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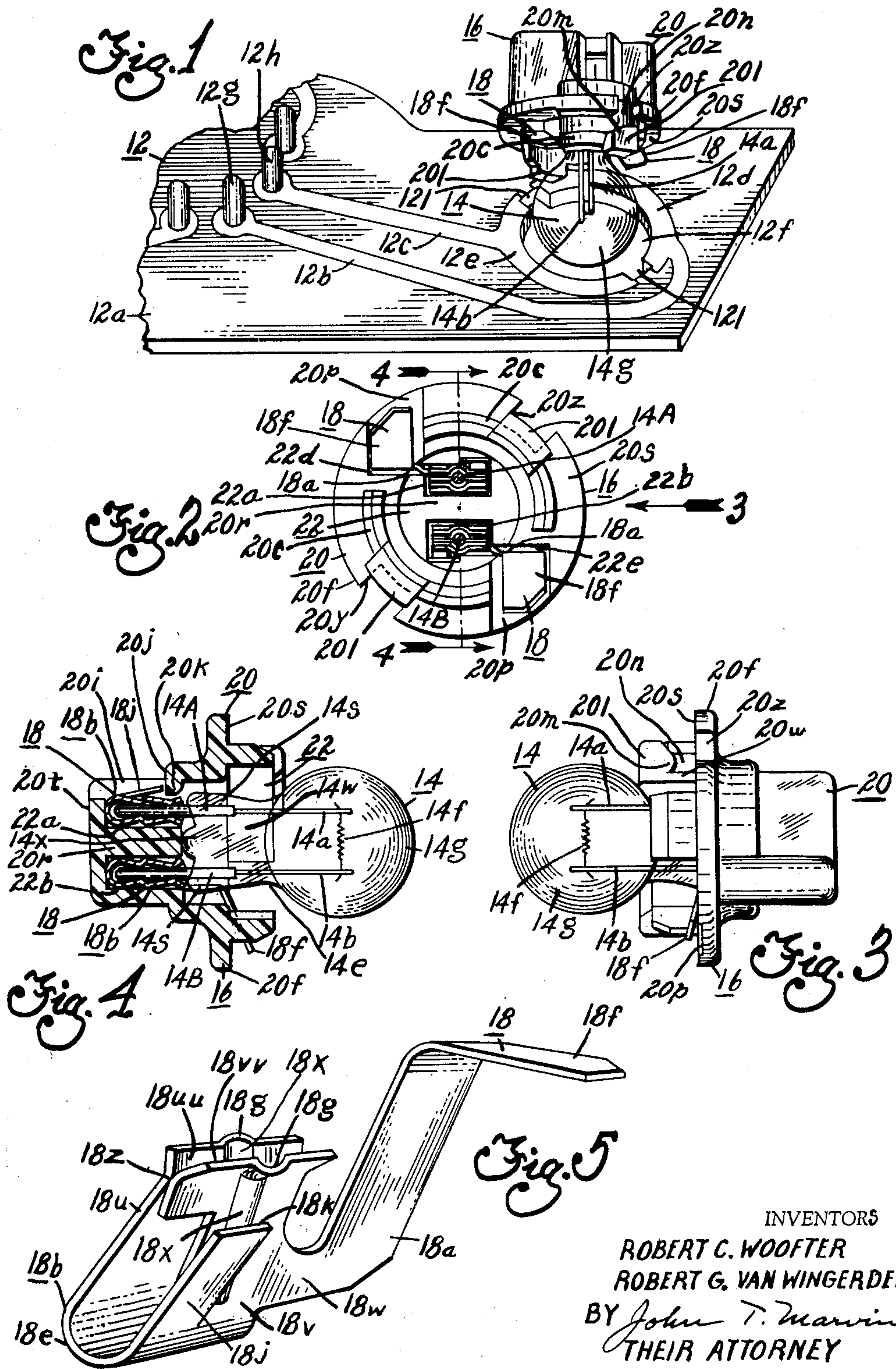
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SOCKET AND TERMINAL MEANS FOR PIN-TYPE LAMP BULB CONNECTION

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1

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SOCKET AND TERMINAL MEANS FOR PIN-TYPE LAMP BULB CONNECTION

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This invention relates to socket and terminal means for connection of pin-type lamp bulbs for use with mounting panels including panels having printed circuits thereon, and particularly, to socket and terminal means adapted to receive a pin-type lamp bulb for connection with a printed circuit on an insulating board or for connection and mounting on a metal panel.

An object of this invention is to provide new and improved lamp socket and terminal means for use with a printed circuit on an insulating board.

Another object of this invention is to provide lamp socket terminal means adapted to receive a pin-type lamp bulb for connection with a printed circuit on an insulating board.

Another object of this invention is to provide a terminal for a lamp socket that is adapted to receive a two-pin miniature lamp, the socket terminal including a substantially V-shaped element with a funnelled entrance to a pin recess and with a tongue for locking the terminal in a socket and a flag adapted to engage an exterior face of the socket for engagement with a mounting panel.

Another object of this invention is to provide a terminal adapted to contact a pin-type lamp-bulb socket and including a one-piece element having at least one recess portion adapted to be complementary to one lamp bulb pin and having a tongue portion adapted to lock the terminal in place in the socket.

A further object of this invention is to provide a lamp socket assembly for use in combination with a pin-base-type lamp bulb and having terminal means insertable in a cavity of a lamp socket where pins provided on a base of the lamp bulb fit into contact portions on each of the terminal means contoured to be complementary to the pins on opposite sides of a partition adapted to separate and insulate terminal means from each other and also adapted to serve as a stop engageable to limit insertion of the pin-base-type lamp bulb relative to the socket.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Figure 1 is a fragmentary perspective view of a mounting panel and a lamp bulb and socket assembly having terminal means in accordance with the present invention.

Figure 2 is an end view looking into the Fig. 1 socket assembly having terminal means in accordance with the present invention.

Figure 3 is a view taken in the direction of arrow 3 in Fig. 2 and including a lamp bulb inserted in the socket assembly.

Figure 4 is a cross sectional view taken along line 4—4 of Fig. 2.

Figure 5 is a perspective view of terminal means used in the socket assembly of Figures 1—4 in accordance with the present invention.

Figure 6 is a cross sectional elevational view of a socket assembly using a terminal means of Fig. 5 as well as an additional terminal means also for engaging a pin-

2

base-type lamp bulb inserted in an insulating socket in accordance with the present invention.

Figure 7 is an end view looking into the socket assembly in the direction of arrow 7 in Fig. 6.

Figure 8 is a plan view of a blank of one of the terminal means used in the socket assembly of Fig. 1 in accordance with the present invention.

Figure 9 is a side view of a terminal means formed from the blank of Fig. 8 and used in the socket assembly of Figures 6 and 7.

Figure 10 is an end view of terminal means taken in the direction of arrow 10 in Fig. 9.

With particular reference to Fig. 1 there is shown a mounting panel generally indicated by numeral 12 and including an insulating board 12a on which there is provided a conducting material 12b and 12c terminating in semi-circular or annular conducting portions 12d and 12e, respectively. The annular conducting portions 12d and 12e are located on one side of the insulating board 12a and are located adjacent to a periphery of a hole or aperture 12f provided extending through the insulating board. A plurality of pins such as 12g and 12h connected to the conducting material such as 12d and 12c, respectively can be provided on the insulating board for connection of the conducting material to a source of electrical power or into an electrical circuit such as may be provided for an instrument cluster of a dashboard of a vehicle requiring illumination. The aperture 12f has a diameter of sufficient magnitude to permit insertion of a lamp bulb generally indicated by numeral 14 and having a glass envelope 14g inside of which there is provided a filament 14f connected at opposite ends to wires 14a and 14b.

The lamp bulb 14 is fitted into a socket and terminal means assembly generally indicated by numeral 16 and including terminal means generally indicated by numeral 18 inserted and retained in an insulating body or socket 20 for mounting of the lamp bulb 14 as described below. The insulating body or socket 20 shown in Fig. 1 includes a flange 20f having a face portion or surface 20s adapted to be positioned against the insulating board 12a and/or conducting material 12d and 12e. The flange 20f extends radially outwardly from the insulating body 20 and is adapted to provide a pair of slots 20y and 20z as shown in Fig. 2. Only one of these slots 20z is visible in the perspective view of the socket and terminal means as shown in Fig. 1. The slot 20z extends radially and longitudinally of the insulating body 20 and a recess or notch 20n visible in Figures 1 and 3, is formed by a lug or arm 201 having a curved surface portion 20m extending toward the slot 20z. On one side of notch 20n there is a wall portion or web 20w that interconnects the flange 20f with the lug 201. The purpose of the notch 20z is to provide resilience between the flange 20f and curved portion 20m of the lugs 201 for engagement of the insulating panel 12a between the lug or arm 201 and flange 20f. This engagement of the insulating board occurs when the lamp socket lug or lugs 201 are inserted into diametrically opposite cutout portions 121 provided extending radially outwardly from the aperture 12f. The cutout portions 121 also serve to separate the conducting material portions 12d and 12e from each other. As the lugs 201 are inserted into the cutout portions 121, a rotation of the insulating body 20 in a clockwise direction relative to the aperture 12f in the panel of Fig. 1 effects a bayonet type locking of the insulating body 20 relative to the panel 12.

As the insulating body 20 is locked into engagement with the panel 12, the terminal means 18 are engaged against the printed circuit conducting material portions 12d and 12e. Fig. 2 is a view looking toward the surface 20s of the flange 20f of the insulating body 20 and the

3

terminal means 18 can be seen in an end view taken looking into a chamber 22 formed inside the insulating body. The chamber 22 is substantially cylindrical and has a pair of laterally outwardly extending slots 22d and 22e provided for receiving an alignment or longitudinal portion 18a of each of the terminals 18. Also clearly visible in Fig. 2 is a wall portion or annular shield 20c of the insulating body 20 which is partially visible also in Fig. 1. This shield 20c has an outer diameter substantially equal to the diameter of the opening 12f in the panel 12 and the wall portion 20c serves as a guide for positioning the insulating body 20 relative to the aperture 12f. The wall portion 20c extends in opposite directions from each of the lugs 201 referred to in the description of the insulating body 20 of Fig. 1.

The insulating body 20 as visible in Fig. 2 further includes chamber portions 22a and 22b which extend downwardly from the bottom of the chamber 22 in the insulating body 20. Each of the terminals 18 is provided with a main contact or body portion 18b which is inserted into the recesses or auxiliary chamber portions 22a and 22b. The surface 20s of the flange 20f is provided with undercut portions or platforms 20p which extend radially outwardly from the chamber 22. These platform portions 20p are adapted to be complementary to and to provide a recess in which contact or flag portions 18f of each of the terminals 18 are positioned. The specific relationship of these platforms 20p relative to the flag portions 18f is readily seen in the side view of Fig. 3 taken in the direction of arrow 3 in Fig. 2. It is apparent that the flag portions 18f are bent extending laterally and angularly relative to the terminal means 18 especially the alignment portions 18a of each of the terminals. This angular relationship of the flag portions 18f is also apparent in the perspective view of the socket and terminal means assembly shown in Fig. 1 and the purpose of bending the flag portion 18f is to assure resilient engagement of the flag portions relative to the printed circuit conducting material portions 12d and 12e on the panel 12.

One of the bayonet type locking lugs 201 and the specific flange structure 20f having the slot 20z extending radially inwardly from the outer periphery of the flange can be seen in the side elevational view provided by Fig. 3. The lamp bulb 14 is shown inserted in the socket and terminal means assembly. A more detailed view of the socket and terminal means assembly in which the lamp bulb is mounted is provided by the cross sectional elevational view of Fig. 4.

Fig. 4 illustrates a two-pin type miniature lamp bulb for which the specific socket and terminal means assembly of the present invention is provided. The bulb 14 includes the filament 14f and filament wires or connecting means 14a and 14b referred to in Fig. 1. The glass envelope 14g is substantially spherical in shape and extending outwardly from the glass envelope at one side thereof there are lead-in wires or pins 14A and 14B connected to the connecting wires 14a and 14b respectively for the filament 14f. The glass envelope 14g is provided with an extension 14e formed integral with the glass envelope 14g and providing a beaded glass seal 14s relative to each of the pins 14A and 14B. A web portion 14w joins the glass seal portions 14s and provides a means or passage for evacuating the interior of the glass envelope 14g. The passage for evacuating the glass envelope is not part of the present invention and therefore is not specifically illustrated in the drawings. However, the web portion 14w provides a connection between the sealing portions 14s of the glass of the bulb and intermediate these sealing portions there is a projection or stop portion 14x which is engageable against a central partition or dividing wall 20r provided extending integrally from a cover or closed end 20t of the insulating body 20. The partition or wall 20r is visible in Fig. 2 as well as in Fig. 4 and separates and insulates the auxiliary chambers 22a

4

and 22b from each other. It is apparent that the wall portion or partition 20r is located longitudinally of the chamber 22 extending one way therein so that the auxiliary chamber portions 22a and 22b are in effect recesses into which the terminal means 18 are fitted. As visible in Fig. 4 the auxiliary chamber portion 22a has a lateral opening 20i extending radially outwardly through the body portion 20 and forming a shoulder 20j against which a locking leg portion or tongue 18j of the terminal means 18 is engageable. The alignment portion 18a of the terminal means 18 as well as other portions of the terminal means are visible in part in Fig. 4 but a better view is available in Fig. 5 where there is shown a perspective representation of the terminal means 18.

As noted earlier, the terminal means 18 include a flag portion 18f visible in Fig. 5 together with a longitudinal or aligning body portion 18a which is connected by a web 18w to one side portion or resilient leg means 18v of the main body portion 18b of each of the terminals. An opposite resilient leg means 18u of the body portion 18b is also clearly visible in the perspective view of Fig. 5. A bent end portion 18e interconnects the legs 18u and 18v to form the main body portion 18b. The locking leg portion or tongue 18j is bent laterally outwardly from the leg portion 18v as indicated in Figures 4 and 5. The leg portion or tongue 18j has its free end 18k extending outwardly from the leg portion 18v at a position remote from the interconnecting end portion 18e. Thus the tongue 18j is integral with the leg portion 18v adjacent to the end portion 18e and the terminal means 18 can be easily inserted into the auxiliary chamber space such as 22a because the end 18e fits directly into the chamber space and the leg portion 18j has a slope permitting insertion of the terminal means 18 into the auxiliary chamber 22. Resilience of the leg portions 18j permits the tongue to be temporarily pressed at its free end 18k toward the leg portion 18v. After the tongue 18j and edge 18k pass the abutment or shoulder 20k of the socket body 20, the edge 18k locks behind the shoulder 20k and engages surface 20j for resisting any attempt to remove the terminal means 18 from insulating body 20. It is to be understood that the terminal means 18 are easily removable from the insulating body 20 because the opening 20i extending laterally outwardly from the auxiliary chamber 22a permits a tool or even a finger to be pressed against the tongue 18j for temporarily disengaging the edge 18k from the shoulder 20k of surface 20j permitting removal of the terminal means from the insulating body. Each of the leg portions 18v and 18u are substantially in engagement with each other adjacent to their free ends remote from the end portion 18e. The leg portions 18v and 18u form a substantially V-shaped or U-shaped structure which has the appearance of a teardrop when the pins such as 14A and 14B are not inserted or connected relative to the terminal means.

As visible in Figures 2 and 5, the terminal means 18 are provided with an abutting contact portion 18z formed as a channel or concave portion extending laterally along each of the legs 18u and 18v. A funnel or entrance guide portion edge 18g is provided extending laterally outwardly centrally relative to each of the free ends of the leg portions or resilient leg means 18u and 18v of the terminal means 18. The perspective view of Fig. 5 indicates a recess or concave grooves 18x formed below this guide portion edge 18g of each of the legs extending complementary to each other on opposite sides of the lateral recess portion 18z. Thus the pins such as 14A and 14B can be easily guided or inserted into the specific central location of complementary grooves 18x for connection with the terminal means 18 resiliently retaining the pins therebetween. The lateral channel 18z forms a guide in which pins such as 14A or 14B can slide over surfaces 18uu and 18vv provided on leg portions 18u

5

and 18v respectively centrally toward the guide portion edges 18g and grooves 18x for funnelling a pin into proper engagement with the terminal means 18.

In the lamp socket and terminal means assembly of Fig. 4, the lamp bulb 14 is inserted with the pins 14A and 14B in engagement with the main body portion 18b of the terminal means 18. Due to lateral spacing of the auxiliary chambers 22a and 22b, the terminal means 18 are spaced parallel to each other and insertion of the pins into the body portions 18b of the terminal means 18 is accomplished with an easy movement of the lamp bulb into frictional engagement of the pin relative to the longitudinal recesses 18x of the terminal means. The partition 20r acts as a limit or stop engaged by the bulb stop portion 14x or web 14w and the bulb cannot be rotated or shifted once the pins are inserted into the longitudinal recess portions 18x of the terminal means.

For electrically connecting a lamp bulb 14 with a printed circuit panel, the terminal means and socket assembly in accordance with the present invention utilizes terminal means 18 having identical structure for connection with each of the pins 14A and 14B and each having flag portions 18f engageable with the printed circuit conducting material portions 12d and 12e. The terminals as shown in Fig. 2 are maintained in parallel or aligned position relative to each other due to the specific arrangement of body portions 18a relative to the auxiliary chambers 22a and 22b as well as the slots 22d and 22e. Thus the insulating body 20 is secured by a bayonet type fastening to the printed circuit panel 12 and flag portions 18f of the terminals engage printed circuit conducting material for establishing electrical connection through the body portions 18b thereof adapted to be complementary to the two pin miniature-type lamp bulb shown in the drawings.

Since there are also entrances where a two pin miniature lamp bulb must be used for electrical connection with other than a printed circuit panel, there is shown in Fig. 6 a terminal means and socket assembly 40 in accordance with the present invention and adapted to be connected to a metal mounting panel indicated by numeral 42. A terminal means generally indicated by numeral 18 in Fig. 6 is exactly like the terminal means illustrated in Fig. 5 and in Figures 1-4. However, since the panel 42 is made of metal and can be used as a ground terminal for completing a circuit from a power source, the terminal means 18 has a flag portion 18f directly in engagement with the panel 42. The panel has an opening or aperture 42f through which the socket 40 and a bulb 44 are inserted with resilient lugs 40i having an outwardly extending central shoulder portion 40m adapted to be pushed through the aperture 42f. The shoulder portion 40m is greater in diameter externally than the peripheral diameter of the aperture 42f and a flange 40f of the socket 40 locks the socket relative to the panel 42 in conjunction with the lugs 40i and shoulder portions 40m. The terminal 18 again is provided with a tongue or locking leg portion 18j engageable against a shoulder 40k of the socket 40 and an opening or lateral slot 40i is provided to form the shoulder 40k against which the tongue 18j is engageable.

Since the metal mounting panel 42 serves as a ground connection, the terminal means 18 as used in the socket and terminal assembly of Fig. 6 is a ground terminal and an additional terminal means generally indicated by numeral 48 is provided for use in the socket 40. The socket 40 has a chamber portion 52 into which glass web 44w of bulb 44 is inserted and the insulating body or socket 40 has a central partition or wall 40r separating auxiliary chamber 40a from a longitudinal auxiliary chamber 40b. The auxiliary chamber portions 40a and 40b are connected at one end with the chamber 52 and pins 44A and 44B extend longitudinally into these auxiliary chambers and into engagement with the terminal means 18 and 48.

6

The terminal means 48 is outlined in phantom in Fig. 6 and includes a resilient leg means or tongue portion 48f which is connected by a bent over end portion 48e to a main body portion 48b of the terminal means 48. In the end view of Fig. 7 the socket 40 is illustrated as it appears when disconnected or in relation to the metal panel 42 for mounting. The flange 40f and lugs 40i are clearly visible and a recess or platform portion 48p formed on a surface or a portion of the flange 40f can be seen in Fig. 7. The flag portion 18f of terminal means 18 is outlined in phantom in Fig. 7, and is engageable with the metal panel 42 as is partially visible in Fig. 6. The partition or wall portion 40r has a central depression or cavity 40c into which a glass tip or seal 44s can be inserted until there is engagement of the partition or wall 40r relative to the web 44w of the bulb 44 for limiting and stopping movement of the bulb during insertion thereof into the socket 40.

The terminal means 48 as outlined in phantom in Fig. 7 has a recess portion 48x extending inwardly toward the main body portion 48b of the terminal means 48 and a better understanding of the specific structure of the terminal means 48 can be attained by referring to Figures 8, 9 and 10 which show only the terminal means 48 for use in accordance with the present invention. In Fig. 8 there is shown a developed or plan view of the terminal means 48 having main body portion 48b with pairs of laterally extending wings 48v and 48w. The purpose of the wings 48v and 48w is to provide a conductor connecting means whereby an insulation-covered conductor or wire 48z outlined in Fig. 6 can be secured to the terminal means 48. The conductor 48z connects the terminal means 48 to a source of electrical power. The side wings 48w are bent over inwardly toward each other so as to crimp and engage an insulating covering of the conductor 48z while the side wings 48v are crimped inwardly toward each other for engaging a wire or metal conducting portion of the conductor 48z in a well-known manner.

The intermediate end portion 48e connects the body 48b to the resilient leg means or tongue portion 48f of the terminal means. The terminal means 48 is illustrated further in Fig. 9 which is a side view of a terminal formed from the blank of Fig. 8. The recess or longitudinal cavity 48x which is complementary to a pin such as 44B is visible in Fig. 9 and the wings 48w and 48v are bent to positions transverse relative to the main body portion 48b of the terminal means 48. The end portion 48e joining the body portion 48b and resilient leg means 48f serves as a guide for the pin such as 44B since the terminal means 48 as positioned in the chamber 40b permit the bent over end 48e to abut against a shoulder 40e of the socket 40. The free end 48n of the tongue or leg means 48f is resiliently locked behind a shoulder 40n of the socket or body portion 40 so that the terminal means 48 is retained in the socket 40 due to an interlocking of the free end 48n and bent over end 48e of the terminal means relative to the socket 40. The side wings 48w and 48v are positioned longitudinally spaced from the end portion 48e in a passage 40t as outlined in Fig. 6.

Fig. 10 shows an end view taken in the direction of arrow 10 in Fig. 9 and illustrates the positioning of the side wings 48w as well as side wings 48v relative to the main body portions 48b of the terminal means 48. The bent over end portion 48e is shown connecting the resilient leg means or tongue portion 48f to the body portion 48b. The recess 48x which is complementary to a side of a pin such as 44B is also visible in Fig. 10.

Among the advantages realized by using the terminal means and socket of the present invention is the simplicity in design of the socket adapted to be easily inserted into an aperture of a mounting panel in a minimum of time and requiring a minimum of space. Specifically the socket 20 as illustrated in Fig. 3 is considerably shorter than the socket 40 in Fig. 6 but the advantages of

the terminal means such as 18 can be realized in either of the sockets 20 or 40. It is to be understood that the terminal means 18 can be attached to the pins 14A and 14B so that the lamp bulb would carry the terminal means 18 prior to insertion into the lamp socket 20. However, it is preferred that the bulb 14 and pins 14A and 14B be detachable from the terminal means 18 so that the bulb 14 is readily replaceable in the terminal means 18 of the socket 20 in the event the filament 14f burns out. There is considerable reduction in cost due to the use of terminal means 18 for connection with pin type lamp bulbs due to the standardization of the terminal means 18 for use in each of the auxiliary sockets 22a and 22b and also due to a savings in the cost of the bulb 14 requiring no screw type base or bayonet type base as has been provided previously by various electrical manufacturers. The advantages in the two-pin-type miniature lamp bulbs per se are obvious as to savings in weight, space, ease of maintenance as well as better electrical contact due to elimination of soldered connections of the terminal wires or pins relative to a metal screw-type base or bayonet-type base of the lamp bulb per se. It is to be understood that the lamp bulb per se is not part of the present invention but that the socket and terminal means therefore are specifically adapted to be used with lamp bulb means having two pins projecting outwardly therefrom. The partitions 20r and 40r as provided in the sockets or body portions 20 and 40 respectively are adapted to separate and insulate terminal means from each other and are also adapted to serve as a stop engageable to limit insertion of the pin base type lamp relative to the socket.

While the embodiments of the present invention as herein disclosed constitute a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A two-pin lamp-bulb socket and terminal means adapted to be mounted directly into an aperture of a panel, comprising, an insulating body open at one end and having a chamber divided into a pair of immediately laterally adjacent auxiliary portions by a central partition portion of said body, means for mounting said body in the aperture of the panel, terminal means adapted to be locked into the auxiliary portions of the chamber and including a main body portion and a web portion connecting the body portion with a laterally extending alignment portion substantially parallel to the main body portion of the terminal means, said insulating body having a slot extending laterally outwardly from each auxiliary chamber portion for receiving the alignment portion of said terminal means, a flag portion of said terminal means attached to said alignment portion, said flag portion protruding laterally outwardly from the open end of the chamber, and a resilient leg means included with the main body portion of said terminal means, said resilient leg means having a longitudinal recess portion adapted to complement a pin of a pin-type lamp bulb.

2. A two-pin-type lamp bulb socket and terminal means adapted to support and connect a two-pin-type light bulb relative to a printed circuit that has a conducting portion adjacent to an aperture through an insulating board, comprising, an annular one-piece insulating body open at one end and having a chamber divided into a pair of immediately laterally adjacent auxiliary portions by a central partition provided in said body, a terminal means having a body portion insertable in each auxiliary chamber portion and including a pair of resilient legs each having a longitudinal recess adapted to be complementary to a pin of the two-pin-type light bulb, a flag portion protruding laterally outwardly from said terminal means adjacent to the open end of the chamber, an alignment portion attached between said body portion of said terminal means and said flag portion and adapted to fit into an outwardly extending slot provided in one side of said one-piece insulating body for said terminal means, and an outwardly extending tongue projecting from each ter-

terminal means and engageable relative to an abutment provided immediately adjacent thereto in said insulating body, said alignment portion being provided for each of the terminal means for maintaining said terminal means parallel to each other and in alignment relative to said flag portion.

3. A dual-pin-light-bulb socket and terminal means adapted to support and connect a dual-pin light bulb relative to an aperture of a mounting panel, comprising, an annular insulating body open to receive the dual-pin light bulb at one end and having a chamber divided at an opposite end into a pair of adjacent parallel auxiliary portions, a wall portion of said insulating body separating the auxiliary portions of the chamber from each other, terminal means having a body portion insertable in separate chamber portions and including at least one resilient leg portion having a longitudinally-extending centrally-located recess adapted to be complementary to one side of a pin of the light bulb, a flag portion protruding laterally outwardly from one of said terminal means adjacent to the open end of the chamber and an outwardly extending tongue projecting from said terminal means and engageable relative to said insulating body, said wall portion serving as a means for limiting insertion of a dual-pin light bulb into the socket.

4. The dual-pin-light-bulb socket of claim 3 wherein said wall portion has a recess adjacent to the open end of the chamber, the recess being adapted to be complementary to a glass-web-portion between pins and integral with the glass envelope of the dual-pin-light bulb.

5. A combination, comprising, an insulating board having conducting material thereon on opposite sides of an aperture such as for a panel of a vehicle requiring illumination and a socket assembly including terminal means adapted to be electrically connected relative to said conducting material, a base-less light bulb having a glass envelope, integral web portion, and only one pair of substantially parallel pins projecting in longitudinal and aligned relation from said web portion, an annular one-piece insulating body open at one end to receive the dual-pin light bulb and having a chamber divided at an opposite end into a pair of adjacent parallel auxiliary portions, a wall portion of said insulating body separating the auxiliary portions of the chamber from each other, terminal means having a body portion insertable in separate chamber portions and including at least one resilient leg portion having a longitudinally extending centrally-located recess adapted to be complementary to one side of a pin of said dual-pin light, a flag portion protruding laterally outwardly from one of said terminal means adjacent to the open end of the chamber and an outwardly extending tongue projecting from said terminal means and engageable relative to said conducting material, said wall portion having a recess adjacent to the open end of the chamber, the recess being adapted to be complementary to said web portion of said base-less dual-pin light bulb, said resilient leg portion having a longitudinally extending recess complementary at least in part to one said pin of said base-less light bulb which thereby is maintained in parallel and aligned relation to said wall portion against which said web portion abuts.

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