Nov. 6, 1956 R. POPP 2,769,871

ELECTRIC SWITCH AND SOCKET

Filed Nov. 10, 1954

Fig. 1.

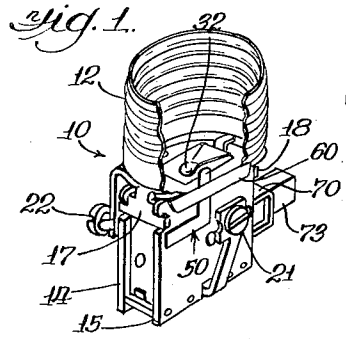


Fig. 7.

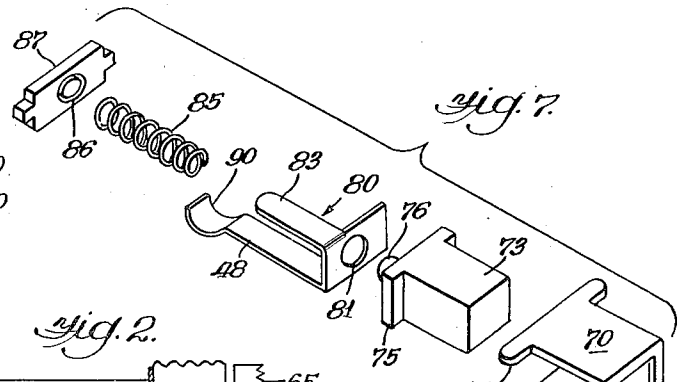


Fig. 2.

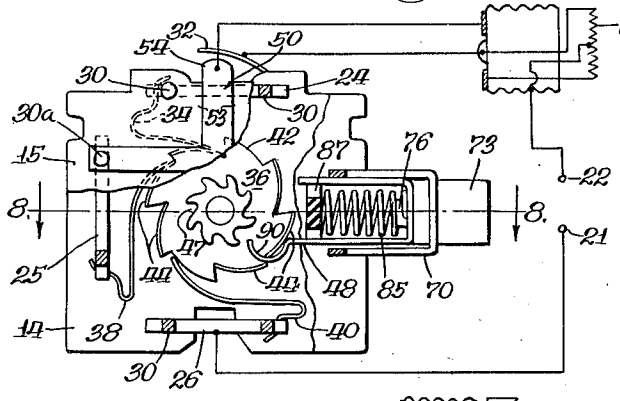


Fig. 8.

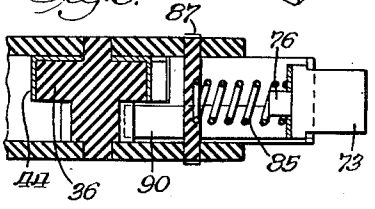


Fig. 6.

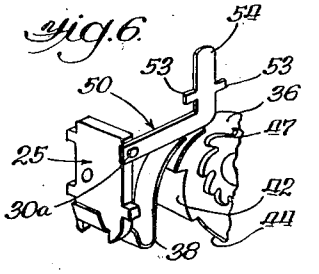


Fig. 3.

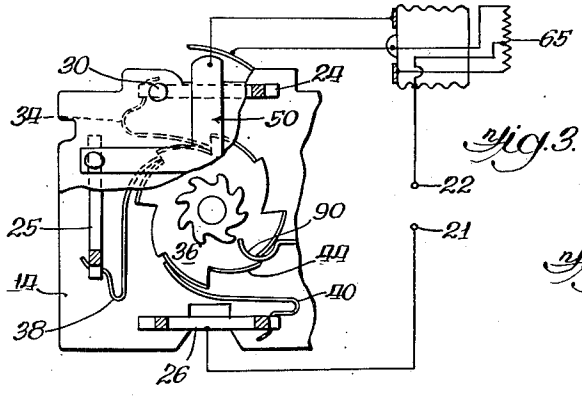


Fig. 5.

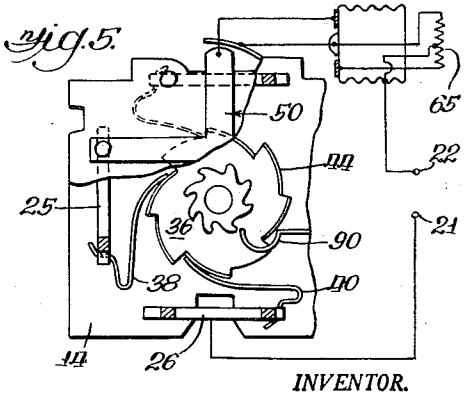
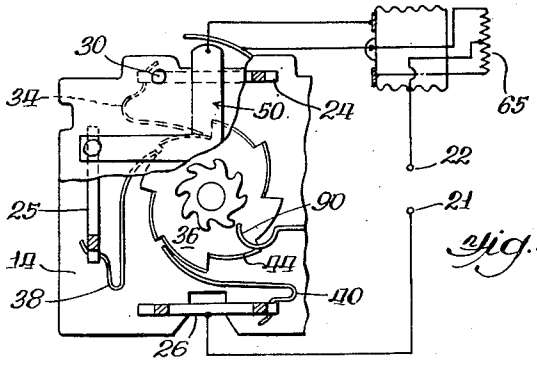


Fig. 4.



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ELECTRIC SWITCH AND SOCKET

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4 Claims. (Cl. 200—51.06)

This invention relates generally to electric switch and socket combinations and more particularly to an improved form thereof which is of simplified and inexpensive construction.

It is common practice to assemble electric sockets in combination with switches to regulate the power supplied to lamps supported in such sockets. In the interest of economy and greater utility, it is desirable to utilize a minimum of component parts which are, however, of substantial construction so as to extend the useful life of the entire device. Furthermore, it is highly advantageous when some of the various components of a switch and socket combination may be used in the manufacture of different types of switches and sockets, for example, if the components of a so-called three-way switch and socket may be utilized in a standard two-way device.

This invention is directed toward such an assembly and it provides a greatly improved push-type, three-way switch and socket combination which is suitable for supporting and energizing lamp bulbs having a tapped or dual filament to permit different light levels from the same bulb.

An object of the invention is to provide a simplified and inexpensive three-way switch and socket device.

Another object is to provide a improved switch and socket device, the components of which may be easily fabricated and assembled to accept and operate conventional single filament light bulbs or by the incorporation of a minimum of additional parts to accept and operate a light bulb having a dual filament for varied light outputs.

Still another object of the invention is to provide an improved push-type switch actuating mechanism which is positive acting and of rugged, sturdy construction.

A feature of the invention is the provision of a switch actuating mechanism including a slidable pawl member operable by a push-type lever, the pawl member being guided by a guide bar and having a extension to engage the periphery and cause rotation of an actuating ratchet.

Another feature of the invention is the provision of a three-way switch and socket device including a frame of insulating material to which is affixed a connector strip providing connection between the switch and a lamp bulb terminal of a three-way light bulb.

Further objects and features will be apparent upon consideration of the following description and drawings in which:

Fig. 1 is a perspective cut-away view of the switch and socket assembly of the present invention;

Fig. 2 is a side view of the switch mechanism, partly schematic and partly cut-away to illustrate a position of the switch;

Figs. 3, 4 and 5 are views similar to that of Fig. 2 but illustrating different positions of the rotary switch;

Fig. 6 is a perspective view of a portion of the electrical connection between the switch and socket;

Fig. 7 is an exploded view of the switch actuating mechanism; and

Fig. 8 is a sectional view of the assembled switch actuating mechanism taken along the line 8—8 of Fig. 2.

Referring now to Fig. 1, there is a perspective view of the switch and socket combination 10 with the socket 12 partially cut away to illustrate the contacts in the interior. Insulating plates 14 and 15 are secured to the socket 12 by means of a pair of suitable metal clamps 17 and 18. Electrical power may be supplied to the screw type terminals 21 and 22 with terminal 22 providing connection to the socket 12 and terminal 21 providing connection to the switch housed between insulating plates 14 and 15 as will be desribed presently.

Fig. 2 illustrates a side view of the switch mechanism with a portion of insulating plate 15 cut away. It may be seen that separating or spacer members 24, 25 and 26 have extended lug portions 30 which protrude through apertures in the insulating plates and are upset to secure the plates and spacer members in fixed relation. Spacer member 24 includes a resilient contact 32 which extends into the socket 12 to make connection to one terminal of a lamp bulb retained therein. Secured to one end of the spacer member 24 is a stationary contact member or resilient connecting arm 34 which is looped to engage the periphery of ratchet device 36. Additional resilient connecting arms 38 and 40 extend respectively from spacer arms 25 and 26 also to engage the ratchet device at different positions along its periphery. The ratchet device 36 is composed of suitable insulating material such as molded plastic and includes an electrical contact cog or connector wheel 42 with a stepped periphery including eight steps with six of the steps, three on opposite sides of the connector wheel, electrically interconnected by a suitably formed metallic rotary switch connector 44. Integral with the connector wheel 42 is a toothed actuating cog 47. Therefore, by operation to be described presently, lateral movement of pawl arm 48 to the left against actuating cog 47 will cause rotation of the ratchet structure thereby electrically connecting different combinations of the resilient connecting arms 34, 38, 40 through the switch connector 44.

A connector strip 50 is shown in Figs. 1 to 5 disposed upon insulating plate 15 and may, if desired, be preassembled thereto by lugs 53 to facilitate assembly of the entire mechanism. It is also secured in position by means of the upset lug portion 30*a* of spacer member 25 as well as the lugs 53 extending into apertures in the insulating plate 15. This mechanism is also shown in fragment and somewhat diagrammatically in Fig. 6. It is apparent from that figure and Fig. 1 that straight end portion 54 of the connector strip 50 extends into the socket 12 for making electrical contact to a second terminal of a lamp bulb base. Resilient contact 32 is arranged to engage first and center contact of a lamp bulb base as it is being inserted into the socket after which further turning of the lamp bulb brings a second contact, in the form of a ring spaced about the center contact, into engagement with end portion 54. The end portion 54 being simply formed as a straight member of limited cross-section area and the contact 32 being resilient, provide good contact with a lamp base without danger of shorting in case excess solder exists on either contact. As shown in Fig. 1 only, an insulating strip 60 is disposed over the connector strip 50 to prevent short circuit thereof with the socket 12.

The perspective view of Fig. 6 illustrates the cooperation of connector strip 50, spacer member 25 and resilient connecting arm 38 with the connector wheel 42. The engagement of connector strip 50 with the upset lug portion 30*a* of spacer member 25 is shown as well as the support of connecting arm 38 in a slotted section of member 25. Connecting arms 34 and 40 are similarly secured to spacer members 24 and 26 respectively (Fig. 3).

Fig. 2 shows the electrical connection to a dual filament of a lamp bulb and to the power terminals 21 and

22. It may be seen that the power is supplied from terminal 21 to the spacer member 26, the terminal and the member being integral (Fig. 1), and from terminal 22 to the base of the lamp and a tap of the filament 65, i. e. through socket 12 to a tap of the filament. Further connections are made from one end of filament 65 to the contact 32 of spacer member 24 and from another end terminal of filament 65 to the end portion 54 of connector strip 50. With the connections thus made through base terminals of a lamp bulb, successive operations of the pawl arm 48 to cause rotation of the ratchet device 36 will de-energize the filament 65 as well as connect it in what may be termed bright, medium and dim conditions of energization.

Fig. 2 illustrates the de-energized condition of filament 65 since the connection from terminal 21 is complete only through spacer member 26 and resilient connecting arm 40 to a step of the connector wheel 42 which is not covered by the metallic switch connector 44. Therefore, the lamp remains unlighted.

Fig. 3 illustrates an energized condition of the filament 65 which exists after one step of rotation of the ratchet device 36 from the position of Fig. 1. Connection is made from terminal 21 through spacer member 26 and resilient connecting arm 40, switch connector 44 through connector arm 34, spacer member 24 to the end of filament 65. A further connection is also made through resilient connecting arm 38, spacer member 25, connector strip 50 to the other end of the filament 65. Therefore, power will be supplied to the two portions of the filament which are connected in parallel and it will be energized to a bright condition.

A further step of rotation of the ratchet device 36 results in a connection as shown in Fig. 4 in which power is supplied from terminal 21 through the switch connector 44, the resilient connecting arm 34 and the spacer member 24 to one end of filament 65. Since resilient connecting arm 38 is not in engagement with the switch connector 44, no power will be supplied to the other portion of filament 65 and only the larger portion of the filament will be energized in this position of the ratchet structure. Therefore, the filament will be energized to medium brightness.

Fig. 5 illustrates further rotation of the ratchet device 36 and in this position it may be seen that power from terminal 21 is supplied through resilient connecting arm 38, spacer member 25, connector strip 50 to one end of the filament 65 but that no connection is made to the other end of the filament so that the power is supplied across a different or smaller portion of the filament, and it will be energized to its dim condition. Further rotation of the ratchet structure 36 would de-energize the filament as shown in Fig. 2

Fig. 7 illustrates an exploded view of the switch actuating mechanism to permit manual opeartion of the pawl arm 48 and thus rotation of the ratchet device 36. The switch structure includes a frame member 70 with ear portions 71 which extend into supporting apertures in the insulaitng plates 14 and 15 to secure the frame in rigid fashion. One end of the frame member 70 includes an aperture which supports push button or operating member 73 which may be formed of suitable plastic material so as to minimize the danger of shock to a person operating the switch. The button 73 includes a flange portion 75 and a projected portion 76. Pawl member 80 has an aperture 81 for engaging the projected portion 76 and a pair of pawl arms 48 and 83. Spring 85 also engages projected portion 76 as well as a cup portion or seating aperture 86 in the spacer bar 87 which is supported between the insulating paltes 14 and 15 by means of extensions thereof and apertures in the plate members.

The assembled switch is shown in cross-section in Fig. 8, and it may be seen that the spring 85 biases the button 73 so that the flange portion 75 thereof engages the frame member 70. Pawl arms 48 and 83 are guided in their slidable motion by means of the straddling of spacer bar 87 as shown in Fig. 2. Movement of the button 73 to the left as shown in Fig. 2 against spring 85 will therefore move pawl arm 48 into engagement with actuating cog 47 and will cause rotation of the ratchet device 36. Displacement of arm 48 is limited to an amount sufficient to cause the ratchet device to be advanced one step so that the contacting arms engage the previously adjacent step of the switch connector 44 while at the same time the contacting arms tend to restrict undesired rotation of the entire ratchet device. An arcuate section 90 is formed at the end of pawl arm 48 to facilitate engagement of the actuating cog and the pawl arm during the actuating operation and also to reduce wear of cog 47 on the return of pawl 80 to its position of rest as it draws past the next tooth of the cog.

It is clear that the switch actuating mechanism is of simple and rugged construction. Only five components are necessary and some of these may be inexpensively stamped from metal and others molded in plastic. Furthermore, a distinct advantage of the mechanism is that it engages the ratchet device uniformly with each operation of the switch since the pawl is restricted and guided to prevent lateral movement thereof. Also noteworthy is the fact that the entire actuating mechanism may be interchanged with a pull type lever structure without altering the remaining portions of the ratchet and socket. Pull type lever structure suitable for such use is disclosed in my Patents Nos. 2,068,930 and 2,068,701 of January 26, 1937.

While the socket contacts shown are particularly adapted for electrical contact with a dual filament lamp bulb, the assembly may also be easily adapted for use with regular single filament lamp bulbs. This is possible by omitting the connector strip 50, the connecting arm 38 and substituting a metallic switch connector which covers alternate steps of connector wheel 42. Retention of spacer member 25 is, however, desirable since this aids in securing the insulating plates in fixed relation. Therefore switch socket combinations of other types may be formed utilizing components of combinations described herein.

To provide a complete and serviceable device, the entire switch and socket assembly may be installed in any suitable housing with the lever 73 protruding therefrom. Of course it is also possible to utilize various configurations of the portion of lever 73 presented to the operator so as to provide the most convenient shape for pushing the same.

I claim:

1. In a three-way electric switch and lamp socket device for supporting and energizing a dual filament lamp bulb which has contacts on the base thereof, and which socket device includes shell socket means for retaining and electrically contacting a lamp bulb base, a pair of spaced insulating plates secured to the socket means, and rotatable ratchet means disposed between the insulating plates and including actuation and electrical contact cogs therewith, the improvement in such a device comprising the combination of first, second and third electrically conductive separating members disposed in spaced relation between the insulating plates, slidable actuation means supported by the insulating plates and including an arm portion retractably engageable with the actuating cog to cause rotation of the ratchet means, said first separating member having a contact portion extending centrally of and into the socket means for engaging a first contact of a lamp bulb base, a contact member associated with each separating member and engaging the electrical contact cog of the ratchet means, a connector strip disposed on one of the insulating plates and having a portion in engagement with said second separating member and a further portion extending into the socket means

adjacent said contact portion for engaging a second contact of a lamp bulb base, and means to supply electrical energy to the socket means and said third separating member, whereby rotation of the ratchet means connects various of said contact members to electrify the contacts of a lamp bulb base retained in the socket means.

2. In a three-way electric switch and lamp socket device for a dual filament lamp bulb, which device includes socket means for retaining and electrically contacting a lamp bulb base, a pair of insulating plates secured to the socket means, and rotatable switch means disposed between the insulating plates and including actuation and electrical contact cogs therewith, the improvement in such a device comprising the combination of, a plurality of electrically conductive separating members disposed in spaced relation between the insulating plates, slidable actuating means supported by the insulating plates and including an extended portion retractably engageable with the actuation cog to cause rotation of the switch means, one of said separating members having resilient means for engaging a first contact of a lamp bulb base, stationary contact members coupled to said separating members and engaging the electrical contact cog of the switch means, a connector strip disposed on one of the insulating plates and having a portion in engagement with another of said separating members and a further straight portion extending into the socket means in a rigid position short of said resilient means for engaging a second contact of a lamp base, and means to supply electrical energy to the socket means and the electrical contact cog, whereby rotation of the ratchet means connects said contact members to electrify the contacts of a dual filament lamp bulb retained in the socket means.

3. In three-way electric switch and lamp socket device for supporting and energizing a dual filament lamp bulb with contacts on the base thereof, and which device includes therewith socket means for retaining and electrically contacting a lamp bulb base, a pair of insulating plates secured to the socket means, and rotatable switch contact means disposed between the insulating plates, the improvement in such a device comprising in combination, first, second and third electrically conductive separating members disposed in spaced relation between the insulating plates and having upset lugs to secure said plate in fixed relation, said first separating

member having a contact portion extending into the socket means for engaging a center contact of a lamp bulb base, a switch contact member associated with each separating member engaging the switch contact means, a connector strip disposed on one of the insulating plates and having a portion secured thereto by an upset lug of said second separating member and a further portion extending into the socket means for engaging a second contact of a lamp bulb base, and means to supply electrical energy to the socket means and said third separating member, whereby rotation of the switch contact means connects various of said contact members to electrify the contacts of a lamp bulb base retained in the socket means.

4. In a three-way electric switch and lamp socket device for a dual filament lamp bulb, which device has socket means for retaining and electrically contacting a lamp bulb base, a pair of insulating plates secured to the socket means, and rotatable switch contact means disposed between the insulating plates, the improvement in such a device comprising in combination, first, second and third electrically conductive spacing members disposed between the insulating plates and secured thereto by upset lugs, said first spacing member having a resilient extension adapted to engage a center contact of a lamp bulb base, a stationary contact member associated with each spacing member and engaging the switch contact means, an elongated connector strip disposed on one of the insulating plates and secured thereto by a pair of integral lugs, said connector strip having a portion in engagement with an upset lug of said second spacing member and a further portion adapted to engage a further contact of a lamp bulb base, and means to supply electrical energy to the socket means and said third spacing member, whereby rotation of the switch contact means connects various of said contact members to electrify the contacts of a dual filament lamp bulb.

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