(No Model.)

W. F. SMITH.

INCANDESCENT ELECTRIC LAMP CUT-OUT.

No. 525,293. Patented Aug. 28, 1894.

Fig. 1.

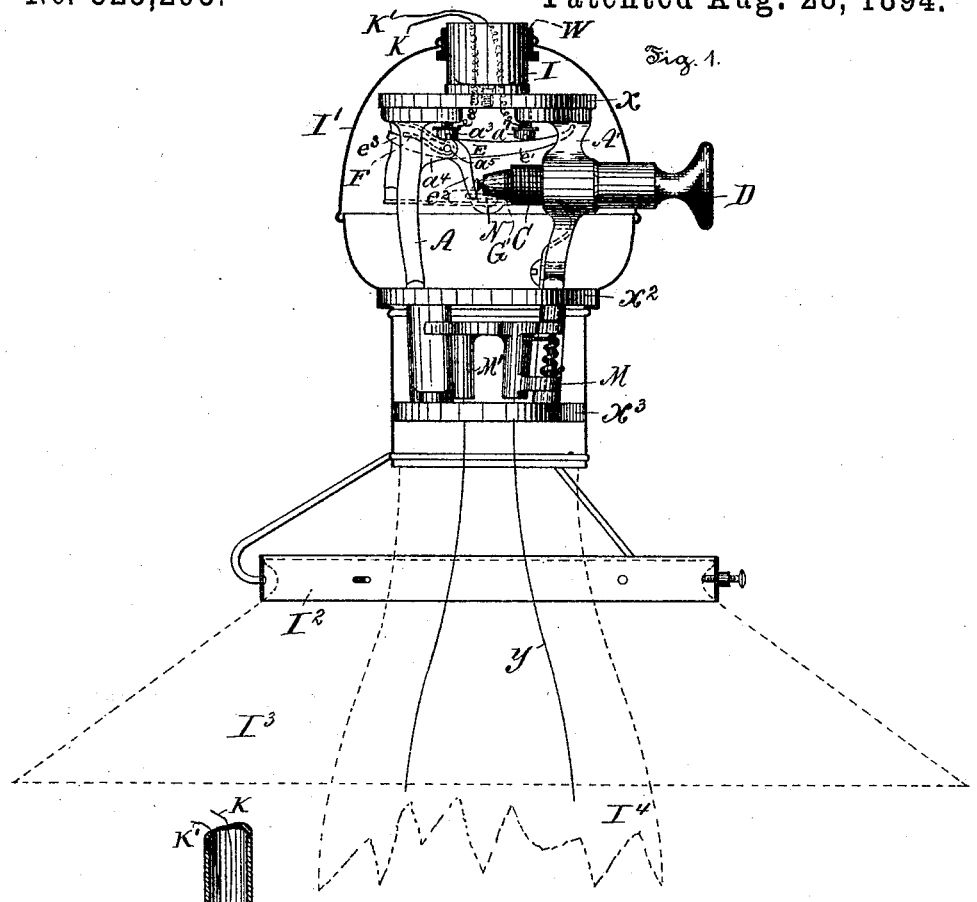


Fig. 3.

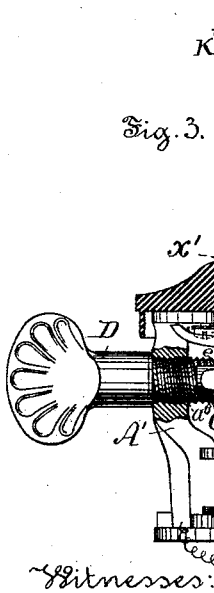
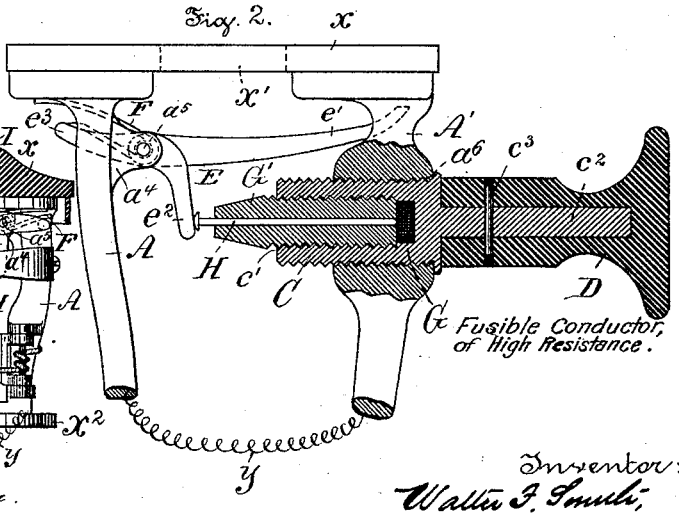


Fig. 2.



Witnesses:
Hermann Bornmann.
Thomas M. Smith.

Inventor:
Walter F. Smith,
by J. Walter Douglass.
Atty:

UNITED STATES PATENT OFFICE.

WALTER F. SMITH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE HEISLER ELECTRIC COMPANY, OF GLOUCESTER CITY, NEW JERSEY.

INCANDESCENT-ELECTRIC-LAMP CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 525,293, dated August 28, 1894.

Application filed August 23, 1889. Serial No. 321,724. (No model.)

To all whom it may concern:

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

My invention relates to an improved cut-out device for an incandescent electric lamp arranged preferably for use in series with one another with a current of high electro-motive force.

The principal objects of my invention are: first, to provide a sensitive cut-out simple, durable and positive in action; second, to provide a cut-out which in the event of the filaments of one or more of the lamps disposed in series being broken or otherwise destroyed will short circuit the electric current and automatically cut the lamp to which it is attached out of the dynamo or generator circuit; and third, to provide a device arranged so that the parts thereof may be readily readjusted without interrupting the dynamo or generator circuit when the defect in the lamp which caused the cut-out to operate, is remedied.

My invention consists in shunting the electric current traversing the dynamo or generator circuit in which the lamp is included and causing one portion of the current to pass through the filament of the lamp and the other through the shunt circuit and with a substance or material of high electrical resistance readily melting or softening interposed in said shunt circuit with a pin in contact therewith and an actuated lever, whereby the lamp is short circuited by the melting or softening of said substance or material.

My invention further consists in providing an electric lamp with a combined switch and cut-out, whereby the filament of the lamp may be mechanically included in or excluded from the dynamo or generator circuit and when the lamp is included in said circuit, with the current shunted, that is, one part passing through the filament of the lamp and the other through the shunt circuit in which is included a material or substance of high electrical resistance susceptible of being readily melted or softened and means to automatically short circuit the dynamo or generator circuit in the event of said filament being broken.

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

Figure 1, is a view partly in elevation and partly in section of an incandescent lamp and its holder showing my improved cut-out device in application. Fig. 2, is a similar view of a lamp holder with my improved automatic-cut-out, shunt circuit, the material of high electrical resistance interposed in said shunt circuit and the means for short circuiting the dynamo or generator circuit; and Fig. 3, is a similar view of a combined switch and cut-out device, whereby the filament of the lamp may be mechanically included in or excluded from the dynamo or generator circuit.

Referring to the drawings and more particularly to Figs. 1 and 2, x is the base plate of the holder composed of insulating material and provided with an aperture x' in the center thereof. The vertical metal support A, is secured to the base plate x, in any preferred manner and is provided with a binding screw or other terminal device a^3, and with a bifurcated shoulder or lug a^4, having a bearing a^5 formed therein. The vertical support A′ is secured to the base plate x, in any preferred manner and is provided near the upper extremity thereof with a similar binding screw or other terminal device a^7 and with an aperture a^6. The filament y of suitable material is secured to the vertical supports A and A′, in any preferred manner and held within a sealed bulb I^4. A bell crank lever E, is pivotally connected with the bifurcated lug or shoulder a^4, and is provided with a finger e', and a wing e^2. A spring F, is interposed between the bell crank lever E and the base of the vertical support A, which holds the finger e', normally in contact with the upper part of the vertical support A′.

C is a threaded metal plug fitted into the aperture a^6 of the support A′, and having a

tapped chamber c' and an insulating thumb-piece D, mounted on or secured to the shank c^2, of said plug by means of a pin c^3.

G is a thin disk, pellet or substance of high electrical resistance but of substantial rigidity or hardness when cold, yet, nevertheless, capable of being melted or softened at a low temperature and which is fitted or loosely mounted in the chamber c' of the plug C. The disk, pellet or substance G, may be made of rubber or graphite or any other preferred material.

G′ is a plug of suitable insulating material secured into the threaded metal plug C, and this plug serves to retain the disk, pellet or substance G in the chamber c' of the said plug C.

H is a metallic pin, bar or device fitted loosely into and extending through the insulating plug G′, one end of which is in contact with the wing e^2 of the bell crank lever E, and the opposite end in contact with the disk, pellet or substance G, mounted in the chamber c' of the metal plug C.

K and K′ are wires or other conductors attached to the terminals a^3 and a^7, of the supports A and A′, respectively and lead to the dynamo or other source of electric energy.

I is a metal threaded thimble secured to the base plate x, and by which the lamp socket or holder is secured to the electrolier or other fixture. The wires K and K′ extend through the aperture x' in the base plate x and through the thimble I.

I′ is the housing of the lamp within which the various parts thereof are confined and this housing is insulated from the thimble I, by means of a gasket W.

I^2 is a support for a globe or shade I^3 illustrated in dotted lines and I^4 is the neck of a glass bulb in dotted lines the lower portion thereof being shown broken away.

x^2 and x^3 are insulating disks which support the vertical conductors A and A′, and also the housing I′.

M and M′ are spring actuated clamps of the usual or any preferred construction which serve to retain the glass bulb in position and N is a switch of suitable construction adapted to short circuit the filament and extinguish the lamp.

In Fig. 3 is shown my invention in another form in which the switch and cut-out are combined for operation in the manner to be described.

D is the insulating plug secured onto a threaded shank C of good-conducting material and extending through an opening a^6 in the vertical support A′. Into this hollow shank C of the plug D, is introduced a smooth surfaced plug G′, of any preferred insulating material and through which plug is inserted a horizontal pin or bar H, of good conducting material. In the rear of the hollow threaded shank C is fitted or packed a disk, pellet or substance of high electrical resistance susceptible of being melted at a low temperature. The wing e^2 of the bell-crank lever E is normally held in contact with the head of the movable pin H, by the action of the spring F, until the electric current is sufficiently intense to melt or soften the disk, pellet or substance G, when the pin H is automatically actuated causing the finger e' of said bell crank lever E, to contact with the upper part of the support or conductor A′, and thereby causing the filament of the lamp to be cut out of the dynamo or generator circuit.

N is a spring of any preferred construction secured or attached to the vertical support A, and the free extremity of this spring is normally in contact with the smooth surfaced plug G′, of insulating material mounted in the hollow threaded shank C of the insulating plug D. This spring N, normally in contact with the smooth surfaced plug G′, performs the functions, when the thumb piece D is actuated, of a switch to short circuit the filament as well as extinguish the lamp. The spring N in contact with the smooth surfaced plug G′, as shown in Fig. 3 permits of the current passing from the dynamo or generator through the wire K to the binding post a^3, thence through the vertical conductor A and the filament y to the support or conductor A′ and the binding post a^7, and then by the wire K′ to the next lamp in series or to the source of electric energy. The several parts of the lamp are in other respects substantially the same as the one described in Figs. 1 and 2, the real difference being that in Fig. 3 the switch plug and its parts are combined with the cut-out and operated by hand to cause the same to perform its respective functions while in Figs. 1 and 2, the switch plug N, for extinguishing the lamp is separate and distinct from the cut-out device.

The mode of operation of my improved cut-out device is as follows:—To adjust the device, the plug C carrying the movable pin or bar H and the disk, pellet or substance G, is screwed into the surface surrounding the opening a^6, of the vertical arm A′, until the pin H, normally in contact with the wing e^2, overcomes the resistance of the spring F, and raises the finger e', thereby breaking the contact between the finger and the vertical support A′. The lamp is then interposed in the dynamo or generator circuit in the usual or in any other preferred manner and the electric current entering the lamp is shunted. One part of the current of the generator circuit passing through the vertical supports A, filament y and the vertical support A′, to the source of electric energy and the other part of the current passing through the bell crank lever E, the pin H, the disk, pellet or substance G, to the source of electric energy. In the event of the filament being broken or otherwise injured the shunt current will greatly increase in intensity and the disk, pellet or substance G, by reason of its high electrical resistance will become heated, melted or softened so that the spring F, will

cause the pin H, to sink into said disk and the finger e' to come in contact with the vertical support A', whereby the current is short circuited through the bell crank lever E and the lamp cut-out of the dynamo or generator circuit. To readjust the cut-out device when the broken or otherwise injured filament has been replaced by a new one, the plug C is removed and a new disk, pellet or substance G, inserted and the plug replaced as in the first instance. By unscrewing the plug D, as illustrated in Fig. 3, the dynamo or generator current entering the lamp by the wire K is shunted either through the binding post a^3, support A, switch N, metal plug C, support A', binding post a^7, to the wire K', or shunted through the binding post a^3, support A, bell crank lever E, support A', and binding post a^7, to the wire K', or the dynamo or generator current by the above described arrangement of parts divides and passes through both of the said several devices so that in any event the current will be shunted or the lamp short circuited by the mere rotation by hand of the thumb piece D, to extinguish the lamp. The automatic cut-out mechanism illustrated in Fig. 3 is arranged for operation in a similar manner to that hereinbefore described in connection with Figs. 1 and 2.

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

1. In an incandescent electric lamp, a shunt circuit, a substance of high electrical resistance readily melting or softening interposed in said circuit, a movable pin contacting with said substance and a lever held in contact with said pin and short circuiting the lamp by the melting or softening of said substance, substantially as and for the purposes described.

2. The combination with an electric lamp, of a substance readily melting or softened interposed in a shunt circuit and a spring actuated lever contacting with a pin which normally engages with said substance, substantially as and for the purposes described.

3. In an electric lamp, the combination of a metallic plug, a disk of high resistance melting or softening at a low temperature held in said plug, a pin mounted in an insulating plug and a spring actuated short circuiting lever normally in contact with said pin, substantially as and for the purposes set forth.

4. In an electric lamp, the combination with vertical supports, a spring actuated short circuiting device pivotally connected with one of said supports, a plug secured into the other support, a movable pin, a pellet melting at a low temperature interposed between said pin and plug, substantially as and for the purposes set forth.

5. A cut-out device for an electric lamp consisting of a plug of conducting material, a pellet of poor electrical conductivity and melting at a low temperature supported in said plug, an insulating plug attached to said plug, a movable pin held in said insulated plug, a spring in contact with said insulated plug and a spring actuated bell-crank lever in contact with said pin, substantially as and for the purposes set forth.

6. In an electric lamp, the combination of a spring actuated bell crank-lever, a metal plug with an insulated thumb-piece, an insulating plug secured to said metal plug, a pellet of high electrical resistance melting or softening at a low temperature held in said metal plug, a pin mounted in said insulated plug and in contact with said pellet and lever, substantially as and for the purposes set forth.

7. In a cut-out device for an electric lamp, a metal plug provided with a disk of high electrical resistance but melting or softening at a low temperature interposed in a shunt circuit, an insulating plug mounted in said metal plug, a spring in engagement with the latter plug and a short circuiting lever in contact with said disk, 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:
ALEX. C. HUMPHREYS,
CHARLES E. SMALL.