

Jan. 31, 1967

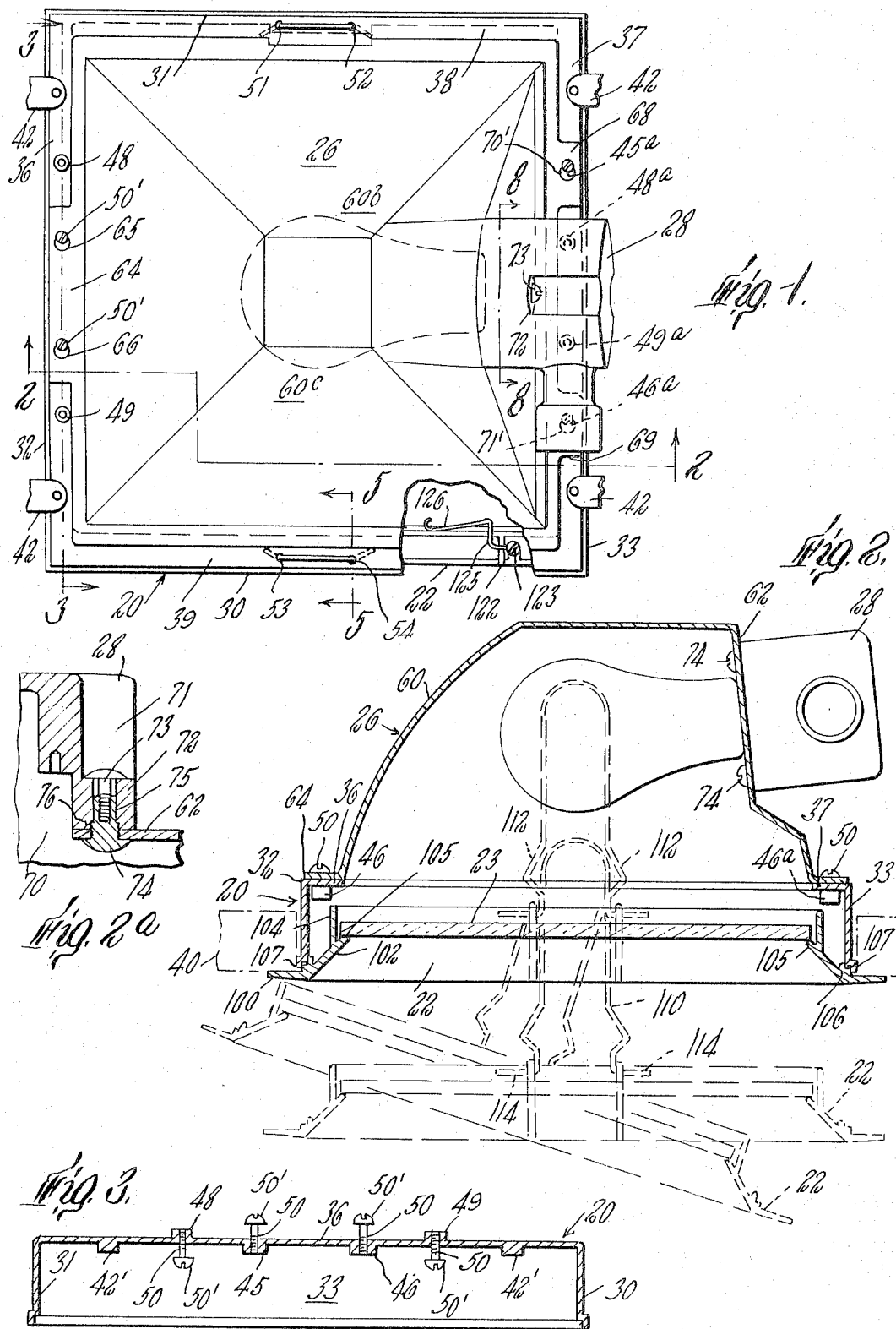
M. MENZIN

3,302,019

INCANDESCENT LIGHT FIXTURE IMPROVEMENTS

Filed Sept. 29, 1964

3 Sheets-Sheet 1



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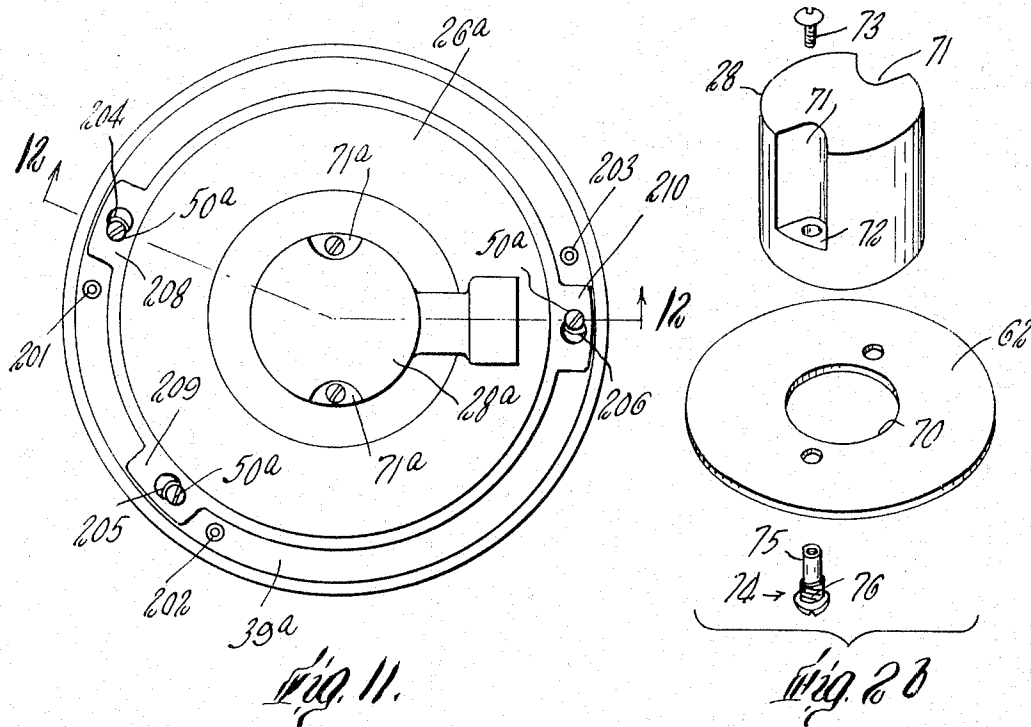
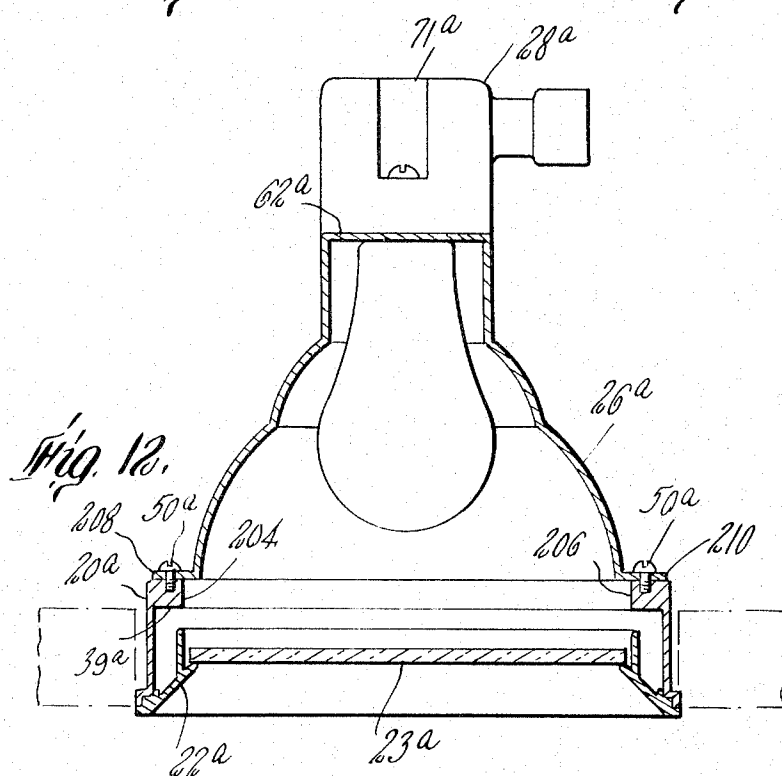
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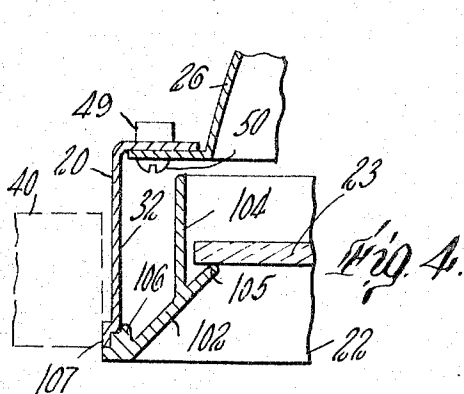
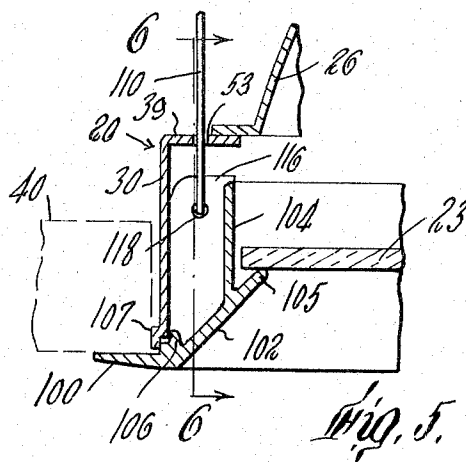
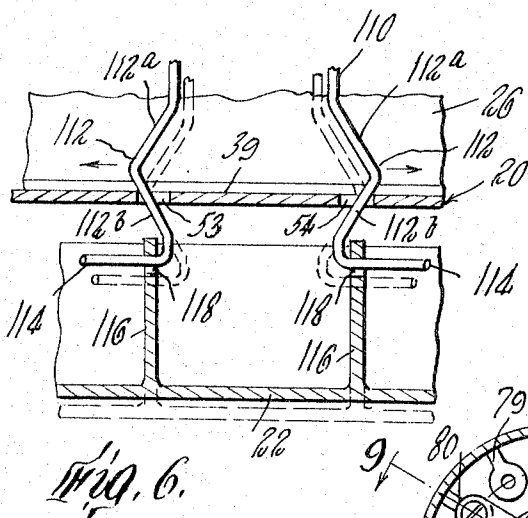
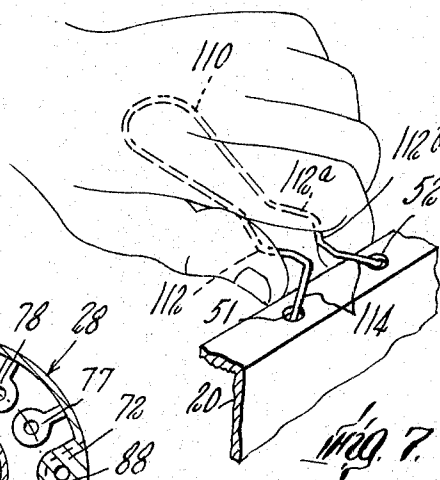
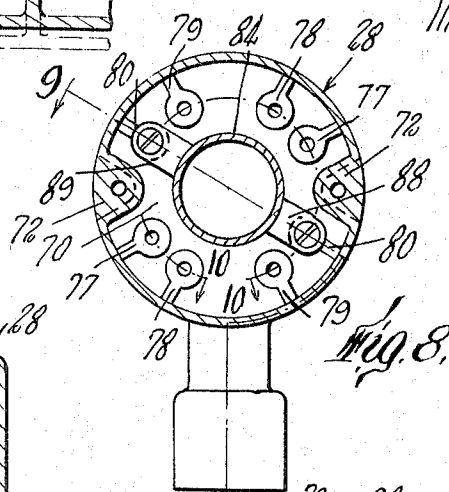
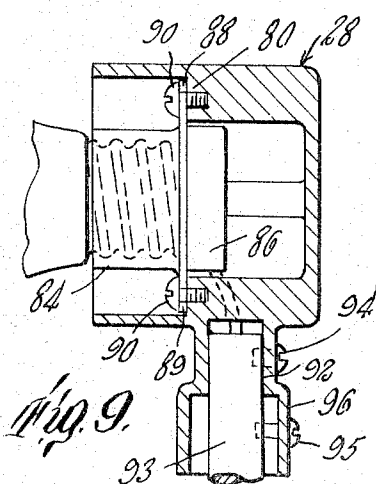
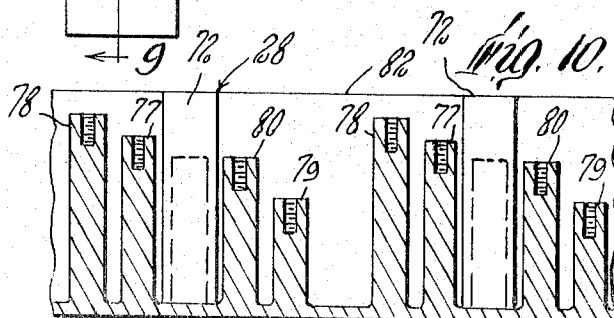
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INCANDESCENT LIGHT FIXTURE IMPROVEMENTS

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INCANDESCENT LIGHT FIXTURE IMPROVEMENTS

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8 Claims. (Cl. 240-147)

This invention relates to incandescent fixtures of the type adapted for stationary installation in a ceiling structure and has as a major object the provision of improved reflector and socket mounting systems capable of use in a variety of installation situations.

More particularly, the invention provides a mounting frame adapted to receive in keyed relationship a reflector from either above or below, and a socket mounting in which a single socket may be selectively mounted in several different positions to correspondingly locate the centers of brightness of several different length bulbs at the focal points of various reflectors.

Another major object is to provide such a socket with multipositional socket housing in which the position of the socket in the housing can be changed or the socket wiring inspected without going inside the reflector.

Further objects of the invention are to provide such mounting systems that can be employed uniformly throughout a line of fixtures of varying shapes, sizes and functions, are easily manipulated by unskilled persons, require a minimum of parts, and offer maximum functionality at minimum cost.

Another object is to provide improved means for retaining a lens frame in various selected positions relative to the above mentioned mounting frame, and a lens in the lens frame.

Further objects and advantages of the invention will be apparent upon the description of preferred embodiments thereof, including the drawings, in which:

FIG. 1 is a top view of one embodiment, partially broken away near one corner;

FIG. 2 is a cross-sectional view taken through 2-2 of FIG. 1, with the reflector mounted from above the mounting frame, and with successively lowered positions of the lens frame shown in dotted lines;

FIG. 2a is a cross-sectional view of a portion of the socket housing and reflector of FIG. 1;

FIG. 2b is an exploded perspective view showing the socket housing and the manner in which it is mounted on the reflector;

FIG. 3 is a cross-sectional view taken through 3-3 of FIG. 1, showing the mounting frame alone;

FIG. 4 is a view similar to that of a portion of FIG. 2, but on an enlarged scale with the reflector mounted from below the mounting frame and incorporating a modified lens frame;

FIG. 5 is a cross-sectional view through 5-5 of FIG. 1;

FIG. 6 is a cross-sectional view through 6-6 of FIG. 5;

FIG. 7 is a perspective view of a portion of the embodiment of FIG. 1 showing the manner of installing a retaining spring in the mounting frame openings;

FIG. 8 is a cross-sectional view through 8-8 of FIG. 1, showing the socket mounting of the invention;

FIG. 9 is a cross-sectional view through 9-9 of FIG. 8;

FIG. 10 is a circular cross-sectional view through 10-10 of FIG. 8, displayed in linear fashion;

FIG. 11 is a top view of another embodiment of the invention; and

FIG. 12 is a cross-sectional view through 12-12 of FIG. 11.

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Referring in detail to FIGS. 1-10, the fixture comprises broadly a main mounting frame 20, a lens frame 22, reflector 26, and socket housing 28 mounted on the reflector 26.

Mounting frame 20 is a generally rectangular, open centered structure having vertical (when installed) walls 30-33 and two pairs of opposing horizontal ledges 36-37, 38-39 extending centrally of the frame from the upper edges of said vertical walls. Frame 20 is secured to the ceiling structure 40 by suitable brackets shown only in part at 42, connected to lugs 42' of the frame 20.

Disposed along ledge 36 are spaced downwardly projecting lugs 45 and 46, and spaced upwardly projecting lugs 48 and 49, the former pair being located between the latter. Similarly disposed along ledge 37 are lugs 45a, 46a, 48a and 49a, except that downwardly projecting lugs 45a, 46a are aligned opposite lugs 48, 49, and upwardly projecting lugs 48a and 49a are aligned opposite lugs 45, 46. This arrangement, with the lugs on opposite sides of a given ledge offset from each other, enables the frame to be easily die cast as a unit. Key pins 50, which may be screws or shoulder rivets, are inserted in all the above mentioned lugs, the heads 50' of the pins being slightly spaced from the ends of said lugs.

Ledges 38 and 39 are provided, near their centers, with paired holes 51-52, and 53-54, respectively, for receiving the legs of a U-shaped retaining spring to be described below.

Reflector 26 comprises a rectangular cross section housing open at one side, and has a contoured wall 60, with a flat portion 62 on the wall opposite the contoured wall. The inside of the housing is coated with a suitable reflective substance. The other two walls may also be contoured.

Projecting outwardly from the bottom edge of wall 60 is a horizontal flange 64 containing key openings 65, 66. Each of these key openings has one circular portion of diameter slightly larger than that of the heads 50' of pins 50, and a second circular portion of diameter slightly smaller than that of said heads, the large and small circular portions adjoining, and the key openings arranged and spaced with the small portions lying on the same side of the large portions so that the key pins in lugs 45 and 46, or 48a and 49a, can simultaneously be inserted in the larger portions and, by sliding the reflector longitudinally along the ledges, be moved simultaneously into the smaller portions to lock flange 64 securely against the mounting frame. In a similar manner, spaced apart flanges 68 and 69, projecting outwardly from the lower edge of the reflector wall opposite wall 60, carry key openings 70' and 71', these openings being arranged and spaced to key onto the key pins in lugs 45a and 46a, or 48 and 49 with the same sliding movement of the reflector 26 that keys the key pins in lugs 45 and 46 or 48a and 49a. In order to accomplish this sliding movement when the reflector is mounted from below, the portions of the opposing reflector walls 60b and 60c adjacent ledges 38 and 39 must be spaced apart less than the spacing between said ledges 38 and 39.

By virtue of the arrangement just described the same reflector can easily be mounted just described the same reflector can easily be mounted from above (FIG. 1) the mounting frame 20 (e.g., in a high ceilinged building with catwalks above the fixtures), by using the key pins in lugs 45, 46, 45a and 46a, with the reflector in the position of FIG. 1, or can alternatively be mounted from below (FIG. 4) (e.g., to permit inspection of wiring from floor or ladder) by using the key pins in lugs 48, 49, 48a and 49a, with the reflector reoriented 180° in the horizontal plane from its position in FIG. 1.

Referring to FIGS. 1, 2, and 2a a circular opening 70 is provided in flat portion 62 of the reflector 26, and

socket housing 28 is secured externally of the reflector to cover opening 70. Housing 28 is generally cylindrical, but has two opposing cutaway sections 71 along its external surface, providing lugs 72 which are adapted to fit against the reflector flat portion 62 outside the circumference of opening 70. Right hand threaded screws 73 are passed, from outside the reflector, through holes in lugs 72 and flat portion 62. A rivet type nut 74, having a hollow shaft 75 with internal right hand threading and external left hand knurling 76 is screwed onto the end of each screw 73. Then, by tightening the screw, the rivet nut 74 is urged through the hole in the reflector. The knurling on the nut is larger than the hole in the reflector, so that said nut becomes tightly engaged in flat portion 62 as screw 73 is tightened. Then, the socket housing can be removed from the reflector without going inside the reflector by simply unscrewing screws 73, nuts 74 remaining fixed.

Along the inner cylindrical wall of housing 28 are spaced a series of socket mounting lugs 77, 78, 79 and 80. These lugs are paired to provide lugs of equal distance from the rim 82 of the housing, at opposite ends of diameters of the housing. The four pairs of lugs are stepped at different heights, providing four mounting positions for the socket.

Attached to the base of socket 84 is a bracket 86, which provides two arms 88, 89 extending in opposite directions beyond the cylindrical wall of the socket. The arms have holes in them and fit over the ends of one of the pairs of lugs 77, 78, 79, 80. Screws 90 secure the socket to the lugs. In this manner, the socket may be mounted selectively depending upon the size of the bulb, to locate the center of brightness at the focal point of the reflector, and the socket can be employed with reflectors having focal points located at different distances from the point of attachment of the socket housing.

In assembly, the socket is installed in the desired position in its housing, and then the housing is mounted on the reflector as described above. If at some future time it is desired to change the position of the socket, or to inspect the socket wiring, it can be done without going inside the reflector by simply unscrewing the housing 28 as described.

Wiring from the socket passes into a stepped hollow extension 92 of the socket housing, where it is protected by removable steel tubular shielding 93. The shielding is held in extension 92 by means of set screw 94. The stepped configuration is provided in extension 92 so that a tubular shield of two standard diameters can be used. The small diameter size is shown in FIG. 9, but if the larger diameter shield is used, it is inserted into increased diameter portion 96 of the extension, and is held in place there by set screw 95. The socket housing and extension are advantageously die cast in a single unit.

Referring to FIG. 2, lens frame 22 is, like mounting frame 20, a generally rectangular open centered structure, comprising, on all four sides, a horizontal flange 100, an oblique portion 102 extending upwardly into the mounting frame and a vertical opaque light shield rib 104 extending upwardly from a line spaced below the upper edge of oblique portion 102, leaving an overhang 105 upon which lens 23 rests. Ribs 104 serve to limit movement around the edges of the lens. At the junctions of flange 100 with oblique portion 102 is found a stepped ribbing 106, which is adjacent a complementary stepped edge 107 of the mounting frame 20. In the flanged embodiment of FIGS. 2 and 5, flanges 100 abut the ceiling, and are drawn against said ceiling by the U-springs to be described below. In this embodiment, the horizontal surfaces of the stepped ribbing 106 do not contact the corresponding horizontal surfaces of the stepped edge 107 of the mounting frame. However, the vertical surfaces of the steps are allowed to contact, centering the lens frame in the fixture and preventing the escape of light between the frames. In an alternative embodiment shown in FIG. 4, flanges 100 are not present, and the lens frame

is drawn up into the ceiling recess until the horizontal surfaces of the steps are in contact, thereby stopping the upward movement of the frame, the U-shaped spring being able to move the lens frame into contact and maintain the contact firmly.

With regard to the two U-shaped springs 110, as best shown in FIG. 2, the legs of these springs are bowed at 112, near the ends, and terminate in outwardly extending hook portions 114. Unlike the usual construction, these hooks are bent, symmetrically to the bisector of the U, out of the plane of the U. By this construction, when the legs of the U are squeezed together, the hooks 114 point away from each other at an angle of less than 180° and hence may be easily and even simultaneously inserted into holes 51-54 in the mounting frame, as shown in FIG. 7. After insertion into holes 51-54, the hooks 114 are squeezed between ribs 116, located along the two oblique portions 102 lying beneath holes 51-54, the four such ribs being directly beneath said holes 51-54 respectively when the lens frame is installed, and then allowed to spring into holes 118 in the ribs. By pressing upwardly on the lens shield, the upper segments 112a of the bowed portions of the U-springs are forced above openings 51-54, and the resilient pressure of the lower segments 112b of said bowed portions against the peripheries of openings 51-54 is transmitted into an upward force on the lens frame 22, holding it against the mounting frame or the ceiling, as described above. To remove the lens frame, it is pulled down away from the mounting frame, as shown in the dotted positions of FIG. 2, by curling one's fingers over the overhangs 105, and it can then be completely unhooked if desired.

Lens 23 can be of any desired type, such as ribbed plastic or open egg crate, and is sized to rest upon overhangs 105. A spring arrangement is provided to retain the lens firmly in the lens frame, and at the same time allow the lens to be pushed upward from the lens frame so that fingers can be curled over overhangs 105. Thus, the lens frame is fitted (FIG. 1) along two opposite sides, adjacent diagonally opposed corners, with vertical ribs 122 and adjacent lugs 123. Ribs 122 and lugs 123 lie between oblique portions 102 and light shield ribs 104. At each of these two locations a torsion spring 125 is secured to the lens frame through lug 123, and is bent to extend horizontally through a hole in rib 122. The spring then extends up over rib 104 to arm portion 126 which presses down upon the lens.

While the invention has thus far been described with reference to a rectangular cross section fixture, it is equally applicable to a circular fixture, as shown in FIGS. 11-12.

In this embodiment circular mounting frame 20a is provided, along the inwardly projecting ledge 39a, with three arcuately spaced upwardly projecting lugs 201, 202 and 203, and three downwardly projecting lugs 204, 205, 206, the latter uniformly spaced adjacent the former. Pins 50a are inserted in the lugs, and circular cross section reflector 26a is provided with three keying flanges 208, 209, 210, of arcuate spacing corresponding to the spacing of each set of lugs, which can be keyed onto the pins in either set of lugs, depending upon whether the reflector is to be mounted from above or below the mounting frame. It is only necessary to bring the view of the reflector to a position parallel with and above or below the mounting frame, whichever is desired, align the key openings with the pins, bring the reflector and mounting frame together so that the keying flanges pass the heads of the keying pins, and then rotate the reflector to complete the keying.

Lens frame 22a and lens 23a are constructed, and mounted in the fixture, in a manner analogous to the rectangular embodiment, and need not be described in detail. Similarly, socket housing 28a is identical to that already described, and attaches to flat portion 62a at the apex of the reflector, providing multi-positional mounting for the socket. This reflects the fundamental utility of

the invention, in that uniform structure, including a single socket housing and socket, as well as uniform installation techniques, can be carried throughout a line of fixtures and through various installation situations for a given fixture in the line.

While the preferred embodiments have been described in detail, variations within the scope and spirit of the invention will occur to those skilled in the art.

What is claimed is:

1. An incandescent lighting fixture having a multi-use bulb-surrounding reflector adapted for stationary installation from a plurality of positions relative to a ceiling structure, comprising a mounting frame for the reflector having means for securing said frame relative to said ceiling structure, said frame having at least one substantially horizontal supporting ledge, means for securing together said mounting frame and said reflector, said means including at least one keying pin, means associated with said frame enabling said pin to extend upwardly from said ledge, and means associated with said frame enabling said pin to extend downwardly from said ledge, said reflector having a focal point and substantially horizontal keying flange means having key opening means sized to admit said keying pin and to lock said flange means and reflector to said ledge and mounting frame, said reflector being adapted to be mounted on said frame from above by the cooperation of said key opening means and said upwardly extending pin, said reflector additionally being adapted to be mounted on said frame from below by the cooperation of said key opening means and said downwardly extending pin, and a socket housing mounted on said reflector for supporting the bulb within said reflector, said housing having a cavity directed toward the interior of said reflector and a plurality of socket mounting lugs located adjacent the interior wall of said cavity at varying distances from said focal point, said housing thereby being adapted to selectively locate a single socket at any of a plurality of distances from said focal point.

2. An incandescent lighting fixture having a multi-use bulb-surrounding reflector adapted for stationary installation from a plurality of positions relative to a ceiling structure, comprising a mounting frame for the reflector having means for securing said frame relative to said ceiling structure, said frame having at least one substantially horizontal supporting ledge, means for securing together said mounting frame and said reflector, said means including at least one keying pin, means associated with said frame enabling said pin to extend upwardly from said ledge, and means associated with said frame enabling said pin to extend downwardly from said ledge, said reflector having a focal point and substantially horizontal keying flange means having key opening means sized to admit said keying pin and to lock said flange means and reflector to said ledge and mounting frame, said reflector being adapted to be mounted on said frame from above by the cooperation of said key opening means and said upwardly extending pin, said reflector additionally being adapted to be mounted on said frame from below by the cooperation of said key opening means and said downwardly extending pin, a socket housing mounted on said reflector for supporting the bulb within said reflector, said housing having a cavity directed toward the interior of said reflector and a plurality of socket mounting lugs located adjacent the interior wall of said cavity at varying distances from said focal point, said housing thereby being adapted to selectively locate a single socket at any of a plurality of distances from said focal point, and a lens frame and a lens, said lens frame having adjacent its periphery a stepped rib portion providing at least one horizontal and at least one vertical face, said mounting frame having a stepped lower edge complementary to said rib portion, said stepped edge spaced above the lowest surface of said ceiling structure and providing at least one horizontal and at least one vertical face, said lens frame being adapted for installation adjacent said mount-

ing frame with said vertical faces in contact, said fixture further comprising resilient means for holding said lens frame adjacent said mounting frame.

3. The fixture of claim 2 wherein said lens frame has a horizontal flange portion extending outwardly from said stepped rib portion and adapted to overlap from below and contact said lowest surface of said ceiling structure under the influence of said resilient means when the lens frame is installed, with said horizontal surfaces spaced when said lens frame is installed in said mounting frame.

4. An incandescent fixture having a multi-use bulb-surrounding reflector adapted for stationary installation from a plurality of positions relative to a ceiling structure, comprising a rectangular mounting frame having means for securing said frame relative to said ceiling structure, said frame having two supporting ledges extending substantially horizontally from first and second opposing sides of said frame, the first of said ledges having at least one keying pin, first pin support means associated with said ledge to enable said keying pin to extend upwardly from said ledge, second pin support means associated with said ledge and spaced horizontally from said first means to enable said keying pin to extend downwardly from said ledge, the second ledge similarly having first and second spaced pin support means, located respectively opposite said second and first pin support means of said first ledge, said reflector having keying flanges with keying openings adapted to cooperate with said upwardly extending pins when said reflector is mounted from above said frame, said same keying openings adapted to cooperate with said downwardly extending pins when said reflector is reoriented horizontal 180° and mounted from below said frame.

5. The fixture of claim 1 further comprising means, operable from outside said reflector, for removably mounting said socket housing on said reflector.

6. The fixture of claim 5 wherein said socket housing has at least one mounting lug and said mounting means comprises a right hand threaded screw adapted to pass from outside said reflector through said lug and a hole in said reflector, and a rivet nut with a hollow shaft having right hand internal threading and left hand external knurling, said nut being adapted to cooperate with said screw by means of said internal threading to retain said housing against said reflector, and to cooperate with said reflector by means of said external knurling to retain itself in said reflector hole when said screw is removed, said knurling being of larger diameter than said hole.

7. In an incandescent lighting fixture having a bulb-surrounding reflector, the combination of

a socket housing having a cavity opening toward the focal point of said reflector and a plurality of lugs located adjacent the interior wall of said cavity at varying distances from the outer rim of said cavity, each of said lugs providing a surface for receiving a mounting portion of a bulb socket, and

a bulb socket having a mounting portion for mounting said socket alternately on different ones of said lugs thereby to locate said socket at different distances from said focal point.

8. An incandescent fixture having a multi-use bulb-surrounding reflector adapted for stationary installation from a plurality of positions relative to a ceiling structure, comprising a rectangular mounting frame having means for securing said frame relative to said ceiling structure, said frame having two supporting ledges extending substantially horizontally from first and second opposing sides of said frame, the first of said ledges having at least one keying pin, first pin support means associated with said ledge to enable said keying pin to extend upwardly from said ledge, second pin support means associated with said ledge and spaced horizontally from said first means to enable said keying pin to extend downwardly from said ledge, the second ledge similarly having first and second spaced pin support means located respectively opposite

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said second and first pin support means of said first ledge, said reflector having keying flanges with keying openings adapted to cooperate with said upwardly extending pins when said reflector is mounted from above said frame, said same keying openings adapted to cooperate with said downwardly extending pins when said reflector is re-oriented horizontally 180° and mounted from below said frame, said reflector adapted to be mounted on said mounting frame by inserting said pins located on opposite ledges into said keying openings and then sliding said reflector longitudinally along said ledges, the third and fourth sides of said frame being spaced apart a distance

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greater than distance between the reflector walls lying adjacent said third and fourth sides when said reflector is installed.

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NORTON ANSHER, *Primary Examiner*.
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UNITED STATES PATENT OFFICE

Certificate

Patent No. 3,302,019

Patented January 31, 1967

Marvin Menzin

Application having been made by Marvin Menzin, the inventor named in the patent above identified; Sherman Z. Kasdin of Newton, Massachusetts; and Smithcraft Corporation, Chelsea, Massachusetts, a corporation of Massachusetts, the assignee, for the issuance of a certificate under the provisions of Title 35, Section 256, of the United States Code, adding the name of the said Sherman Z. Kasdin as a joint inventor, and a showing and proof of facts satisfying the requirements of the said section having been submitted, it is this 3rd day of December 1968, certified that the name of the said Sherman Z. Kasdin is hereby added to the said patent as a joint inventor with the said Marvin Menzin.

EDWIN L. REYNOLDS,

First Assistant Commissioner of Patents.

[SEAL]