

[54] **MULTI-LAMP ASSEMBLY**

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353/19; 313/51; 340/378 R**

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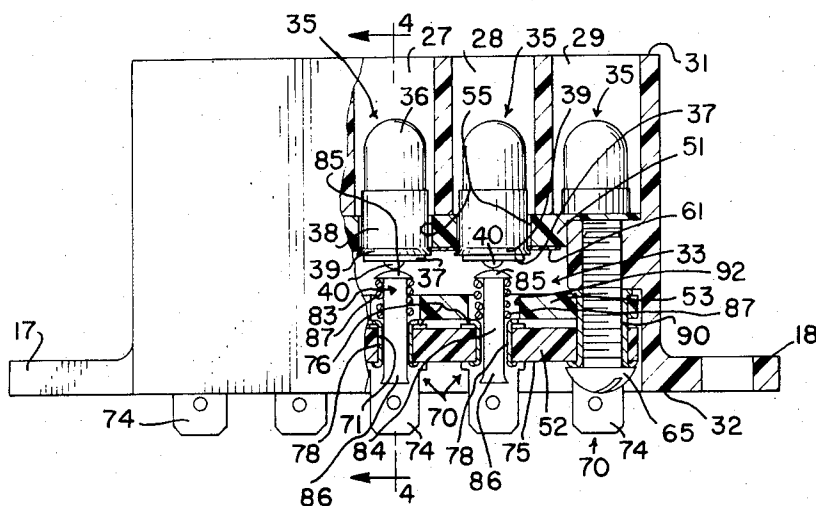
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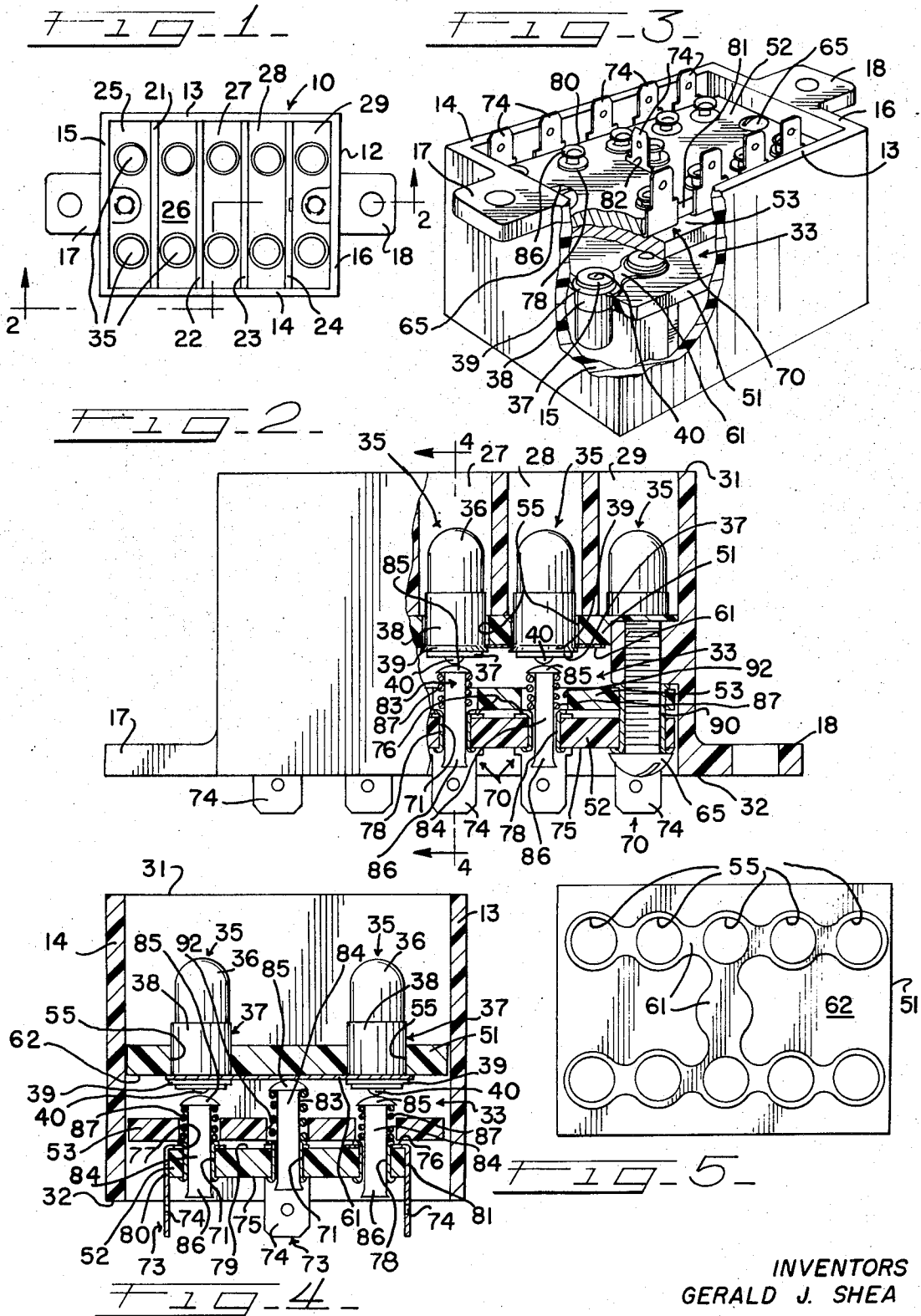
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ABSTRACT

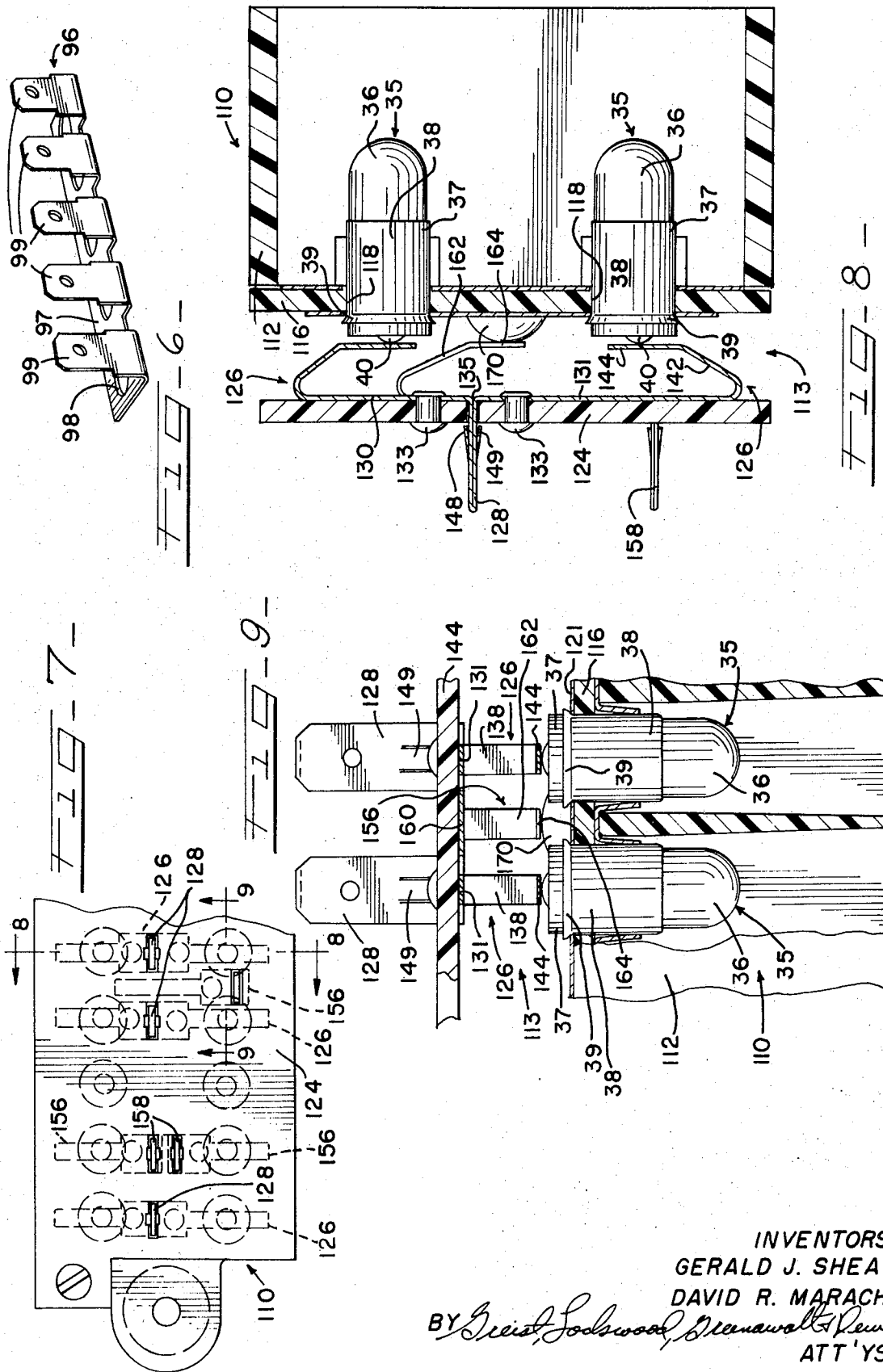
The multi-lamp assembly includes a compact housing for mounting a plurality of lamps with a minimum of lead terminal connectors for energizing the lamps exposed on the bottom side of the housing. First and second spaced apart, generally parallel base plates forming a multi-lamp socket are mounted within the housing. The first base plate has a plurality of openings therein for receiving the bases of the lamps and one face of the first base plate has a printed circuit thereon for interconnecting contact surfaces on the bases of the lamps. Individual electrical contact means for contacting the end contact on the base of each lamp and one contact means for contacting the printed circuit on the first base plate are mounted on the second base plate. Each contact means includes a movable contact, a terminal connector and a spring means for urging the movable contact toward the first base plate for establishing an electrical circuit connection between the contact means and a lamp end contact or the printed circuit.

17 Claims, 9 Drawing Figures





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MULTI-LAMP ASSEMBLY

The present invention relates to a compact multi-lamp assembly. More particularly the present invention relates to a compact multi-lamp assembly for mounting a plurality of indicating lamps in a relatively small housing and with a minimum number of terminal connectors exposed on one side of the housing of the multi-lamp assembly.

Multi-lamp assemblies are well known and typically have been formed by mounting a plurality of conventional lamp sockets on a mounting board or within a housing. These multi-lamp assemblies have been somewhat bulky since each lamp socket required a certain amount of space and had two lead connections thereto. Thus, although these multi-lamp assemblies are satisfactory in many applications, they are not satisfactory where only a limited amount of space is available for the multi-lamp assembly. Accordingly, a primary object of the present invention is to provide a compact multi-lamp assembly.

Another object of the present invention is to provide a compact multi-lamp assembly which is adapted to mount a plurality of lamps in a multi-lamp socket within the assembly.

Another object of the present invention is to provide a compact multi-lamp assembly in which a plurality of lamps are mounted in a multi-lamp socket in the assembly and in which a minimum of lead terminal connectors are exposed on one side of the housing of the lamp assembly.

Another object of the present invention is to provide a compact multi-lamp assembly including a housing mounting a multi-lamp socket defined by spaced apart generally parallel base plates, the first base plate having a plurality of openings for receiving and mounting a plurality of lamps and a printed circuit on one face of the base plate for contacting and interconnecting contact surfaces on the bases of the lamps received in the openings, and the second base plate having contact means thereon for engaging the printed circuit or the end contact on the base of one of the lamps.

Still another object of the present invention is to provide a multi-lamp assembly as described in the preceding paragraph in which each of the contact means on the second base plate includes a movable contact member, a terminal connector and a spring means establishing an electrical connection between the contact member and the terminal connector and urging the contact member toward the first base plate and against the printed circuit or the end contact of a lamp for establishing two electrical connections to each lamp and for maintaining each lamp within one of the openings in the first base plate.

For a more complete understanding of the nature and scope of the present invention, reference may now be had to the following detailed description of the preferred embodiments of the invention taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a top plan view of one embodiment of the multi-lamp assembly of the present invention;

FIG. 2 is a side elevational view of the lamp assembly shown in FIG. 1 with a portion thereof in section and taken along line 2—2 of FIG. 1;

FIG. 3 is a perspective view with portions broken away of the multi-lamp assembly shown in FIG. 1 viewing the same turned upside down;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 2;

FIG. 5 is a bottom plan view of the first base plate of the multi-lamp assembly of FIG. 1 and showing a printed circuit thereon;

FIG. 6 is a perspective view of a multiple terminal connector strip which can be used in place of the individual terminal connectors of the multi-lamp assembly shown in FIG. 3;

FIG. 7 is a fragmentary bottom plan view of another embodiment of the multi-lamp assembly of the present invention;

FIG. 8 is a sectional view taken along line 8—8 of FIG. 7;

FIG. 9 is a sectional view with portions broken away and taken along line 9—9 of FIG. 7.

Referring now to the drawings in greater detail one embodiment of the multi-lamp assembly of the present invention is generally indicated at 10 in FIG. 1. The assembly 10 includes a generally rectangular housing 12 defined by side walls 13 and 14 and end walls 15 and 16. A mounting flange 17, 18 extends from each of the end walls 15, 16 and a plurality of interior partition walls 21—24 extending between the side walls 13 and 14 divide the upper portion of the housing 12 into five compartments 25—29. As best shown in FIG. 2, the partition walls 21—24 extend inwardly of the housing from the top 31 thereof a predetermined distance to a point intermediate the top 31 and bottom 32 of the housing. The remainder of the housing beneath the partition walls 21—24 and between the side and end walls 13—16 is hollow and is adapted to receive a multi-lamp socket generally indicated at 33. As shown in the figures, the housing 12 can be made from opaque plastic, but typically the housing 12 is a die cast part such as a zinc casting.

Each compartment 25—29 has two lamps 35 positioned therein. The lamps 35 are mounted in the multi-lamp socket 33 and each lamp is of conventional design having a globe 36 with a filament (now shown) therein fixed to a generally cylindrical base 37 as best shown in FIGS. 2 and 3. The periphery of each base 37 of each lamp has a contact surface 38 thereon including a flange portion 39. An end contact 40 is fixed to the bottom of the base 37 approximately on the longitudinal axis of the lamp 35 and in spaced insulated relationship with respect to the contact surface 38.

The multi-lamp socket 33 includes at least two spaced apart generally parallel base plates 51 and 52 and preferably a third base plate 53 fixed to and rigidifying the second base plate 52.

The first plate 51 has a plurality of openings 55, one each for each of the lamps 35, and is provided with a printed circuit 61 (FIG. 5) on one face 62 thereof. The printed circuit is located in at least part of the area surrounding the openings 55. It will be understood that when the lamps 35 are received in the openings 55, the flange portion 39 of the contact surface 38 on the base 37 of each lamp will engage the printed circuit 61. As a result, the printed circuit 61 forms or defines circuit means for interconnecting the contact surfaces 38 on the bases of the lamps. The second base plate 52 is releaseably mounted in the housing 12 by two screws 65, in generally parallel, spaced apart relationship with respect to the first base plate 51.

A plurality of individual contact means 70 are mounted on the second base plate 52, at least one contact means 70 for each of the lamps 35, and one contact means 70 for establishing an electrical circuit connection with the printed circuit 61 on the first base plate 51 as best shown in FIG. 4. In the embodiment illustrated in FIGS. 1-4 the second base plate 52 is provided with a plurality of apertures 71 for mounting each of the contact means 70 to the second base plate 52. As best shown in FIGS. 2 and 4 each of the contact means 70 includes an L-shaped terminal connector 73 having a blade portion 74 which extends outwardly from the bottom face 75 of the second base plate 52 and a base portion 76 which is held in place about one of the apertures 71. In this respect, the base portion 76 of each terminal connector 73 has an opening 77 which is adapted to be positioned in coaxial relationship with respect to one of the apertures 71. Each contact means 70 further includes an eyelet 78 which is received through one of the apertures 71 and the opening 77 and staked or crimped over to fasten the base portion 76 against the upper face 79 of the second base plate 52.

As best shown in FIGS. 3 and 4 all but one of the terminal blade portions 74 of each of the terminal connectors 73 bears against a side edge 80, 81 of the second base plate 52 and in this way each terminal connector 73 is prevented from rotating about the axis of the eyelet 78. The blade portion 74 of the one terminal connector 73 mounted in the center of the second base plate 52 is received through a slot generally indicated at 82 in FIG. 3.

Each contact means 70 further includes a movable contact member 83 which is slidably received in the eyelet 78. In the embodiment illustrated in FIGS. 1-4 the contact member 83 is a rivet having a shank 84, a head 85 mounted at one end of the shank 84, and a flared or enlarged shank portion 86 at the other end of the shank 84 opposite the head 85. The end portion 86 is flared or enlarged after the rivet 83 is received through the eyelet 78 so that the head 85 and the flared end portion 86 of the rivet 83 serve to maintain the rivet 83 within the eyelet 78. The contact means 70 also includes a spring 87 which is positioned on the shank 84 of the rivet between the head 85 of the rivet and the crimped over portion of the eyelet 78. The spring 87 urges the rivet 83 toward the first base plate 51 for engaging the end contact 40 on one of the lamps 35 or the printed circuit 61. The spring 87 also functions to establish an electrical connection between the rivet 83 and the eyelet 78 and terminal connector 73.

By reason of the spring biased movable contact member 83, each of the contact means 70 serves three functions:

first, it establishes an electrical contact with the end contact 40 or one of the lamps 35; secondly, the contact means 70 maintains each lamp in one of the openings 55; and thirdly, as the contact means 70 urges one of the lamps 35 into one of the openings 55, it also urges the flange portion 38 on the contact surface 37 of the base 36 of the lamp 35 against the printed circuit 61 for establishing an electrical circuit connection between the contact surface 37 and the printed circuit 61.

As best shown in FIGS. 3 and 4 the width of the second base plate 52 is less than the width of the first

base plate 51 such that the side edges 80, 81 thereof are spaced from the side walls 13, 14 of the housing 12. In this way, the terminal blade portions 74 extending along the side edges of the second base plate 52 and in a direction outwardly of the housing 12 are located in spaced insulated relationship with respect to the side wall, 13, 14 of the housing 12.

Preferably, and as shown in FIGS. 2, 3 and 4 the multi-lamp assembly 10 includes the third base plate 53 which is secured to the second base plate 52 by eyelets 90 (FIG. 2). By providing two plates 52 and 53 clamped together a more rigid mounting is provided for the contact means 70. Additionally, the plate 53 has a plurality of openings 92 therein, one each for each one of the contact means 70. The rivet 83 and spring 87 of each contact means 70 extend through one of the openings 92 and the openings 92 serve to center, locate and retain the spring 87 and rivets 83 in proper position. Also, and as best shown in FIGS. 3 and 4, the third plate 53 is preferably wider than the second plate 52 and essentially as wide as the first plate 51 to thereby enclose the space between the second and third plates 52 and 53 to prevent foreign matter from entering into this space.

Although in the embodiment illustrated in FIGS. 1-4 each contact means 70 includes an individual terminal connector 71, it may be desirable in some applications to have two or more of the terminal connectors 71 interconnected. For this purpose, the terminal connectors can be formed integrally on a terminal connector strip such as the terminal connector strip indicated at 96 in FIG. 6. This terminal strip 96 has an elongated base portion 97 with a plurality of openings 98 therein through which the eyelets 78 are received and then crimped over. The terminal strip 96 also includes a plurality of terminal blades 99 which are adapted to extend along side edge 80 or 81 of the second base plate 52 in a direction outwardly of the housing 12 in the same manner as the blade portions 74.

The blade portions 74 and the blades 99 define lead contact means for connecting leads to the contact means 70. In this respect, leads can be soldered to the blade portions 74 or blades 99, or connected thereto by means of female quick connect-disconnect clips fastened to the lead ends.

Another embodiment of the multilamp assembly of the present invention is generally indicated at 110 in FIGS. 7, 8 and 9. The assembly 110 includes a housing 112 similar to the housing 12 with a multi-lamp socket 113 therein for mounting a plurality of the lamps 35. The multi-lamp socket 113 includes a first base plate 116 mounted within the housing 112 and having a plurality of openings 118 for receiving the lamps 35 with the bases 37 of the lamps 35 uniformly exposed beyond one surface of the first base plate 116. Each of the openings 118 is adapted to receive and hold the base 37 of one of the lamps 35. The first base plate 116 also has a printed circuit 121 on one face 122 thereof against which the flange portions 39 on the contact surfaces 38 of the bases 37 are urged for establishing an electrical circuit connection between the contact surfaces 38 and the printed circuit 121. Thus, the first base plate 116 is substantially identical to the first base plate 51 shown in FIGS. 1-5.

The multi-lamp socket 113 also includes a second base plate 124 which cooperates with the first base plate 116 for holding the lamps 30 in the multi-lamp assembly. For this purpose, the second base plate 124 mounts a plurality of dual lamp contact means 126. Each one of the contact means 126 is formed from a strip of metal which is stiff but resilient. Typically, the strip is stamped from a sheet of metal and then formed to the configuration shown in FIG. 8. In this respect, a central portion of the strip is folded over on itself to form a terminal blade portion indicated at 128. The portions extending generally at right angles from the blade portion 128 and on either side thereof form base portions 130 and 131 of the contact means 126. Each base portion 130, 131 has an aperture therethrough for receiving a rivet.

As shown in FIG. 8, the second base plate 124 has a plurality of pairs of openings 132 therein for receiving rivets 133 and at least one slot 135 between each pair of openings 132. The slot 135 is adapted to receive the blade portion 128 of the contact means 126 and the openings 132 on either side of the slot 135 are adapted to receive the rivets 133 for securing the base portions 130 and 131 to the second base plate 124.

The dual lamp contact means further includes a spring arm 138 and contact leaf 140 connected to and extending outwardly from the base portion 130 toward the first base plate 116 and a spring arm 142 and contact leaf 144 connected to and extending outwardly from the base portion 131 toward the first base plate 116. The spring arms 138 and 142 resiliently urge the contact leaves 140 and 144 into respective engagement with two end contacts 40 of the lamps 35 as shown in FIGS. 8 and 9.

To facilitate mounting of the contact means 126 to the second base plate 124, the folded over portions of the strip forming the blade portion 128 have partially cut portions of the strip bent outwardly from the plane of the strip to form shoulders as indicated at 148 and 149. The shoulders 148 and 149 serve to hold the contact means 126 in place while the rivets 133 are staked over to fasten the base portions 130 and 131 to the second base plate 144.

In addition to three of the dual lamp contact means 126, two single contact means are indicated at 156 in FIG. 7. The single contact means 156 includes a blade portion 158 extending from one base portion 160, a spring arm 162 connected to and extending outwardly from the base portion 160 and a contact leaf 164 connected to the spring arm 162. In this respect, the contact means 156 can be considered identical to the contact means 126 with the base portion 131, spring arm 141 and contact leaf 144 removed therefrom. The single contact means 156 only establishes one electrical circuit connection with an end contact of one of the lamps or with the printed circuit on the first base plate 116 as shown in FIGS. 8 and 9. In order that the spring arms 138, 142, 162 and contact leaves 140, 144 and 164 can be substantially identical, the printed circuit has a projection 170 which extends outwardly from the first base plate 116 the same distance that an end contact 40 of one of the lamps 35 extends from the base plate 116, whereby the contact leaves 140, 144 and 164 are all located at approximately the same distance from the second base plate 124.

It will be noted from FIG. 8 that the base portion 131 is longer than the base portion 130. This construction of the contact means 126 is preferred so that single contact means 156 can be formed from the same strip that the dual lamp contact means 126 is formed.

Also, and as best shown in FIGS. 8 and 9, the multi-lamp assembly 110 includes U-shaped insulating strips which are received over the inner ends of the partition walls and between each partition wall and the first base plate 116 to form insulating barriers between the metal partition walls and the contact surfaces 38 of the lamps 35.

From the foregoing description it will be understood that the base plates 51, 52, 53, 116, 124 are made of insulating material. Furthermore it will be understood that the base plates 51, 52 or 116, 124, the printed circuit 61 or 121 on one plate 51 or 116 and the contact means 70 or 126, 156 mounted on the other plate 52 or 124 form a simple effective and compact lamp socket 33 or 113. Moreover, it will be understood that the contact means 70 or 126, 156 having a spring biased contact, either a contact member or a contact leaf, function not only to establish an electric circuit connection between the end contact 40 of each of the lamps 35 and a terminal connector or blade of the contact means but also serve to maintain each of the lamps 35 in each of the openings 55 or 118 in the first base plate 51 or 116 and, by urging the lamps 35 into the openings, urge the flange portions 34 on each of the lamps 35 into engagement with the printed circuit 61 or 121 for establishing an electric circuit connection between the flange portion 39 and the printed circuit 61 or 121 on the first base plate 51 or 116.

Additionally, from the foregoing description of two embodiments of the multi-lamp assembly of the present invention it will be understood that various modifications and variations can be made to the multi-lamp assembly without departing from the scope of the invention. Accordingly, the scope of the present invention is only to be limited as necessitated by the accompanying claims.

We claim:

1. A multi-lamp assembly comprising:
 - a metal housing; multi-lamp socket means including a plurality of lamp sockets; and a plurality of lamps; said housing including outer walls, and inner partition walls extending inwardly of the top of the housing a predetermined distance towards the bottom of the housing, said partition walls extending between outer walls to divide a first portion of the housing into a plurality of compartments, a second portion of the housing being hollow beneath the partition walls and between the outer walls, and being adapted to receive said multi-lamp socket means, said multi-lamp socket means residing in the second portion; portions of respective sets of lamps residing in respective compartments, and respective lamp sockets being positioned adjacent the inner end of respective compartments, wherein the lateral enclosure of that portion of respective lamps residing within respective compartments consists essentially of portions of said walls; said socket means comprising a first base plate mounted in said housing and having a plurality of openings, said plurality of lamps each having a casing contact surface and an end contact on the base thereof, said lamps being received in said openings with

said bases of said lamps uniformly exposed beyond one surface of said first base plate, first contact means on a face of said first base plate for interconnecting at least two of said casing contact surfaces, a second base plate removably mounted in said housing in parallel spaced relationship with respect to said first base plate, said second base plate carrying a plurality of second contact means for contacting said lamps and including at least one third contact means which contacts said first contact means, each of said second contact means including a spring means for establishing resilient engagement of respective second contact means with an end contact on said base of one of said lamps, spring means for establishing resilient engagement of said third contact means with said first contact means to selectively establish circuits which include one or more of said lamps, and lead contact means forming a part of said respective second and third contact means and projecting outwardly from said second base plate for establishing lead connections to said second and third contact means.

2. The assembly of claim 1 wherein said first contact means includes a printed circuit on said face of said first base plate in at least part of the area surrounding at least two of said openings in said first base plate.

3. The assembly of claim 1 wherein each of said second and third contact means includes a terminal blade in position for connecting a lead thereto.

4. The assembly of claim 1 wherein each of said second and third contact means includes a movable contact member which is in electrical contact with said lead contact means, and said spring means biases said second and third contact member in the direction toward said first base plate.

5. The assembly of claim 4 wherein said casing contact surface on each of said lamp bases has a flange portion which is adapted to contact said first contact means on said first plate when said lamp is received in one of said openings and wherein some respective spring means urge respective movable members of said third contact means towards said first base plate and against said first contact means and wherein other respective spring means urges one of said second contact means towards said first base plate and against a respective end contact on one of said lamp bases for establishing an electrical circuit connection between said movable member and said end contact on one of said lamp bases for establishing an electrical circuit connection between said movable member and said end contact and for urging said flange portion of said one lamp against said first contact means to establish an electrical circuit connection between said flange portion and said first contact means, and for holding said lamp in one of said openings, whereby said second contact means not only maintains said one lamp in said opening but also establishes two electrical circuit connections with said lamp.

6. The assembly of claim 1 wherein at least two of said second contact means on said second base plate are electrically interconnected.

7. The assembly of claim 1 wherein said second base plate has a plurality of apertures therein, at least one for each of said second contact means, and each of said second contact means includes an eyelet received in one of said apertures with one end of said eyelet being

clamped over a portion of said lead contact means, a movable contact pin having a shank slidably received in said eyelet, a head at one end of said shank adapted for engagement with said end contact on one of said lamps, and an enlarged shank portion at the other end of said contact pin, said head and said enlarged shank portion serving to retain said contact pin within said eyelet, and said spring means is positioned about said shank of said contact pin between said eyelet and said head of said pin in the direction toward said first base plate.

8. The assembly of claim 7 including a third plate made of an insulating material and having a plurality of apertures therein equal in number to the number of second and third contact means on said second base plate, said third plate being positioned between said first and second base plates and adjacent said second base plate with said spring means and said contact pin of each of said contact means extending through one of said apertures.

9. The assembly of claim 1 wherein at least one of said spring means is connected to said lead contact means of said contact means and is defined by a spring arm which extends from said second base plate, and wherein the distal end of said spring arm is adapted to contact one of said lamp end contacts or said circuit means on said first base plate.

10. In a multi-lamp assembly including a housing having mounted therein a plurality of lamps of the type having a base with a contact surface and an end contact thereon, the improvement in which said housing is die cast metal and includes outer walls, and inner partition walls extending inwardly of the top of the housing a predetermined distance towards the bottom of the housing, said partition walls extending between outer walls to divide a first portion of the housing into a plurality of compartments, a second portion of the housing being hollow beneath the partition walls and between the outer walls, and being adapted to receive said multi-lamp socket means, said multi-lamp socket means residing in the second portion; portions of respective sets of lamps residing in respective compartments, and respective lamp sockets being positioned adjacent the inner end of respective compartments, wherein the lateral enclosure of that portion of respective lamps residing within respective compartments consists essentially of portions of said walls; said socket means comprising first and second, generally parallel, spaced apart base plates, said first base plate being fixed within the housing and having a plurality of openings therein in which said bases of said lamps are received, circuit means on one face of said first base plate for contacting and interconnecting said contact surfaces, and said second base plate being removably mounted within said housing and having a plurality of contact means thereon for contacting said lamp end contacts and separate contact means for contacting said circuit means on said first base plate.

11. A multi-lamp assembly comprising: a housing; multi-lamp socket means including a plurality of lamp sockets; and a plurality of lamps; said housing including outer lateral walls, and inner partition walls extending inwardly from the top of the housing a predetermined distance toward the bottom of the housing, said inner partition walls extending between the outer walls to divide the upper portion of the housing into a plurality of

compartments, the lower portion of the housing being hollow beneath the partition walls and between the outer lateral walls and being adapted to receive said multi-lamp socket means; said multi-lamp socket means residing in the hollow lower portion; portions of respective sets of lamps residing in respective compartments; respective lamp sockets being positioned adjacent the inner end of respective compartments; and wherein the lateral enclosure of said portions of said respective lamps which reside within respective compartments consists essentially of portions of said walls.

12. A multi-lamp assembly as defined in claim 11 wherein said housing is a die cast part.

13. The multi-lamp assembly of claim 11 wherein said socket means includes a plurality of lamp sockets, each comprising an opening in a plate member and wherein a respective lamp is positioned in said opening with a bulb portion thereof being positioned on one side of said plate member, and electrical contacts of said respective lamp being disposed at the other side of said plate member, and wherein said plate member is positioned transversely with respect to said partition walls and adjacent the inner edge of said partition walls.

14. A multi-lamp assembly comprising: a housing; multi-lamp socket means including a plurality of lamp sockets; and a plurality of lamps; said housing including side walls, and inner partition walls extending inwardly from the top of the housing a predetermined distance to a point intermediate the top and the bottom of the housing, said partition walls extending between the side walls to divide the upper portion of the housing into a plurality of compartments, the lower portion of the housing being hollow beneath the partition walls and between the side and end walls and being adapted to receive said multi-lamp socket means, said multi-lamp socket means residing in the hollow lower portion, portions of respective sets of lamps residing in respective compartments, and respective lamp sockets being positioned adjacent the inner end of respective compartments wherein the lateral enclosure of that portion of respective lamps residing within respective compartments consists essentially of portions of said walls.

15. A multi-lamp assembly as defined in claim 11 wherein said housing is a die cast part.

16. The multi-lamp assembly of claim 11 wherein said socket means includes a plurality of lamp sockets each comprising an opening in a plate member and wherein a respective lamp is positioned in said opening with a bulb portion of said lamp being positioned on one side of said plate, and electrical contacts disposed

at the other side of said plate member and wherein said plate member is positioned transversely with respect to said partition walls and adjacent the inner edge of said partition walls.

17. Multi-lamp assembly comprising: a metal housing; a multi-lamp socket means including a plurality of lamp sockets; a plurality of lamps; said housing including outer lateral walls, and inner partition walls extending inwardly from the top of the housing a predetermined distance toward the bottom of the housing, said inner partition walls extending between the outer walls to divide the upper portion of the housing into a plurality of compartments, the lower portion of the housing being hollow beneath the partition walls and between the outer lateral walls and being adapted to receive said multi-lamp socket means; said multi-lamp socket means residing in the hollow lower portion; portions of respective sets of lamps residing in respective compartments, wherein the lateral enclosure of said portions of said respective lamps consists essentially of portions of said walls; respective lamp sockets being positioned adjacent the inner end of the respective compartments; said socket means comprising a first base plate mounted in said housing and having a plurality of openings, said plurality of lamps each having a casing contact surface and an end contact on the base thereof, said lamps being received in said openings with said bases of said lamps exposed beyond one surface of said first base plate, first contact means on a face of said first base plate for interconnecting at least two of said casing contact surfaces, a second base plate removably mounted in said housing in parallel spaced relationship with respect to said first base plate, said second base plate carrying a plurality of second contact means for connecting said lamps and including at least one third contact means which contacts said first contact means, each of said contact means including a spring means for establishing resilient engagement of respective second contact means with an end contact on a respective base of one of said lamps, spring means for establishing resilient engagement of said third contact means with said first contact means to selectively establish circuits which include one or more of said lamps, and lead contact means forming a part of said respective second and third contact means and projecting outwardly from said second base plate for establishing lead connections to said second and third contact means; each of said second and third contact means being an integral part formed from a sheet of stiff resilient metal from which the lead contact and spring means are formed by bending portions of said sheet.

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