

Sept. 24, 1963

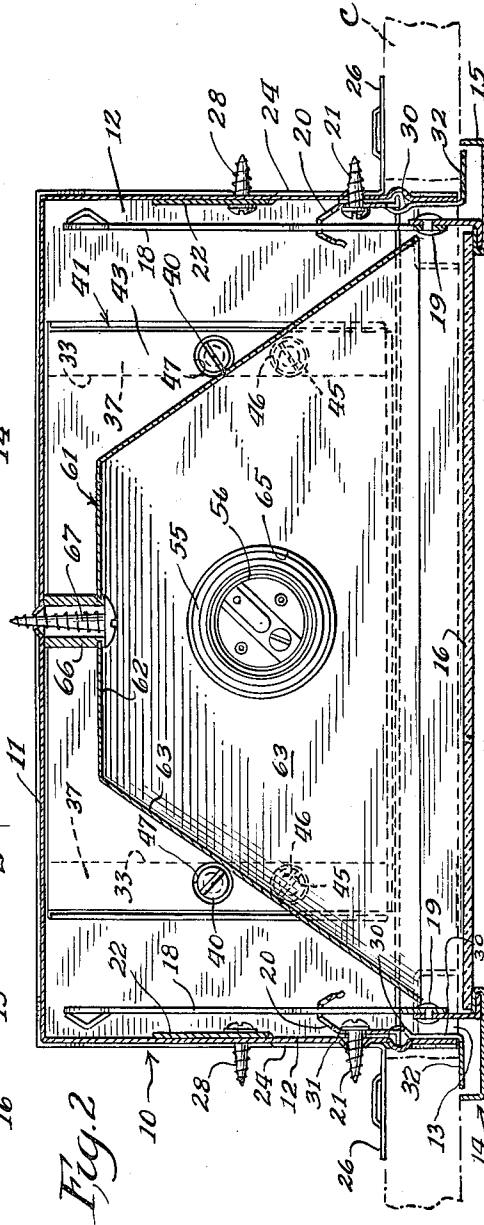
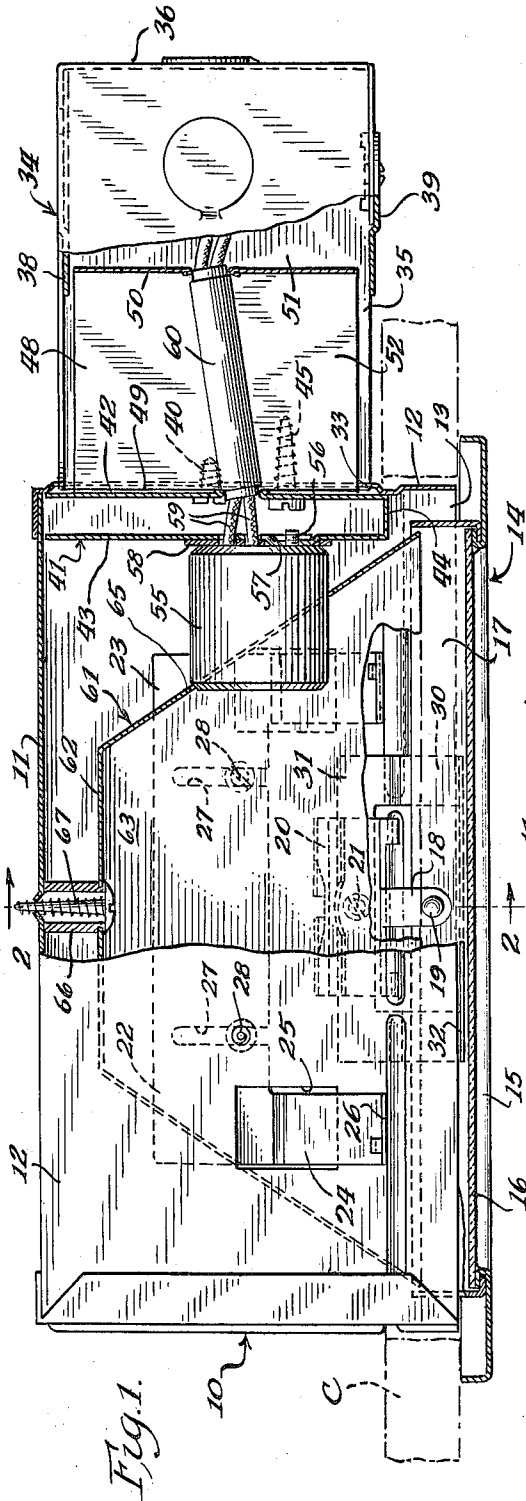
C. J. STUART ET AL

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RECESSED LIGHTING FIXTURE

Filed Dec. 14, 1959

2 Sheets-Sheet 1



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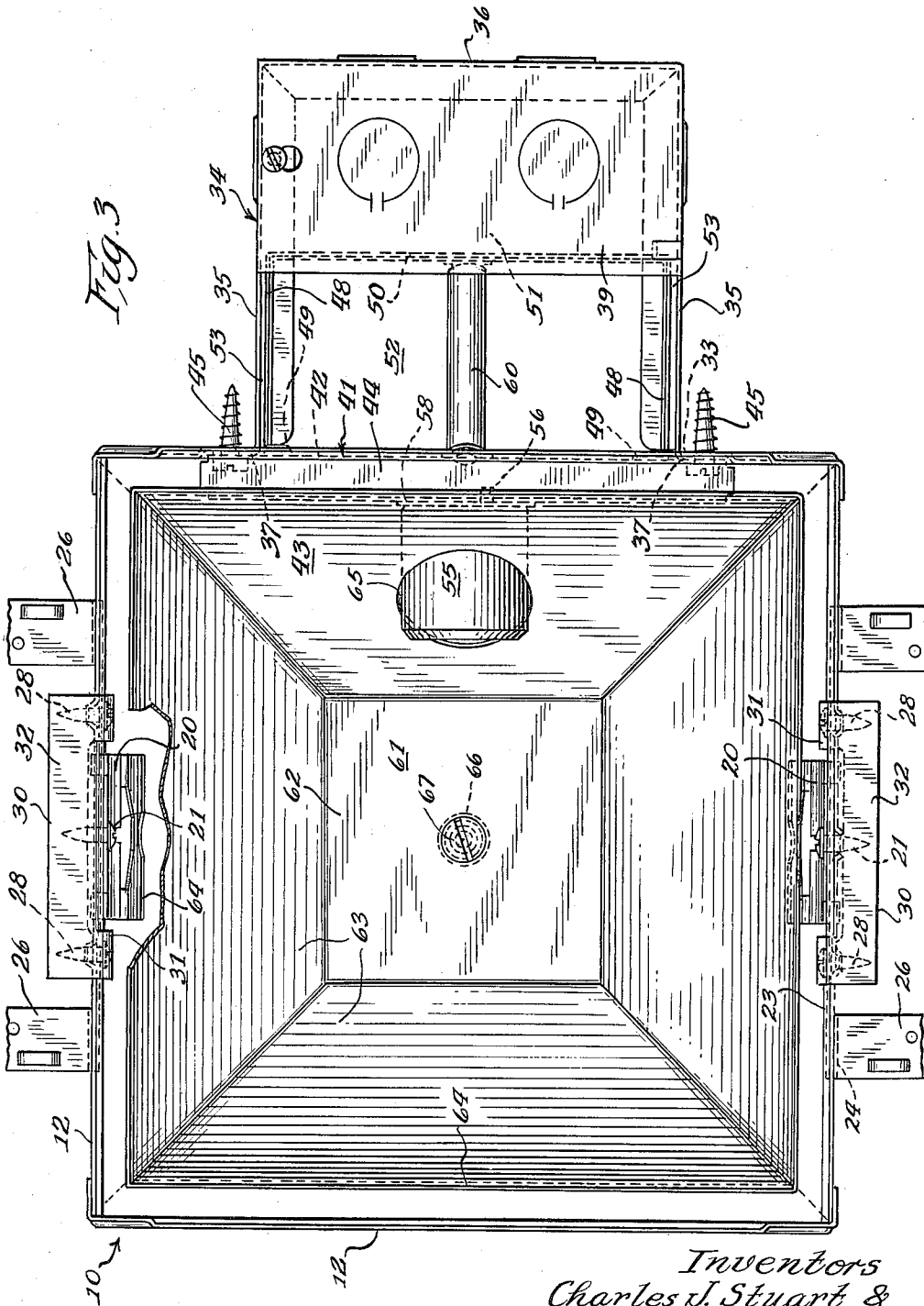
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RECESSED LIGHTING FIXTURE

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Filed Dec. 14, 1959, Ser. No. 859,192
9 Claims. (Cl. 240-78)

The present invention relates to recessed lighting fixtures.

Lighting fixtures of the type which in use are mounted in recessed relation in walls, ceilings, or the like, encounter the problems of subjection of the wiring to possibly excessive heat developed by the lamp or light bulb employed in the fixture, and of the need for accessibility of the wiring from the interior of the fixture. The fixture construction of the present invention provides solutions to these problems representing improvements over previous structures of this type.

It is an important object of the invention to provide a recessed lighting fixture construction which greatly minimizes both the radiation and conduction of heat so as to protect the wiring against the deleterious effects thereof, and at the same time provides for easy access to the wiring when desired.

Another object is the provision of a recessed lighting fixture in which substantially the entire interior of the fixture housing is shielded from the radiant heat of the lighting means.

Another object is the provision of a recessed lighting fixture employing a heat-dissipating mount for the lighting means providing a limited circuitous heat-conducting path between the lighting means and the housing to minimize transmission of heat to the housing.

A further object is the provision of a recessed lighting fixture in which a reflector is mounted in completely heat-insulated relation to the housing.

Another object of the invention is the provision of a recessed lighting fixture employing unitary means for both closing the wiring-access aperture and mounting the lighting means which also provides a heat insulating space and a heat baffle plate within the housing to minimize heat transfer to the wiring.

A further object is the provision of a recessed lighting fixture including a junction box mounted on and accessible from the fixture housing in which the junction box is spaced from the housing and an air passage or open ended chamber is defined between the box and housing to minimize heating of the junction box.

Another object is the provision of a recessed lighting fixture having a junction box mounted thereon in spaced relation, in which a plurality of cooling air spaces or passages are provided to minimize transmission of heat to the box.

A further object is the provision of a recessed lighting fixture which includes a junction box mounted on the fixture housing in spaced relation thereto and with a cooling air passage defined therebetween, in which protective shielding means is provided for wiring extending through said space from the housing to the box.

It is also an object of the invention to provide a recessed lighting fixture in which a reflector is mounted on the top wall of the fixture housing in spaced relation thereto by a tubular heat-insulating spacer and a single fastening element itself also insulated from the reflector.

Other and further objects, advantages, and features of the invention will be apparent to those skilled in the art from the following detailed description, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a side elevational view of a lighting fixture according to the present invention, with portions broken

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away and portions shown in section for greater clarity of disclosure;

FIG. 2 is a cross-sectional view taken substantially as indicated by the line 2-2 of FIG. 1; and

FIG. 3 is a bottom plan view of the fixture with the closure removed.

Referring to the drawings, there is shown a fixture embodying the present invention, in which a housing generally indicated as 10 is defined by a rectangular top wall 11 and four side walls 12 extending from the edges of the top wall, with the side wall edges remote from the top wall defining an open bottom 13 of the housing. The fixture is illustrated as mounted within a ceiling C indicated in dotted lines, in which an opening is formed of sufficient size to allow the insertion of the housing from below. A closure generally designated 14 is provided for the open housing bottom, comprising a rectangular bezel or trim member 15 in which is mounted a lens or plate of glass 16 or other suitable light-transmitting material. The trim member has a cross-sectional width sufficient to conceal the edges of the housing side walls 12 and of the opening in the ceiling C. About the glass-receiving opening of the trim member 15 extends a flange 17 which holds the glass 16 against lateral movement, and projects within the open bottom of the housing when the closure 14 is in its closing position, the flange 17 paralleling the respective side walls 12 and being spaced inwardly therefrom throughout its extent. The closure is removably secured to the housing, and held in closed position relative thereto, by a pair of spring members 18 pivoted on the flange 17 as by rivets 19 to extend along opposite side walls 12 of the housing 10, the spring members 18 engaging in slotted spring brackets 20 secured to such opposite housing side walls as by screws 21. The spring members provide for a resilient connection yieldably holding the closure on the housing. Since the spring members 18 and brackets 20 form no part of the present invention, and may be replaced with other suitable means for accomplishing the same purpose, the details of construction and operation thereof are omitted. Any suitable means may be employed for mounting the fixture, but in the present instance there is illustrated a pair of mounting brackets 22 each having a plate portion 23 disposed against the interior of one of the walls 12 on which the brackets 20 are secured. Outwardly offset leg portions 24 extend from the plate portion 23 of each bracket 22 and project through suitable apertures 25 formed in the adjacent side walls 12, and extend parallel to the outer faces of the walls. Outwardly extending foot portions 26 on the leg portions are adapted to engage on the upper surface of the ceiling C, as best shown in FIG. 2, and to be secured thereto if desired. Slots 27 in the plate portions 23 receive there-through screws 28 threaded through the side walls, to provide for vertical adjustment of the brackets 22 relative to the housing 10 so as to determine the vertical position of the housing relative to the ceiling, as will be understood. In the present instance, the foot portions 26 are not shown as secured to the ceiling C, the housing being secured by a clamping arrangement. The clamping action is provided by a pair of mounting angle members 30 each of which has one leg 31 thereof extending into the interior of the housing along the adjacent side wall and secured by the screw 21 which secures the spring bracket 20. The other leg 32 of the angle member extends outwardly below the edge of the side wall to engage the lower surface of the ceiling C, so that the ceiling is in effect clamped between the foot portions 26 of the mounting brackets 22 and the out-turned legs 32 of the mounting angle members 30. These outwardly extending legs 32 are concealed by the trim member 15.

One of the housing side walls 12 extending between the side walls on which the spring brackets 20 and the mounting means described are secured is provided with an aperture 33 of size and shape to receive therethrough a junction box generally designated 34. The box 34 is formed by a pair of substantially parallel walls 35 connected at one end by a preferably integral wall 36, and each having at the opposite end thereof an out-turned flange 37. The box is completed by a bottom plate 38 and a cover plate 39, the plate 38 being secured in place by spot welding to suitable flanges of the walls 35, and the plate 39 being removably secured in any well known manner. The side or end of the box 34 opposite that at which the wall 36 extends is open so as to allow access into the box through the aperture 33, the box being mounted on the apertured side wall 12 of the housing by means of the flanges 37. These flanges engage the inner surface of the wall adjacent the opposite ends of the aperture 33 and are secured to the wall by means of screws 40. The plates 38 and 39 extend from the wall 36 only a portion of the distance between that end wall and the housing wall 12, the width of the plates 38 and 39 being shown in FIGS. 1 and 3 as substantially half the distance between the wall 36 and the flanges 37. In the present instance, the cover plate 39 is shown as disposed at the bottom side of the box, and the bottom plate 38 at the upper side, although this arrangement might of course be reversed or otherwise changed if it were more convenient in any particular case. It may be pointed out, however, that the walls 35 preferably are vertical walls, with the plates 38 and 39 horizontal.

For closing the aperture 33 in the housing side wall, there is employed a combined closure and mounting member or support member 41 of general U-shape in cross section, comprising a closure plate 42 and a mounting plate 43 connected to the closure plate along one edge by a preferably integral portion 44 which holds the plates 42 and 43 in suitably spaced and substantially parallel relation. The member 41 is secured on the interior of the side wall 12, extending over the aperture 33, by means of screws 45 extending through the closure plate 42 and the housing wall. Suitable apertures 46 are formed in the mounting plate 43 to permit application and removal of the screws 45, as will be clear from FIG. 2. As best evident from FIGS. 2 and 3, the cover plate 42 overlies the flanges 37 of the junction box 34 and the securing screws 40 thereof. To accommodate the heads of these screws, the cover plate is provided with appropriately located apertures 47 (FIG. 2).

Secured to the U-shaped support member 41 is a U-shaped heat baffle means extending between the walls 35. The baffle means comprise a pair of substantially parallel vertically arranged spacing plates 48 each having an intumed flange 49 secured to the closure plate 42 as by spot welding and extending outwardly from the plate 42 to an integral transversely extending baffle plate 50. The plate 50 is disposed just within the adjacent edge portions of the plates 38 and 39 of the junction box 34 and extends therebetween, as best shown in FIGS. 1 and 3, to define with the walls 35 and 36 and the plates 38 and 39 a junction compartment 51 within which the wiring connections for the fixture are enclosed. The baffle plate, as shown, is preferably slightly smaller than the wall 36 to which it lies parallel, but is of such dimensions as to substantially close the compartment, as is evident from the drawing. It will be apparent that the compartment 51 may be considered as a junction box of smaller size than the junction box 34, held in spaced relation to the housing side wall by the portions of the walls 35 extending between the housing and the compartment and in effect forming spacing extensions of a pair of opposed walls of the box or compartment 51. The compartment 51 may also be considered as one division of the junction box 34, another division of which is the vertical air passage or open-ended air

chamber 52 defined between the walls 35 by the closure plate 42, spacing plates 48, and baffle plate 50. This passage or air chamber 52 permits free circulation of air between the housing and the junction box or compartment 51 to assist in maintaining the latter in a reasonably cool condition. Auxiliary air passages or spaces 53 (FIG. 3) are defined between the baffle spacing plates 48 and the adjacent portions or extensions of the walls 35, and serve to cool the walls so as to reduce the possible conduction of heat through the walls 35 to the junction compartment.

An electrical socket 55 for the light bulb (not shown) employed in the fixture is mounted on the mounting plate 43 by means of a screw 56 or the like, an embossment 57 of the plate 43 engaging in a corresponding recess in the base of the socket to hold the socket against rotation without requiring more than one securing screw 56. A disc 58 of heat-insulating material, which may also be electrically insulating, is disposed between the socket 55 and the mounting plate 43 therefor to minimize conduction of heat therebetween. Wires 59 lead from the socket to the junction box, passing through the chamber 52. Extending across the chamber 52, with its ends suitably received in apertures formed in the plate 42 and the baffle plate 50, is a tube 60 of suitable heat insulating material which may also have electrical insulating properties, which encloses the portion of the wires 59 within the air chamber to protect the same from the effect of heat transmitted from the light bulb. The tube 60 may be suitably held in place by being resiliently pressed between the closing plate 42 and baffle plate 50, which may be slightly distorted by the tube.

The junction box may be mounted on the housing 10 in initial assembly of the fixture, and upon installation of the fixture, with the closure 14 and the reflector 61 removed, the wires 59 may be connected to the electrical conductors (not shown) leading from the mains to the junction box or compartment. Such conductors ordinarily are protected by suitable rigid or flexible conduit an end of which may be connected to the junction box. In making the wiring connections, several inches of excess or slack of the conductors is provided for, either by providing such a length of the conductors beyond the end of the conduit, or in the case of flexible conduit allowing such an excess of the conduit outside of the junction box itself. To make the connections, the U-shaped support member 41 with the socket 55 and the baffle plate 50 carried thereby is disengaged from the housing by removal of screws 45, and the conductors are drawn out to a point where their ends may be engaged with the socket lead wires 59. This may be done either by using the slack in the conductors or by moving the junction box inwardly upon removal of screws 40, as most convenient. The connections may thus be made either within the area bounded by the walls 35 or at a point inwardly of the plane of the side wall. With the junction box supported by means of the flanges 37 secured to the housing by the screws 40, and with the connections completed, the U-shaped support member 41 is secured in its mounted position on the side wall by means of the screws 45, the connections being disposed in the compartment 51. The reflector 61 is then mounted in the housing in a manner to be described more fully hereinafter. With a bulb disposed in the socket 55, the closure 14 is secured in its closed position, and the fixture is ready for use. If at any time it is desired to obtain access to the connections of the wires 59, the closure, reflector, and support member 41 with the parts secured thereon may be removed and the wires 59 drawn inwardly of the housing, with or without the junction box being similarly moved inwardly of the housing as already explained, to bring the connections within reach, either through the aperture 33 or within the outline of the housing. Replacement of the parts may thereafter be made in the manner already explained.

The U-shaped support member 41 provides not only a closure for the aperture 33 affording access to the junction box, but also carries the baffle means and therewith defines the air passage or open ended chamber 52 and the auxiliary air spaces 53, as already explained. The member 41 preferably is secured in the housing in such fashion that the free edge of the mounting plate 43 is spaced from the housing so as not to contact therewith and thus avoid providing a heat-conductive path thereto. Instead, the member 41 provides a restricted circuitous heat-conducting path from the connecting portion 44 to the plate 42 and adjacent side wall, the connection of the plates 42 and 43 along only one edge thereof and the spaced relation of the plate 43 assuring such limited conductive path. The plate 43 is made substantially as shown, that is, of substantially the same size as the plate 42, so that it may aid in the dissipation of heat which may be transmitted thereto. Instead of spacing the plate 43 from the housing, it may, if desired, be arranged to engage against any appropriate portion of the housing, such as the top wall 11, to rigidify the mounting of the socket 55, and also to provide a second path for the conduction of heat to the fixture housing for dissipation thereby, when the circumstances are such that such a second path is advantageous. The member 41 provides an insulating space between the plates 42 and 43 by reason of the spaced relation thereof, and also provides a heat baffle in addition to the baffle plate 50 which acts to minimize radiation of heat to the junction box.

In the housing there is provided the reflector 61, of suitably concave form, which is directed toward or faces the open bottom 13 of the housing. The reflector is illustrated as of frusto-pyramidal form, with a rectangular flat top portion 62 from which four side walls 63 incline outwardly and downwardly to define the open lower edge 64 of the reflector. An aperture 65 is formed in one of the reflector side walls 63 to allow the socket 55 to project within the reflector and hold the light bulb in proper position. As most clearly shown in FIG. 3, the reflector 61 at its edge 64 has a perimeter generally corresponding to the interior of the housing, but of slightly smaller dimensions, so that it is spaced from the housing and from the trim flange 17 at all points, and furthermore is spaced from all parts of the structure which contact the housing. By reason of such spacing, there is no conduction of heat from the lighting fixture bulb to the housing or other parts by the reflector 61. The top portion of the reflector is formed with a central aperture providing an edge portion which engages in a circumferential groove adjacent one end of a tubular spacer 66 formed of heat-insulating material. The spacer extends between the reflector and the top wall 11 of the housing to receive therethrough a screw 67 the head of which is insulatingly spaced from the reflector by the end of the spacer lying within the reflector, and the threaded shank of which extends through a suitable aperture in the top wall to hold the spacer 66 against the wall and thereby clamp the reflector securely in the desired position. The reflector may be formed of suitable sheet metal and may of course have a configuration other than that specifically disclosed. The relatively short length of the tubular spacer 66 assures the necessary degree of stability of the reflector which could not be provided by a long spacing member.

As shown in FIGS. 1 and 2, the reflector 61 extends within the flange 17 of the trim 15, the edge of the reflector lying in a plane below the plane of the edge of flange 17, so that the flange and reflector extend in overlapping relation. The margin of the reflector, as already mentioned, is spaced from and surrounded by flange 17. Complete shielding of the housing from heat radiated by the light bulb is thus achieved, since the flange 17 serves as a deflector for rays from the light bulb, and by reason of its overlapping relation to the reflector cooperates therewith to prevent heat rays impinging on the housing.

It will be evident that the provision of the socket-receiving aperture 65 in the reflector instead of the usual edge slot contributes to the substantially complete shielding of the housing interior. Except for heat absorbed by the reflector 61 and flange 17, all of the heat radiated by the light bulb either passes directly through the glass 16 of the housing closure 14, or is reflected therethrough. Since both the reflector 61 and the flange 17 are spaced from the housing and from each other, there is no conduction of heat therefrom to the housing and only such heat as is transmitted by convection or by re-radiation from the reflector or flange can reach the housing, together with such minor proportion as may be conducted through the insulating spacer 66 and screw 67 or pass about the socket 55 through the aperture 65. Because of the confined locations in which lighting fixtures of the type herein disclosed are normally installed, the insulation of associated electrical conductors would be subjected to such a great concentration of heat as to deteriorate very quickly to the danger point, if special provision were not made to maintain the conductors at a reasonably low, safe temperature. The present construction accomplishes this in a most thorough and effective manner.

As already pointed out, the U-shaped supporting member 41 provides both a baffle and an insulating air space interposed directly between the source of heat and the junction box mounted on the housing, and thus in large degree prevents radiation of heat to the wiring in the junction box. The conduction of heat through the socket 55, normally the coolest portion of the lighting means and as a practical matter heated only by the light bulb, is largely minimized by the heat-insulating disc 58 disposed between the socket and the member 41 and further by the limitation of the heat conductive path provided by the U-shaped construction of the member 41, as previously explained. Transmission of heat to the junction box by conduction from the housing is minimized by the fact that the only heat-conductive path to the junction box is through the walls 35. It is further reduced by the cooling effect of the open-ended air spaces 52 and 53 on the walls 35, so that much of the heat being conducted through the walls is dissipated. The provision of the tube 60 further limits conduction of heat to the compartment 51, since in addition to protecting the wires 59 against the effects of radiated heat, it does not itself conduct any appreciable quantity of heat to the compartment 51, and provides a heat-radiating surface to dissipate heat conducted through the wires 59 themselves.

We claim:

1. A recessed lighting fixture comprising a housing defined by side and top walls and having an open bottom, a junction box mounted on a side wall of said housing including a first pair of opposed walls secured to said side wall and a second pair of walls laterally terminating in spaced relation to said housing side wall and connecting said first wall pair, an opening in the side wall affording access to the junction box, a closure for said opening, a heat baffle plate carried by said closure in such spaced relation as to extend between said second pair of box walls at the edge portions thereof adjacent the housing and between said first pair of walls to define a substantially closed compartment in said juncture box, means connecting said baffle plate to the closure including a pair of plates integral with the baffle plate extending parallel to the walls of said first pair to define a pair of laterally outer open spaces therewith and to define with said baffle plate an inner open space between said compartment and the housing, said closure comprising a pair of parallel plate members connected along one pair of adjacent edges, one of said plate members being secured to said housing side wall and extending over said opening and the other being spaced inwardly from the housing side wall and disposed out of contact with the housing, a heat-insulating tube extending between apertures

in said one plate member and said baffle plate to enclose wiring extending between the housing and said compartment, an electrical socket mounted on the other plate member, a heat insulating member disposed between said socket and other plate member, a concave reflector in the housing having an aperture spaced from the edge thereof receiving the socket therethrough, heat-insulating spacing means extending between the center of said reflector and the top wall of the housing and having a portion within the reflector, fastening means securing the reflector in place extending from the reflector to said top wall through said spacing means and held out of contact with the reflector by the spacing means and holding the reflector out of contact with the housing, trim means extending about the open housing bottom, and a flange on said trim means extending within the housing in vertically overlapping laterally spaced relation to the reflector and spaced from the housing side walls.

2. A recessed lighting fixture comprising a housing defined by side and top walls and having an open bottom, a junction box mounted on a side wall of said housing having a pair of opposed walls thereof terminating in spaced relation to said housing sidewall, an opening in the side wall affording access to the junction box, a closure for said opening, a heat baffle plate carried by said closure in such spaced relation as to extend between said pair of box walls at the edge portions thereof adjacent the housing to define a substantially closed compartment in said junction box and an open space between said compartment and the housing, said closure comprising a pair of parallel plate members connected along one pair of adjacent edges, one of said plate members being secured to said housing side wall and extending over said opening and the other being spaced from the housing, an insulating tube extending between apertures in said one plate member and said baffle plate to enclose wiring extending between the housing and said junction box compartment, an electrical socket mounted on the other plate member, a concave reflector in the housing extending over said socket, heat-insulating spacing means extending between the center of said reflector and the top wall of the housing and having a portion within the reflector, and fastening means securing the reflector in place extending from the reflector to said top wall through said spacing means and held out of contact with the reflector by the spacing means and holding the reflector out of contact with the housing.

3. A recessed lighting fixture comprising a housing defined by side walls and a top wall and having an open bottom, a junction box mounted on a side wall of said housing having a pair of opposed walls thereof terminating in spaced relation to said housing side wall, an opening in the side wall affording access to the junction box, a closure for said opening, a heat baffle plate carried by said closure in such spaced relation as to extend between said pair of box walls at the edge portions thereof adjacent the housing to define a substantially closed compartment in said junction box and an open space between said compartment and the housing, said closure comprising a pair of parallel plate members connected along one pair of adjacent edges, one of said plate members being secured to said housing side wall and extending over said opening and the other being spaced from the housing, a heat and electrical insulating tube engaged in and extending between apertures in said one plate member and said baffle plate to enclose wiring extending between the housing and said junction box compartment, an electrical socket mounted on the other plate member, a concave reflector in the housing extending over said socket, and heat-insulating means mounting the reflector on the housing top wall in spaced relation thereto.

4. A recessed lighting fixture comprising a housing defined by side walls and a top wall and having an open bottom, a junction box mounted on a side wall of

said housing having a pair of opposed walls thereof terminating in spaced relation to said housing side wall, an opening in the side wall affording access to the junction box, a closure for said opening, a heat baffle plate carried by said closure in such spaced relation as to extend between said pair of box walls at the edge portions thereof adjacent the housing to define a substantially closed compartment in said junction box and an open space between said compartment and the housing, said closure comprising a pair of parallel plate members connected along one pair of adjacent edges, one of said plate members being secured to said housing side wall and extending over said opening and the other being spaced from the housing, an electrical socket mounted on the other plate member, a concave reflector in the housing extending over the socket, and heat-insulating means mounting the reflector in the housing out of contact therewith.

5. A recessed lighting fixture comprising a housing defined by side and top walls and having an open bottom, an aperture in a side wall of the housing, a junction box mounted on said side wall accessible through said aperture, a closure for the aperture including a first plate member secured to the side wall over the aperture and a second plate member secured to said first plate member only along an edge thereof and spaced therefrom, an electrical socket mounted on said second plate member, and a concave reflector heat-insulatingly mounted in the housing in spaced relation thereto and extending over said socket.

6. A recessed lighting fixture comprising a housing having a side wall, an aperture in said side wall, a junction box mounted on the side wall having an open side registering with said aperture partially defined by a first pair of opposed vertically disposed wall members of the box extending and secured to the housing side wall at opposite ends of the aperture, closure means for the aperture, heat baffle means mounted on said closure means including a vertical baffle plate spaced from the side wall extending between said first wall member pair and with said closure means defining an open-ended air chamber, said baffle means also including plate members integral with the baffle plate and extending parallel to the first wall members to define therewith a pair of laterally outer open-ended air spaces, said chamber and air spaces being open at the top and bottom thereof, and a second pair of opposed wall members, defining with said first pair and said baffle plate a junction compartment separated from said housing by said air chamber, said second pair of opposed wall members terminating in spaced relation to said side wall whereby said open-ended air chamber and said open-ended air spaces communicate with the atmosphere surrounding the junction box so as to permit a flow of air therethrough.

7. A recessed lighting fixture comprising a housing having an apertured side wall, a junction box having an open end, means mounting said box on said side wall in spaced relation thereto with said open end facing the side wall, a first closure member for said aperture and a second closure member for said open end, at least one of said closure members being resilient, and a tube of heat and electrical insulating material extending between said closure members and removably held in position by being resiliently pressed therebetween for protectively enclosing wiring extending between the housing and box.

8. A recessed lighting fixture comprising a housing defined by side and top walls and having an open bottom, a concave reflector in said housing directed toward said open bottom and having a central aperture, a tubular spacing member of heat-insulating material disposed between said top wall and reflector and having a portion extending through said aperture, and a headed fastener extending through the aperture and spacing member into retaining engagement with the top wall and held out of contact with the reflector by said spacing member portion.

9. A recessed lighting fixture of the type set forth in claim 7 characterized by said closure members each having an aperture therein and said tube of insulating material having reduced end portions accommodated within said apertures respectively.

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