

May 17, 1938.

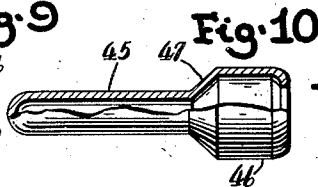
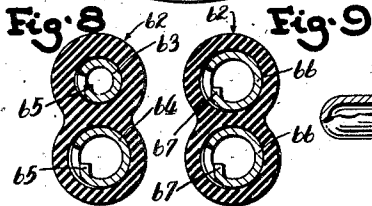
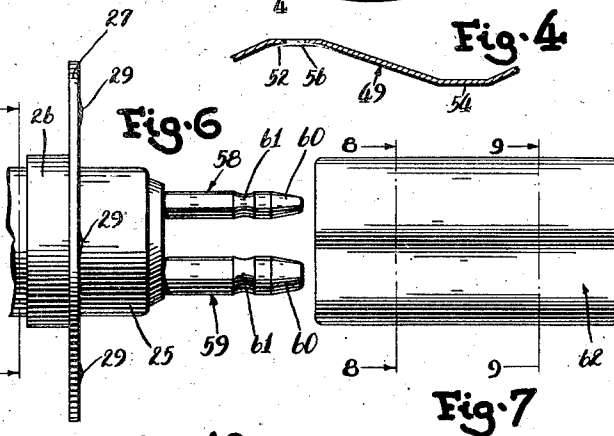
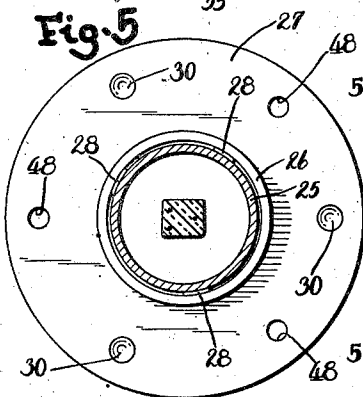
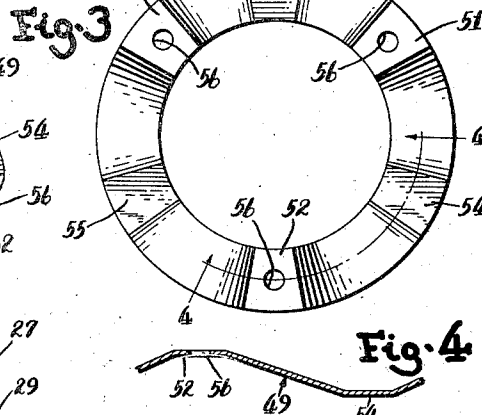
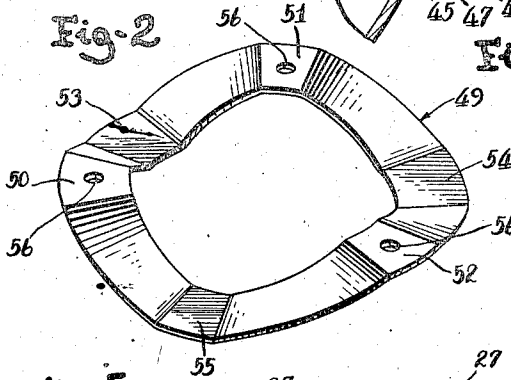
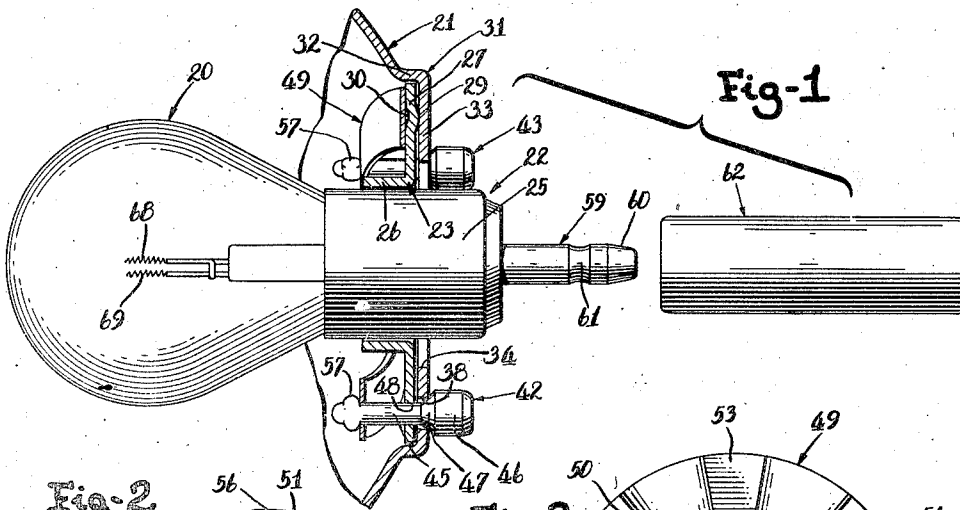
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2,117,756

ELECTRIC LIGHTING DEVICE

Filed March 2, 1936

2 Sheets-Sheet 1



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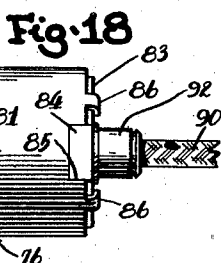
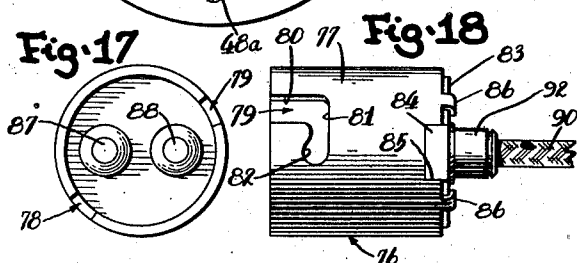
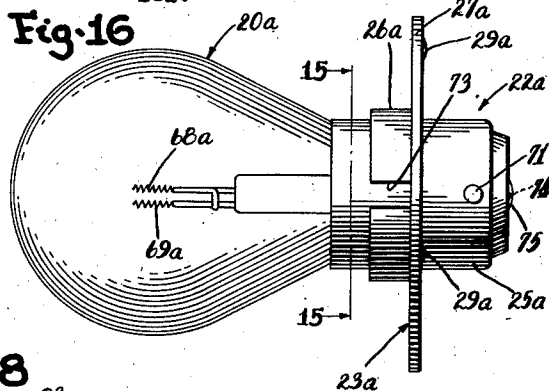
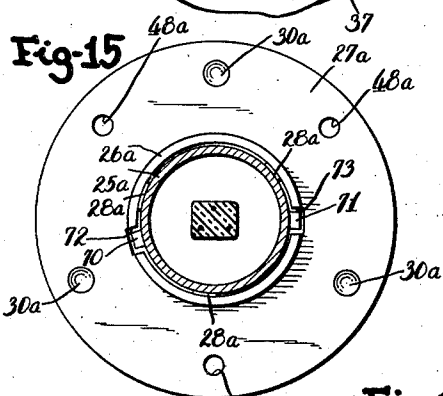
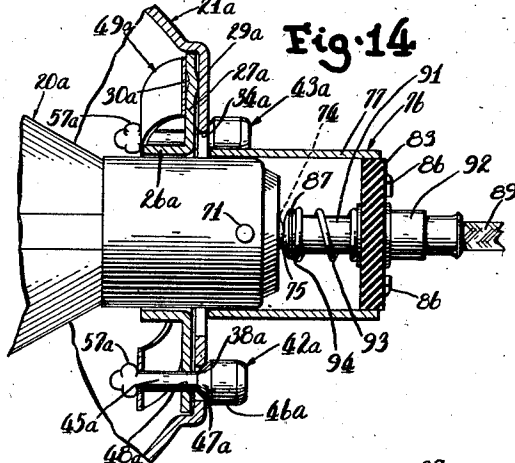
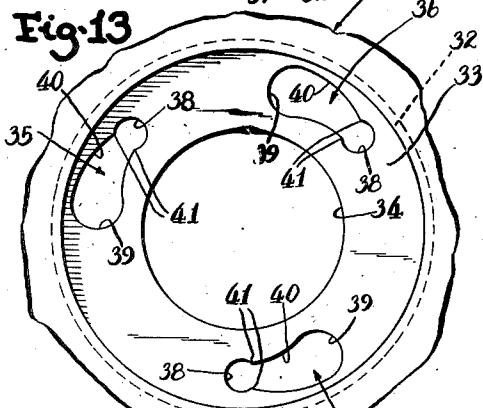
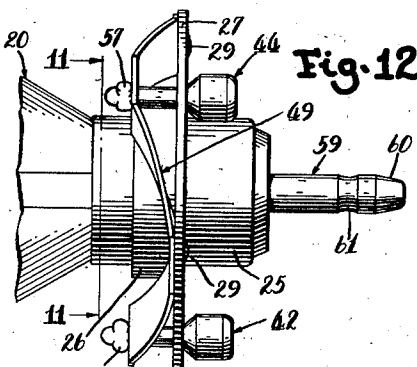
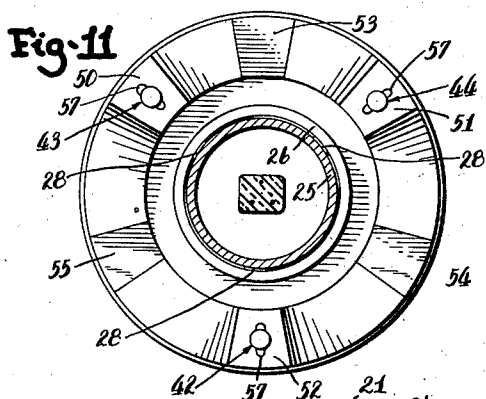
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2,117,756

ELECTRIC LIGHTING DEVICE

Filed March 2, 1936

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,117,756

ELECTRIC LIGHTING DEVICE

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Application March 2, 1936, Serial No. 66,653

5 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 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 side elevation of a line connector which may be used with said embodiment,

Figure 2 is a perspective view of a detail,

Figure 3 is a front elevation of the detail shown in Figure 2,

Figure 4 is a fragmentary section taken along the line 4—4 of Figure 3,

Figure 5 is a section, taken on the line 5—5 of Figure 6, of a detail portion of a lamp used in the embodiment of Figure 1,

Figure 6 is a fragmentary side elevation of the parts shown in Figure 5, and is a plan view of the parts corresponding thereto in Figure 1,

Figure 7 is a plan view of the connector which is shown in side elevation in Figure 1,

Figures 8 and 9 are sections taken on the lines 8—8 and 9—9 of Figure 7, looking in the direction of the arrows,

Figure 10 is a side elevation, partly in longitudinal fragmentary section, of a connector pin before assembly in the embodiment of Figure 1,

Figure 11 is a section, taken on the line 11—11 of Figure 12, looking in the direction of the arrows, of a complete lamp used in the embodiment of Figure 1,

Figure 12 is a side elevation of such a lamp, the bulb being shown fragmentarily,

Figure 13 is a fragmentary front elevation of a mounting or reflector used in the embodiment of Figure 1,

Figure 14 is a vertical sectional view, certain parts being fragmentarily shown, of another embodiment of my invention,

Figure 15 is a section, taken on the line 15—15 of Figure 16, looking in the direction of the arrows, of a detail portion of a lamp used in the embodiment of Figure 14,

Figure 16 is a side elevation of the detail portion of the lamp shown in Figure 15, and

Figures 17 and 18 are front and side elevations

respectively of a detail of the embodiment of Figure 14.

Referring to Figure 1, the embodiment of my invention here illustrated is shown as including an incandescent electric lamp 20, adapted to be suitably connected to a mounting 21, the mounting being in this instance a reflector fragmentarily shown. The lamp 20 is provided with a base 22, which in this instance includes laterally extending positioning means 23. The base includes a shell 25, and the laterally extending portion of the base comprises a collar 26 surrounding the shell 25 and a radially extending flange 27 on the collar. The collar 26 may be fastened to the shell 25 in any suitable manner, as by soldering 28 (see Figure 5). As may be seen in Figure 5, the flange 27 is, in this instance, circular in outline. The flange 27 is provided with, desirably three, axially rearwardly extending projections 29 formed by making depressions 30 in the opposite face of the flange 27. By the term front is meant that side of a part presented toward the light producing source of the lamp 20, while the term rear is used with reference to the opposite side.

The reflector 21 is here shown as being provided with a cup-shaped rearward extension or pocket 31, including a rearwardly extending cylindrical portion 32, the inner periphery of which is shown as slightly spaced from the radially outer periphery of the lamp flange 27, but which may gage this outer margin, that is, snugly fit it. The cup-shaped extension 31 also includes an apertured plane end or bottom 33, seen in front elevation in Figure 13. The bottom 33 is provided with a central aperture 34, here shown as considerably larger than the shell 25 of the lamp base.

Circumferentially, desirably unequally, spaced about the central aperture 34 of the reflector are, in this instance, three compound apertures 35, 36, 37. Each compound aperture comprises an arcuate smaller portion 38 and an arcuate larger portion 39, circumferentially spaced from the smaller portion 38, the larger and smaller aperture portions 38, 39 being joined by a connecting portion 40 tapering from the larger portion 39 to the smaller portion 38. The margins of the connecting portion 40 are in this instance arcuate and generally tangent to the larger arcuate portion 39, while the junction between the connecting portion 40 and the smaller portion 38 is narrower than the diameter of the circle defined by the smaller portion 38, thus forming humps 41 at the junction.

The lamp 20 is held in the position shown in Figure 1 by means including connectors 42, 43, 44, desirably three in number, and all identical so that only one needs to be described in detail.

5 The connector 44 is visible in Figures 11 and 12. Each connector 42, 43, 44 is in the form of a pin having a cylindrical shank 45 and a cylindrical head 46 joined to the shank by a frustro-conical portion 47. With the parts shown in

10 the position of Figure 1, the frustro-conical portions 47 are seated on the rear margins of the smaller aperture portions 38 in the reflector 21, the seat portions 38 being of somewhat larger diameter than the shanks 45. The shanks 45

15 are disposed snugly but slidably in apertures 48 in the lamp flange 27. In order to press the frustro-conical surfaces 47 of the connector pins 42, 43, 44 against the seats formed by the margins of the smaller aperture portions 38, and

20 at the same time to press the lamp flange 27 against the bottom 33 of the cup of the reflector 21, biasing means is provided, this being here shown in the form of a circumferentially corrugated annular sheet metal spring 49. The spring

25 49 may have, as viewed from the front, three crests 50, 51, 52 in a common plane, and three troughs 53, 54, 55 in a common plane, the crests 50, 51, 52 being provided with apertures 56, in alignment with the apertures 48 of the lamp flange, through

30 which apertures 56, the shanks 45 of the connectors 42, 43, 44 are disposed. The crests 50, 51, 52 of the spring 49 bear against lateral projections 57 at the ends of the shanks 45 of the connector pins, and the rear faces of the troughs

35 53, 54, 55 of the spring 49 bear against the front face of the lamp flange 27. The result is that, since the frustro-conical portions 47 of the connector pins are seated in the seats provided by the smaller aperture portions 38, and the connector pins therefore cannot move frontwardly,

40 the flange is biased, by the spring 49, toward the bottom 33 of the reflector pocket, and hence the projections 29 are pressed against the bottom 33.

45 The spring 49 may be drawn to its corrugated shape from sheet metal stock and then pierced and trimmed, or formed in any other suitable way.

50 In order to make electrical connection to the lamp 20, the lamp is here shown as provided with a pair of contacts in the form of spaced, axially extending plug terminals 58, 59, of the snap type; and these plug terminals are here shown

55 as of a different cross-sectional diameter, but otherwise similar. Each plug terminal 58, 59 has a frustro-conical end portion 60 and an annular furrow 61, spaced somewhat from the frustro-conical end portion. Cooperable with the plug terminals 58, 59 is a line connector 62 of

60 insulating material in which are disposed two sleeves 63, 64, as may be seen in Figure 8, the inside diameters of which correspond respectively to the outside diameters of the plug terminals 58, 59, and which are spaced to cooperate with the plug terminals. Each conducting sleeve

65 63, 64 may be provided with a detent 65, struck inwardly from each sleeve, these detents 65 being spaced from the left hand end of the connector (as viewed in Figure 7), and so designed

70 that when the plug terminals 58, 59 are pushed into the left hand end of the line connector 62 the detents 65 will resiliently yield and slide up the frustro-conical end surfaces 60 of the respective plug terminals, and then snap into the annular furrows 61. The right hand end of the

line connector 62 is here shown as provided with a pair of conducting sleeves 66 of the same diameter, and these sleeves 66 may be respectively integral with the sleeves 58, 59 at the left hand end. The sleeves 66 at the right hand end may

5 also be provided with detents 67, 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 a plurality of contacts 58, 59 on the lamp base

10 enables the use of a multiple filament lamp, the lamp being here shown as provided with two filaments, one of which, 68, may desirably have its lighting center at some predetermined point with respect to the reflector, as for example at

15 the focus, and the other of which, 69, may be displaced from the filament 68, and may be used for providing dim light or so-called tilted light. The filaments 68, 69 have their terminals connected in a well known manner to the lamp base 22

20 and to the contacts 58, 59 on the lamp base. The passage of current to either one or both of the filaments 68, 69 may be controlled in any suitable manner, by switching means (not shown) suitably electrically connected to the lamp 20

25 through the line connector 62.

The mode of assembly and operation of the embodiment shown in Figure 1 is as follows. The shanks 45 of connector pins such as shown in Figure 10, for example, (which may be hollow as shown in Figure 10), are inserted through the

30 apertures 48 in the lamp flange 27, from the rear of the flange 27, and also through the apertures 56 in the corrugated spring 49. With the spring 49 pre-stressed, that is, with the troughs 53, 54, 55 in abutment with the flange 27 and with the crests 50, 51, 52 moved toward the front face of the flange 27, and while the small ends of the frustro-conical surfaces 47 of the connector pins

35 42, 43, 44 abut the rear margins of the apertures 48 in the flange 27, as shown in Figure 12, the shanks 45 of the connector pins are squeezed or swedged transversely, locally, near their ends, thereby forming the lateral projections 57, thus holding the spring in its pre-stressed condition.

40 The lamp 20 is then complete as shown in Figures 11 and 12.

When it is desired to assemble such a lamp 20 with the reflector 21, the heads 46 of the pins are brought into registry with the larger aperture portions 39 of the compound apertures 35, 36, 37. The lamp is then moved axially rearwardly (the heads 46 passing through the aperture portions 39), until the axial extensions 29 on the lamp flange 27 abut the front face of the bottom 33 of the reflector pocket. The lamp 20 is then rotated in a clockwise direction, as viewed from the front of the reflector, thereby causing the margins of the tapering portions 40 of the compound reflector apertures 35, 36, 37 to interengage with the frustro-conical surfaces 47 on the connector pins 42, 43, 44. As rotation of the lamp 20 continues, this interengagement causes the connector pins to be pulled rearwardly, against the bias of the spring 49, until the frustro-conical surfaces 47 of the pins pass the humps

65 41 at the junctions between the tapered aperture portions 40 and the seat portions 38, whereupon the frustro-conical portions 47 of the connector pins snap into the seat portions, and the lamp 20 is then held tightly assembled with the reflector 21 in the position shown in Figure 1.

It will be evident that since the flange 27 is accurately pre-positioned with respect to its distance from the filaments 68, 69, and the direc-

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tion of the plane of the flange is pre-positioned with respect to the axis of the lamp, and, furthermore, since, due to the unequal circumferential spacing of the connector pins 42, 43, 44, in conjunction with the corresponding unequal circumferential spacing of the compound apertures 35, 36, 37, the lamp may be assembled with the reflector in only one relative rotative relation, and the filaments 68, 69 will assume the desired predetermined position with respect to the reflector 21 when the parts are assembled as in Figure 1.

Removal of the lamp 20 may be effected by simply rotating it in a counter-clockwise direction, whereupon the frusto-conical surfaces 47 of the connector pins 42, 43, 44 will become unseated from the smaller aperture portions 38, against the bias of the spring 49, and further rotation of the lamp will bring the heads 46 of the pins into registry with the larger aperture portions 39, whereupon the lamp may be removed in an axial direction. Such removal of the lamp 20 of course causes the line connector 62 and the conductors (not shown) connected thereto to be pulled through the central aperture 34 in the reflector 21, whereupon the lamp 20 may be disconnected from the line connector 62 and another lamp plugged into the connector, whereupon the new lamp may be connected to the reflector in the manner hereinbefore described.

Referring to Figure 14, this shows another embodiment of my invention. A lamp 20a is utilized in the embodiment of Figure 14, and parts of this lamp which are similar or substantially similar to parts of the lamp 20 of the embodiment of Figure 1 have been given the same reference numerals with the suffix a, while added parts and parts having a different embodiment are given different reference numerals. The lamp 20a, shown partly completed in Figures 15 and 16, comprises a base 22a having a shell 25a, and a laterally extending positioning means 23a, but in this instance the base 22a is further provided with two lateral projections 70, 71 in the form of cylindrical pins, for a purpose which will appear. The pins 70, 71 are circumferentially spaced less than 180°, as may be seen in Figure 15, and are in a plane spaced from the plane of the flange 27a. The collar 26a is provided with slots 72, 73 to enable the collar to be slipped over the pins 70, 71, and thereafter soldered to the shell 25a.

The flange 27a of the lamp is provided, as in the case of the lamp 20, with apertures 48a through which, in the completely assembled lamp, the shanks 45a of three connector pins are disposed, two of which, 42a, 43a, are visible in Figure 14. These three pins are held assembled with the flange 27a and the heads 46a of the pins are biased toward the flange 27a by a spring 49a corresponding to the spring 49 of the embodiment of Figure 1, in the manner already set forth in connection with that embodiment.

The lamp 20a is further distinguished from the lamp 20 of the embodiment of Figure 1 in that instead of the base 22a being provided with plug terminals it is provided with two butt type contacts 74, 75 at the end of the base. One of these contacts 74 is not visible, being directly behind the contact 75 visible in Figures 14 and 16.

In order to make electrical connection to the contacts 74, 75 on the lamp base, a contact carrier 76 is provided, (instead of the line connector 62), comprising in this instance a cylindrical shell 77 adapted to be slipped over the shell 25a of the lamp base and to be connected to the base

by a bayonet connection. To this end the shell 77 is provided with two bayonet slots 78, 79 each of which has an axially extending portion 80 and a circumferentially extending portion 81, the latter terminating in a seat 82, these bayonet slots 78, 79 being positioned circumferentially so as to be cooperable with the pins 70, 71 on the lamp base. The contact carrier includes an insulating member 83 having an outside diameter such as to fit within the shell 77, and having three circumferentially spaced radial projections, one of which, 84, is visible in Figure 18, adapted to fit in three axial extending recesses in the rear end of the shell 77, one of the recesses, 85, being visible in Figure 18. The projection 84 and recess 85 may be larger than the other projections and recesses, so that the insulating member 83 may be assembled with the shell 77 in but one relative rotative relation. In order to hold the insulating member 83 assembled with the shell 77 a plurality of fingers 86, in this instance four fingers, extending rearwardly from the shell, may be provided, and clinched radially inwardly over the rear face of the insulating member.

The insulating member 83 is adapted to carry contacts 87, 88, these contacts being desirably formed as enlarged heads on shanks fitted over and swedged to the ends of conductors 89, 90 respectively. The conductors 89, 90 are disposed in sleeves, one of which, 91, is visible in Figure 14, each sleeve being slidable within a bushing 92, which is fixedly mounted, in any suitable manner, as by beading, through the insulating member 83. Each sleeve, 91, is surrounded by a spring 93 between its bushing 92 and a flange 94 on each sleeve abutting the respective contacts 87, 88.

The contacts 87, 88 are adapted to make contact respectively with the contacts 74, 75 on the base of the lamp, when the contact carrier 76 is assembled with the lamp 20a, as shown in Figure 14. The springs 93 serve to bias the contacts 87, 88 into firm engagement with the contacts 74, 75 and to bias the pins 70, 71 seated on the bayonet slot seats 82. It will be evident that the contact carrier 76 may be assembled with the lamp 20a in but one relative rotative relation. The filaments 68a, 69a of the lamp 20a may be connected to the base 22a and to the lamp contacts 74, 75, and may be controlled in a manner as already described in connection with the lamp 20 and its contacts 58, 59.

The reflector 21a, used in the embodiment of Figure 14, is constructed similarly to the reflector 21 of the embodiment of Figure 1, and as is obvious, the lamp 20a is connected thereto in the same manner.

When it is desired to remove the lamp 20 from the reflector 21a, the lamp is rotated counter-clockwise, viewing the reflector from the front, whereby, as in the case of the embodiment of Figure 1, the frusto-conical portions 47a of the connector pins 42a, 43a, 44a ride rearwardly out of the seats formed by the smaller aperture portions 38a of the compound apertures in the reflector 21a, and upon continued rotation, the lamp 20a may be removed as already explained in connection with the lamp 20 of the embodiment of Figure 1. In this instance also, the contact carrier 76, analogously to the line connector 62, will be drawn through the central aperture 34a in the reflector, whereupon the lamp 20a may be disconnected from the contact carrier 76 by disengagement of the pins 70, 71 out of the bayonet slots 78, 79, as will be apparent.

A new lamp may be then connected to the contact carrier 76, and assembled with the reflector 21a as already explained in connection with the embodiment of Figure 1.

From the foregoing it will be apparent to those skilled in the art that the illustrated embodiments of my invention provide new and improved electric lighting devices and units, 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 sacrificing 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 bulb; base-means for said bulb; said base-means including a lateral positioning extension 25 for abutting a mounting means, and including also additional means for connecting said lamp to a mounting means, said additional means including a plurality of circumferentially spaced projections extending slidably through said positioning extension, said projections each having a lateral extension at one end thereof disposed on the same side of said positioning extension, said base-means including also resilient means constructed and arranged to so bias said projections 30 that said lateral extensions on said projections are biased toward said positioning extension.

2. In combination: an incandescent electric lamp having a base including a lateral positioning extension; a mounting plate abutted by said lateral positioning extension; means for connecting said lamp and said mounting plate, said connecting means including a portion of said mounting plate provided with a plurality of circumferentially spaced slots, and a plurality of circumferentially spaced projections carried by said base and constructed and arranged for cooperation with said respective slots; said projections having lateral extensions at their ends cooperable with said respective slots, means biasing said projections so that said lateral extensions on said projections are biased toward said positioning extension; and said lateral extensions and said slots being so constructed and arranged that rotation of said lamp causes said connecting means to press said positioning extension against said mounting plate.

3. In combination: an incandescent electric lamp having a base including a lateral positioning extension; mounting means abutted by said lateral positioning extension; means for connecting said lamp and said mounting means, said connecting means including a portion of said

mounting means provided with a plurality of circumferentially spaced slots, and a plurality of circumferentially spaced axially extending projections carried by said base and constructed and arranged for cooperation with said respective slots; said projections having lateral extensions at their ends cooperable with said respective slots; means biasing said projections so that said lateral extensions on said projections are biased toward said positioning extension; and said connecting means being so constructed and arranged that said slotted portion and said projections are relatively movable in a direction both axially and circumferentially with respect to the axis of said lamp and so that rotation of said lamp causes such cooperation between said lateral extensions on said projections and said slots that said connecting means presses said positioning extension against said mounting means.

4. In combination: an incandescent electric lamp having a base including a lateral positioning extension; a mounting plate abutted by said lateral extension; means for connecting said lamp and said mounting plate, said connecting means including a portion of said mounting plate provided with a plurality of circumferentially spaced slots, and a plurality of circumferentially spaced projections carried by said base and extending slidably through said positioning extension and constructed and arranged for cooperation with said respective slots; said projections having lateral extensions at their ends cooperable with said respective slots; means biasing said projections so that said lateral extensions on said projections are biased toward said positioning extension; and said slots and said projections being so constructed and arranged that rotation of said lamp causes said connecting means to press said positioning extension against said mounting plate.

5. In combination: an incandescent electric lamp having a base including a lateral positioning extension; a mounting plate abutted by said positioning extension at one side thereof; means for connecting said lamp and said mounting plate, said connecting means including a portion of said mounting plate provided with a plurality of circumferentially spaced slots, and a plurality of circumferentially spaced projections carried by said base and extending slidably through said positioning extension and constructed and arranged for cooperation with said respective slots; said projections having lateral extensions at their ends cooperable with said respective slots and abutting said mounting plate at the other side thereof; and resilient means, carried by said base, constructed and arranged to so bias said projections that said lateral extensions on said projections are pressed against said other side of said mounting plate.

HARRY A. DOUGLAS.