly to the area to be illuminated. Because of this shielding, the existence of minor imperfections in the joint due to practical limitations imposed by manufacturing or expansion or contraction of the panels is immaterial. A shoulder 18' is provided about the inner periphery of each of the exterior edge cells to mate with the undersurface of the extensions 14 to assure that the joint is not visible without the necessity of making cell walls 17' unduly thick. Shoulder 18' also provides a relatively large surface in contact with the undersurfaces of the extensions to facilitate securing of the panels together thereat, if desired, by any of the conventional means. For the sake of uniformity in appearance, each of the cells of the panels 11 and 11' has a shoulder 18 and 18', respectively, about its inner periphery.

Besides preventing the leakage of light at the joints between the panels, the mating of extensions 14 with recesses 16' interlocks the panels and assures proper and stable alignment therebetween. That is, the panels only fit together with the cells of one aligned with the cells of the other, and when the cells are so aligned the panels are prevented from lateral movement relative to one another.

The outside edge of the cylindrical walls 17' of panel 11', and the similar cylindrical walls 17 of panel 11 are flattened so that when the panels are moved together with these cylindrical walls, the meeting points of the walls define a wall of a thickness equal to thickness of the walls of the other cylinders 13 of the panels. This further assures that the joint between adjoining panels is not visible.

The modular panels 11 and 11' are shown in adjoining relationship in FIGS. 3 and 4. Since the joint therebetween is not readily discernible, it has been indicated by the arrow marked C. It is apparent from these figures that when the panels are so joined, they appear to be one continuous panel.

The other two adjacent edges of panel 11 have recesses 16 therein identical to the recesses 16' of panel 11. These recesses are adapted to mate with extensions on other panels (not depicted) identical to the extensions 14. It is thus apparent that a plurality of panels can be adjoined together to provide a large panel of a desired size and shape. In this regard, it is to be noted that panels can be secured to panel 11 on every side thereof.

While the panel 11' is identical to the panel 11, it is to be appreciated that this is not necessary. In some instances it might be desirable to provide a "checkerboard" pattern for the composite closed louver panel. To do so the panel 11 can be joined with panels of dissimilar louver design. Then, the extensions 14 of panel 11 will generally conform to the design of the louver of the dissimilar panels so that the joints between the extensions and recesses conforming to the louvers will be shielded by the louver cell walls. Likewise, the dissimilar panels will have extensions thereon conforming to the recesses 16 of panel 11.

Another panel 18 of the invention having a different louver design or pattern is depicted in FIG. 6. In this panel, the louver is comprised of adjoining diamond shaped cells 19. Extensions 21 protruding from this panel have a configuration designed to mate with recesses on a panel having similar diamond shaped cells. This panel itself has such recesses 22 generally conforming to the louver pattern along the two edges thereof not having extensions 21. It is, of course, to be appreciated that louver patterns other than the diamond-shaped and cylindrical cells patterns described are also within the scope of the invention.

While, if desired, modular panels of the invention can be secured together in any conventional manner such as by means of an adhesive or high-frequency welding or shoulders 18 to extensions 14, the invention includes a clip 23 which facilitates assembly of a plurality of these panels in a rapid and simple manner. This clip is shown in perspective in FIG. 7 and comprises a U-portion 24 for gripping together adjacent louver cells of two adjoining panels. Further, means are provided on the clip for securing it to the panels. More particularly, one of the legs of the U-portion extends upward to form a cylindrical shank 26, and has a horizontally extending bar 27 integrally secured to its free end. The material of clip 23 is desirable similar to, and of the same color, as, the material from which the modular panels are made. When it is of such a material, the clip is unobtrusive and does not form light shadows.

Clip 23 is also desirably flexible in order to facilitate its securance to the panels. As shown in FIG. 8, when the clip is assembled to the panels, U-portion 24 grips between its legs the adjacent cylindrical walls adjoining modular panels, and shank 26 extends through an aperture 28 within an extension 14 of panel 11. The aperture 28 is circular and of a size to just receive shank 28 so that light cannot directly pass thereabout to the area being illuminated. The bar 27 has a flat under surface portion which abuts against the upper surface 29 of backing 12 of panel 11. In this manner, bar 27 and shank 26 act to hold the U-portion of the clip in engagement with the aforesaid adjacent cell walls.

Desirably, the clip 23 is inserted into the aperture 28 of each of the panels at the place of manufacture. Then, when the panels are assembled at the installation, they can be easily and simply secured together. Because of the resiliency of the clip, the U-portion can be snapped over the adjacent cell walls of adjoining panels by rotating the clip to secure them together. When the clip is in such securing position, it should be noted that shank 26 engages shoulder 18' of panel 11' and thereby urges the upper portion of cell wall 17 against the adjacent cell wall to assure tight relationship between the panels. The bar 27 acts to prevent vertical movement of the panel 11' with respect to panel 11.

In providing a conventional closed louver light-transmitting panel beneath a lighting fixture, it is now common to utilize a lattice framework since the use of a conventional hanger results in an undesirable aperture in the panel. The instant invention includes as an important part thereof a hanger which obviates the necessity of these lattice structures and does not result in an aperture in the panel. A preferred embodiment of the hanger system of the invention is depicted in FIGS. 9 and 10. Such hanger system includes a hanger rod 31 adapted at one end to be secured to a structure such as an upper ceiling (not shown) above the position at which the light-diffusing panel is desired to be supported. The depending free end 32 of such rod is threaded as depicted.

A hanger member 33 is provided for securing the panels to hanger rod 31. This hanger member includes a web 34 having alternating threaded half-cylinders 36 for threadably receiving end 32 of hanger rod 31. Two flexible legs 37 depend from web 34 and are adapted to extend through a cylindrical aperture 38 within panel 11. Aperture 38 is through backing 12 coaxially with one of the cylindrical cells 13. The periphery of this aperture corresponds to the periphery of the shoulder 18 within the cell.

Each of the legs 37 has an enlarged foot portion 41 which provides an inwardly extending flange 42 for engagement with a discoidal retaining members 43. Such retaining members 43 is of a size to fit within the cylindrical cell below aperture 38 and abut against the shoulder 18. It has notches 44 in its edge adapted to receive the legs 37. When the legs are so received within notches 44, the retaining member acts to spread the legs apart, and the shoulders 42 abut against the retaining member to hold it in position. A nub 46 is provided on the

inner surface of each leg to assure that the retaining member cannot move upward with respect to the legs and, in this manner, come out of position. It should be noted that the exterior side configurations of the feet portion **41** will coincide with the periphery of the retaining member when it is so supported.

The manner in which the hanger system is assembled to support panel **11** should be apparent from the above. The flexible legs of hanger member **33** are brought together and inserted through aperture **38** from above the panel. To facilitate holding of the legs together as they are so inserted, a pin **47** is provided on one of the legs over which the other leg can be hooked. After the legs are inserted, they are released from one another and retaining member **43** is attached thereto as shown in FIG. **9**. Then the panel and hanger can be raised to a hanger rod **31**, and the hanger rotated, such as by means of a tab **48** on retaining member **43** to threadably receive the rod **31**. It should be noted that tab **48** is provided by forming the retaining member with an indentation **49** on one side thereof. In this manner the retaining member can be made of uniform thickness so that no undesirable shadows are caused thereby.

It is to be noted that shoulder **18** of the panel will rest upon the periphery of retaining member **43** and thus the retaining member acts to close off the aperture **38**. In this regard it should be noted that both the retaining member **43** and shoulders **51** on the leg feet **41** provide support for the panel. Furthermore, it is possible to level the height of a plurality of panels supported by hangers of the invention, by simply rotating the individual hangers by means of the retaining member and thereby vertically moving its associated panel. In this regard it is to be noted that the retaining member can be turned over so that the indentation is on the undersurface thereof, and provides a notch for a screwdriver to facilitate such adjustment. Hanger **33**, and disc **43** should be of a light-transmitting material corresponding to that of the panels in order that they will be unobtrusive and not cause undesirable shadows.

While the invention has been described in conjunction with the forming of large continuous panels for ceilings, it is to be appreciated that panels formed with modular panels of the invention can be used in other lighting structures such as a light fixture. Further, while the concept of the invention has been described with respect to light-transmitting panels, it is to be realized that it is especially applicable to opaque panels utilized for various purposes such as in a decorative wall structure. The invention provides the advantage of permitting various size and shapes of decorative composite panels in such a structure without the joints between adjoining modular panels being visible.

We claim:

**1**. A hanger assembly for supporting a light-transmitting panel below a light fixture from a hanger rod depending from a structure above said panel and in which said panel is provided with an aperture and a shoulder extending transversely of the axis of the aperture, said panel being also provided with a plurality of adjacent cells with said aperture being in communication with one of said cells and said shoulder is spaced above the bottom of said one cell, said assembly including a web threadedly engaged with said hanger rod for vertical adjustment thereon and a pair of flexible legs depending from said web for passing through said aperture in said panel, said assembly further including a separate retaining member extending between and engaging free end portions of said legs for maintaining said legs in a spread position, said retaining member being of light-transmitting materials and having a peripheral edge configuration generally conforming to the edge configuration of said cell, said retaining member having opposed notches for receiving said legs whereby said member and legs are interlocked for unitary rotation about the axis of said aperture, means on said assembly adapted for sliding rotatable engagement with said shoulder whereby said panel is supported on said hanger and whereby rotation of said assembly on said hanger will vertically adjust the position of said panel.

**2**. A hanger assembly as set forth in claim **1** in which said retaining member is in slidable rotatable engagement with said shoulder.

**3**. A hanger assembly as set forth in claim **1** in which said legs are provided with outwardly extending flanges in slidable rotatable engagement with said shoulder.

**4**. A hanger assembly for supporting a light-transmitting panel below a lighting fixture from a hanger rod depending from a structure above said panel and in which said panel is provided with an aperture and a plurality of adjacent cells, at least one of said cells being in alignment with said aperture and having an inwardly directed shoulder spaced above the bottom of said one cell, said assembly including a web threadedly engaged with said hanger rod for vertical adjustment thereon and a pair of flexible legs depending from said web for passing downwardly through said aperture into said one cell, said assembly further including means extending between and engaging free end portions of said legs for releasably maintaining said legs in a spread position, and means on said assembly adapted for rotatable supporting engagement with said shoulder whereby said panel is supported on said hanger and said assembly is rotatable relative to said panel.

**5**. A hanger assembly as set forth in claim **4** in which said supporting means comprise outwardly extending flanges adjacent the ends of said legs.

**6**. A hanger assembly as set forth in claim **4** in which said leg-spreading means is provided with opposed notches for receiving said legs.

**7**. A hanger assembly as set forth in claim **4** in which said leg-spreading means is provided with peripheral edge portions generally conforming to adjacent portions of the inner edge configuration of said one cell.

**8**. A hanger assembly as set forth in claim **4** in which said leg-spreading means comprises a disclike element having diametrically opposed notches for receiving said legs, and further having a peripheral edge configuration generally conforming to the edge configuration of said one cell.

* * * * *