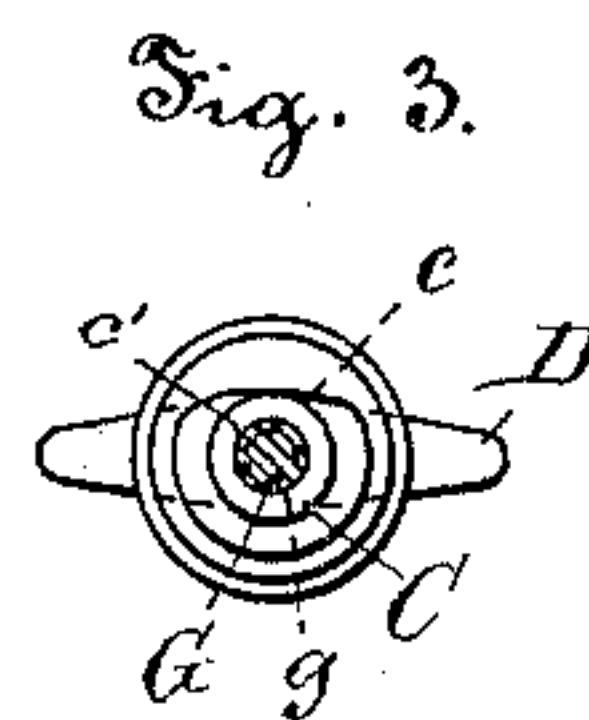
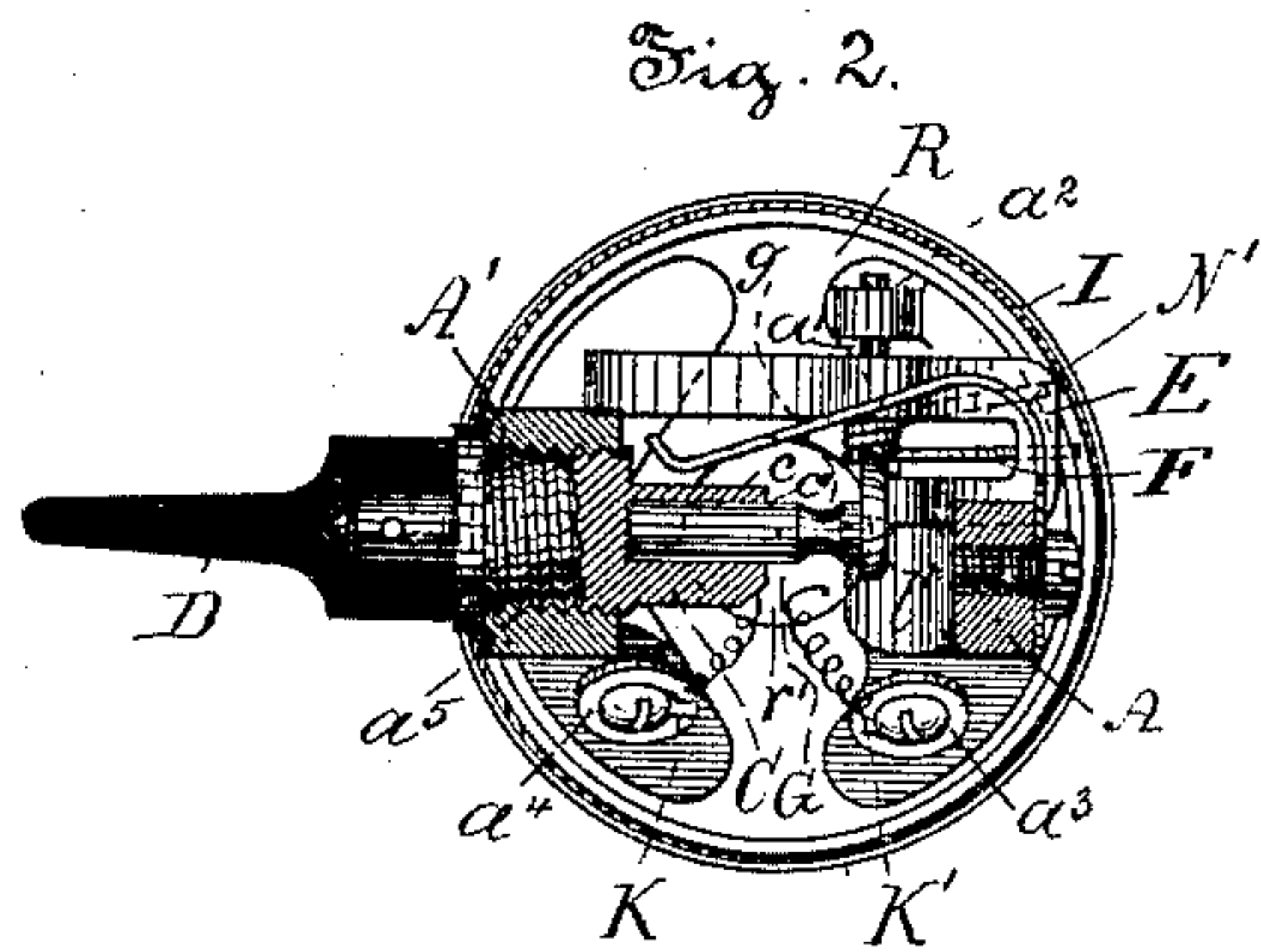
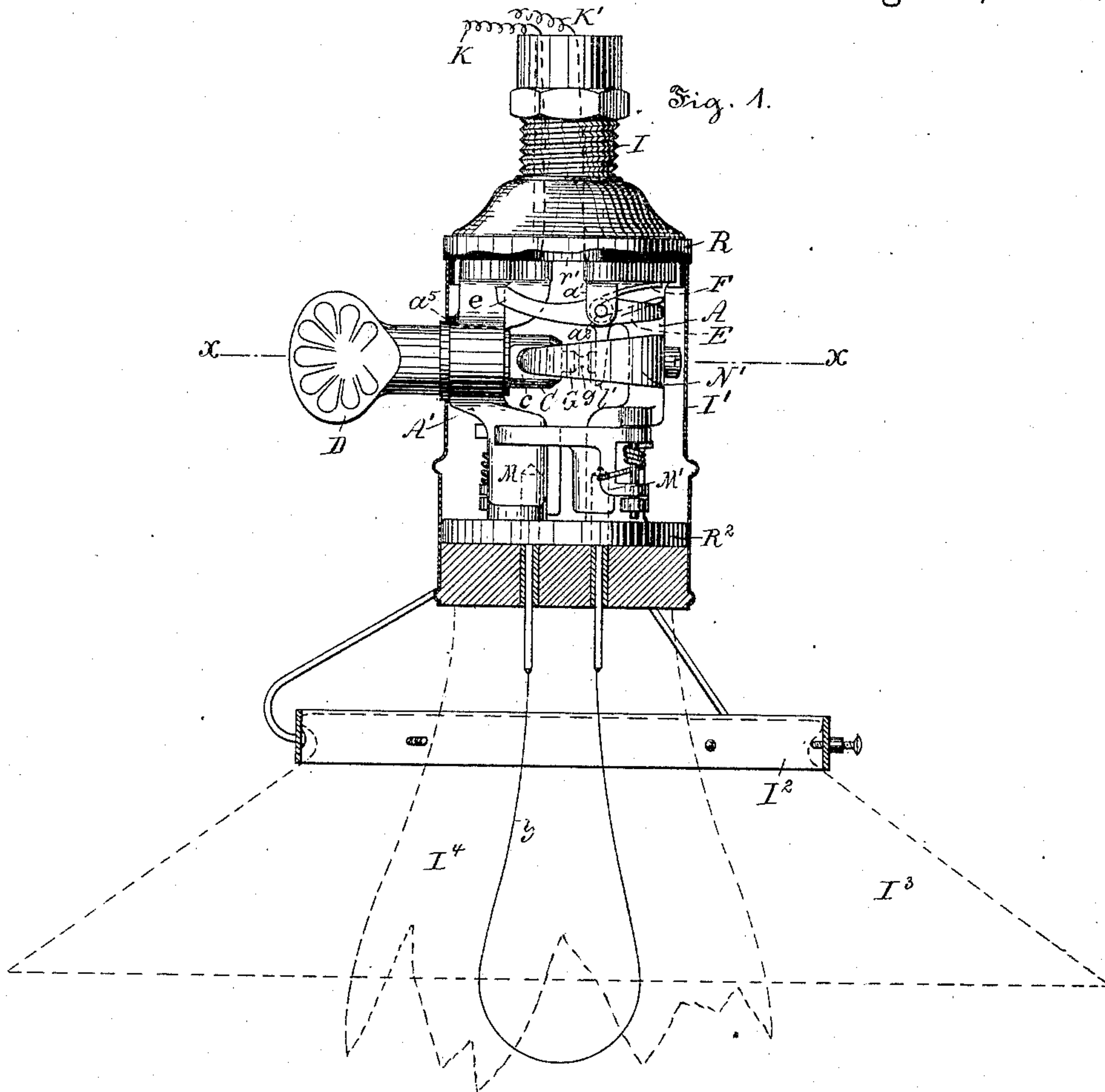


(No Model.)

W. G. BREMER.  
CUT-OUT FOR ELECTRIC LAMPS.

No. 435,029.

Patented Aug. 26, 1890.



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# UNITED STATES PATENT OFFICE.

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## CUT-OUT FOR ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 435,029, dated August 26, 1890.

Application filed April 24, 1890. Serial No. 349,208. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM GEORGE BREMER, a subject of the Emperor of Germany, but residing at the city of St. Louis, in the State of Missouri, 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 have been provided with a spring-actuated short-circuiting lever pivotally connected with one of said supports and included in a shunt-circuit having interposed therein either a rigidly-supported tube capable of being melted or softened at a low temperature and provided with a conducting-cap or movable pin resting upon or against a pellet or disk of similar material, so that when the intensity of the shunt-current was from any cause increased the rod or pellet softened or yielded and permitted the spring-actuated lever to short-circuit the generator or dynamo circuit. Although such types of cut-outs were efficient in operation to a greater or less extent, still their excessive cost, due largely to the number of parts and to the amount of machine-work incident to their construction, precluded their general employment.

The principal objects of my present invention are, first, to dispense with both the movable pin and rigidly-supported tube provided with a cap or ferrule, and consequently to obviate the above-mentioned disadvantages; second, to reduce the number and cost of the parts operating together to constitute the cut-out device; and, third, to provide a sensitive, simple, and efficient cut-out.

My invention consists of a removable bar or rod of low electrical conductivity and capable of softening or melting at a low temperature interposed in a shunt-circuit and the said rod or bar melted or softened when the intensity of the shunt-current is from any cause increased to permit a spring-actuated lever to cause said rod or bar to yield in the direction of its length and to short-circuit the dynamo or generator circuit.

My invention further consists in reducing the cross-section of said rod at a point within or beyond its support in order that it may yield at that point without fear of becoming jammed or wedged in the support thereof.

My invention further consists in the construction of the switch-plug for removably supporting said rod or bar and in its arrangement with reference to a contact-spring for forming a hand-switch.

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 electric-lamp holder or socket with my improved cut-out applied thereto and showing portions of an incandescent electric lamp, shunt-circuit, the solid bar or rod removably supported and interposed in said circuit, and the means for short-circuiting the dynamo or generator circuit. Fig. 2 is a transverse sectional view on the line  $x x$  of Fig. 1, showing the switch-plug having a rod or bar with a reduced cross-section removably supported in a recess or chamber formed therein; and Fig. 3 is a similar view of the switch-plug, showing the extremity thereof flattened, filed, or otherwise cut away on one side or portion and rounded off on the opposite side or portion thereof.

Referring now to the drawings, R is a circular base-plate of insulating material, such as hard rubber, having an aperture  $r'$  formed therein. The vertical metal support A, secured to the base-plate R, is bifurcated at  $a'$  and is provided with a bearing  $a^2$  and a binding-screw or other terminal device  $a^3$ . The vertical metal support A', secured to the base-plate R, is provided near its upper extremity with a binding-screw or other terminal device  $a^4$ , and with a tapped or threaded aperture  $a^5$ . The filament  $y$  is secured to the vertical supports A and A' in any preferred manner.

E is a bell-crank lever provided at one extremity thereof with a finger  $e$  and with a depending wing or arm  $l$  for a purpose to be presently described. This bell-crank lever E is pivotally connected with the bifurcated support A. A spring F, interposed between the bell-crank lever E and the upper extremity of the support A, is in compression and tends to force the finger  $e$  of the lever E into close contact with the vertical support A'.

C is a metal plug having an external thread cut entirely around the surface thereof for



engaging in the tapped orifice  $a^5$  of the support  $A'$  and having one portion of the extremity flattened, filed, or otherwise cut away laterally at the point  $c$  thereof in order that it may assume a somewhat eccentric form for the performance of a function to be hereinafter fully described. The metal plug  $C$  is provided with a recess or chamber  $c'$  for the reception of a solid bar or rod  $G$  of low electrical conductivity, but capable of melting, softening, or fusing to a greater or less degree at a low temperature. Onto the shank of the plug  $C$  is suitably mounted or secured an insulating thumb-piece  $D$ . The solid bar or rod  $G$ , of low electrical conductivity and capable of melting, softening, or fusing at a comparatively moderate temperature, has a reduced cross-section at the point  $g$  in order to insure its yielding in the direction of its length at the point  $g$ . This rod or bar  $G$  is loosely mounted in the recess or chamber  $c'$  of the metallic plug  $C$  in order that it may be readily and quickly removed, as may be required.

Heretofore in practice great difficulty was experienced in employing material or substances for the formation of the rods or bars  $G$  owing to the inability to secure the proper resistance, and various materials or compositions have been tried, but with little success until a composition composed of graphite and rubber was thoroughly tried, and then these materials, in order to be applicable for the purpose, had to undergo a particular treatment by mixing therewith a small percentage of sulphur and vulcanizing the mass, which rendered it hard, yet at the same time it was found after assuming the required form for use that it would readily melt, soften, or even fuse under the influence of heat of an electric current brought into contact therewith sufficiently to enable these bars or rods to yield in the direction of their length. After experiments with various substances or materials it was found that the bars or rods  $G$ , if made of rubber and graphite in about equal proportion mixed with a small percentage of sulphur and vulcanized in a suitable appliance in the manner above described, gave most excellent results—that is, the bars or rods  $G$  were capable of measuring a comparatively high resistance, at least one thousand ohms; but of course the resistance thereof will vary with the change in the proportion of rubber or graphite used in said composition for the formation of said bars or rods  $G$  used in the different types of lamps, and also in a measure according to the strength of the generator or dynamo current.

$K$  and  $K'$  are the two leading-in wires or conductors attached to the terminals  $a^3$  and  $a^4$  and extending from a source of electric energy.

$I$  is a threaded thimble secured to the base-plate  $R$ , by which the lamp socket or holder is secured to the electrolier or other suitable fixture. The leading-in wires  $K$  and  $K'$  pass

through the aperture  $r'$  in the base-plate  $R$  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 bulb, globe, or shade  $I^3$ . (Illustrated in dotted lines in Fig. 1.)

$I^4$  is the glass bulb or vacuum-chamber of any preferred construction.

$R^2$  is an insulating-disk supporting the vertical arms or conductors  $A$  and  $A'$  and the housing  $I'$ .

$M$  and  $M'$  are spring-actuated clamps of any preferred construction and serving to retain the glass bulb or vacuum-chamber in proper position.

$N'$  is a strip of spring metal secured to the vertical support  $A$  and adapted to contact with the extremital portion of the plug  $C$ , opposite to the part  $c$ , which is shown cut away in order that the filament  $y$ , by the bringing of said strip  $N'$  into contact therewith, may be short-circuited or shunted, and the lamp thereby extinguished.

The mode of operation of the cut-out device, as hereinbefore described, is as follows: The cut-out is first adjusted and the plug  $C$ , within which is loosely mounted the rod or bar  $G$ , is secured or otherwise introduced through the tapped opening  $a^5$  in the vertical support  $A'$ , with the extremity of the bar or rod  $G$  in contact with the depending wing or arm  $l$  of the bell-crank lever  $E$  until the resistance of the spring  $F$  is overcome, whereupon the finger  $e$  is raised and the contact between this finger  $e$  and the vertical support  $A'$  is broken. The lamp is then interposed 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 or generator current is caused to traverse the vertical supports  $A$  and  $A'$  and the filament  $y$ , respectively. At the same time the current is shunted through the bell-crank lever  $E$  and wing or arm  $l$  and the bar or rod  $G$  and support  $A'$ . If the filament  $y$  becomes broken or otherwise injured, the intensity of the shunt-circuit will be greatly increased, and the bar or rod  $G$  will, by reason of its low electrical conductivity, be melted or softened sufficiently to yield in the direction of its length at the point  $g$ , thereby causing the spring  $F$  to force the finger  $e$  into contact with the vertical support  $A'$ , so that the electric current is shunted or short-circuited through the bell-crank lever  $E$ , and the lamp thereby 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 bar or rod  $G$  removed and replaced by a new one of similar construction. This change is readily effected, because the bar or rod will always yield at the point  $g$ , and therefore never become jammed in the recess or chamber  $c$  of the plug  $C$ . The lamp is then readjusted in the manner hereinbefore



described for subsequent use. The dynamo or generator current may be short-circuited and the lamp extinguished without causing the bar or rod 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 A', while at the same time the portion opposite the cut-away portion *c* of the plug C will be brought by said half-turn of the switch-plug C into contact with the strip of spring metal N', thereby closing the shunt-circuit in a manner which can be readily understood, without further explanation from the drawings.

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 bell-crank lever pivotally attached to one of said supports, 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 solid bar or rod of low electrical conductivity supported in said plug and yielding in the direction of its length at a low temperature, substantially as and for the purposes set forth.

2. The combination, in an electric lamp, of two supports, a bell-crank lever pivotally attached to one of said supports, a spring interposed between said lever and support, a metal plug provided with a threaded shank mounted in the other of said supports and provided with an insulating thumb-piece, and a solid bar or rod having a reduced cross-section and of low electrical conductivity, substantially as and for the purposes set forth.

3. The combination, in a cut-out for electric lamps, of circuit-connections, a switch-plug, a solid bar or rod composed of rubber and graphite capable of melting or softening at a low temperature mounted therein, and a spring-actuated bell-crank lever pressed against said bar or rod, substantially as and for the purposes set forth.

4. The combination, in a cut-out for electric lamps, of a circuit, a switch-plug, a removable bar or rod, melting, softening, or fusing at a low temperature, mounted in said plug and having a reduced cross-section, and a pivotally-supported bell-crank lever pressed against said bar or rod and adapted to be included in said circuit, substantially as and for the purposes set forth.

5. The combination, in a cut-out device for electric lamps, of a circuit, a switch-plug provided with a bar or rod of reduced cross-section, and a spring-actuated bell-crank lever pressed against said bar or rod and adapted to be automatically included in said circuit, substantially as and for the purposes set forth.

6. The combination, in a cut-out for electric lamps, of a shunt-circuit, electrical connections, a switch-plug having a cut-away and rounded extremital parts, and a bar or rod of

reduced cross-section loosely mounted therein, and a spring-actuated bell-crank lever pressed against said bar or rod and included in said shunt-circuit, substantially as and for the purposes set forth.

7. The combination, in a cut-out device for electric lamps, of a circuit and connections, a plug having eccentric and concentric portions, a bar or rod of low electrical conductivity mounted in said plug, a bell-crank lever included in said circuit and pressed against said bar or rod, and a spring adapted to contact with the concentric portion of said plug, substantially as and for the purposes set forth.

8. The combination, in an electric-lamp cut-out, of an insulating-housing I', two supports held therein, a bell-crank lever pivotally attached to one of said supports, a plug mounted in the other of said supports, and a solid bar or rod of low electrical conductivity loosely mounted therein and yielding in the direction of its length at a low temperature, substantially as and for the purposes set forth.

9. The combination, in a cut-out for electric lamps, of two vertical supports, a switch-plug mounted in one of said supports and having eccentric and concentric extremital portions, a bar or rod of low electrical conductivity mounted therein, a spring attached to the other support and adapted to contact with the concentric extremital portion of said plug, a circuit, a bell-crank lever pivotally supported from one of said vertical supports, a spring interposed between said support and lever, and said lever normally contacting with said bar or rod and adapted by the melting or softening of said bar or rod to contact with the other of said vertical supports, substantially as and for the purposes set forth.

10. A cut-out for electric lamps provided with two arms suitably supported within an insulating-housing, a switch-plug having an eccentric extremity, a removable bar or rod mounted in said plug and yielding in the direction of its length, a pivotally-supported bell-crank lever, a spring adapted to contact with said plug, a filament, and circuit-connections, substantially as and for the purposes set forth.

11. The combination, in a cut-out for electric lamps, of two supports, a switch-plug mounted in one of said supports and having a solid bar or rod of low electrical conductivity and reduced cross-section mounted therein, and a flat spring secured to the other of said supports and adapted to contact with the enlarged extremital part of said plug, substantially as and for the purposes set forth.

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

WM. GEO. BREMER.

Witnesses:

J. WALTER DOUGLASS,  
ARTHUR L. BOSLEY.