United States Patent [19]

Woloski

[11] **3,810,085**

[45] **May 7, 1974**

[54] **ADJUSTABLE LIGHTING FIXTURE FOR HUNG CEILING INSTALLATION**

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[73] Assignee: **Lightolier Incorporated,** Jersey City, N.J.

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[21] Appl. No.: **345,863**

[52] **U.S. Cl.** ..... **240/51.11,** 240/9 R, 240/144, 240/147

[51] **Int. Cl.** **H05b 33/02**

[58] **Field of Search** 240/51.11, 9, 144, 146, 240/147, 151

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Attorney, Agent, or Firm—Arthur B. Colvin

[57] **ABSTRACT**

The present invention is directed to an improved lighting fixture especially adapted for use in a hung ceiling installation of the so-called "grid" type, and is characterized by the provision of a rectangular housing supported by the ceiling hanger structure and a separate rectangular diffuser frame dimensioned to telescope with the housing. The frame and housing includes complemental mounting devices permitting the vertical spacing between the diffuser and housing to be varied between preselected adjusted positions to compensate for the height characteristics of the ceiling tiles.

8 Claims, 15 Drawing Figures

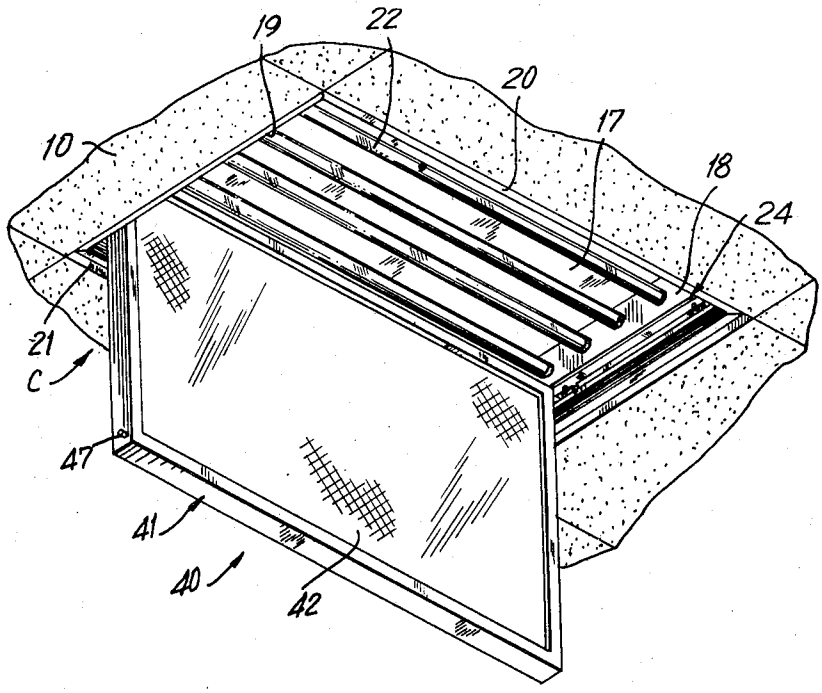


FIG. 1

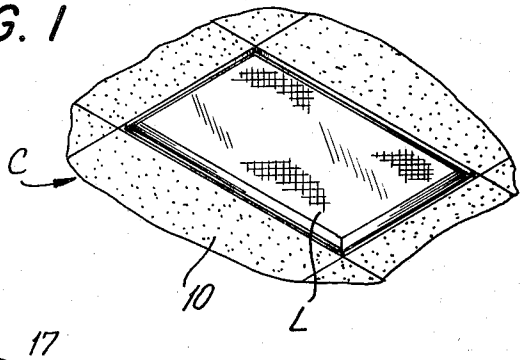


FIG. 2

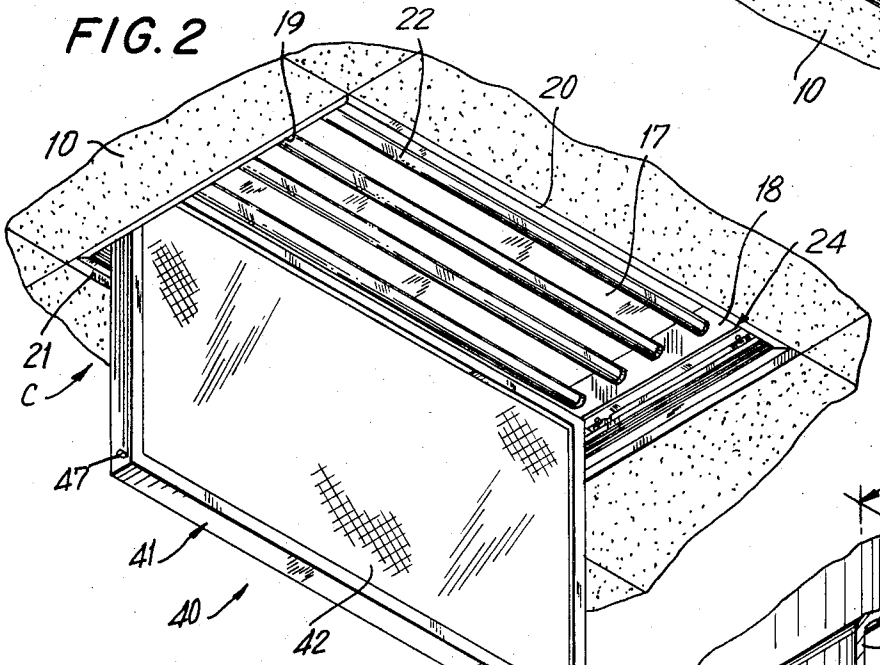
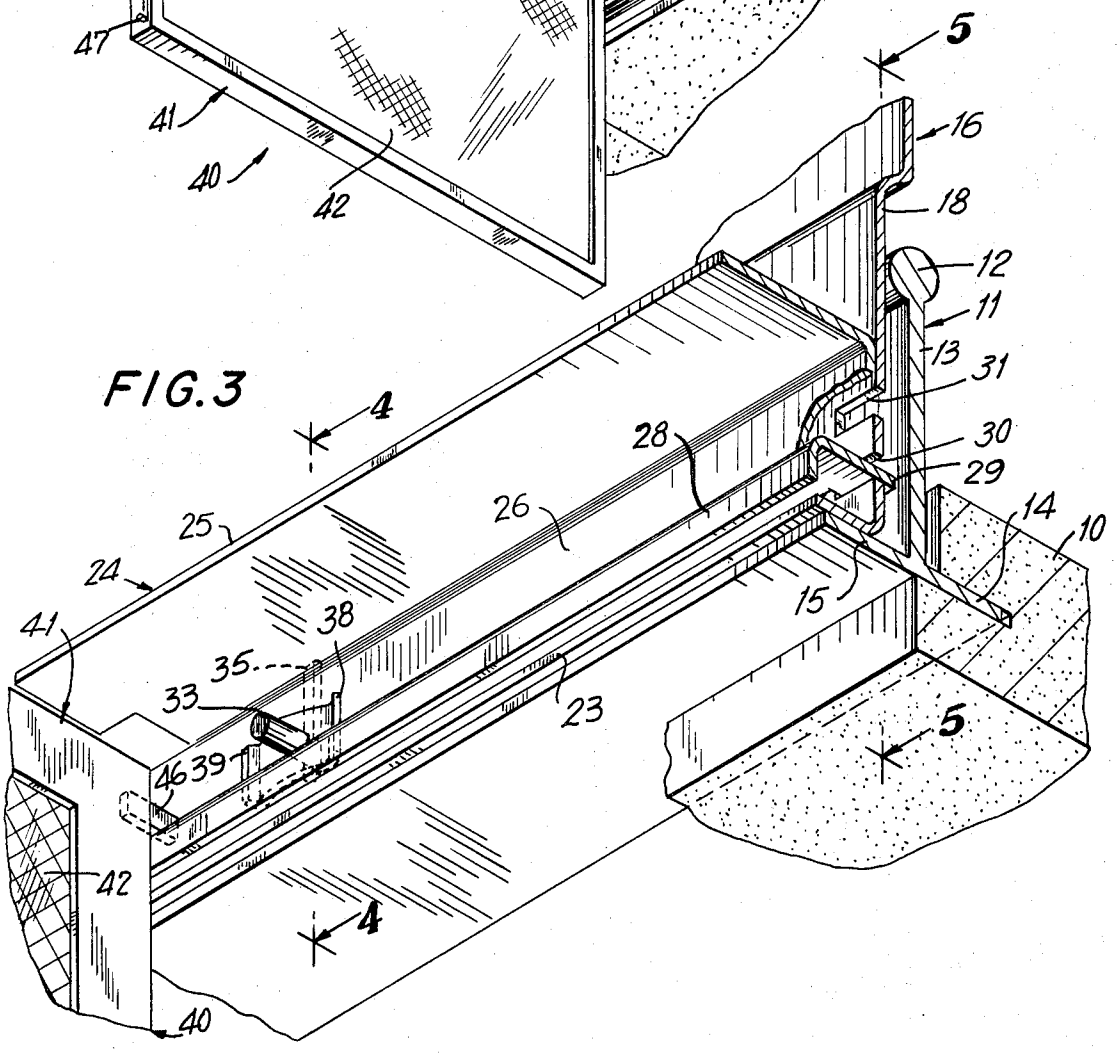


FIG. 3



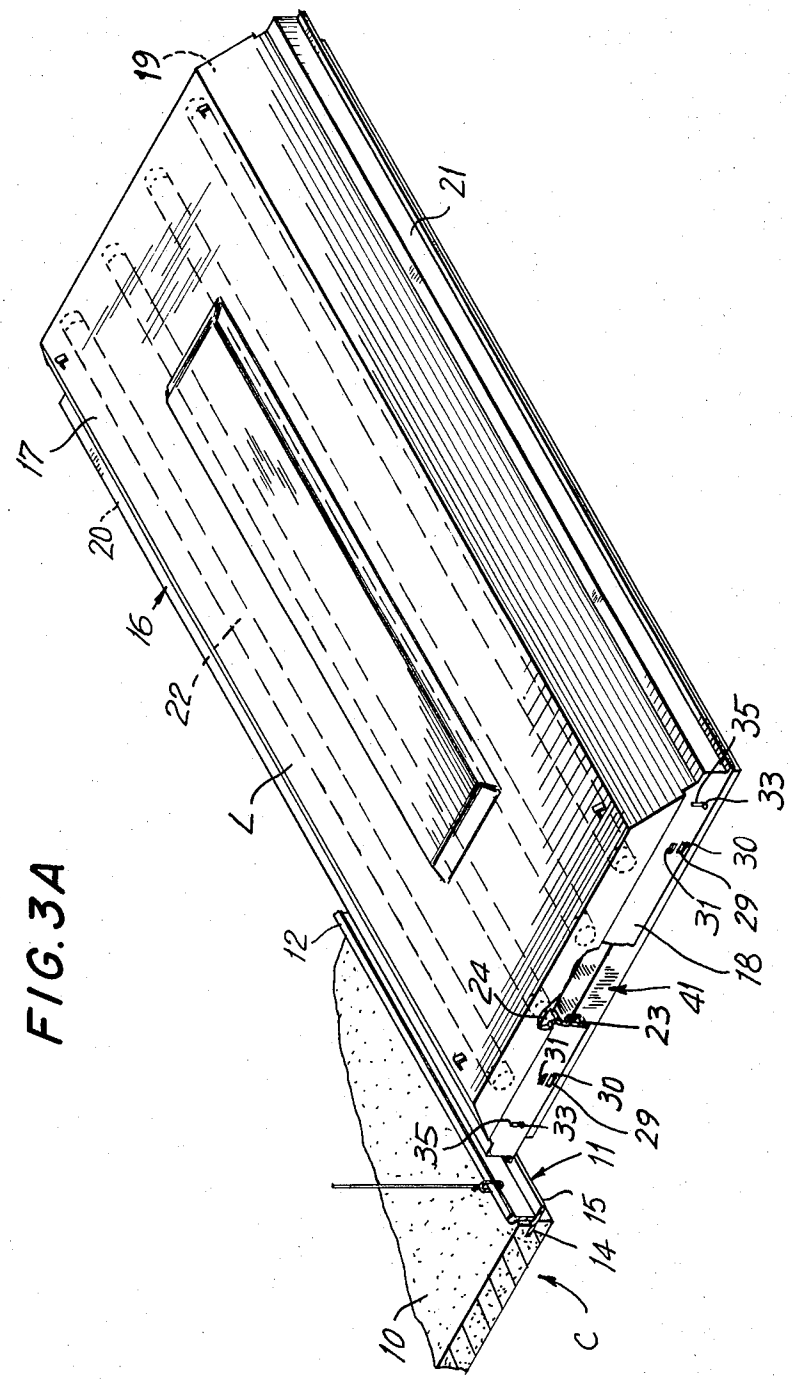


FIG. 3A

FIG. 4

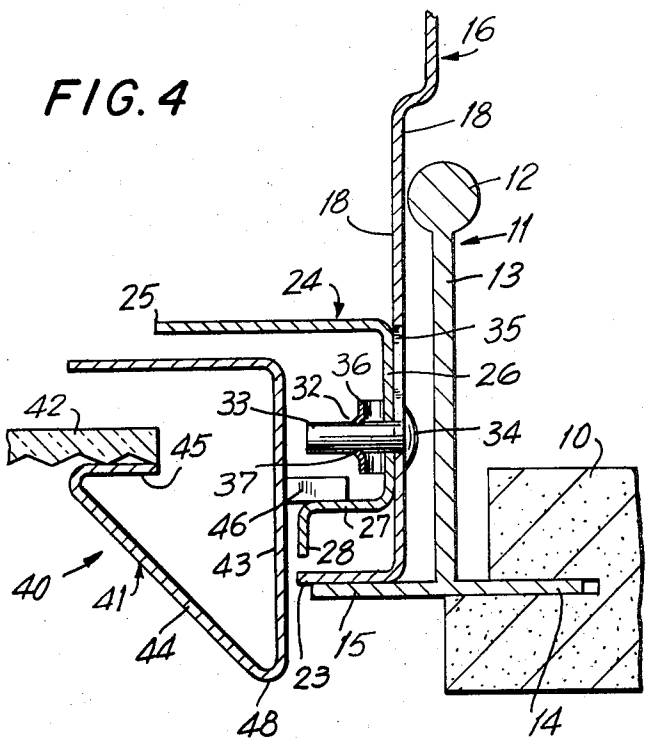


FIG. 6

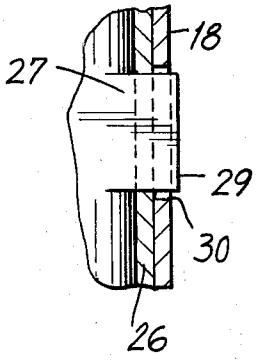


FIG. 7

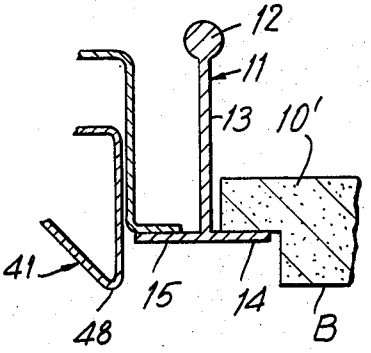


FIG. 5

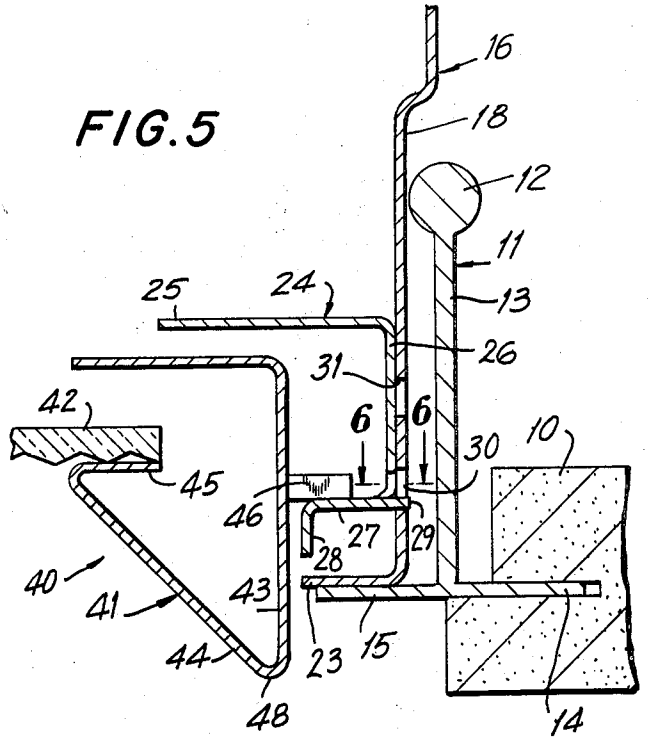


FIG. 8

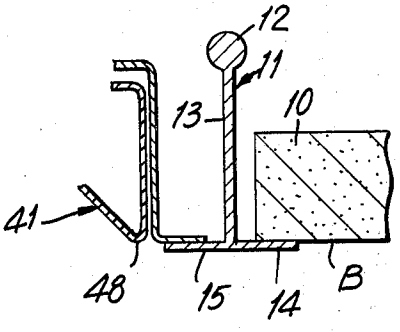


FIG. 9

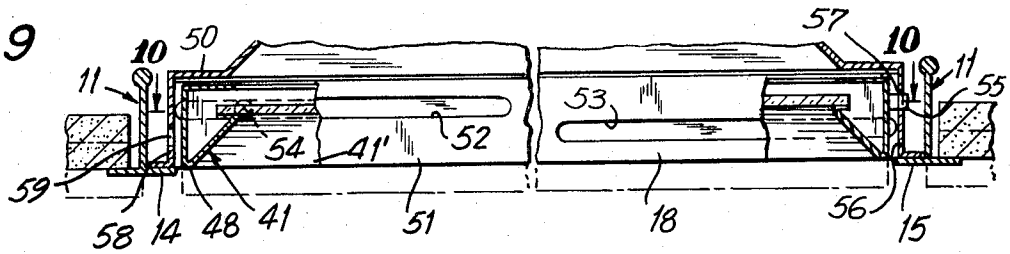


FIG. 10

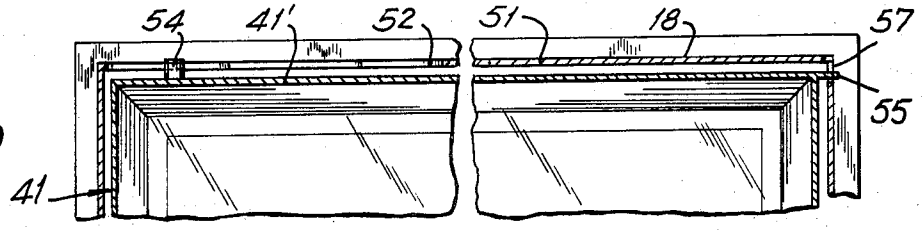


FIG. 11

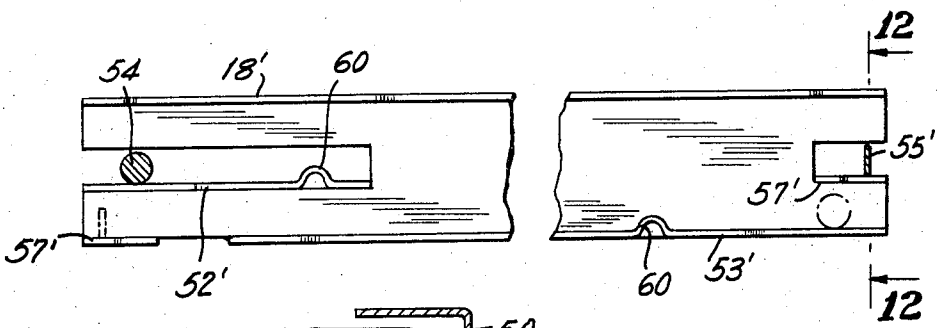


FIG. 12

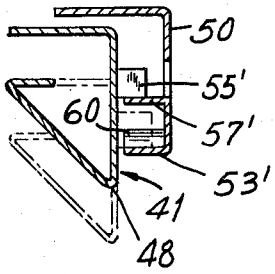


FIG. 13

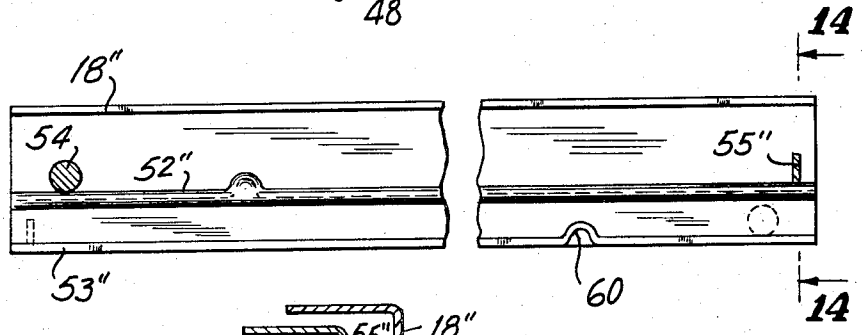
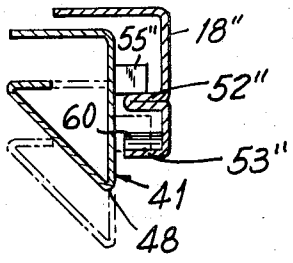


FIG. 14



ADJUSTABLE LIGHTING FIXTURE FOR HUNG CEILING INSTALLATION

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is in the field of lighting fixtures, and more particularly is in the field of lighting fixtures employed in hung ceiling structures for use in so-called grid type ceilings.

2. The Prior Art

In modern constructions, it is customary to provide a ceiling incorporating ceiling tiles and lighting fixtures supported between spaced, parallel, horizontally disposed grids fixed to the beams of the building by intermediate hangers. Ceiling tiles are mounted to the grid structure by connections effected along their longitudinal marginal edges.

In a typical construction, the tile and fixture supports are comprised of parallel, elongated steel or aluminum runners in the form of inverted Ts, the vertical branch of the T, through the use of intermediate supports, being hung from the building structure, the legs of the T extending horizontally to each side of the branch.

Rectangular ceiling tiles are typically seated with their lower side edges resting upon the upper surfaces of the opposed legs of parallel rows of the T extrusions. Obviously, in such construction the downwardly facing surface of the T forms a visible component of the ceiling, and the ceiling tiles are supported at a level above the legs of the Ts.

In a more recent development, the ceiling tiles are provided at their side edges with longitudinally extending slots, the legs of the T extrusions supporting the tiles by extending into the slots. In such instances it will be evident that the lower surface of the tile is disposed below the level of the legs of the T and that all, or substantially all, of the under face of the leg of the T will be obscured by the tile components below the level of the slot. Typically, lighting fixtures are mounted at spaced positions along the T supports, with the under face of the fixture seated atop the leg portions of opposed rows of the T structure.

It is thus apparent that in existing lighting structures used in connection with ceilings of the type described, the height of the fixture is established whereas the height of the tile may vary in accordance with the type of tile used, e.g. the slotted or recessed tiles extending below the lower level of the T, and the unslotted and unrecessed tiles extending above the T level. It is, however, considered desirable for the exposed portion of the lighting fixture to be disposed in co-planar alignment with the under face of the tile since, if the light diffuser is above the tile, the side edges of the tiles adjacent the fixture, which are often rough and unfinished, are highly illuminated.

SUMMARY OF THE INVENTION

The present invention may be summarized as directed to improvements in lighting fixtures of the type employed in grid type hung ceilings, a principal advantage of the fixture of the present invention being the ability to adjust or vary the height at which the diffuser frame is disposed in accordance with the type of ceiling tile employed, whereby a desired relation between the lower edge of the diffuser frame and ceiling tile may be maintained, without the necessity of stocking different fixtures to be used with tiles of different types.

In accordance with the invention, a separable diffuser frame is provided which may be secured to the housing containing the light source in at least two different heightwisely adjusted positions in accordance with type of tile employed.

In a preferred embodiment of the invention, the adjustability is provided by incorporating in the housing a pair of side rails secured to the housing to provide for relative adjustment in a vertical plane. The diffuser assembly is pivotally secured to the rails such that the diffuser will be higher or lower in relation to the ceiling in accordance with the adjusted position of the rails.

In accordance with modifications of the invention, the housing is itself provided with vertically displaced slots or tracks, the heightwise orientation of the diffuser and housing being modified in accordance with which of the slots is engaged with mounting means formed on the diffuser.

It is accordingly an object of the invention to provide an improved lighting fixture for a hung ceiling installation.

A further object of the invention is the provision of a lighting fixture of the type described wherein the heightwise orientation of the diffuser frame and the housing may be varied to provide a selected, desired vertical adjustment between the diffuser and the ceiling tiles employed.

A further object of the invention is the provision of a fixture of the type described wherein the diffuser frame is mounted to a pair of side rails adapted to be fixed to the housing in at least two vertically adjusted positions.

A still further object of the invention is to provide a modified lighting fixture wherein the diffuser is adapted to be connected directly to the housing, the housing and diffuser being provided with vertically displaced complemental fastener means, the heightwise relation of the diffuser and housing being varied in accordance with the manner in which the diffuser is connected to the housing.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, reference is made to the accompanying drawings, forming a part hereof, in which:

FIG. **1** is a perspective view of a small portion of a tile type hung ceiling installation employing a lighting fixture in accordance with the invention;

FIG. **2** is an enlarged perspective view similar to FIG. **1**, with the diffuser assembly shown in open position, providing access to the light bulbs;

FIG. **3** is a fragmentary perspective view showing details of construction;

FIG. **3***a* is a perspective view of the lighting fixture;

FIG. **4** is a vertical section taken on the line **4—4** of FIG. **3**;

FIG. **5** is a vertical longitudinal section taken on the line **5—5** of FIG. **3**;

FIG. **6** is a fragmentary horizontal section taken on the line **6—6** of FIG. **5**;

FIGS. **7** and **8** are simplified fragmentary vertical cross sectional views through the structural support, housing, diffuser plate assemblies and ceiling tile, showing modification of the heightwise orientations of

the fixture parts to accommodate the same for tiles having different characteristics;

FIG. 9 is a vertical section through a fixture in accordance with a further embodiment of the invention;

FIG. 10 is a horizontal section taken on the line 10—10 of FIG. 9;

FIG. 11 is a vertical sectional view of still a further embodiment of the invention;

FIG. 12 is a vertical section taken on the line 12—12 of FIG. 11;

FIG. 13 is a vertical section through still a further embodiment of the invention; and

FIG. 14 is a vertical section taken on the line 14—14 of FIG. 13.

Referring now to the drawings, there is shown in FIGS. 1 and 2 a ceiling C of the so-called hung or suspended type which is comprised of a multiplicity of rectangular ceiling tiles 10. As is conventional, a lighting fixture L is mounted within a space provided by the omission of a tile or tiles, it being understood that the number of such fixtures in any given subdivision of space will vary in accordance with the lighting requirements of such space.

As best seen in FIG. 3, the tiles and fixtures are supported by a grid formed of a plurality of parallel rows of support members 11, essentially conventional in nature. The support members 11 may include an enlarged bead 12 received within a complemental socket extending downwardly from the hanger clip structure (not shown) depending from the beams or other supports of the building.

Support members 11 are general T-shaped in vertical section, including depending vertical branch 13 and laterally extending legs 14, 15. While only one such support assembly 11 has been shown, it will be understood that the ceiling grid is defined of a plurality of parallel rows of supports 11, the spacing of the supports being adjusted to coordinate with the width of the ceiling tiles, such that tiles will rest between the opposed or facing legs of adjacent supports.

In accordance with the invention, the lighting fixture includes a housing 16 having a top wall 17, parallel side walls 20, 21 and parallel end walls 18, 19. A conventional light source 22 of any sort is mounted within the housing.

The walls 18, 19, 20, 21 define a generally rectangular structure which is open at the bottom. The walls may include an inturned flange 23 which supports the weight of the housing, the flange being seated atop the branch components 15 of the support structures 11.

Referring to FIGS. 2, 3 and 4, the walls 18 and 19 are provided with rails 24, the rails being connected to the walls by an adjustment mechanism which permits the rails to be adjusted in a vertical direction between at least two adjusted positions relative to the walls 18, 19. Since rails 24 and the manner of their connection to the walls 18, 19 are identical, a description of one such rail and its connection to one wall 18 will suffice.

The rail 24, which is of a length slightly smaller than the length of the wall 18, is formed of bent metal and includes an upper ledge 25, side web 26, a horizontal support ledge 27, and a downwardly depending lip 28 formed at the terminus of the ledge 27. The rail 24, adjacent its lateral extremities, is provided with a pair of support tabs 29 struck from the metal of the web 26, the tabs extending laterally outwardly beyond the plane of the web.

The end wall 18, adjacent each of its lateral extremities, is formed with a pair of vertically displaced slots 30, 31, within which the tabs 29 may be selectively seated. The web portion 26 of the rail 24 is yieldingly maintained in abutting relation with the end wall 18 by a spring fixture 32 interposed between the rail and the wall.

The spring fixture includes an elongated cylindrical shank member 33, headed at its outer end 34. The wall 18 is provided with a vertical slot 35, through which the shank 33 is passed, with the head 34 bearing against the outer face of the wall surrounding the slot 35. A butterfly spring 36 is fixed to the shank 33 at a central portion 37, the lateral arms 38, 39 of the spring bearing against the inner surface of the rail 24 in spaced relation to the shank 33.

From the foregoing it will be apparent that the rail may be shifted to the left, as viewed in FIG. 4, relative to the wall 18, which movement will unseat or remove the tabs 29 from the slots, permitting the rail 24 to be shifted vertically upwardly or downwardly.

When the tabs are in registry with the desired one of the slots 30 or 31, the rail may be released, the spring 36 thereupon pressing the tabs through the desired slots, whereby adjustment in a vertical direction of the rail relative to the wall 18 may be effected.

While only two adjustment slots have been shown in FIGS. 3 to 5, it will be apparent that more such slots may be provided. In practice, however, with existing tile constructions adjustability between two positions, displaced vertically about ⅜ inch has been found sufficient.

A shield or diffuser plate assembly 40 in the form of a rectangular frame 41 carrying a light shielding or diffuser plate 42 is pivotally secured between the spaced rails 24. Optionally but preferably, the frame 41 incorporates a substantial vertical dimension embodying vertically extending side web 43 and an inwardly beveled flange 44 terminating in an outwardly extending diffuser support ledge 45. The frame 41 is attached between the rails 24 in such manner as to permit it to be pivoted clear of the normal horizontal position to the open position shown in FIG. 2, to permit changing of bulbs. For this purpose, an opposed pair of pivot pins 46 extend laterally outwardly from the frame 41, the pins being seated on the ledge portion 27 of the rails 24.

The frame 41 is additionally provided with one or more latches 47 which may be engaged with the rails 24, it being understood that when the latches are engaged, the plate 42 is disposed in the normal horizontal position, release of the latches from the rails 24 enabling pivotal movement to the position shown in FIG. 2.

In FIG. 7 there is shown a tile 10' which is recessed at its lower edge such that the bottom face B of the tile is at a level substantially below the legs 14, 15 of the support. The diffuser frame 41 in FIG. 7 has been illustrated in the lowered position, whereby the apex 48 of the diffuser plate is in substantial co-planar alignment with the bottom B of the tile.

In FIG. 8 there is illustrated a more conventional ceiling tile 10, the frame 41 being illustrated in its raised position within the housing whereby the apex 48 is again in essentially co-planar alignment with the bottom B of the tile.

In the embodiment of FIGS. 9 and 10 wherein like parts have been given like numerals to the illustrations of the prior described embodiment, there is disclosed a variation in which the diffuser frame assembly 41 is mounted directly to the housing 50 rather than through the interpositioning of vertically shiftable rails, such as the rails 24.

As will be apparent from an inspection of FIG. 9, the housing 50 is supported on the inturned legs 14 and 15 of adjacent support members 11. Each of the two opposed parallel walls 51 (only one wall being shown, the parallel wall being identical) is provided with a pair of horizontally disposed, longitudinally extending slots 52, 53. It will be observed that the slot 52 is located in a vertical plane above the plane of the slot 53.

The diffuser frame 41 is provided on its end wall portion 41' with a mounting pin 54, it being appreciated that a similar, coaxially disposed mounting pin is secured to the wall of the diffuser assembly 41 which is parallel to the wall 41'.

The diffuser frame 41 includes a projecting latch extension member 55. The wall 56 of the housing is provided with a latch aperture 57. In similar fashion, the wall 58 of the housing 50 is provided with a latching aperture 59. It will be observed that the latching aperture 59 and slot 53 are in co-planar alignment at a level below latching aperture 57 and slot 52, which are likewise in co-planar alignment.

In the embodiment of FIGS. 9 and 10, if it is desired to support the diffuser frame in an upward or raised vertical position as respects the housing 50, the pins 54 are mounted in the upper opposed slots 52 and latches 55 in the upper latching apertures 57, whereupon the apex 48 of the frame 41 will be disposed in substantial co-planar alignment with the lowermost portion of the housing.

If it is desired that the diffuser frame 41 project below the level of the housing, the diffuser plate is removed from the housing, rotated through 180° about a vertical axis, and the pins 54 seated within the lower slot 53, the latches 55 being passed into the lower latch receiver slots 59 in the wall 58.

It will be appreciated that after the pins have been seated within the appropriate slots, the frame may be pivoted to a horizontal position, and when the latches 55 are in registry with the latch receiver apertures 57, for instance, the entire diffuser plate may be bondily shifted in a horizontal plate to engage the latches and receivers and lock the diffuser plate in its horizontal position. Obviously, different latching mechanism than the slot and latch tab 57 and 55, respectively, may be employed without departing from the spirit of the disclosure.

FIGS. 11 and 12 disclose a quite similar embodiment to that of FIGS. 9 and 10. In this embodiment, the pins 54 of the diffuser frame ride on tracks 52', 53' corresponding to the slots 52, 53 of FIGS. 9 and 10. Preferably, the tracks 52', 53' are comprised of metal struck from and folded inwardly relative to the walls 18' of the housing.

In the embodiment of FIGS. 11 and 12, the diffuser frame includes laterally extending latch tabs 55' adapted to maintain the diffuser frame in horizontal position by the tabs being seated selectively on one or the other of the support ledges 57', which are similarly struck from the metal of the wall 18'.

The tracks 52', 53' are preferably provided with stop detents 60 which prevent the pins 54 from inadvertently being shifted beyond the supports 52' or 53' and falling clear of the lighting assembly.

The embodiment of FIGS. 13 and 14 is essentially similar in concept to that of FIGS. 11 and 12, the upper support track 52'' in FIGS. 13 and 14 being an inwardly extending metal fold rather than a ledge struck inwardly from the body in the wall 18'' of the housing.

In the embodiment of FIG. 13, the support detent 55'' maintains the diffuser frame in horizontal position by being seated directly upon the track 52'' in the upper position of the diffuser, or the bottom flange 53'' in the lower position of the diffuser.

From the foregoing it will be seen that the present invention is directed to an improved lighting fixture incorporating as its basic components a housing mounted in fixed position on the supporting grid work of a hung ceiling installation, and a diffuser frame carrying a diffuser plate, the frame being susceptible of being mounted in at least two different, vertically offset positions relative to the housing, whereby the heightwise relationship of the diffuser frame and housing may be adjusted in accordance with the type of tile employed in the construction of the ceiling.

Through the use of a fixture of the type described, the installer is enabled readily to adapt the fixture to ceiling tiles of the various styles employed, rather than stocking different fixtures.

It will be apparent that variations in detail may occur to skilled workers in the light of the instant disclosure, without departing from the spirit of the invention and, accordingly, the same is to be broadly construed within the scope of the appended claims.

Having thus described the invention and illustrated its use, what is claimed as new and is desired to be secured by Letters Patent is:

1. A lighting fixture for a hung ceiling installation comprising, in combination, a housing member rectangular in horizontal section and including a top wall, a pair of spaced parallel side walls, and a pair of spaced parallel end walls, the lower marginal edges of said walls defining a downwardly open, horizontal mouth portion, a light source in said housing, a pair of parallel rail members in said housing, respectively adjacent the end walls of said housing, adjustment means operatively connecting each of said rail members to said housing for supporting said rails at a selected, predetermined, vertically adjusted position relative to its adjacent end wall, a diffuser assembly including a rectangular frame having an opening, a diffuser plate mounted in said opening, hinge means adjacent one end of said frame pivotally connecting said end of said frame to a corresponding pair of said rail members, and releasable connector means mounted adjacent the end of said frame opposite said one end for releasably securing said opposite end of said frame to said rail members.

2. The lighting fixture of claim 1 wherein said frame portion of said diffuser assembly includes a rectangular depending lip extending, in the secured position of said frame, downwardly through said open mouth portion of said housing.

3. A lighting fixture in accordance with claim 2 wherein said adjustment means includes vertically spaced apart slots formed in said end walls of said housing, tab members formed on said rail members and ex-

tending outwardly toward said end walls, and spring assembly means yieldingly urging said rails against said end walls for holding said tabs within said slots.

4. The lighting fixture of claim 3 wherein each said end wall includes two pairs of said vertically spaced apart slots, the slots forming each said pair being disposed adjacent opposite ends of said end walls, said side rail members each having a pair of said tabs each adapted to register with a slot of each said pair.

5. The device in accordance with claim 4 wherein said spring assembly means each includes a coupler member having a head and an elongated shank, a vertical slot formed in each said end wall, an aperture formed in each said rail in registry with said vertical slot, said coupler member having its shank portion extending through said slot and aperture, said spring assembly means including a spring member in said housing having portions engaging said shank and said rail and yieldingly urging said head portion of said coupler against the face of said end wall.

6. A lighting fixture for a hung ceiling installation comprising a housing member including a top wall, a depending pair of spaced parallel side walls and a depending pair of spaced parallel end walls, said side and end walls together defining a generally rectangular structure, the lower marginal edges of said walls defining a downwardly open mouth portion, a light source in said housing, a diffuser assembly adapted to be mounted within said housing and extend downwardly through said mouth portion, said assembly being rectangular in horizontal section, two opposed pairs of pivot receiver members formed on said housing adjacent opposite ends thereof, the receiver members of one said pair being disposed in a plane above the receiver members of the other said pair, pivot means formed on said diffuser assembly and engageable selectively with one or the other said pairs of receiver members for pivotally coupling said diffuser assembly to said housing, latch means on said diffuser assembly, first and second latch receiver means on said housing adjacent opposite ends thereof, said first and second receiver means being vertically displaced in accordance with the vertical displacement of said pivot receiver means, whereby the vertical spacing of said diffuser assembly and said top wall portion of said housing is of a first value when said pivot means of said diffuser is engaged with one said pair of pivot receiver members, and said latch means is engaged with said first receiver means, and of different value when said pivot means is engaged with the other said pair of receiver means, and said latch means is engaged with said second receiver means.

7. The device of claim 6 wherein said first pair of pivot receiver members comprises opposed slots formed in the parallel end walls of said housing in a first vertical plane and said second pair of pivot receiver members comprise opposed slots in said end walls in a second vertical plane displaced from said first plane and said pivot means comprises a pair of pins extending from said diffuser assembly, said pins being selectively engageable with the slots of one or the other of said pairs, thereby to adjust the vertical spacing of said pins and, hence, said diffuser assembly from said top wall portion.

8. A lighting fixture for a hung ceiling installation comprising a housing member including a top wall, a depending pair of spaced parallel side walls and a depending pair of spaced parallel end walls, said side and end walls together defining a generally rectangular structure, the lower marginal edges of said walls defining a downwardly open mouth portion, a rectangular diffuser assembly including vertically extending end and side walls defining a frame, a diffuser plate mounted within said frame, said end and side walls extending above and below the plane of said plate, a parallel pair of rail members in said housing disposed adjacent the end walls thereof, adjustment means connecting each said rail member with an adjacent said end wall for shifting movement between first and second vertically offset positions within said housing selectively in accordance with the desired spacing of said diffuser plate from said top wall portion, pivot means on said frame adjacent a first side thereof pivotally connecting said first side to said rail members and latch means on the other side of said frame adapted to releasably engage the other side of said frame with said rail members.

* * * * *