(No Model.)

W. F. SMITH.

CUT-OUT.

No. 435,048. Patented Aug. 26, 1890.

Fig. 1.

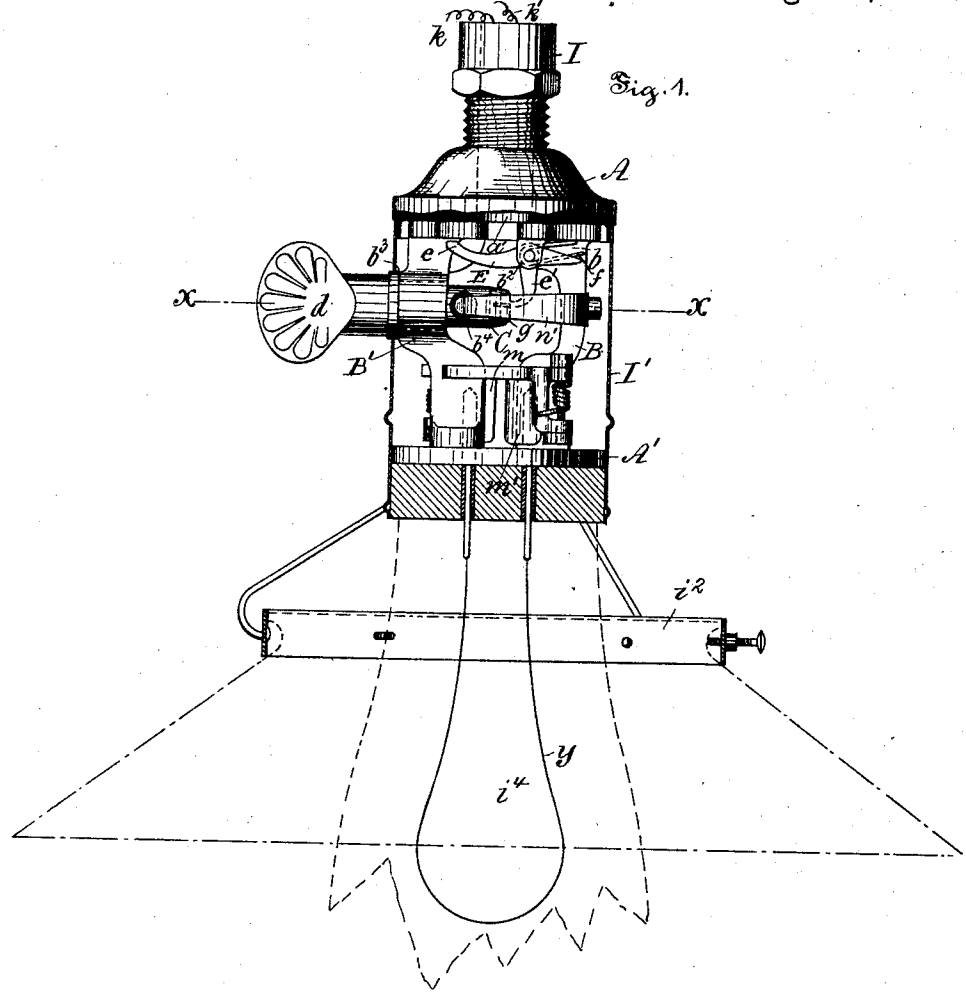


Fig. 2.

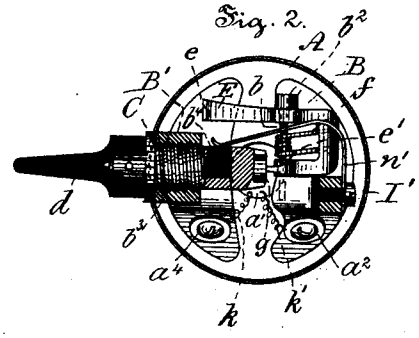
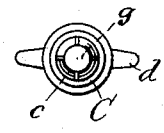


Fig. 3.



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UNITED STATES PATENT OFFICE.

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CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 435,048, dated August 26, 1890.

Application filed May 5, 1890. Serial No. 350,616. (No model.)

To all whom it may concern:

Be it known that I, WALTER F. SMITH, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Cut-Outs for Electric Lamps, of which the following is a specification.

Heretofore electric lamps having two vertical supports included in a dynamo or generator circuit have been provided with a spring-actuated short-circuiting lever pivotally connected with one of said supports and included in a shunt-circuit; and also with various devices attached to the other of said vertical supports and adapted to automatically control the movements of said short-circuiting lever, so that when the intensity of the shunt-circuit was increased, either from the breaking of the filament or from any other cause, the spring-actuated lever was automatically permitted to contact with both of said vertical supports, thereby short-circuiting the dynamo or generator circuit.

Of the various devices for automatically controlling the movement of the spring-actuated lever which have been interposed in the shunt-circuits of such types of cut-outs the following have been in practice most usually employed: First, a rigidly-supported tube, capable of being melted or softened at a low temperature and provided with a conducting-cap or ferrule; second, a movable pin resting upon or against a pellet or disk of similar materials, and, third, a rigidly-supported bar or rod having a reduced cross-section and susceptible of being melted at a low temperature. Although cut-outs provided with the above-mentioned devices were more or less efficient in practice, still their excessive cost, due largely to the number of parts and to the construction thereof, precluded their general employment.

The principal objects of the present invention are, first, to obviate the above-mentioned disadvantages; second, to reduce the number and cost of the parts consituting the cut-out device; third, to provide a compact, durable, and sensitive cut-out, and, fourth, to provide such type of cut-outs with an efficient manual switch.

My invention consists of a short-circuiting lever pivotally attached to one of the vertical supports and provided with a right-angular projection contacting with a thin disk or pellet mounted in the extremity of a switch-plug attached to the other of said vertical supports, and said short-circuiting lever, pellet, and switch-plug interposed in a shunt-circuit, so that when the intensity of the shunt-circuit is from any cause increased the pellet becomes softened or melted, thereby permitting the right-angular projection to become embedded in the disk or pellet, and thus allowing the spring-actuated lever to short-circuit the dynamo or generator circuit.

My invention further consists of the construction and arrangement of said pellet and switch-plug, whereby the cut-out is adapted for use in connection with lamps of different candle-power.

My invention further consists of a solid metal switch-plug having a pellet or disk composed of a mixture of graphite and rubber, either vulcanized or not, supported in the end thereof, and having a piece of insulating material embedded in the side thereof, as is hereinafter more fully described.

The nature and characteristic features of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is an elevation, partly in section, of an electric-lamp holder or socket with the improved cut-out applied thereto, and showing a short-circuiting lever provided with a right-angular projection, a pellet, and a metallic switch-plug interposed in a shunt-circuit. Fig. 2 is a transverse section on the line $x\,x$ of Fig. 1, showing the switch-plug having insulating material embedded in the side thereof, and having a pellet or disk supported in the end thereof, and also showing the spring-actuated lever provided with a right-angular projection contacting with said pellet. Fig. 3 is an end elevation of the switch-plug, showing the extremity thereof recessed and split for the reception of the pellet or disk.

Referring to the drawings, A is a circular plate of insulating material, such as hard rubber, and having an aperture a' formed there-

in. The vertical metal support B, secured to the base-plate A, is bifurcated at b, and is provided with a bearing b^2 and a binding-screw or other terminal device a^2. The vertical metal support B′, secured to the plate A, is provided near its upper extremity with a binding-screw or other terminal device a^4 and with an internally threaded or tapped aperture b^3. The filament y is secured to the vertical supports B and B′ in the usual or in any other preferred manner.

E is a lever pivotally connected with the bifurcated support B and provided with a finger e and with a right-angular projection e'. A spring f, interposed between the lever E and the upper extremity of the support B, is in compression and tends to force the finger e of the lever E into close contact with the vertical support B′.

d is an insulating thumb-piece mounted on or secured to a solid metal switch-plug C. The switch-plug C has an external thread cut entirely around a portion of the surface thereof for engaging in the tapped orifice b^3 of the support B′, and is provided with a piece of insulating material b^4—such as ebonite—embedded in the side thereof. The metal plug C is also provided with a shallow axially, split recess or chamber c for the reception of a pellet or disk g. This pellet or disk g is composed of a mixture of graphite and rubber, preferably vulcanized. Of course the electrical conductivity of this mixture may be increased or diminished by varying the relative proportions of the graphite, rubber, and sulphur, in order to adapt pellets or disks formed thereof to the varying resistance of lamps of different candle-power.

The compound of which the pellet or disk g is composed may be made in any preferred manner but good results have been obtained in practice by making these disks or pellets in substantially the following manner: By passing a mixture of graphite and rubber, with or without the addition of sulphur, through or between heavy calenders or rolls heated by steam, then inclosing the mass in sheets of tin-foil and placing the same in vulcanizers for fourteen hours, more or less, and finally removing the mixture in the form of sheets, which are readily punched or cut into the desired form for use. However, the invention is not limited to the employment of pellets or disks made in the manner above described.

It will be readily understood by those skilled in the art to which my invention relates that the pellet or disk g, composed of graphite and rubber, with or without the addition of sulphur, is capable of yielding at a low temperature, and that the temperature at which it softens will of course depend upon the relative proportions of the ingredients above described and also upon the degree of vulcanization to which they are subjected. In use this pellet or disk g is loosely fitted in the recess c of the metallic plug C, and is retained in place therein by bending the split portions of the extremity of the plug C inward, so that the disk or pellet may be readily and quickly inserted or removed, as may be required.

k and k' are two wires or other conductors attached to the terminals a^3 and a^4 and leading from a source of electric energy.

I is a threaded thimble secured to the base-plate A, by which the lamp socket or holder is secured to the electrolier or other fixture. The wires k and k' are passed through the aperture a' in the base-plate A and through the thimble I.

I′ is the housing of the lamp socket or holder insulated from the thimble I.

i^2 is a support for the globe or shade, which is illustrated in dotted lines in Fig. 1.

i^4 is a closed bulb or vacuum chamber of any preferred construction.

A′ is an insulating-plate supporting the vertical conductors B and B′ and the housing I′.

m and m' are spring-actuated clamps of any preferred construction, and serve to retain the closed bulb or vacuum-chamber in position.

n' is a strip of spring metal secured to the vertical support B and adapted to contact with the piece of insulating material b^4, embedded in the plug C, in order that the filament y may be short-circuited and the lamp thereby extinguished.

The mode of operation of the cut-out device is as follows: The cut-out device is first adjusted and the plug C, carrying the disk or pellet g in the end thereof, is introduced through the tapped opening b^3 in the vertical support B′, with the pellet or disk g in contact with the right-angular projection e' of the lever E until the resistance of the spring f is overcome, whereupon the finger e is raised and the contact between said finger e and the vertical support B′ is broken. The lamp is then placed in the dynamo or generator circuit in the usual or in any preferred manner, and the electric current entering the lamp is shunted and the main line is caused to traverse the vertical supports B and B′ and the filament y at the same time the shunt-circuit traverses the disk or pellet g. If the filament y is broken or otherwise injured, the intensity of the shunt-circuit will be greatly increased and the disk or pellet g will be melted or softened, thereby yielding and permitting the right-angular projection e' to sink into the disk or pellet g, so that the spring f will force the finger e into contact with the vertical support B′, whereby the electric current is short-circuited through the lever E and the lamp cut out of the dynamo or generator circuit. When the broken or otherwise injured filament y has been replaced by a new one, the plug C is withdrawn and the disk or pellet g removed and replaced by a new one of similar construction, and this result is readily attained by simply spreading the split end of

the plug C, removing the pellet, inserting the new one, and finally bending the split end of the plug inward in order to retain the pellet or disk in place. The lamp is then readjusted in the manner above described for subsequent use. The dynamo or generator current is short-circuited and the lamp extinguished without causing the disk or pellet g to yield by rotating or unscrewing the plug C through a half-revolution, whereupon the spring f will force the finger e into contact with the vertical support B′, while at the same time the strip of spring metal n' moving off the piece of insulating material b^4 onto the solid metallic portion of the plug C closes the shunt-circuit in a manner which will be readily understood.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in an electric lamp, of two supports, a short-circuiting lever pivotally attached to one of said supports and provided with a right-angular projection, a spring interposed between said lever and support, a metal plug connected with the other of said supports and provided with an insulating thumb-piece, and a disk or pellet of a vulcanized mixture of rubber and graphite supported in said plug, substantially as and for the purposes set forth.

2. The combination, in an electric lamp, of two supports, a short-circuiting lever pivotally attached to one of said supports and provided with a right-angular projection, a spring interposed between said lever and support, a metal plug connected with the other of said supports and provided with an insulating thumb-piece, and a disk or pellet of a mixture of rubber and graphite embedded in the extremity of said plug, substantially as and for the purposes set forth.

3. The combination, in an electric lamp, of two supports, a short-circuiting lever pivotally attached to one of said supports, a spring interposed between said lever and support, a metal plug mounted in the other of said supports and provided with an insulating thumb-piece and with a split extremity, and a disk or pellet composed of a mixture of vulcanized rubber and graphite embedded in the split extremity of said plug, substantially as and for the purposes set forth.

4. In a cut-out device, the combination of a plug having a split extremity, a pellet or disk mounted therein, a short-circuiting lever included in a circuit and pressed against said pellet or disk, an insulating material embedded in the body of said plug, and a spring adapted to be brought into contact therewith, substantially as and for the purposes set forth.

In witness whereof I have hereunto set my signature in the presence of two subscribing witnesses.

WALTER F. SMITH.

Witnesses:
THOMAS M. SMITH,
LISLE STOKES.