April 17, 1934. H. J. GRAHAM 1,955,285

ELECTRICAL RECEPTACLE

Filed April 18, 1931

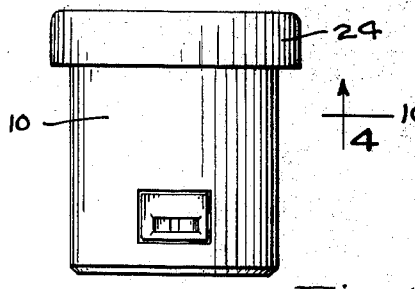


Fig. 1.

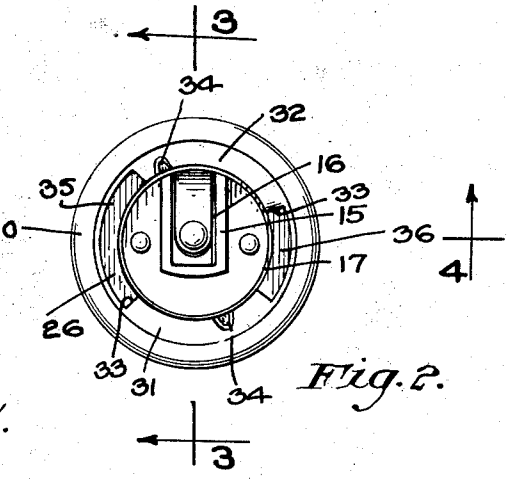


Fig. 2.

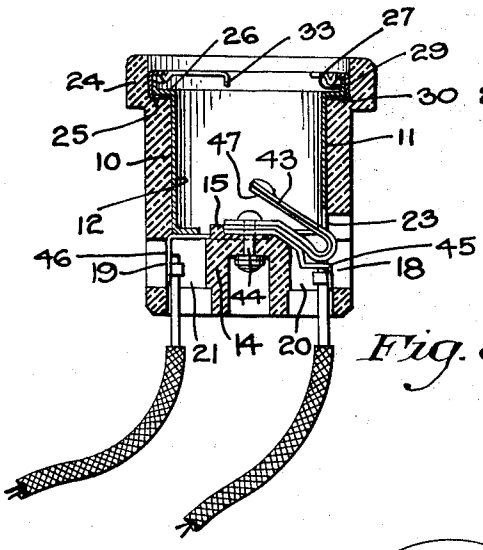


Fig. 3.

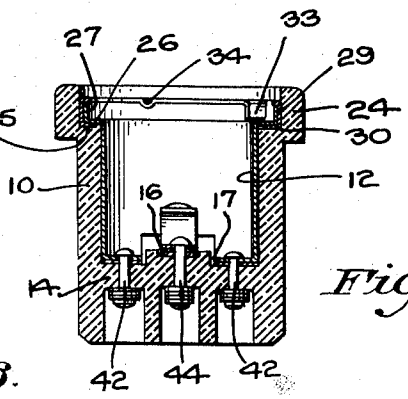


Fig. 4.

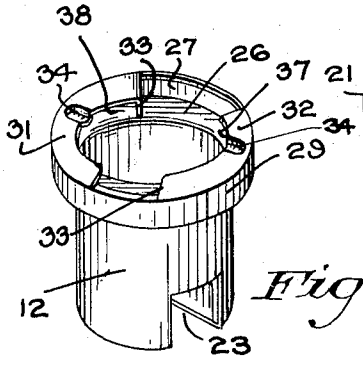


Fig. 6.

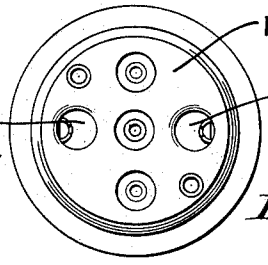


Fig. 5.

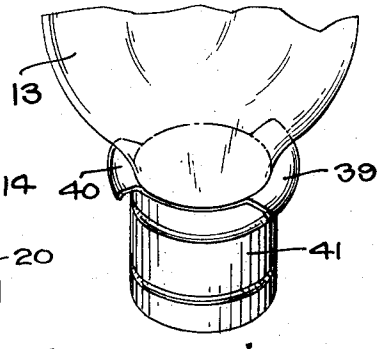


Fig. 7.

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UNITED STATES PATENT OFFICE

1,955,285

ELECTRICAL RECEPTACLE

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Application April 18, 1931, Serial No. 531,054

10 Claims. (Cl. 173—328)

This invention relates to electric lamp sockets and more particularly to improvements therein for effectually precluding that destructive arcing which takes places between the center contacts of the lamp and socket when the latter is subjected to vibration and other shocks incidental to its use as well as to automatically insure a correct positional relationship between the lamp filament and the lamp supporting socket.

It has been observed that when a lamp socket is subjected to undue vibrations, shocks or jars, as in those instances where the socket is used in connection with locomotive headlights, considerable difficulty has been encountered due to the tendency for the lamp to "back-out" or otherwise become loosened. Not only does this result in uncertain electrical contact between the center contacts of the lamp and socket in consequence of which there is established a destructive and dangerous arcing condition, but the positional relationship between the filament of the lamp and the socket is also affected with the result that the lighting unit in which the socket is mounted operates at reduced efficiency. It is well known to those skilled in the art that maximum efficiency in a lighting unit, such as a locomotive headlight, a search-light or the like, is obtained only where the lamp filament is located along the focal axis of the reflector. To disturb the predetermined proper relationship between the lamp filament and the reflector, as when the lamp becomes loosened within its socket or where no provision is made to automatically insure a predeterminedly fixed relation between the lamp base and the socket, necessarily impairs the operating efficiency of the lighting unit.

It is the aim of the present invention to overcome the aforementioned objections and difficulties by providing a lamp socket which is so designed and constructed as to automatically and at all times insure the correct positional location of the filament of an electric incandescent lamp with respect to its socket or holder, it being understood that the latter is maintained in predeterminedly fixed position with relation to the lighting unit from which the light rays emanating from the lamp are controlled and directed.

A further object of the invention is the provision of a lamp socket within which a lamp may be quick-detachably inserted and retained against accidental displacement or dislodgment even when subjected to unusually severe vibrations or shocks.

Still another object of the invention is the provision of a lamp socket which is adapted to retain a lamp in predeterminedly fixed position by virtue of what is herein termed a "bayonet and slot" type of connection, this connection being such as to not only insure the correct positional adjustment of a lamp initially inserted within the socket but also to insure the attainment of the same correct relation between said socket and a lamp inserted in replacement of that which was initially received by the socket.

Still further objects of the invention are to provide a lamp socket wherein all danger of arcing between the center contacts of the lamp and socket is effectually precluded; to provide a socket the metal parts of which, such as the contact shell for the lamp base, are protected by an external shell or casing of insulating material; to provide a contact shell assembly which is simple, sturdy and inexpensive in construction, and which is durable and efficient in use; and to generally provide a socket the design and arrangement of which are such as to facilitate the attachment of conducting wires thereto.

Other objects and advantages relating to details of construction and assembly for effecting economies in the manufacture of the socket will appear more fully hereinafter.

The invention consists substantially in the combination, construction, location and relative arrangement of parts, all as will be described more fully hereinafter, as shown in the accompanying drawing and as finally pointed out in the appended claims.

In the accompanying drawing:—

Figure 1 is a side elevational view of a socket constructed in accordance with and embodying the principles of the present invention;

Figure 2 is a top plan view thereof;

Figure 3 is a vertical cross-sectional view taken on the line 3—3 of Figure 2;

Figure 4 is a vertical cross-sectional view taken on the line 4—4 of Figure 2;

Figure 5 is a bottom plan view of the socket;

Figure 6 is a perspective view of the inner contact shell assembly of the socket; and

Figure 7 is a view showing the base portion of a lamp adapted to be used in conjunction with the socket shown in the preceding figures.

Referring now more particularly to the drawing, it will be seen that the lamp socket embodying the principles of this invention comprises a main insulating body or casing 10 having a central recess or socket 11 within which is arranged to be received a metallic shell 12 constituting one of the socket contacts for an electric incandescent lamp 13. Projecting upwardly from and

formed integrally with the bottom wall 14 of the insulating casing 10 is substantially U-shaped boss 15, the function of which is to divide the outer surface of said bottom wall into separate seats or depressions 16 and 17 for respectively receiving the contact terminals of the socket. The seat 16, which is that enclosed by said U-shaped boss 15, is of substantially rectangular form, while the seat 17, which is that embraced between the internal surface of the casing 10 and the external surface of said U-shaped boss 15, is of substantially U-shaped form. Transversely extending openings 18 and 19 are respectively provided in diametrically opposed sides of the casing 10, the opening 18 being in communication with the seat 16 and the opening 19 in communication with the seat 17. Communicating respectively with said transversely extending openings 18 and 19 are the openings 20 and 21 which extend vertically through the bottom wall 14 of the casing.

The contact shell 12 within which the base of the lamp 13 is arranged to be snugly received is of the form most clearly shown in Figures 3 and 6 wherein it will be seen that the bottom and one side thereof are slotted, as at 23, the construction of this shell being such that when it is properly positioned within the insulating casing 10 the upwardly projecting U-shaped boss 15 of the insulating body is projected freely into the bottom of said shell through the horizontally extending portion of the slot 23.

It will be observed that the upper end of the insulating casing 10 is provided with an integrally formed radially extending flange 24 and that the internal surface of this flanged portion of the casing is provided with an annular seat or shoulder 25. The metallic contact shell 12 is likewise provided at its outer or open end with a radially extending flange 26 which is in turn provided with an axially extending annular flange 27.

Snugly embracing the axially extending flange 27 of the contact shell 12 is a metallic annulus 29. The inner edge of this annulus 29 is spun or otherwise inturned, as at 30, for securement to the adjoining portion of the radially extending flange 26 of the contact shell. The opposite or outer edge of the annulus 30 is provided with a pair of circumferentially spaced inturned flanges 31 and 32. These flanges 31 and 32 of the annulus 30 lie in a plane substantially paralleling that of the radial flange 26 and offset axially therefrom by a distance substantially equal to the depth of the axially extending flange 27 of the contact shell. It will thus appear that the annulus 30 is firmly and permanently secured to the upper or outer end of the contact shell 12 and together with the flanges 26 and 27 form an annular shoulder which is adapted to be received within the annular seat 25 of the insulating casing 10. By so securing the annulus 30 to the shell 12 a unitary shell assembly is provided the upper or lamp receiving end of which is characterized by the provision of a circumferentially extending internal groove.

As appears most clearly in Figure 6 the corresponding ends of the arcuately formed flanges 31 and 32 are respectively inturned, as at 33, to provide a pair of substantially diametrically opposed stop elements. Also formed in each of the flanges 31 and 32 is a depression or indentation 34, each of which is directed toward the radial flange 26 of the contact shell. It will be observed that the slots or openings 35 and 36 which are respectively provided between the adjoining ends of the flanges 31 and 32 of the annulus 30 are of different linear lengths for a purpose which will be explained hereinafter. It will also be noted that the linear distance between the depression 34 and the stop element 33 of the flanges 31 is substantially equal to that of the slot or opening 36, while the linear distance between the depression 34 and stop element 33 of the opposite flange 32 is substantially equal to that of the longer slot or opening 35.

From the foregoing description it will be apparent that I have provided a metal contact shell assembly the socket receiving end of which is provided with a pair of opposed internal grooves 37 and 38 which are respectively adapted to receive the radially extending wings 39 and 40 formed on the base 41 of the lamp 13, one of these lugs being of somewhat greater circumferential extent than the other and both being disposed in a common plane. To insert the lamp within its socket the base 41 is telescoped within the shell 12 with the wings 39 and 40 thereof respectively received within the openings or slots 35 and 36 formed in the lamp receiving end of the contact shell. The lamp is then turned in clockwise direction whereby to force the wings 39 and 40 respectively beyond the depressions 34 and into the opposed internal grooves 37 and 38. The downturned elements 33 prevent rotation of the lamp base beyond a predetermined point while the indentations or depressions 34 effectually preclude unintentional rotation of the lamp base in a counter-clockwise direction. Due to the fact that the spaces 35 and 36 formed between the flanges 31 and 32 of the annulus 30 are of different size, the possibility of incorrectly inserting the lamp base within the socket is effectually precluded in consequence of which proper positional relation between the lamp filament and the focal axis of the lighting unit is assured.

It will be understood of course that the contact shell assembly such as is shown in Figure 6 is firmly secured against rotation within the insulating casing 10, this securement being preferably effected by means of rivets or other such securing elements 42. While any desired means may be employed for securing the center contact 43 of the lamp socket in position, it is deemed preferable in the present instance to effect this by means of a rivet 44 which is projected axially through the bottom wall of the insulating casing and which also serves commonly to maintain the terminal lug 45 in electrical connection with said center contact 43 of the socket. The remaining terminal lug 46, which is in electrical contact with the shell 12, is preferably clamped in position between the base of said shell and the base of the insulating casing by means of the rivets 42 aforesaid. It will also be observed that the rivet 44 is employed to secure a leaf spring 47 in superimposed relation with respect to the center contact 43. This leaf spring 47, which may preferably be constructed of tempered steel or bronze or other such metal, is designed primarily to urge the contact 43 into engagement with the center terminal of the lamp, thereby relieving the member 43 from any function other than as a conducting element. A more detailed description of the constructional arrangement for effecting electrical connection with the socket will not be given herein because the same form no part of the present invention. Such a description, however, will be found in my copend-

ing application, Serial No. 272,729, filed April 25th, 1928 now Patent Number 1,927,638 dated Sept. 19, 1933.

In a socket constructed in the manner described hereinbefore, it becomes a relatively simple matter to insure correct positional adjustment between the filament of the lamp and the focal axis of the lighting unit within which the lamp socket is mounted. This adjustment, which is predeterminedly attained for a given lighting unit, is automatically insured and cannot be disturbed even where the initially inserted lamp is replaced by another lamp. Obviously this feature is of paramount importance in connection with all lighting units which are designed to be operated at maximum efficiency. In addition to this, the bayonet and slot type of connection not only facilitates the ease with which the lamp may be inserted or removed from its socket, but its construction is such as to effectually preclude all tendency for the lamp to become loose within the socket due to any vibrations or shocks to which the socket might be subjected when in use, thereby materially reducing, if not entirely eliminating, the destructive and dangerous arcing condition resulting from uncertain electrical contact between the center contacts of the lamp and socket.

It will be understood, of course, that the present invention is susceptible of various changes and modifications without departing from the general spirit or principles of the invention and it is accordingly intended to claim the same broadly, as well as specifically, as indicated by the appended claims.

What is claimed as new and useful is:—

1. In a lamp socket, in combination, an insulating main body member having a central recess therein, a metallic contact shell received within said recess, said body member being provided in its lamp receiving end with an enlarged bore and said shell being provided in its corresponding end with an annular portion adapted for snug accommodation within said bore, and an annulus secured to said annular portion and constituting therewith an internal groove in the lamp receiving end of said shell, one wall of said groove being provided with an opening through which the wing of a lamp base may be inserted prior to rotating said wing into predeterminedly fixed position within said groove.

2. In a lamp socket, a metal contact shell comprising in the form of a unitary assembly a substantially cylindrical body portion, a radially extending flange at the lamp receiving end of said body portion, said flange terminating in an axially extending flange, and an annulus having a rim portion embracing said axially extending flange and a radial flange substantially paralleling and axially spaced from said radially extending flange of the body portion, said radial flange being provided with circumferentially spaced cut out portions for the purpose specified.

3. In a lamp socket, a metal contact shell comprising a substantially cylindrical body having a radial flange at its lamp receiving end, and an annulus immovably secured to said end of the shell and including a radial flange disposed in a plane substantially paralleling but axially spaced from that of said body flange, said annulus being provided with circumferentially spaced cut out portions affording entrance openings to the annular groove formed between said flanges.

4. In a lamp socket, a metal contact shell comprising a substantially cylindrical body having a radial flange at its lamp receiving end, an annulus immovably secured to said flanged end of the body and including a pair of circumferentially spaced segmental flanges disposed in a plane axially spaced from that of said body flange, said flanges forming conjointly with said body flange a pair of circumferentially spaced internal grooves, the corresponding ends of said segmental flanges being axially turned to constitute end walls for said grooves.

5. In a lamp socket for a lamp the base of which is provided with a pair of radially extending segmental wings, in combination, a metal contact shell comprising a main cylindrical body the lamp receiving end of which is provided with an outwardly turned flange terminating in an axially extending flange, a ring embracing said axial flange and including a pair of inwardly turned segmental flanges axially spaced from said outwardly turned body flange, each of said segmental flanges being provided with an indentation adjacent one end thereof and with an axially turned lip at the opposite end thereof, said indentations terminating short of said body flange whereby to permit the wings of the lamp base to be forced therebeyond upon rotation of said base about the axis of said shell.

6. In a lamp socket for a lamp the base of which is provided with a pair of radially extending segmental wings, in combination, a metal contact shell comprising a main cylindrical body the lamp receiving end of which is provided with an outwardly turned flange terminating in an axially extending flange, a ring embracing said axial flange and including a pair of inwardly turned segmental flanges axially spaced from said outwardly turned body flanges, each of said segmental flanges being provided with an indentation adjacent one end thereof and with an axially turned lip at the opposite end thereof, said indentations terminating short of said body flange whereby to permit the wings of the lamp base to be forced therebeyond upon rotation of said base about the axis of said shell, said lips serving as stop elements against which said wings abut for limiting the extent of rotation of said lamp base.

7. In a lamp socket, in combination, an insulating main body member having a central recess therein, a substantially U-shaped boss projecting upwardly from the base of said recess, a cylindrical contact shell received within said recess, the bottom of said shell being formed with a slot through which said boss projects, a terminal member clamped between the bottom of said shell and the base of said recess and arranged in embracing relation with respect to said boss, an annular flange of substantially right-angle section formed upon the open end of said shell, and a rim fixedly secured to and embracing the axially extending branch of said flange, said rim being provided with a pair of circumferentially spaced segmental flanges spaced axially from the radially extending branch of said angle flange.

8. In a lamp socket adapted to receive an electric lamp bulb of the type having its base provided with radially extending segmental wings, in combination, a cylindrical contact shell, the lamp receiving end of which is characterized by the provision of an outwardly directed annular flange terminating in an axially extending flange said axial flange being in turn provided with a multiple-notched annular flange whereby to provide a pair of grooves for respectively receiving

the segmental wings of the lamp base, said wings being respectively positioned for rotation into said grooves by projecting the same through the notches in said last-mentioned flange.

9. In a lamp socket adapted to receive an electric lamp bulb of the type having its base provided with radially extending segmental wings, in combination, a cylindrical contact shell, the lamp receiving end of which is characterized by the provision of a pair of axially spaced annular flanges, the outermost flange being notched at circumferentially spaced intervals to provide a pair of internal grooves adapted to respectively accommodate therewithin the segmental wings of the lamp base, said wings being insertable through the notches in said outermost flange and one wing and its respective notch being of different size than the remaining wing and notch.

10. In a lamp socket adapted to receive an electric lamp bulb of the type having its base provided with a radially extending segmental wing, in combination, a cylindrical contact shell, the lamp receiving end of which is characterized by the provision of a pair of axially spaced annular flanges, the outermost flange being notched to receive the segmental wing of the lamp base, an insulating casing having a central recess within which said shell is received, and means projecting through the bottom walls of said shell and casing for securing the same together.

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