Aug. 10, 1948. W. KAUFMAN 2,446,768

ELECTRICAL SWITCH DEVICE FOR LAMP SOCKETS

Filed Jan. 11, 1946

Fig. 1

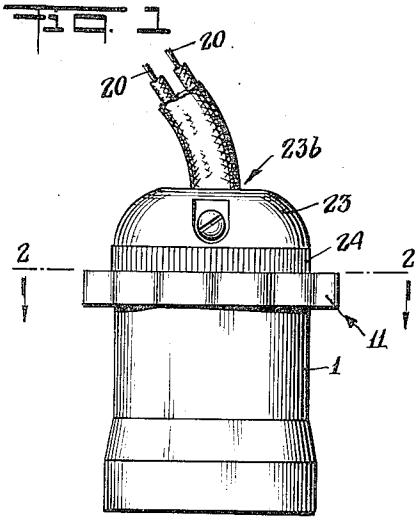


Fig. 2

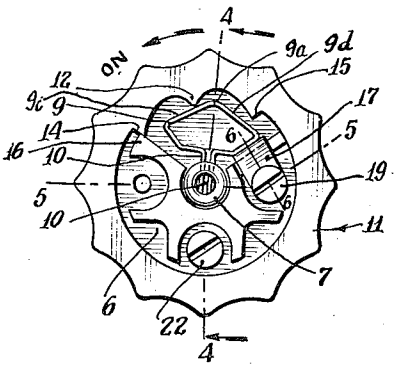


Fig. 3

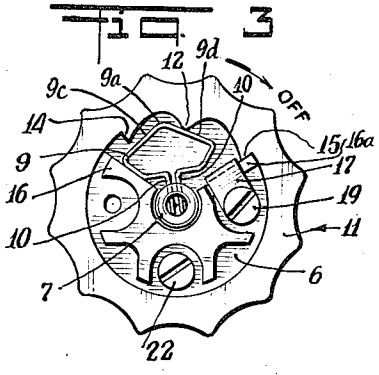


Fig. 4

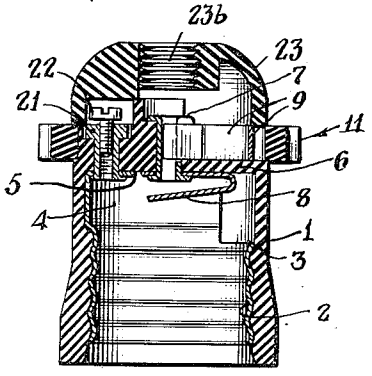


Fig. 5

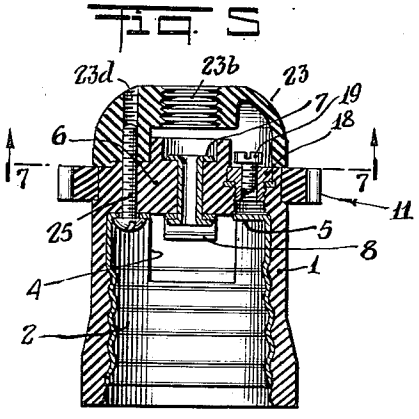


Fig. 6

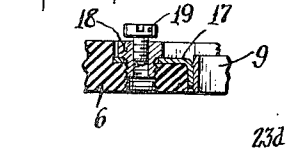
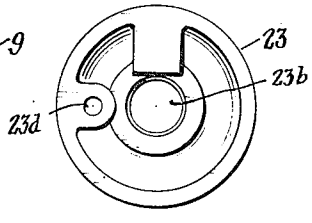


Fig. 7



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ELECTRICAL SWITCH DEVICE FOR LAMP SOCKETS

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6 Claims. (Cl. 200—51.14)

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My invention relates to a new and improved electrical switch, and in particular to an improved lamp-socket switch.

According to my invention, I provide a lamp-socket or other device which includes a switch, with an external ring or other external and hand-operated control member, which can be turned back-and-forth in respective reverse directions, relative to a selected axis, such as the longitudinal axis of the lamp-socket. In the case of a lamp-socket, such respective movements of said hand-operated member respectively open and close the circuit of the lamp, whose base is screwed into or otherwise fixed to said lamp-socket. The invention is not limited to a screw-type lamp-socket.

Another object of my invention is to provide a very simple and convenient device which can be manufactured and assembled at low cost.

Numerous additional objects and advantages of my invention will be set forth in the annexed description and drawings, which illustrate a preferred embodiment thereof.

Fig. 1 is an elevation of a lamp-socket which includes my improvements.

Fig. 2 is an internal view on the line 2—2 of Fig. 1. In this view, the control-member is in circuit-closing position.

Fig. 3 is similar to Fig. 2, showing the control-member in the circuit-opening position.

The arrows in Fig. 2 and Fig. 3 indicate the direction in which the ring 11 has been turned, in order to move the ring 11 to its respective circuit-closing and circuit-opening positions which are shown in Fig. 2 and Fig. 3.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Fig. 5 is a section on the line 5—5 of Fig. 2.

Fig. 6 is a section on the line 6—6 of Fig. 2.

Fig. 7 is an internal view on the line 7—7 of Fig. 5.

The drawings are to scale, and reference is made thereto for details.

The invention is illustrated in connection with a lamp-socket, but it is not limited to this use.

The socket comprises an outer casing 1, which is made of any suitable insulating material. The drawings show the longitudinal axis of said casing 1 in the vertical position. Said casing 1 has the usual internal threads at its open bottom or front end-portion, by means of which the usual conductive metal shell 2 is fixed to said casing 1, at the front opening of said casing 1. Said casing 1 may be replaced by any suitable support.

As shown in Fig. 4, a part of said metal shell 2 is extended integrally rearwardly beyond the

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point 3, in order to provide a partial cylindrical extension 4, which has a partial horizontal and integral head 5.

Said casing 1 has an integral and lateral top wall 6 which is also made of insulating material. Said lateral top-wall 6 is located rearwardly of the bottom open end of the casing and it is provided with a longitudinal axial bore, in which the central contact 7 is located. Said central contact 7 is made of any suitable metal, and in this embodiment it is of hollow and of eyelet construction, so that it is easily fixed to wall 6. A resilient contact spring 8, made of any suitable metal, has the angular, bent formation shown in Fig. 4. The upper leg of said contact spring 8 is fixed to the bottom surface of the top-wall 6 of the casing 1, by means of the lower end of said metal eyelet-contact 7.

The switch-spring 9 is a resilient blade spring, which is made of any suitable metal. It has two end-legs 10. As shown in Fig. 4, the central contact 7 is provided with a longitudinal or axial slot or recess, rearwardly of the wall 6. The top of this slot or recess may be closed. The end-legs 10 of the switch spring 9 are located in said longitudinal slot of the fixed contact 7. This slot or recess and these end-legs 10 provide a pivot for the switch-spring 9, so that it can be turned relative to the contact 7, ring 11 and casing 1, into either of the positions shown in Fig. 2 and in Fig. 3. The resilience of the spring 9 biases its end-legs 10 away from each other, so that said end-legs 10 abut the respective vertical walls of said vertical slot or recess at all times, to ensure good electrical contact. Said spring 9 also has an outer peak 9a, between cam-legs 9c and 9d.

The top-wall 6 is provided with a shoulder, upon which the hand-operated control ring 11 rests turnably. This ring 11 is made of insulating material. As shown in Figs. 2 and 3, said control ring 11 is provided with an internal spring-operating tooth 12, which is located between respective internal stop-teeth 14 and 15 of said control ring 11. The top-wall 6 is provided with integral ribs 16 and 16a. When the ring 11 and the spring 9 are in their respective circuit-closing positions of Fig. 2, the tooth 14 abuts a part of rib 16. Said tooth 14 and said part of rib 16 constitute stop-means for preventing the movement of ring 11 beyond its circuit-closing position. When the ring 11 and the spring 9 are in their respective circuit-opening positions of Fig. 3, the tooth 15 abuts rib 16a, thus providing stop-means for preventing the movement of ring 11

beyond its circuit-opening position. A stationary electrical contact 17, made of any suitable metal, is fixed to the top-wall 6 by means of a hollow and vertical bushing 18, whose longitudinal internal wall is tapped. As shown in Fig. 5, the upper end of said bushing 18 has an enlarged head. The shank of a turnable binding screw 19 can be releasably connected to the internal thread of the bushing 18. One of the wires 20 is physically and electrically connected to a supplemental hollow, metal bushing 21 by means of a binding screw 22. Said supplemental bushing 21 is fixed to top-wall 6 and to the top-wall or head 5 of the metal shell 2. As shown in Fig. 4, the lower end of the supplemental bushing is enlarged to clamp the metal top-wall or head 5 of metal shell 2.

A cap 23, whose bottom end-portion 24 is knurled, is fixed to the casing 1 by means of a clamping screw 25. The shank of this screw 25 extends through a bore in the top-wall 5 of the metal shell 2, and through an alined bore of the insulating top wall 6, and into a tapped bore 23*d* of cap 23. Said cap 23 has a central bore 23*b*. Cap 23 is made of insulating material.

When the device is assembled, the ring 11 can be turned easily through a limited angle, around the longitudinal vertical axis of the casing 1, relative to casing 1 and cap 23. In this embodiment, the lamp-socket is of the screw type. When the metal base of the lamp is screwed into the metal shell 2, the central contact at one end of the filament of the lamp will abut and make electrical contact with the metal blade spring 8. The other contact at the other end of the filament will be connected through its metal base to the metal shell 2, and therefore to a respective wire 20, by the supplemental bushing 21 and its metal binding screw 22. Said wires 20 are respectively connected to the respective terminals of the source of electricity. The switch-spring 9 is always electrically connected to the central contact 7. Therefore, when the switch-spring 9 abuts the contact 17, as shown in the circuit-closing position of Fig. 2, the circuit of the lamp will be closed. When the switch-spring 9 is in the circuit-opening position shown in Fig. 3, the circuit of the lamp will be opened. When spring 9 is in the circuit-opening position of Fig. 3, said spring 9 abuts a part of rib 16, so that this part of rib 16 provides means for limiting the movement of spring 9 beyond its circuit-opening position.

When the ring 11 is in either of the two positions shown in Fig. 2 or Fig. 3, the resilient spring 9 presses against the tooth 12 at one of the cam-legs of the spring 9, thus biasing the spring 9 and the ring 11 to remain in the respective position of Fig. 2 or of Fig. 3. The spring 9 therefore operates not only as a circuit-closing spring, but also releasably to maintain the ring 11 in either of the two selected positions shown in Fig. 2 and in Fig. 3.

The operation of the device is as follows:

When the spring 9 is in its circuit-opening position of Fig. 3, tooth 12 abuts cam-leg 9*d* between its inner end and its outer end, and tooth 12 inwardly forces said cam-leg 9*d*, so as to inwardly compress spring 9. The cam-legs 9*c* and 9*d* have proximate ends, which meet to form a peak 9*a* in this embodiment. Said cam-legs 9*c* and 9*d* also have respective remote ends, which are closer radially to the longitudinal axis of central contact 7 than said proximate ends of said cam-legs 9*c* and 9*d*. The tooth 12 is radially closer to said axis than said proximate end of said cam-legs 9*c* and 9*d*. Spring 9 is therefore firmly held against a part of the fixed insulating rib 16 in its circuit-opening position of Fig. 3, and it is biased to turn counterclockwise, as viewed in Fig. 3. The reaction of the compressed spring 9 biases ring 11 to turn clockwise as viewed in Fig. 3, so that stop-tooth 15 is held firmly against a part of the insulating rib 16*a*. The spring 9 then biases ring 11 to its circuit-opening position.

In order to close the circuit between elements 7 and 17, ring 11 is turned counterclockwise from its position of Fig. 3, to the position of Fig. 2, until stop-tooth 14 abuts a part of the insulating stop 16. During the first part of this counterclockwise turning movement of ring 11, as it is viewed in Figs. 2 and 3, its internal tooth 12 rides in sliding engagement with cam-leg 9*d*, thus additionally compressing spring 9 inwardly, until tooth 12 abuts the peak 9*a*, which is sharply angular. The reaction of spring 9 then sharply snaps said spring 9 to turn clockwise, as soon as tooth 12 passes peak 9*a* in this circuit-closing movement of ring 11, so that said spring 9 is snapped into circuit-closing contact with the conductive member 17. When tooth 12 abuts cam-leg 9*c*, the reaction of the compressed spring 9 urges the ring 11 to turn counterclockwise until its stop-tooth 14 abuts a part of the rib 16.

The spring 9 is compressed in each of its respective positions shown in Fig. 2 and Fig. 3, so as to hold the respective stop-tooth 14 or 15, firmly against a part of the respective rib 16 or 16*a*.

In each position of spring 9 shown in Fig. 2 and Fig. 3, it is biased by its resilience to turn either towards or away from the conductive member 17, and the ring 11 is biased to turn in a direction which is opposed to the direction of biased turning of the spring 9.

The more important feature is the cam-leg 9*c*, whereby the spring 9 is held in contact with the conductive member 17.

In this embodiment, the spring 9 is optionally constructionally connected to the conductive member 7, in addition to being electrically connected to said member 7. The electrical connection is the more important feature.

If a circle were drawn through the peak 9*a*, said circle having its center on the longitudinal axis of casing 1, being in a plane perpendicular to the common longitudinal axis of rotation of spring 9 and ring 11, the tip of tooth 12 would be located inwardly of said circle. Both cam-legs 9*c* and 9*d* are located inwardly of said circle, so that said cam-legs 9*c* and 9*d* are inclined inwardly to each other. The invention is not limited to a device in which the proximate ends of the cam-legs 9*c* and 9*d* form a sharply defined peak 9*a*.

For convenience in defining the invention in the claims, certain parts and movements are defined as follows:

The position of control-member 11 in Fig. 2 is designated as its circuit-closing position, to which member 11 is turned forwardly or counterclockwise, as viewed in Figs. 2 and 3. Said control-member 11 is turned reversely or clockwise, as viewed in Figs. 2 and 3, to its circuit-opening position.

The tooth 14 and the respective part of rib 16 constitute first stop-means for the control-member 11. The tooth 15 and the respective part of rib 16*a* constitute second stop-means for said control-member 11.

The blade spring 9 extends radially outwardly

from the selected axis around which the control-member 11 and spring 9 are turned.

The conductive member 17 is designated as the second conductive member. The member 7 is designated as the first conductive member.

The cam-leg 9c is designated as the first cam-leg and the cam-leg 9d is designated as the second cam-leg. The second cam-leg 9d is located intermediate the first cam-leg 9c and the second conductive member 17.

The tooth 12 is a projection which compresses the blade spring 9 radially inwardly.

The first cam-leg 9c is proximate to the tooth 14 of the first stop-means and the second cam-leg 9d is proximate to the tooth 15 of the second stop-means.

When the control-member 11 is in circuit-closing position, the part or projection 12 abuts the first cam-leg 9c between its ends.

When the control-member 11 is in circuit-opening position, the part or projection 12 abuts the second cam-leg 9d, between its ends.

When the spring 9 abuts the second conductive member 17, as shown in Fig. 2, the circuit of the lamp is as follows, since the respective wires 20 are connected to the respective terminals of a source of electric current:

One wire 20—conductive bushing 21—head 5—extension 4—shell 2—metal base of the lamp, through the filament of the lamp to the center contact of the lamp which is insulated from its metal base—spring 3—first conductive member 7—spring 9—second conductive member 17—conductive bushing 18—other wire 20.

The invention is not limited to a device in which the control member 11 and the switch-member 9 turn about the same axis. Likewise, the invention includes every type of turnable switch-member which has outwardly biased cam-legs 9c and 9d, which bias the switch-member 9 and the control-member 11 to turn in respective opposed directions.

The peak 9a slidably abuts a part of an edge wall of cap 23, so as to guide the turning movement of spring 9, and to prevent the peak 9a from moving upwardly relative to the cap 23.

In effect, the cap 23 is a part of the casing of the socket-device. While I have shown a control-member 11 which is made wholly of non-conductive material, this is not necessary.

The invention is not limited to a switch-member which is made wholly of conductive material, because it is sufficient if said switch-member can electrically connect the contacts 7 and 17. Likewise, the invention is not limited to a switch-member which has integral cam-legs or cam-members 9c and 9d. It is sufficient if said cam-legs or cam-members are biased towards the contacting part 12 of the control member, and if said cam-legs or cam-members respectively bias the control-member and the switch-member to turn in respective opposed directions.

Numerous changes and omissions and additions can be made in and to the preferred disclosure, without departing from the scope of the invention.

I claim:

1. In a switch, the combination of a non-conductive support, a first conductive member fixed to said support, a second conductive member fixed to said support, said conductive members being spaced from each other, a control-member which is turnably connected to said support, said control-member being turnable forwardly around a fixed axis to a circuit-closing position and being turnable reversely around said fixed axis to a circuit-opening position, first stop-means which limit said forward turning movement of said control-member beyond said circuit-closing position, second stop-means which limit said reverse turning movement of said control-member beyond said circuit-opening position, a conductive blade-spring which extends radially outwardly from said fixed axis, said spring being radially compressible and being turnable about said fixed axis and being electrically connected to said first conductive member, said spring being turnable towards said second conductive member to abut said second conductive member in a circuit-closing position of said spring, said spring being turnable away from said second conductive member to a circuit-opening position of said spring, limiting means which limit said last-mentioned turning movement of said spring to a selected limited angle, said spring having a first cam-leg and a second cam-leg, said cam-legs having proximate ends and remote ends, said cam-legs being inclined to each other, the remote ends of said cam-legs being radially closer to said axis than said proximate ends of said cam-legs, said control member having a projection, said projection being radially closer to said axis than said proximate ends of said cam-legs, said second cam-leg being located intermediate said first cam-leg and said second conductive member, said projection substantially abutting said first cam-leg between its ends when said control-member and said spring are in their circuit-closing positions, said projection substantially abutting said second cam-leg between its ends when said control-member and said spring are in their respective circuit-opening positions, said spring being turned reversely to said control-member when said control-member is turned from one of its said positions to the other.

2. A switch according to claim 1, in which said blade spring is pivotally connected to said first conductive member.

3. A switch according to claim 1, in which said blade spring has legs which are located in a recess of said first conductive member, said legs providing the electrical connection and also a pivotal connection between said blade spring and said first conductive member.

4. In a switch, the combination of a non-conductive support, a first conductive member and a second conductive member, said conductive members being fixed to said support and being spaced and insulated from each other, a control-member which is turnably connected to said support, said control-member being turnable forwardly around a longitudinal axis to a circuit-closing position and being turnable reversely about said longitudinal axis to a circuit-opening position, a first stop which limits said forward turning movement beyond said circuit-closing position, a second stop which limits said reverse turning movement beyond said circuit-opening position, a turnable and conductive switch-member which is turnably connected to said support and which is turnable to a position in which it electrically connects said conductive members, said switch-member being also turnable reversely from its said position to open the circuit between said conductive members, said switch-member having a first cam-leg and a second cam-leg, said cam-legs being biased radially outwardly from the axis around which said switch-member turns, said cam-legs having proximate ends and being inclined towards each other from their proximate ends, said first

cam-leg being proximate to said first stop, said second cam-leg being proximate to said second stop, said control-member having a part thereof which abuts said first cam-leg when said first stop is operative and said control-member is in circuit-closing position, said part abutting said second cam-leg when said second stop is operative and said control-member is in circuit-opening position, said switch-member being turned reversely to said control-member when said control-member is turned from one of its said positions to the other position thereof, each said cam-leg being shaped so that its outward biasing force biases said control-member and said switch-member to turn in respective opposed directions.

5. A lamp socket which includes a casing which is made of insulating material and which is open at its front end to admit the base of an electric lamp which has a central lamp contact and a side lamp contact, said casing having respective casing-contacts which respectively abut said respective lamp contacts when the lamp is operatively inserted into said casing, said casing having a longitudinal axis and a lateral end-wall which is located rearwardly of said front end, one of said casing-contacts being fixed to said end-wall and being alined with said axis, said alined casing-contact extending rearwardly through said end-wall and having a longitudinal recess which is located rearwardly of said end-wall, a conductive blade spring which has legs which engage said alined casing-contact at said recess to connect said blade spring electrically and pivotally to said alined casing-contact, an additional contact fixed to said end-wall, said blade spring being turnable about said axis to a circuit-closing position to abut said additional contact and being turnable away from said additional contact to a circuit-opening position, a non-conductive rear cap which is fixed to said end-wall, a non-conductive and exposed ring which is located forwardly of said cap and which is turnable relative to said casing about said axis to a circuit-closing position and also to circuit-opening position, said blade spring having a first cam-leg and a second cam-leg at its outer end, said cam-legs having a common peak and also having respective remote ends, said remote ends being radially closer to said axis than said peak, the second cam-leg being located intermediate said first cam-leg and said additional contact, said end-wall and said ring having respective stop-means for limiting the movement of said ring beyond its said respective positions, said end-wall also

having limiting means for limiting the movement of said spring beyond its circuit-opening position, said ring having an inner projection which is radially closer to said axis than said peak, said inner projection substantially abutting said first cam-leg between its ends when said ring and said spring are in circuit-closing positions, said projection substantially abutting said second cam-leg between its ends when said ring and said spring are in circuit-opening positions.

6. An electrical socket-device which comprises a casing made of insulating material, a control-member turnably connected to said casing, said control-member being exposed for manipulation, a first conductive member and a second conductive member located in said casing, said casing and said control-member having cooperating stop-means to limit the turning movement of said control-member relative to said casing in respective opposed directions between a respective circuit-opening position and a respective circuit-closing position, a conductive switch member located in said casing and turnably connected to said casing, said switch-member being electrically connected to said first conductive member and being turnable relative to said casing to abut said second conductive member in a circuit-closing position and being also reversely turnable away from said second conductive member to a circuit-opening position, said casing having limiting means which limit said reverse turning-movement of said switch-member beyond its circuit-opening position, said switch-member having a first cam-member, said first cam-member abutting a part of said control-member when said control-member is in its circuit-closing position, said second cam-member abutting said part when said control-member is in its circuit-opening position, said cam-members being biased away from the axis around which said switch-member turns and being biased towards said part, each cam-member being shaped and located to bias said control-member and said switch-member to turn in respective opposed directions.

WILLIAM KAUFMAN.

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