

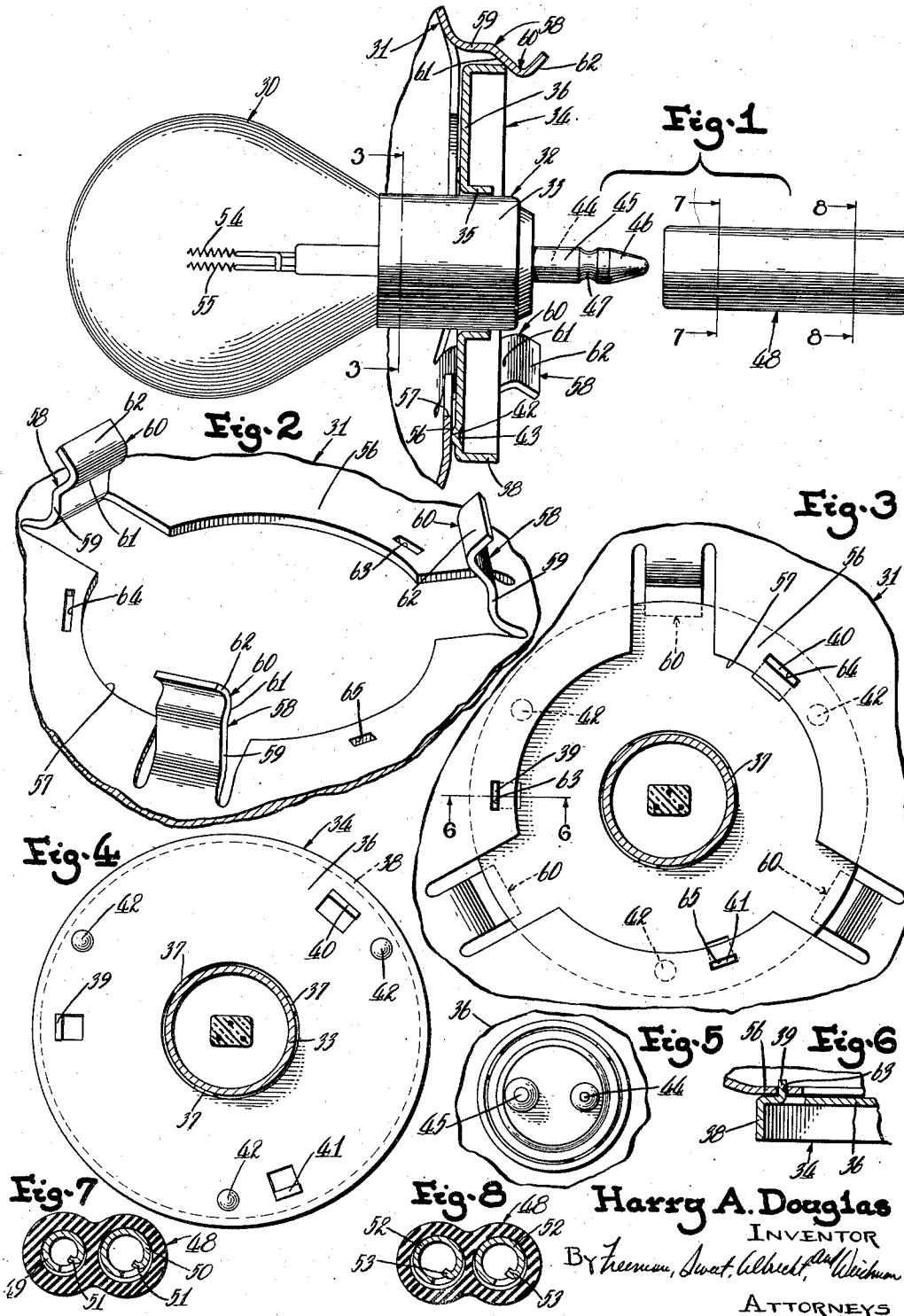
May 17, 1938.

H. A. DOUGLAS  
ELECTRIC LIGHTING DEVICE

2,117,762

Filed April 4, 1936

3 Sheets-Sheet 1



**May 17, 1938.**

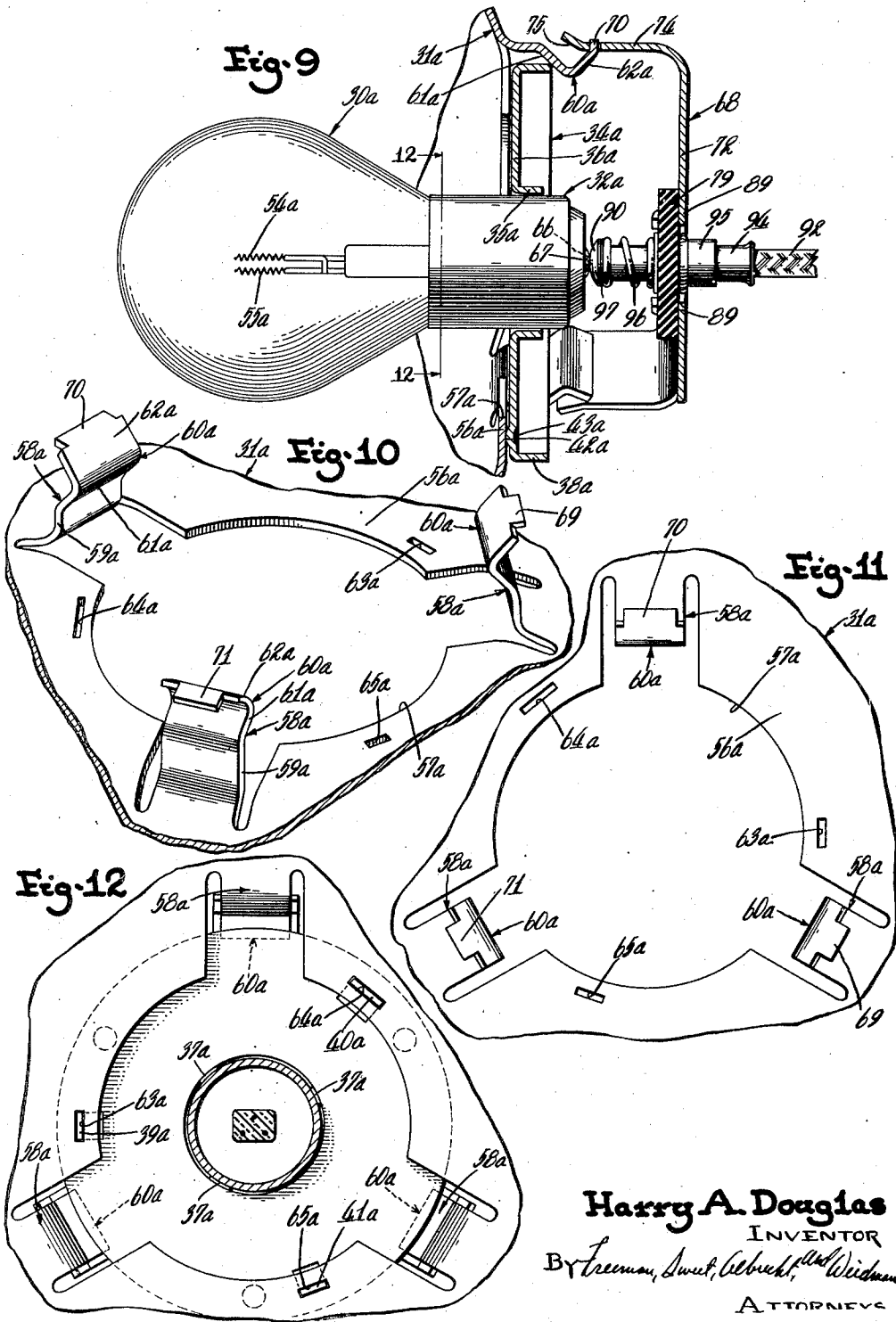
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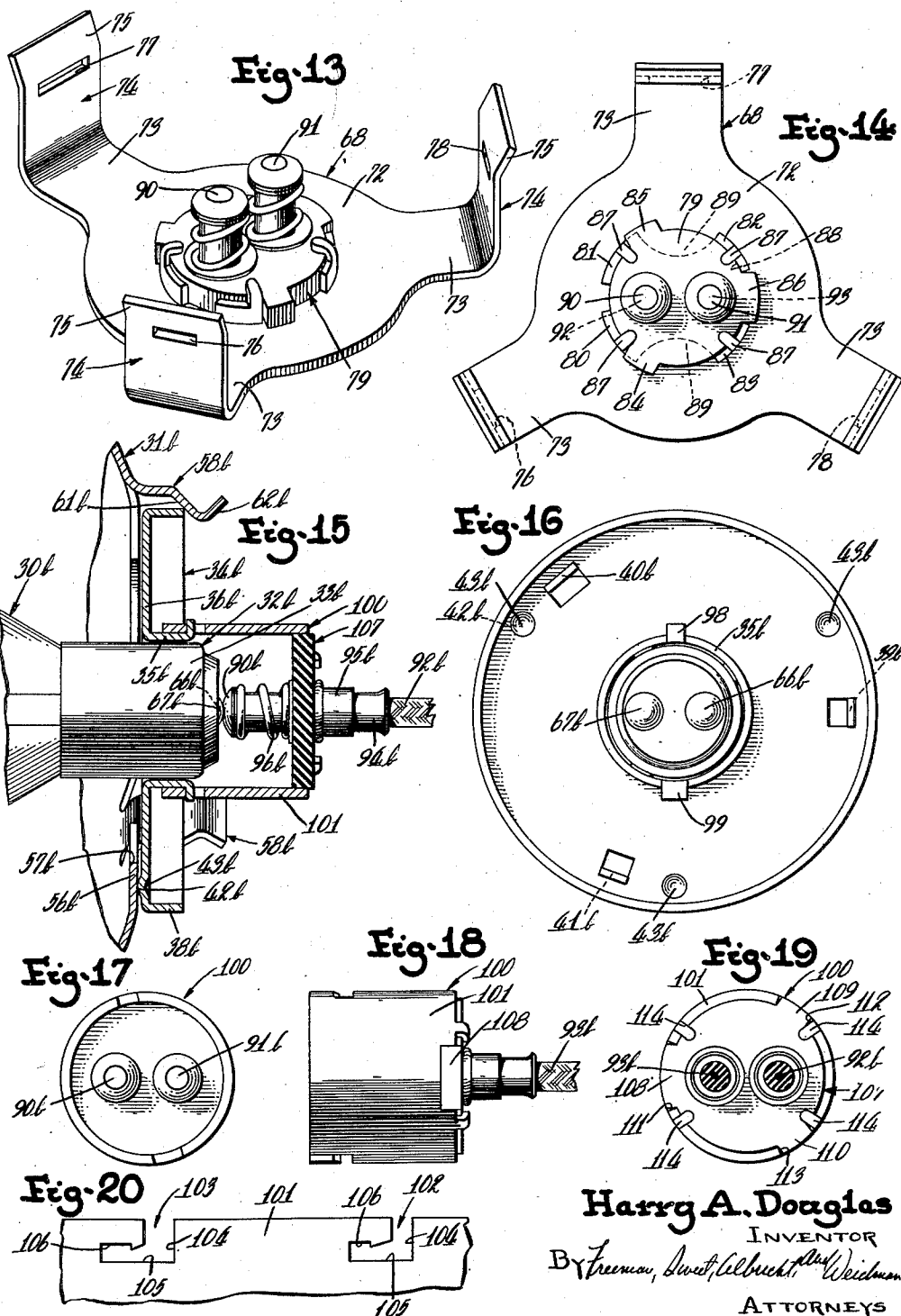
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## UNITED STATES PATENT OFFICE

2,117,762

## ELECTRIC LIGHTING DEVICE

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3 Claims. (Cl. 240—41)

My invention relates to electric lighting devices, and more particularly to electric lamp units comprising an incandescent electric lamp mounted in a reflector, as for example in an automobile headlight, and the principal object of my invention is to provide a new and improved lighting device and unit of this type.

In the drawings accompanying this specification, and forming a part of this application, I have shown, for purposes of illustration, several forms which my invention may assume. In these drawings:

Figure 1 is a vertical sectional view, certain parts being fragmentarily shown, of one embodiment of my invention, along with a line connector which may be used in connection with that embodiment.

Figure 2 is a fragmentary rear perspective view of a mounting or reflector used in the embodiment of Figure 1.

Figure 3 is a section taken on the line 3—3 of Figure 1, looking in the direction of the arrows.

Figure 4 is a front elevation, partly in section, of a lamp used in the embodiment of Figure 1.

Figure 5 is a rear elevation of a fragment of the lamp of Figure 4.

Figure 6 is a fragmentary sectional view taken on the line 6—6 of Figure 3, looking in the direction of the arrows.

Figures 7 and 8 are sectional views taken on the lines 7—7 and 8—8 of Figure 1, looking in the direction of the arrows.

Figure 9 is a vertical sectional view, certain parts being fragmentarily shown, of another embodiment of my invention.

Figure 10 is a fragmentary rear perspective view of a mounting or reflector used in the embodiment of Figure 9.

Figure 11 is a fragmentary rear view of the reflector shown in Figure 10.

Figure 12 is a section taken on the line 12—12 of Figure 9, looking in the direction of the arrows.

Figure 13 is a front perspective view of a contact carrier used in the embodiment of Figure 9.

Figure 14 is a front elevation of the contact carrier shown in Figure 13.

Figure 15 is a vertical sectional view, certain parts being fragmentarily shown, of another embodiment of my invention.

Figure 16 is a rear elevation of a lamp used in the embodiment of Figure 15.

Figure 17 is a front elevation of a line connector used in the embodiment of Figure 15; Figure

18 is a side elevation of the same line connector; Figure 19 is a rear elevation of the same line connector; and Figure 20 is a fragmentary developmental view of a detail.

Referring to Figure 1, the embodiment of my invention here illustrated is shown as including an incandescent electric lamp 30, adapted to be suitably connected to a mounting, the mounting being in this instance a reflector 31 fragmentarily shown. The lamp 30 is provided with a base 32, having a shell 33, which in this instance includes laterally extending positioning means 34, comprising a collar 35 surrounding the shell 33 and a radially extending flange 36 on the collar. The collar 35 may be fastened to the shell 33 in any suitable manner, as by solder 37. The radial flange 36 is here shown as provided with a rearwardly extending cylindrical flange 38. The radial flange 36 is here shown as provided with three frontwardly extending lugs 39, 40, 41, conveniently formed by striking metal out of the flange 36. The lugs 39, 40, 41 are here shown as of rectangular cross-section, unequally circumferentially spaced, and two of the lugs, 39, 41, are here shown as of equal circumferential width, but each narrower than the other lug, 40. The radial flange 36 is here shown as provided also with three axially frontwardly extending projections 42 conveniently formed by making indentations 43 on the rear face of the flange 36. The axial projections 42 are here shown as circumferentially equally spaced.

In order to make electrical connection with the lamp 30, the lamp is here shown as provided with a pair of contacts 44, 45 in the form of spaced axially extending plug terminals, of the snap type; and these plug terminals, 44, 45, are here shown as of different cross-sectional diameter, but otherwise similar. Each plug terminal has a frusto-conical end portion 46 and an annular furrow 47 spaced somewhat from the frusto-conical end portion 46. Cooperable with the plug terminals 44, 45 is a line connector 48 of insulating material in which are disposed two sleeves 49, 50, as may be seen in Figure 7, the inside diameters of which correspond respectively to the outside diameters of the plug terminals 44, 45, and which are spaced to cooperate with the plug terminals. Each conducting sleeve 49, 50 may be provided with a detent 51, struck inwardly from each sleeve, these detents 51 being spaced from the left hand end of the connector 48, as viewed in Figure 1, and so designed that when the plug terminals 44, 45 are pushed into the left hand end of the line connector 48 the detents 51 will re-

siliently yield and slide up the frustro-conical end surfaces 46 of the respective plug terminals, and then snap into the annular furrows 47. The right hand end of the line connector 48 is here shown as provided with a pair of conducting sleeves 52 of the same diameter, and these sleeves, 52, may be respectively integral with the sleeves 49, 50 at the left hand end. The sleeves 52 at the right hand end may also be provided with detents 53 struck in from the sleeves and are thus cooperable with plug conductor terminals of the snap type, similar to those provided on the lamp base.

The provision of two contacts 44, 45 on the lamp base enables the use of two filaments 54, 55, one of which, 54, may be disposed at some predetermined point with respect to the reflector 31, as the focus, and the other of which, 55, may be displaced from the filament 54 to provide dim light or so-called tilted light. The filaments 54, 55 may be connected to the base 42 and to the contacts 44, 45 in a well known manner, and may be controlled by switching means (not shown) interposed in the circuit of which the line connector 48 forms a part.

The reflector 31 is here shown as provided with a flat portion 56 having a diameter approximately the same as the outside diameter of the positioning means 34 of the lamp, and having a central aperture 57, sufficiently large to pass the bulb of the lamp 30. The reflector 31 is here shown as provided with three rearwardly extending resilient tongues 58, here shown as formed by metal stamped out of the reflector 31 itself. The tongues 58 are here shown as equally circumferentially spaced and as of equal circumferential width. Each tongue 58 is here shown as comprising a generally axially extending portion 59 terminating in a radially inwardly directed hump 60. Each hump 60 forms two cam surfaces 61, 62, one of which, 61, is adapted to bear on the rear peripheral margin of the cylindrical flange 38 when the lamp is in the position shown in Figure 1. The crests of the humps 60 are desirably tangent to a circle concentric with the aperture 57, the circle being smaller than the circle defined by the outer periphery of the cylindrical flange 38. The reflector 31 is provided with three recesses or apertures 63, 64, 65, so positioned and so proportioned as to be complementary to the lugs 39, 40, 41 on the radial flange 36 of the lamp, and desirably so positioned that when the lamp is in the position shown in Figures 1 and 3, the axial projections 42 will bear against the rear face of the flat portion 56 of the reflector approximately circumferentially half-way between the respective tongues 58.

It will be clear that in order to remove the lamp 30 from the reflector it is only necessary to pull it axially rearwardly, thereby causing the tongues 58 to resiliently bend radially outwardly, by the cam action exerted on the cam surfaces 61 by the rear peripheral margin of the cylindrical flange 38. When it is desired to assemble the lamp 30 with the reflector 31 it will be evident that it will be positioned co-axially with the aperture 57, at the rear of the reflector, and moved axially frontwardly, bulb first, toward the reflector, the bulb passing through the aperture 57, whereupon the front peripheral margin of the cylindrical flange 38 will engage the cam surfaces 62 of the tongues 58 thereby resiliently bending the tongues 58 radially outwardly, the lamp being rotationally so positioned that the lugs 39, 40, 41 will enter the apertures 63, 64, 65

in the reflector. The lamp 30 then assumes the position shown in Figures 1, 3, and 6 in which the axial projections 42 are in contact with the rear face of the flat portion 56 of the reflector and the resilient biasing action of the tongues 58, by action of the cam surfaces 61, holds the lamp in assembled position.

If, in moving the lamp 30 frontwardly, against the bias of the cam surfaces 62, the lugs 39, 40, 41 do not at once enter the apertures 63, 64, 65, but abut the rear surface of the flat portion 56 of the reflector, the rear peripheral margin of the cylindrical flange 38 will, in that case, not have passed beyond the crests of the humps 60, and it will be apparent to the operator that the lamp is not properly positioned. He will therefore rotate the lamp until the lugs 39, 40, 41 will enter the apertures 63, 64, 65, the lamp then snapping frontwardly to the position shown in Figures 1 and 3. In case the lamp should be rotationally so positioned that one of the lugs 39, 41 would enter the aperture 64, the cocked position of the lamp would indicate to the operator that it was improperly positioned, the remedy being obvious.

It will be evident that when the lamp 30 is assembled with the reflector, as shown in Figures 1 and 3, the filaments 54, 55 will be accurately positioned with respect to the reflector, since the distance of the flange 36 from the filaments 54, 55 is accurately predetermined, and the direction of the plane of the flange 36 with respect to the axis of the lamp is accurately predetermined, and the lamp is rotationally properly positioned by the lugs 39, 40, 41 and apertures 63, 64, 65.

The positioning means 34 may be pre-positioned with respect to the lamp 30 by placing the flange 36 on a standard, with the shell within the collar 35, and adjusting the lamp until the filaments 54, 55 are in the desired positions, whereupon, the collar 35 is soldered to the shell 33.

It will be apparent that the line connector 48 may be connected to the plug terminals 44, 45 of the lamp either before or after the lamp is assembled with the reflector. If, on the other hand, the tongues 58 project frontwardly from the reflector instead of rearwardly, the positioning means 34 being then reversely mounted on the lamp, so that the axial projections 42 abut the front face of the flat portion 56 of the reflector, the line connector 48 would be drawn through the aperture 57 in disassembling the lamp from the reflector, and would be first assembled with such a lamp before assembling the lamp with the reflector.

Referring to Figure 9, the embodiment of my invention here illustrated is shown as including an incandescent electric lamp 30a, which is identical with the lamp 30 of the embodiment of Figure 1, with the exception of the fact that it is provided with a pair of butt-type contacts 66, 67 instead of the plug-type contacts 44, 45 of the lamp of Figure 1.

The lamp 30a is cooperable with a reflector 31a which is identical with the reflector 31 of the embodiment of Figure 1, with the exception that in this instance it embodies means for cooperation with a contact carrier 68, taking the place of the line connector 48 of Figure 1. The contact carrier 68 is constructed and arranged to be cooperable with the butt-type contacts 66, 67 on the lamp base. For cooperation with the contact carrier 68 the ends of the reflector

tongues 58a are here shown as provided with radial extending projections 69, 70, 71, of reduced circumferential width. The projections 69, 71 are here shown as of equal width but narrower than the other projection, 70.

The contact carrier 68, as here shown, comprises a flat generally annular member 72 provided with three circumferentially equally spaced radial projections 73 merging into three axially extending prongs 74. The free ends of the prongs 74 are bent slightly outwardly to form cams 75. The axially extending portions 74 are here shown as provided with rectangular apertures 76, 77, 78, desirably disposed at the junction between the cams 75 and the axially extending portions 74. The apertures 76, 77, 78 are so positioned and proportioned as to be complementary to and co-operable with the radial extending projections 69, 70, 71 on the reflector tongues. The prongs 74 are desirably so constructed and arranged, with respect to the tongues 58a, that when the parts are in the position shown in Figure 9, the ends of the prongs will tend to move radially inwardly, so that the prongs will be firmly seated on the shoulders formed by the projections 69, 70, 71.

The annular member 72 of the contact carrier is here shown as provided with an insulating member 79 having an outside diameter approximately the same as the inside diameter of a circle defined by a plurality of frontwardly extending arcuate projections, on the annular member 72, here shown as four in number, 80, 81, 82, 83. These projections may be conveniently formed by metal integral with the annular member 72, and as having their inner peripheries margining an aperture 88 in the annular member 72. Extending into the aperture 88 are here shown two diametrically opposite segmental flanges 89, integral with the member 72, abutted by the insulating member 79. The insulating member 79 is here shown as provided with three circumferentially unequally spaced projections 84, 85, 86, two of which, 84, 85, are narrower than the other, 86. The wider projection, 86, is adapted to fit between the adjacent margins of the arcuate projections 82, 83, while the narrower projections, 84, 85, have margins abutting margins of the other two arcuate projections, 80, 81. The arrangement of the arcuate projections 80, 81, 82, 83 and of the radial projections 84, 85, 86 on the insulating member 79 is such that the insulating member may be assembled with the annular member 72 in but one relative rotative relation. The arcuate projections 80, 81, 82, 83 are here shown as provided with a plurality of fingers 87 clinched radially inwardly over the front face of the insulating member 79 to hold it in place.

The insulating member 79 carries a pair of contacts 90, 91, desirably formed as enlarged heads on shanks fitted over and swedged to the ends of conductors 92, 93 respectively. The contacts 90, 91 are disposed in sleeves 94, each sleeve being slidable within a bushing 95, which is fixedly mounted, in any suitable manner, as by beading, to the insulating member 79. Each sleeve is surrounded by a spring 96 between its bushing and a flange 97 on each sleeve abutting the respective contacts. When the parts are as shown in the position in Figure 9, the contacts 90, 91 of the contact carrier are adapted to make contact respectively with the contacts 66, 67 on the lamp base.

The filaments 54a, 55a of the lamp are con-

nected to the base 32a and to the lamp contacts 66, 67, and are controllable by switch means (not shown) interposed in the conductors 92, 93, as already mentioned in connection with the filaments 54, 55 of the embodiment of Figure 1.

It will be apparent that in the embodiment of Figure 9, the contact carrier 68 must be first disassembled from the reflector 31a before the lamp 30a can be removed, the contact carrier 68 being disassemblable from the reflector, as will be obvious, by simply springing the prongs 74 outwardly sufficiently to disengage them from the radial projections 69, 70, 71 on the reflector tongues 58a. The lamp 30a may then be removed as already explained in connection with the embodiment of Figure 1. The mode of assembly of the lamp 30a with the reflector is the same as already set forth in connection with Figure 1. After the lamp 30a has been assembled with the reflector, the contact carrier 68 is brought into such relative rotative relation with the reflector tongues 58a that the apertures 76, 77, 78 will be in axial alinement with the projections 69, 70, 71, and the contact carrier is moved bodily frontwardly, the radial projections 69, 70, 71 causing the prongs 74 to move resiliently outwardly by cam action on the cams 75, until the prongs snap radially inwardly, as the projections 69, 70, 71 enter the apertures 76, 77, 78 in the prongs. It will be evident that due to the hereinbefore described construction the contact carrier 68 may be assembled with the reflector 31a, and therefore with the lamp 30a, in but one relative rotative relation, so that the contacts 90, 91 on the contact carrier will cooperate with and be in the proper relation to the contacts 66, 67 on the lamp.

Referring to Figure 15, the embodiment of my invention here illustrated includes an incandescent electric lamp 30b, which is identical with the lamp 30a of the embodiment of Figure 9, with the exception that the collar 35b of the positioning means is provided at its rear end with two radial lugs 98, 99 of unequal circumferential width, and diametrically opposite each other. These lugs, 98, 99, serve as a means for making connection to a contact carrier 100, which in this embodiment takes the place of the contact carrier 68 of the embodiment of Figure 9.

The contact carrier 100 is here shown as including a cylindrical shell 101 of such inside diameter that it will slip over the collar 35b. The shell 101 is provided with a pair of bayonet slots 102, 103 for cooperation with the lugs 98, 99 on the lamp base 32b. The bayonet slots 102, 103 each have an axial extending entrance portion 104 and a circumferentially extending portion 105 terminating in a seat 106. The entrance portion 104 and the seat portion 106 of the bayonet slot 102 are narrower than the entrance portion 104 and seat portion 106 of the bayonet slot 103, for cooperation with the lugs 98, 99, so that the contact carrier 100 may be assembled with the lamp 30b in but one relative rotative relation. The contact carrier 100 includes an insulating member 107, an outside diameter of which is approximately the same as the inside diameter of the shell 101, and is provided with three radially extending projections 108, 109, 110 cooperable with three axially extending recesses 111, 112, 113 at the rear end of the shell 101. The projection 108 and the recess 111 are larger than the other two projections, 109, 110, and cooperating recesses, 112, 113, so that the insulating member 107 may be assembled with the

shell 101 in but one relative rotative relation. The insulating member 107 may be held to the shell 101 by a plurality of fingers 114 provided at the rear end of the shell, and clinched radially inwardly over the rear face of the insulating member. The contact carrier 100 is here shown as provided with a pair of spring pressed contacts 90b, 91b, constructed and arranged the same as already described in connection with the spring pressed contacts 90, 91 of the embodiment of Figure 9. When the parts are in the position shown in Figure 15 the contacts 90b, 91b are cooperable with the butt-type contacts 66b, 67b provided on the lamp base 32b.

The contact carrier 100 may be assembled with the lamp base 32b by bringing the contact carrier into the proper relative rotative relation with the base, so that the lugs 98, 99 will slip into the entrance portions 104 of the bayonet slots 102, 103 and then turning the contact carrier or lamp to bring the lugs 98, 99 onto the seats 106. The springs 96b serve to press the contacts 90b, 91b against the lamp contacts 66b, 67b and also to press the lugs 98, 99 against the seats 106.

The reflector 31b of the embodiment of Figure 15 is here shown as identical with the reflector 31 of the embodiment of Figure 1, and the lamp 30b is assemblable with and disassemblable from the reflector 31b in the manner already set forth in connection with the embodiment of Figure 1. In this instance also the lamp 31b may be assembled with and disassembled from the reflector 31b either with or without the contact carrier 100 in cooperative relation therewith.

From the foregoing it will be apparent to those skilled in the art that each of the illustrated embodiments of my invention provides a new and improved electric lighting device and unit, readily and conveniently constructed and assembled, and accordingly, each accomplishes the principal object of my invention. On the other hand, it also will be obvious to those skilled in the art that the illustrated embodiments of my invention may be variously changed and modified, or features thereof, singly or collectively, embodied in other combinations than those illustrated, without departing from the spirit of my invention, or sacri-

ficing all of the advantages thereof, and that accordingly, the disclosure herein is illustrative only, and my invention is not limited thereto.

I claim:

1. An incandescent electric lamp, comprising: a base; a lateral extension unitary with said base; said lateral extension being provided with a plurality of circumferentially spaced axially extending lugs and a plurality of circumferentially spaced projections extending axially in the same direction as said lugs but to a less extent; and flange means at the outer periphery of said lateral extension, said flange means extending in an axial direction opposite from said lugs and said projections.
2. In combination: an incandescent electric lamp having contact means; mounting means for supporting said lamp; biasing means for holding said lamp on said mounting means; a contact carrier, carrying contact means cooperable with said lamp contact means; and assembling means for detachably assembling said contact carrier and said mounting means; said assembling means including a portion of said mounting means and a portion of said contact carrier and being so constructed and arranged that said contact carrier may be detachably assembled with said mounting means by movement of said contact carrier solely in the general direction of the axis of said lamp.
3. In combination: an incandescent electric lamp having a base provided with a laterally extending flange, and axially extending flange means at the outer periphery of said flange; a reflector having a flat portion defining a plane transverse to the axis of said lamp; said flange being so constructed and arranged that a lateral portion thereof is adapted to register with said reflector portion at a plurality of circumferentially spaced points; said flange means extending in a direction away from said reflector; and biasing means, including a plurality of circumferentially spaced spring fingers carried by said reflector and engaging the peripheral margin of said flange means at its free end, so constructed and arranged that said flange is pressed into register with said reflector.

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