

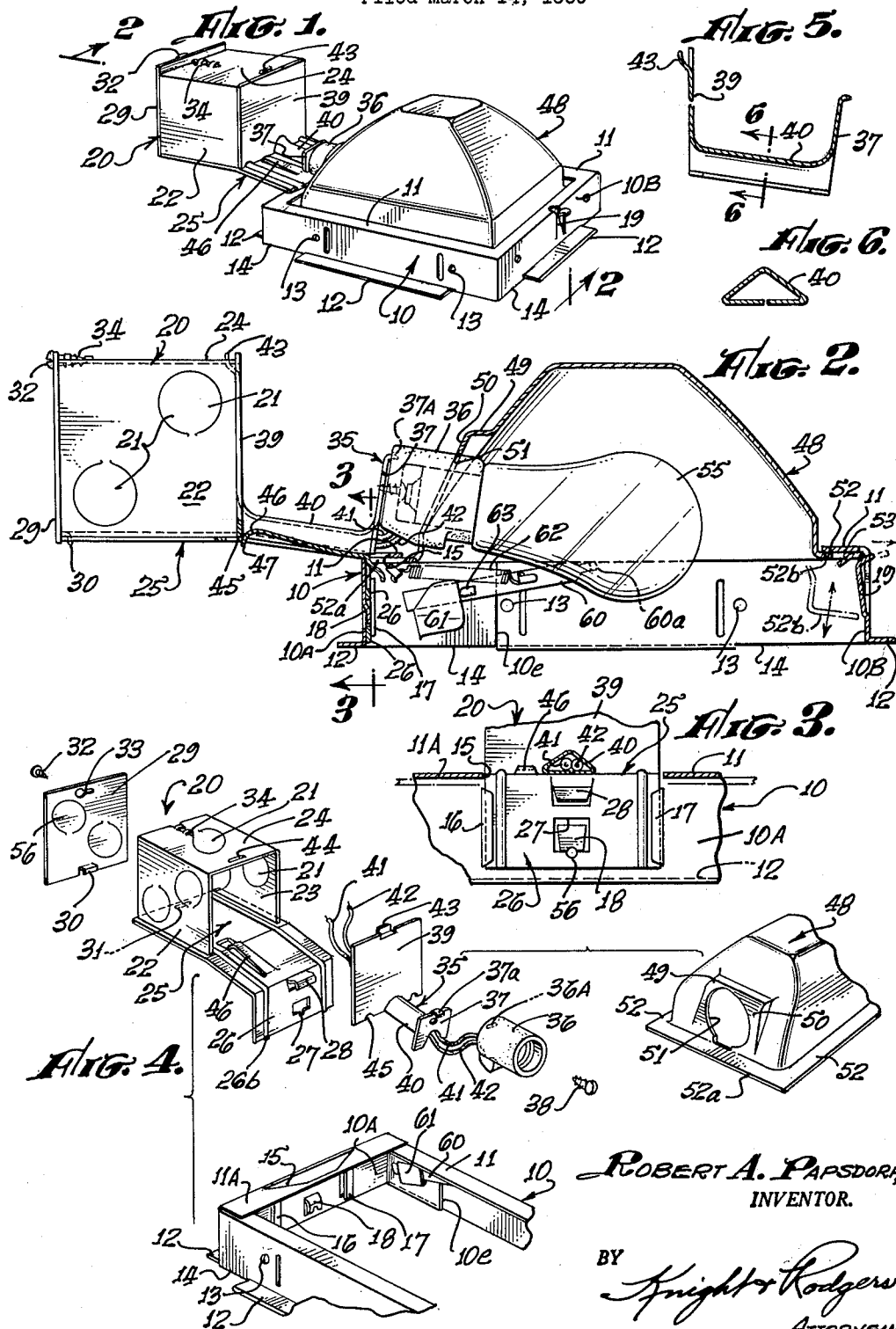
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RECESSED LIGHTING FIXTURE HAVING A SEPARABLE PRE-WIRED SECTION

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**RECESSED LIGHTING FIXTURE HAVING A
SEPARABLE PRE-WIRED SECTION**

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The present invention relates in general to recessed lighting fixtures and pertains more particularly to a fixture of this character which is equally adapted for use in new construction or in the remodeling of existing residential and commercial buildings, and which is distinguished by a main frame relative to which all of the other parts of the fixture are attachable or detachable by simple manual operation and/or with the minimum use of tools.

The recessing of lights in walls and ceilings has become a generally accepted practice during the past decade, and recessed fixtures are now included in many new residential and commercial buildings and in much remodeling and modernization construction.

As a result of this increased use of installations of this character, a rather considerable number of recessed light fixtures have become available to industry, a number of which are claimed to be particularly well adapted for use in remodeling operations since they are so arranged that access to the back of the fixture is not required and wiring connections can be made and the installation completed by working from the front through the light-emitting open side of the fixture. However, the various fixtures of this type known to applicant have required the use of hand tools in cramped quarters and awkward positions to install or adjust them, and some have been so constructed as to necessitate the use of flexible cables and open wires not conforming with the electrical codes in some areas.

Accordingly, the present invention has been made with full cognizance of these difficulties and problems, and may be said to have a number of important objects.

A primary object of my invention is the provision of a pre-wired recessed lighting fixture in which the main structural element is a rigid open mounting frame to which the other parts of the fixture are removably attached in such a way that the fixture can be disassembled without the use of tools other than a screwdriver or the like.

A further object of the present invention is the provision of a recessed fixture of the character described in which the mounting frame is equally well adapted for use in either standard lath and plaster or dry wall construction, whether in new work or remodeling operations.

An additional object of the present invention is the provision of a fixture of the character described and adapted in construction and sequence of assembly whereby the frame and splice box may be installed at the time of roughing-in the electrical work, then a pre-wired socket assembly added and connected when the wires are pulled, and the reflector and front cover installed at the time of hanging the fixtures.

A still further object of the invention is the provision of a fixture of the character described in which the reflector is adapted to close one side of the open frame inwardly of the lamp, and which may be removed singly and without the use of tools, for purposes of cleaning or to provide access through the open frame to the wiring connections.

A general object of the invention is the provision of a fixture of the character indicated which is provided with means for completely isolating the splice box from the lamp and socket except for the rigid metal conduit communicating therebetween, and which is further adapted in

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design and construction to large scale production by economical long-run metal-forming techniques.

In brief, the recessed fixture of my invention includes a rigid flanged frame attachable by conventional means within an opening in a wall or ceiling and having guide means in one wall in which a bracket extended from a splice box is removably engageable; a separate assembly including a side panel of the splice box, a length of rigid conduit, a socket support and a socket, is pre-wired with high-temperature wire, and is engageable between the splice box and the frame; a concave reflector member having a peripheral flange and a lateral aperture in which the socket is received, can pass through one side of the frame and be held in place by latch means. Entry of the socket into the lateral aperture of the reflector also serves to hold the socket in fixed position relative to the entire assembly.

Thus the rigid frame provides a means for attaching the device to the building structure, and also serves as a central means for relative attachment and mutual support of the other parts of the fixture. The concave reflector forms the top of the lamp enclosure, and serves additionally to reflect light, dissipate heat from the lamp, hold the socket and lamp in proper position interiorly of the fixture, and to lock in place the brackets extending to the splice box.

Certain possible variations of the embodiment set forth herein and additional objects of the invention will become apparent upon examination of the following specification together with the references made therein to the accompanying drawing, in which:

FIG. 1 is a perspective of a recessed lighting fixture constructed in accordance with my invention.

FIG. 2 is a vertical sectional view of the fixture taken along the line 2-2 in FIG. 1.

FIG. 3 is a fragmentary vertical cross section and elevation taken along the line 3-3 in FIG. 2.

FIG. 4 is an exploded perspective showing the positional relationship and means of interfitting the various parts of the recessed lighting fixture of my invention.

FIG. 5 is a longitudinal median section through the wireway between the splice box and the socket, and the plates at the ends thereof.

FIG. 6 is a transverse section through the wireway on line 6-6 of FIG. 5.

Reference is again made to FIG. 1 which shows a preferred embodiment of the recessed fixture of the present invention as it appears when completely assembled, and it will be better understood by reference to FIG. 4 in which the fixture is shown completely disassembled. FIGS. 3 and 4 show the manner in which interfitting parts also interlock and are thereby effective to hold each other in place.

The main structural element of the fixture is the rigid, generally rectangular sheet metal frame 10 which is seen in the drawing to have the upper edges of all four sides bent to form an inner flange 11 around the frame. The lower edges of the side walls are bent outwardly to provide a plurality of flanges, designated generally and collectively by the numeral 12, all of which align in a common plane at the bottom of the frame, preferably parallel to the plane of the upper flange 11. Although not limited to this construction, it is preferred to make the frame in two pieces. One piece forms three sides of the rectangular frame and the second piece forms the fourth side. The second piece has a tab at each end bent at 90° to the side of the frame and overlapping end portions of two opposite sides of the frame to which the tabs are attached. Joints are preferably made by spot welding, but other suitable means may be used. One such

tab is shown in FIGS. 2 and 4 and the free end is indicated at 10E.

The frame 10 is attached to the building structure by any conventional means such as wood screws passing through apertures indicated at 13 in FIG. 1 into studs or ceiling joists and bracing members secured therebetween. Some apertures 13 for the screws may be elongated to permit vertical adjustment of the frame to accommodate different thicknesses of plaster. When the wall or ceiling surface is to be plastered after installing frame 10, the outer edge 14 of the frame is usually spaced outwardly from the structural framing by the thickness of the plaster so that the sidewalls of the frame serve as plaster stops and the outer surfaces of the flanges 12 as plaster guides enabling the workmen to keep the finished surface level and properly aligned adjacent and relative to the light-passing opening of the fixture. Hence frame 10 serves as a plaster frame to define the wall opening in which the fixture is mounted.

An irregular aperture 15 is provided in one end section 11A of the flange 11 beneath which are the two parallel, channelled guides 16 and 17. These guides are tabs lanced from the end wall 10A and pressed inwardly of the end 10A of the frame 10, as shown in perspective in FIG. 4 and in frontal elevation in FIG. 3. Between the guides 16 and 17, a spring tongue 18 is also formed from and pressed inwardly of the frame end wall 10A, and a second spring tongue 19 is similarly cut from and pressed inwardly from the opposite end wall 10B of the frame 10.

The frame has also means for supporting a front or cover, including a glass or light diffusing medium, in place over the open bottom of frame 10. A considerable number of fronts are available designed to meet different requirements, and accordingly a front is not shown as it is well known in the art. While several other suitable support means therefor are presently available and may be used in conjunction with frame 10, a novel means comprises an arm 60 having at its free end a hook 60a adapted to pivotally engage a front for the fixture. The other end of the arm 60 is received in a slot cut in the side wall of frame 10 by lancing and pressing inwardly a small section 61 of the wall. A helical spring 62 in tension is attached at one end to the frame and at the other to arm 60. A projection 63 rising above from one face of the bar rides against the forward curved edge of wall section 61 and limits the movement of the bar under the pull of spring 62. Spring 62 tends to move arm 60 to one end or the other of the forward edge of wall section 61. It is shown at the extreme upper range of movement as this is the position occupied when there is no front attached. The arm 60 can swing downwardly to open a gap between the front and the frame to provide access for service, re-lamping, and the like. This front attaching mechanism is described in greater detail and claimed in my copending case Serial No. 23,171, filed April 19, 1960, now Patent No. 3,044,106, issued July 17, 1962, for Cover Attaching Assembly.

A splice box indicated generally by the numeral 20 is provided in any suitable manner with a plurality of knock-outs 21. The box is formed, as seen in FIG. 4, with a continuous piece of material shaped in the manner of an inverted U providing two opposite sides 22, 23, and top 24. The lower edges of the sides 22 and 23 are attached to the bottom wall provided by a part of bracket 25. The bracket has at one end a downwardly disposed insert portion 26, in which there are provided aperture 27 and an elbow portion 28 extending outwardly thereof. The included angle between insert portion 26 and the rest of the bracket is preferably more than 90° as shown in order to raise the splice box above the rim of frame 10. This makes the interior of the box more easily visible when wiring and improves the "angle of pull" for the electrical conductors mentioned below.

The insert portion 26 of the bracket 25 is adapted to

be inserted through the irregular aperture 15 between the two guides 16 and 17 formed in the side 10A of the frame, in the manner most clearly indicated in FIG. 3. When pressed down between the guideways, the spring tongue 18 on the frame moves into the aperture 27 in insert 26 and is thereby effective to hold the bracket 25 securely in position on the frame 10.

The end panel 29 of the splice box 20 is removably attachable to the outwardly facing end of the splice box by means of the offset lug 30 at the bottom of plate 29 which is engaged in slot 31 in the bracket 25, and by a sheet metal screw 32 passing through the aperture 33 near the top of plate 29 and into the thread engaging means 34 pressed into the top 24 of the splice box.

A socket and wireway assembly, designated generally by the numeral 35 in FIGS. 2 and 4, includes a socket 36, a socket support plate 37, socket attaching screw 38, a second splice box end plate or panel 39, and a rigid wireway 40 fixedly attached at one end to the plate 39 and at the other end to the socket support plate 37. The entire assembly 35 is preferably pre-wired with the high temperature electrical conductors 41 and 42 passing through the hollow wireway 40 between the socket 36 and the splice box 20.

The socket 36 is restrained from rotating by means of a positioning stud 37A projecting outwardly from the support plate 37 into a shallow slot 36A in the base of the socket 36.

The pre-wired socket and wireway assembly 35 is supported by the splice box bracket 25 and is attachable thereto by means of the pressed out lug 43 which is received in the slot 44 in the top of the splice box. When inserting the lug 43 in the slot 44 the socket end of the assembly is elevated to facilitate entry of the lug into the slot. Then, as the socket end is rotated downwardly around lug 43 as a center to bring the wireway against the bracket 25 in the manner indicated in FIGS. 1-3, the lower edge 45 of the splice box panel 39 moves across the end of the spring leaf 46 so that it is held in position by the free end 47 of the spring. The tip of the leaf may be longitudinally curved as shown in FIG. 2 to engage the plate 39 at any point along the length of leaf 46 and thus compensate for minor inequalities in the size of the parts. Notches 45 in the lower edge of plate 39 correspond in size and spacing to the longitudinal reinforcing beads 26b in the bracket, thus helping hold plate 29 against lateral displacement.

The wireway and the plate at each end thereof can, and preferably are, made from a single piece of sheet metal. A flat blank can be shaped to the conformation shown. The ends of the wireway when it joins the end plates is heavily filleted to provide rounded surfaces over which wires can be pulled easily. The wireway need not be fully closed on its underside as long as that side is flat since any gap is covered by the bracket 25 on which the wireway rests.

The one-piece combination reflector and top 48 is formed in the general shape of a truncated rectangular pyramid and, as best seen in FIG. 4, includes an outwardly extended area 49 having a generally planar face 50 in which an aperture 51 is positioned of a size to fit around the socket 36. Reflector 48 has a laterally extending peripheral flange indicated generally at 52. The flange is preferably flat and continuous around the reflector.

The reflector top member 48 is shaped and dimensioned so as to pass upwardly through the frame 10 and between flanges 11 to bring the upper surface of the flange 52 against the under surface of the flange 11 of the frame 10. The top 48 is formed of a highly reflective and radiative material, such as polished aluminum, which will reflect the light of the lamp and dissipate the heat therefrom by surface radiation. Other material that is not itself highly reflective may be painted with a reflective substance to serve the same purpose. A metal reflector is also sufficiently rigid to retain its shape and to serve as a clamp

in cooperation with the upper side of the socket effective to prevent dislodgment of the socket assembly 35 and the splice box 20 from engagement with frame 10. Flange 52b of reflector 48 has a tab 53 lanced from the flange and extending inwardly and downwardly. The opening is large enough to receive the bit of a screwdriver or similar tool. By inserting a screwdriver in the opening and pulling down the flange, the reflector can be pulled down past the spring tongue 19 to permit removal of the reflector from the frame. Assembly of the fixture is performed in much the same sequence as that in which its elements have been described above. The frame 10 is first secured to the wall studs or ceiling joists and/or additional supports installed therebetween. The insert portion 26 of the splice box bracket 25 is inserted in the irregular aperture 15 and between the guides 16 and 17 and then pressed downwardly until the spring tongue 18 enters the aperture 27. Then the conduit which will carry the current supply conductors may be attached to a knock-out section such as 21 in the splice box 20. An alternate arrangement, depending upon the circumstances of building construction and electrical inspection, consists of connecting the communicating conduit with a knock-out section in the cover panel 29.

If flexible conduit is used in the electrical wiring of the building, and it is first connected to the splice box, enough slack is left in the conduit to permit the splice box 20 or its end plate 29 to be moved into the final position occupied relative to the frame 10. When rigid conduit is used, it may be preferable to connect to the splice box after the box is attached and in fixed position on the frame.

The socket and wireway assembly 35 is installed by connecting the ends of its high temperature lead wires 41 and 42 in the normal manner to the main conductors; then the prong 43 of the panel 39 is inserted into the slot 44 of the splice box, and the socket end of the assembly is pressed downwardly to bring the wireway 40 into contact with the bracket 25 and force the lower edge 45 inwardly of plate 39 over the arcuate free end 47 of the spring 46. The end of spring 46 engages plate 39 to hold it in position closing one side of the splice box.

The reflector is quickly installed by inserting the end portion 52a of the flange 52 through the open underside of frame 10 to rest upon the prong 23, as seen in FIG. 2. Then by rocking the reflector to raise the opposite end 52b upwardly and interiorly of the frame so that it moves across and depresses the spring tongue 19 formed in the sidewall 10B of the frame, the reflector flange 52 is engaged thereby and held tightly against the under surface of the flange 11, as clearly shown in FIG. 2. The rotation of the reflector about the axis established by the edge 52a brings the aperture 51 over the end of socket 36 so that the open end of the socket is inside the reflector. Finally, the lamp 55 is threaded into the socket 36.

Disassembly of the fixture is, of course, performed in reverse order with inward pressure on the tongue 19 permitting the end 52b of the reflector 48 to drop downwardly. A screwdriver or similar tool may be inserted through the interior of reflector 48 into the opening formed by lance 53 in flange 52 and then pulled downward to drop flange 52b against the restraining pressure exerted by tongue 19. Sufficient pressure upon the spring 46 in bracket 25 to permit the edge of plate 39 to pass over the spring is exerted by raising the socket. Removal of the socket and wireway assembly 35 is now possible. The spring tongue 18, however, being relatively short, does not yield readily to digital pressure and a hole 56 at the bottom of the tongue or some similar arrangement, is provided in which a punch, nail set or a nail may be inserted and employed to pry the spring tongue inwardly out of edgewise engagement with the insert portion 26 of the bracket 25. This frees the bracket to permit it to be raised free of the frame.

From the foregoing description it will be seen that I

have provided through my invention a recessed lighting fixture in which all of the parts are supported by a main frame to which they are removably attachable by simple means requiring only a screwdriver or other simple tool to disassemble the fixture.

It will also be seen from the foregoing that my invention provides a fixture equally suitable for new building construction or remodeling work and which may be installed progressively at various stages of completion of the building.

Additionally it will be understood from the above specification that I have provided through my invention a fixture in which the reflector serves also as the top of the recessed closure, and is completely and independently removable for purposes of cleaning or to provide access, through the space it normally occupies, to the splice box and the wiring connections as well as other elements of the fixture.

Apparent also from the foregoing is the fact that the invention provides a fixture wherein the splice box is spaced from the socket and lamp with a rigid wireway communicating therebetween and completely enclosing the electrical conductors therein; and, lastly, it provides a fixture that is adapted in conformation so that all of its structural elements may be fabricated by means of techniques most conducive to efficient and economical production.

Although for the purpose of the present application I have illustrated and described my present invention in the form of a single embodiment, it is to be understood that various changes in the specific construction or location of certain elements of a recessed lighting fixture embodying the improvements of the present invention may be made without departing from the spirit and scope of the invention. Accordingly, it is to be understood that the foregoing specification and description are regarded as being illustrative of, rather than limitative upon, the appended claims.

I claim:

1. A recessed lighting fixture comprising:

a rigid plaster frame attachable to a building structure and open at the top and bottom, said frame having at the top an inwardly projecting flange at at least two sides of the opening; an assembly including a splice box, a socket and a rigid wireway in communication with said splice box and said socket; means for removably attaching said assembly to said frame, said attaching means including an angular bracket attached to the splice box and extending away therefrom at one side of the splice box and having a depending insert section; a pair of parallel guideways integral with and impressed inwardly from a vertical side wall of the rigid frame, said insert section being received in and between said guideways and removable therefrom by relative upward movement parallel to said vertical side wall of the frame;

a concave reflector adapted to fit interiorly of and upwardly of said frame with substantially all the reflector above the frame, said reflector having a peripherally located flange engageable with the frame flange whereby the reflector closes the top opening of the frame;

said reflector having an aperture opening laterally there-through, adapted to fit around said socket whereby said socket assembly and said splice box spacing bracket are maintained in fixed position relative to said frame when said reflector is held latched therein;

and latch means for removably holding said reflector interiorly of said frame.

2. A recessed lighting fixture comprising:

a rigid frame open on two opposite sides and attachable to a building structure;

a splice box having a bracket extending therefrom

and attaching said box to the frame, said bracket having a downwardly bent insert portion at one end thereof spaced from said splice box, said insert portion having an aperture therethrough;

said frame having a pair of spaced guideways integral with and disposed inwardly of one side of said frame, and a spring tongue integral with and impressed inwardly of said frame side between said guideways, said insert portion being positioned in and between said guideways, and said spring tongue being resiliently adapted to move into said aperture in said insert portion upon registry therewith to hold said bracket and said splice box in releasable attachment to said frame;

a pre-wired assembly including a socket and a rigid wireway communicating with said splice box and with the socket;

means for removably attaching said socket and wireway to said splice box;

a concave reflector member adapted to fit interiorly of said frame to close one side thereof;

and means for removably attaching said reflector to said frame with the socket extending through the reflector wall at one side.

3. The recessed lighting fixture structure as set forth in claim 2 in which said frame is generally rectangular in outline, open at the top and bottom and has an inwardly extended flange around its top and said means for removably attaching said reflector to said frame comprises:

ledge means on said insert portion of said bracket extending away therefrom and inwardly of the frame at an acute angle with the flange on said frame;

and a second spring tongue formed in the side of said frame opposite from said guideways; said concave reflector having a peripheral flange adapted to fit within said frame underneath and in contact with said inwardly disposed frame flange and above said ledge means;

said ledge means and said second spring tongue being adapted to bear against the under surface of said reflector flange and hold the concave portion of said reflector with its convex surface disposed upwardly through and above the top of said frame, and the ledge means locks the bracket and splice box in place by engagement with the reflector flange.

4. A recessed lighting fixture comprising:

a rigid rectangular frame open on two opposite sides and attachable to a building structure;

a splice box having an open side and a bracket extending from the box at said open side;

means for removably attaching said bracket to said frame to hold the splice box at a position adjacent but spaced from one of said open sides of the frame with the open side of the box facing the frame;

an assembly comprising a single, unitary sheet of metal with its central section bent into a hollow, tubular shape forming a wireway and a flat end section at each end of the wireway extending transversely to the wireway and in the same direction from the wireway, one flat end section forming a panel closing the open side of the splice box and having a positioning lug extending from one edge thereof and received in a slot in one wall of said splice box, the other flat end section forming socket mounting means, a socket mounted on said other flat end section, and high temperature electrical conductors extending from the socket through the wireway to the splice box;

and means for removably attaching said assembly to said splice box to hold the socket opposite said one open side of the frame including a spring tongue integral with and disposed upwardly of said bracket and terminating in a resiliently movable end adjacent the splice box, said movable end of the tongue being adapted to engage said panel when said lug is inserted in said slot and the bottom of the panel

is pressed over said spring tongue into a position closing one side of the splice box.

5. The recessed lighting fixture as claimed in claim 4 in which the wireway is continuous on its upper surface with the edges of the sheet forming the wireway brought closely together on the underside of the wireway to form a longitudinal joint, the under surface of the wireway being closely adjacent the upper surface of the bracket to close said joint externally thereof.

6. The combination in a recessed lighting fixture comprising:

a rigid frame of rectangular outline open at the top and bottom;

a splice box having an open side and provided with bracket means extending outwardly from said open side; the bracket means comprising a strap attached to two opposite vertical sides of said splice box whereby said strap forms the bottom of the splice box and extends outwardly from the box and terminates at its end spaced therefrom in a downwardly disposed insert portion;

means for removably attaching said bracket means to one side of the frame to position the splice box with its open side facing the frame and including a pair of parallel guideways integral with and offset inwardly of a side wall of said frame, and a spring tongue also integral with and offset inwardly of said frame between the guideway, said insert portion fitting between and within the guideways and having an aperture therein adapted to register with said spring tongue and receive the spring tongue when the insert portion is fully inserted in the guideways;

wireway means including a section of closed rigid conduit integrally formed with a first panel and a second panel at opposite ends thereof, both panels extending generally transversely of the length of the wireway;

a socket affixed to the second panel;

means for removably attaching the first panel to the splice box to close the open side of the splice box and to locate the second panel over the open top of the rigid frame;

a concave reflector member adapted to fit interiorly and upwardly of said frame entirely closing the open top side of the frame and having an opening to receive said socket;

and releasable means for attaching said reflector to or disengaging it from said frame.

7. The combination in a recessed lighting fixture comprising:

a rigid frame of rectangular outline open at the top and bottom;

a splice box having one open side and provided with bracket means extended outwardly from said open side;

means for removably attaching said bracket means to one side of said frame to position the splice box with its open side facing the frame;

wireway means including a section of closed rigid conduit integrally formed with a first panel and a second panel at opposite ends thereof, both panels extending transversely of the length of the wireway;

a socket affixed to said second panel;

means for removably attaching said first panel to said splice box in position to close the open side of said splice box and to locate the second panel over the open top of said rigid frame, comprising a slot in a wall of said splice box adjacent said open side thereof, a spring tongue formed in and pressed upwardly of said bracket and having a free end disposed adjacent said open side of said splice box, said first panel having a positioning lug extending outwardly from the upper edge thereof and received in said slot, and the lower edge of said panel being movable over said spring tongue into contact with said splice box and being held thereagainst by en-

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gement of said lug in said slot and by pressure imposed along the lower edge of the panel by said free end of said spring tongue;

a concave reflector member adapted to fit interiorly and upwardly of said frame entirely closing the open top side of the frame and having an opening to receive said socket; 5

and releasable means for attaching said reflector to or disengaging it from said frame.

8. A recessed light fixture comprising: 10

a rigid frame attachable to a building structure;

a splice box having an open side;

a rigid bracket mounting the splice box on the frame with the open side of the box facing the frame and spaced laterally therefrom, said bracket having an upwardly facing surface; 15

and an integral assembly made from a single unity sheet of metal and comprising a central portion of hollow, tubular shape forming a wireway with free edges substantially meeting on the underside thereof to form a longitudinally extending joint and a flat portion at each end extending upwardly from 20

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and generally transversely to said wireway, one flat end section forming a panel closing the open side of the splice box, and the other flat end section providing lamp socket mounting means, a lamp socket mounted on said other flat end section, and electrical conductors extending from the socket through the wireway to the splice box;

said longitudinal joint of the wireway being substantially parallel to and in engagement with the upwardly facing surface on the bracket.

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