A. C. McWILLIAMS.

FILM SOCKET FOR SERIES LAMPS.

APPLICATION FILED JULY 11, 1917.

1,314,008.

Patented Aug. 26, 1919.

2 SHEETS—SHEET 1.

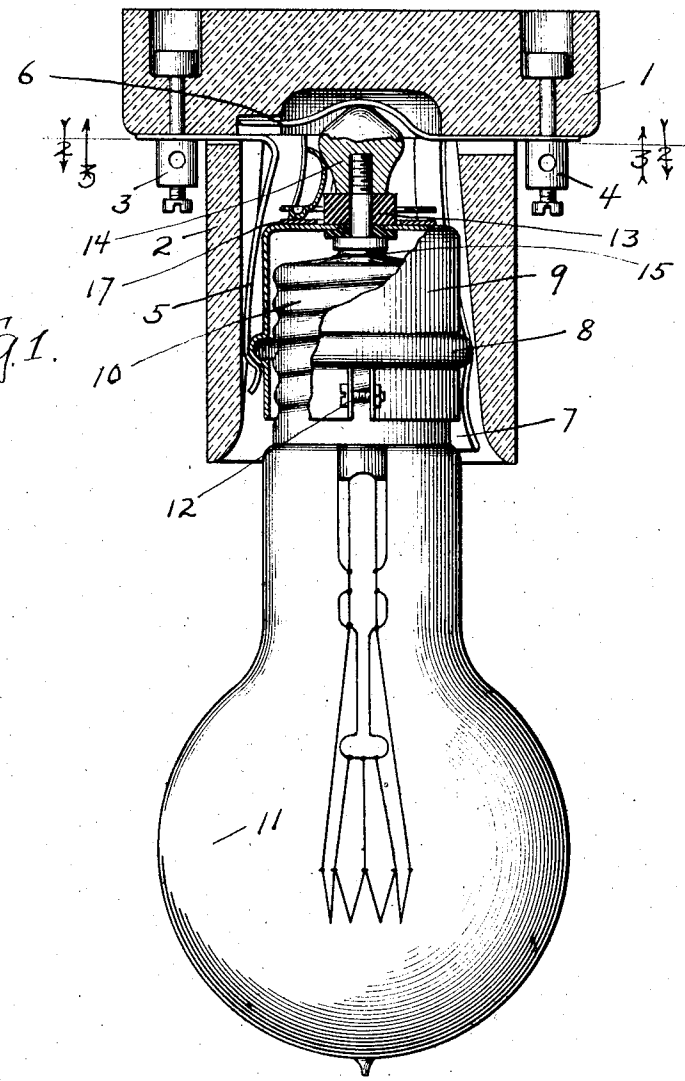


Fig. 1.

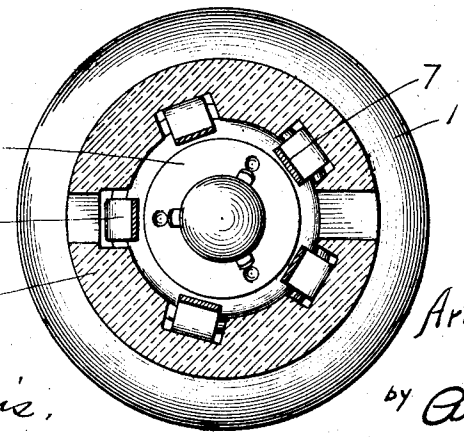


Fig. 2.

Witness:
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2 SHEETS—SHEET 2.

Fig. 3.

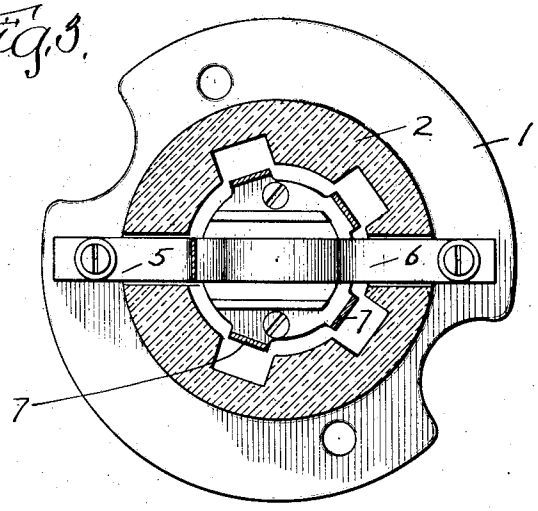


Fig. 4.

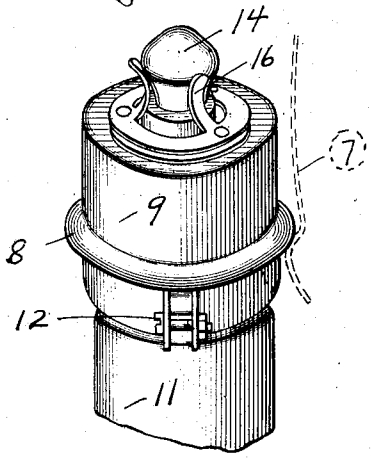


Fig. 5.

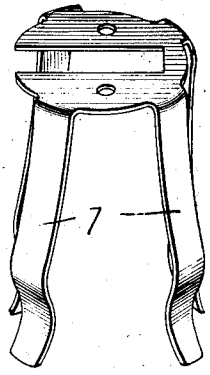


Fig. 7.

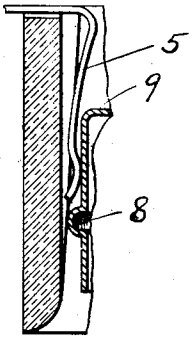


Fig. 6.

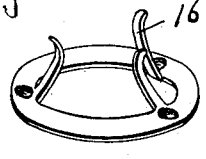
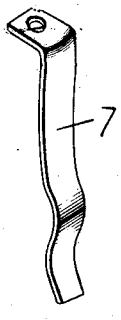


Fig. 8



Witness:
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UNITED STATES PATENT OFFICE.

ARTHUR C. McWILLIAMS, OF CHICAGO, ILLINOIS, ASSIGNOR TO GEORGE CUTTER COMPANY, OF SOUTH BEND, INDIANA, A CORPORATION OF INDIANA.

FILM-SOCKET FOR SERIES LAMPS.

1,314,008. Specification of Letters Patent. Patented Aug. 26, 1919.

Application filed July 11, 1917. Serial No. 179,815.

To all whom it may concern:

Be it known that I, ARTHUR C. McWILLIAMS, citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Film-Sockets for Series Lamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In its general aspects, my invention relates to sockets or receptacles for series circuits and aims to provide advantageous means for maintaining the circuit closed at all times, regardless of the rupturing of a portion of the circuit in an attached socket or other auxiliary appliance or of the bodily removal of such auxiliary appliance. In the same aspect, it also aims to provide simple and positive means for interlocking the socket with the detachable appliance to prevent an accidental separation thereof, while permitting the same to be manually separated or joined at will; also, to provide simple means for introducing a puncturable dielectric at a desirable point in the circuit, for affording convenient access to the dielectric and for quickly restoring a punctured dielectric to operative condition without moving the latter.

In another aspect, my invention relates to means for positively limiting the voltage required for puncturing the dielectric safety element in a film-protected lamp socket, for quickly attaching or detaching the same without materially affecting this puncture voltage, and for quickly shifting the puncture points on a given dielectric element to utilize the latter repeatedly without detaching this element from its mounting.

More particularly, my invention relates to sockets for series lamps and aims to provide a common carrier as to positively interlock with the socket while automatically opening an otherwise closed shunt around the lamp and while permitting the lamp itself to be freely rotated with respect to the socket; to provide common means for making one of the electrical connections from the socket to the lamp and to one of the dielectrically separated elements; to afford a simple, effective and easily manipulated mounting for the dielectric; to define puncture points upon the latter and to permit these puncture points to be instantly shifted without the use of tools and without moving or even touching the dielectric; to provide a substantially constant pressure of the mounting against the dielectric, thereby maintaining the puncture voltage below a desired maximum, and to provide a generally simple, compact and cheap series socket construction. Still other objects will appear from the following specification and from the drawings, which drawings, however, are understood as illustrating only one embodiment of my invention.

In the drawings, Figure 1 is a vertical and for the most part central section through a series socket embodying my invention, with a lamp in place.

Fig. 2 is a transverse section through the same, taken along the line 2—2 of Fig. 1 and looking downward.

Fig. 3 is a transverse section, looking upward from the line 3—3 of Fig. 1.

Fig. 4 is a perspective view of the upper portion of the lamp with the film-carrier and film in position on the lamp base.

Fig. 5 is a perspective view of a spring fingered fork of the socket proper.

Fig. 6 is an enlarged perspective view of the detachable film-pressing collar of Figs. 1 and 4.

Fig. 7 is a fragmentary section of a socket showing another shape of the live contact terminal.

Fig. 8 is a perspective view of an independent gripper finger, a number of which may be used in place of the fork of Fig. 5.

In employing my invention on series lighting circuit the socket embodying the same may desirably have a porcelain base 1 integral with a porcelain collar 2, and may have on its base wire terminals 3 and 4 as shown in Fig. 1. Secured to these terminals and contacting with each other when the lamp is removed from the socket are line closing contacts 5 and 6, of which the former is here shown as extending near one side of the bore of the collar 2 but terminated short of the mouth of the latter, while the companion contact 6 extends substantially transversely of the socket and is continuously forced by its own resiliency toward the contact member 5. The base 1 also carries a plurality of arms 7 all extending within the bore of the collar 2 toward the mouth of the latter and all continuously pressed inward by their own re-

siliency, which arms may be carried by a common base, as in Figs. 1 and 5, or may be independent as in Fig. 8. These arms or gripper fingers 7 all have bends substantially in circumferential alinement about the axis of the collar 2, thereby affording shoulders for jointly engaging a bead 8 on a clamp-cap 9. The contact 5 desirably is shorter than the arms 7 but so disposed as to engage the side of the clamp-cap 9 when the latter is thus interlocked with the arms 7. This clamp-cap fits over the screw base 10 of a standard incandescent lamp 11 and is clamped upon said base by the screw 12 of Fig. 1. Mounted in the axial bore of the upper or closed end of the lamp-cap is an insulator 13 carrying a stud 14 which contacts at one end with the axial terminal 15 of the lamp and at its other end with the line-closing undercut above the insulator 13, thereby presenting sloping cam sides tending to impart a downward movement to the fingers 16 of a clamp ring 17 when the latter is slipped over this stud as shown in the drawings.

Interposed between this clamp ring 17 and the top of the clamp-cap is a dielectric, desirably in the form of a flat ring of cloth or paper, which dielectric is thus clamped between the said clamp-cap and the cam-actuated ring 17. However, instead of providing the latter ring 17 with an unbroken flat contact surface and thus permitting the dielectric to be punctured at any point whatever, I provide substantially conical tits 18 on this ring, thus defining definite puncture points in the dielectric (or film, as the latter is commonly called in series lighting practice). Consequently, if the lamp burns out while in position, the current will jump through the film at one or more of these definitely located points, leaving the remainder of the film ring substantially unscorched. Then, upon withdrawing the lamp from the socket and thereby affording access to the clamp-cap and the parts carried by the latter, the clamping ring 17 can readily be raised slightly and then rotated sufficiently to cause the tits 18 to bear on fresh portions of the film, thereby "resetting" the film without moving or touching the latter.

In practice, I have found that a film of the small size easily positioned over an ordinary lamp base can thus be used a number of times, and since the film itself need not be moved or in any way disturbed while resetting the film clamp, I avoid the tearing of the film which has been so common where the attempt was made to move a film which had been partly scorched to adjoining parts by the puncturing spark. Moreover, I have found that by suitably pointing the tits 18 and suitably proportioning the coöperating spring fingers 16 and the slope of the cam surface on the stud 14, I can effectively keep down the voltage required for puncturing the film, being thus able to reduce it to several hundred volts less than that required for the same film with the film holding parts of the series sockets heretofore in use. Consequently, I avoid the risk of having the voltage rise sufficiently with the burning out of one lamp to affect other lamps on the circuit also—a point of particular importance with the modern nitrogen filled lamps in view of the higher temperatures at which they operate.

At the same time, it will be obvious from the drawings that the clamp-cap 9 can be instantly slipped over and attached to the base of an ordinary Edison base lamp, thereby making this clamp-cap substantially integral with the lamp. Then, on slipping this cap into the socket, the bead 8 readily engages the spring fingers, thereby securely interlocking the lamp with the socket so that it cannot jar loose as in the case of screw-threaded sockets and parts threaded thereinto. When thus positioned, any rotating of the lamp about its axis (as when cleaning the same) cannot affect the security of its position, and there is no danger of its gradually creeping out of the socket. Meanwhile the stud 14 by pressing against the line contact 6 (which contact is suitably spaced from the shoulder on the line contact 5 to give this effect) holds the automatic line-closing contacts apart, yet permits them to contact instantly when the lamp is removed from the socket. Moreover, since the resistance of all the sloping shoulders engaging the bead 8 must be overcome, the lamp must be pulled out with some speed, so that the said line-closing contacts engage each other too rapidly to permit the arcing which has proven destructive in corresponding portions of series sockets having threadedly connected parts permitting a slot withdrawal of the lamp and of the film-carrier. Likewise, when replacing the film-carrier and the lamps on which it is mounted, the joint resistance of the spring fingers 7 insure a quick snapping of the film-carrier into its final position and hence a quick separation of the contact members 5 and 6, while the shortening of the contact 5 as compared with the locking finger 7 avoids the risk of shock to any one accidentally reaching the mouth of the socket.

When the film has been used a sufficient number of times to effectively utilize it, the film-ring 17 can readily be pulled off the stud 14 and the film itself replaced with another. To avoid a change in the effective pressure due to a possible bending or distorting of the flat portion of the ring 17, I preferably dispose the tits 18 substantially in line with the spring fingers 16. However, I do not wish to be limited to this or other details of the construction herein disclosed,

it being obvious that the same might be modified or varied in many ways without departing from the spirit of my invention. Thus, the live contact finger 5 desirably may also be equipped with a bend for interlocking with the bead on the clamp-cap 9, as shown in dotted lines in Fig. 1, thereby coöperating with the gripper fingers 7 in normally holding the conductor-carrier in the socket. Or, this contact finger may be shorter, as in Fig. 7, so as to serve merely for contacting with the clamp-cap while leaving the gripping of the latter entirely to the spring fingers 7.

I claim as my invention:

1. Means for shunting the filament of a series incandescent lamp, comprising a metal member secured to one terminal of the lamp, a conductor carried by and insulated from the said member and contacting with the other lamp terminal, and an auxiliary member mounted directly on the said conductor and disposed for clamping a dielectric between itself and the said metal member, the conductor having an enlarged head and the auxiliary member having a resilient portion adapted to be snapped over the said head.

2. Means for shunting the filament of a series incandescent lamp, comprising a metal member secured to one terminal of the lamp, a conductor carried by and insulated from the said member and contacting with the other lamp terminal, and an auxiliary member mounted directly on the said conductor and disposed for clamping a dielectric between itself and the said metal member, the auxiliary member being rotatable with respect to the metal member and one of the said members being equipped with a projection directed toward the other member to define a puncture point in the dielectric.

3. Means for shunting the filament of a series incandescent lamp, comprising a metal member secured to one terminal of the lamp, a conductor carried by and insulated from the said member and contacting with the other lamp terminal, and an auxiliary member mounted directly on the said conductor and disposed for clamping a dielectric between itself and the said metal member, the auxiliary member being rotatable with respect to the metal member, and one of the said members being equipped with a plurality of symmetrically disposed projections directed toward the other member to define puncture points in the dielectric.

4. In a lamp and socket combination, a metal cap substantially incasing the lamp shell and electrically connecting one terminal of the lamp direct to a line terminal, a contact member carried by but insulated from the cap and connecting the other lamp terminal to the circuit, and an auxiliary conducting member detachably disposed between the cap and the auxiliary conducting member and rotatable with respect to the cap.

5. In a lamp and socket combination, a metal cap substantially incasing the lamp shell and electrically connecting one terminal of the lamp direct to a line terminal, a contact member carried by but insulated from the cap and connecting the other lamp terminal to the circuit, and an auxiliary conducting member detachably disposed between the cap and the contact member and rotatable with respect to the cap, the auxiliary conducting member being rotatable with respect to the contact member.

6. In a lamp and socket combination, a metal cap substantially incasing the lamp shell and electrically connecting one terminal of the lamp direct to a line terminal, a contact member carried by but insulated from the cap and connecting the other lamp terminal to the circuit, and an auxiliary conducting member detachably disposed between the cap and the contact member and rotatable with respect to the cap, one of the elements between which the dielectric is disposed being equipped with puncture-defining projections directed toward the other of said elements.

7. Means for shunting the filament of a series incandescent lamp, comprising a metal member secured to one terminal of the lamp, a conductor carried by and insulated from the said member and contacting with the other lamp terminal, and an auxiliary member mounted directly on the said conductor and disposed for clamping a dielectric between itself and the said metal member, the auxiliary member having resilient portions and the said conductor being so shaped that the auxiliary member is held in its dielectric-clamping disposition merely by the engagement of the said resilient portions with said conductor.

8. Filament-shunting means for an incandescent lamp, comprising a pair of metal members associated with the lamp base and respectively contacting with the lamp terminals on the latter, a puncturable dielectric disposed on the surface of one of the said members, an auxiliary metal element interposed between the dielectric and the other metal member, and cam means associated with said auxiliary element and the last named member for causing the auxiliary element to press against the dielectric.

9. In a series electric lighting system, the combination with a lamp and a socket, of an annular metal element electrically connected to one lamp terminal, an annular dielectric disposed on the said annular element, a metal stem axial of the dielectric and electrically connected to the other lamp terminal, and an auxiliary metal member mounted on the stem and presenting a plurality of projections

forcibly engaging the dielectric at relatively spaced points to press the dielectric against the said annular element; the auxiliary metal member being arranged for manual retraction from the stem and rotation on the latter, thereby permitting the said projections to successively engage different points of the dielectric.

10. In a series electric lighting system, the combination with a lamp, of a pair of annular elements disposed for jointly shunting the lamp, and an annular and puncturable dielectric disposed between said elements, the said annular elements being relatively rotatable.

11. In a series electric lighting system, the combination with a lamp, of a pair of annular elements disposed for jointly shunting the lamp, and an annular and puncturable dielectric disposed between said elements, the said annular elements being relatively rotatable and one thereof being equipped with puncture-defining projections directed toward the other thereof.

12. In a series electric lighting system, the combination with an Edison base lamp, of a cap secured to the base of the said lamp and including a shell electrically connected to the screw shell of the lamp base and having an annular end partially hooding the end of said base, a stem carried by but insulated from said annular end and electrically connected to the axial terminal of the lamp base, a dielectric disposed upon said annular end, and clamping means carried by the stem and pressing the dielectric against said annular end, the clamping means being movable upon the stem so that the same may be brought to press successively against different portions of the dielectric.

13. For use on a series circuit, a terminal carrier; a circuit-connecting appliance therefor equipped with means for simultaneously gripping the carrier, making the circuit connections thereto and opening a shunt around said connections; the said means including a stem secured to the carrier and a shunting switch member engaged by the stem to open the switch; and auxiliary means for shunting the said connections, the said auxiliary means comprising a conducting element concentric with the stem, a resilient element rotatably mounted on the stem, and a dielectric clamped between the said elements.

14. For use on a series circuit, a terminal carrier; a switching socket therefor, and an intermediary member rigidly clamped to the terminal carrier and arranged for mechanically and electrically connecting the terminal carrier to the said socket; the switching socket including a shunting switch; the intermediary member including a pair of relatively insulated conductors electrically connected to the terminals of the terminal carrier; the switching socket including gripper means for gripping the intermediary member while permitting rotation of the latter with respect to the socket, and a shunting switch having elements disposed for contacting with the said conductors and having one of these elements moved by one of the said conductors to open the switch when the intermediary member is thus gripped; and auxiliary shunting means comprising a clamping member rotatably mounted on the last named conductor and a dielectric clamped between the two conductors.

15. In a socket for a series lamp, the combination with a pair of current conducting members normally forming part of the circuit to the lamp, of a puncturable dielectric disposed upon one of the said members, and means connected to the other member and engaging the dielectric and adapted to shunt the circuit upon a puncturing of the latter, the said means being movable to bring the same into engagement with different parts of the dielectric without moving the latter.

16. For use with an Edison base series lamp and a socket having a self-closing line switch and a plurality of spring fingers, an intermediary member carried by the lamp and comprising a substantially single-piece cup-shaped metal element housing the screw-shell of the lamp and affording direct electrical connection from the latter to one terminal of the line switch and having formations interlocking with the spring fingers to hold the intermediary member and the lamp in predetermined relation to the socket, a conductor carried by and insulated from the cup-shaped element and disposed for affording direct electrical connection between the axial lamp terminal and the other terminal of the line switch and for opening the line switch, an annular dielectric disposed on the end of the cup-shaped element, and an auxiliary conductor mounted on the aforesaid conductor and forcibly engaging portions only of the dielectric, the auxiliary conductor being rotatable upon the first named conductor to vary the portions of the dielectric engaged thereby.

Signed at Chicago, June 27th, 1917.

ARTHUR C. McWILLIAMS.