(No Model.)

# W. F. SMITH.

## CUT-OUT FOR ELECTRIC LAMPS.

No. 456,327. Patented July 21, 1891.

Fig. 1.

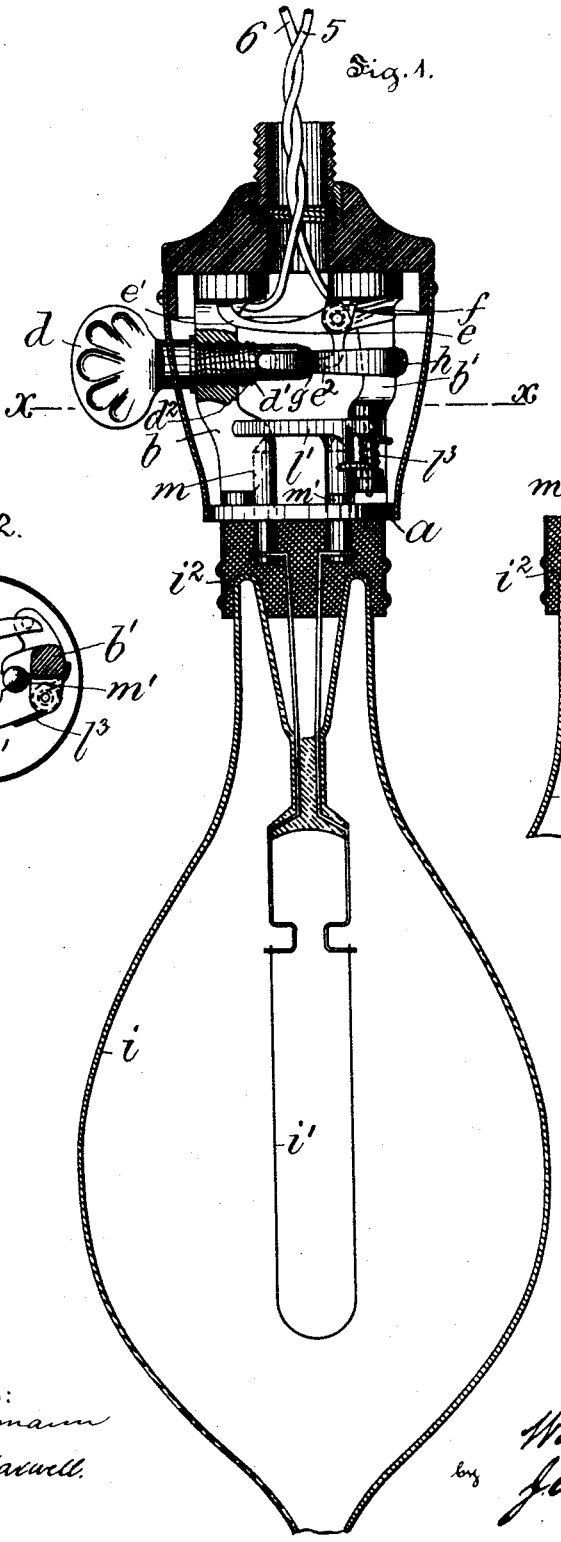



Fig. 2.

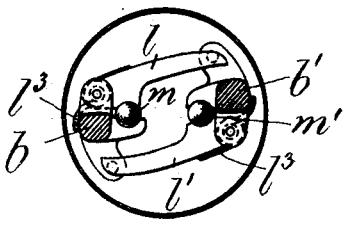
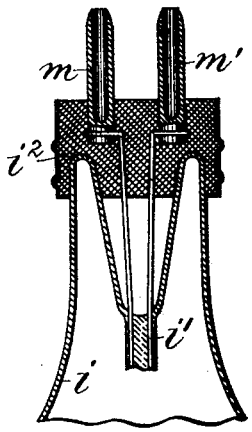



Fig. 3.




Witnesses:
Hermann Bormann
Richard C. Maxwell.

Inventor:
Walter F. Smith,
by J. Walter Douglass.
Att'y.

# UNITED STATES PATENT OFFICE.

WALTER FRANCIS SMITH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE UNITED GAS IMPROVEMENT COMPANY, OF SAME PLACE.

## CUT-OUT FOR ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 456,327, dated July 21, 1891.

Application filed April 24, 1891. Serial No. 390,231. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER FRANCIS 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.

Hitherto electric lamps have been provided with, first, a manual switch for lighting and extinguishing the lamp; second, with a cut-out device interposed in a shunt-circuit or otherwise applied to the lamp to automatically close or short-circuit the dynamo-circuit when the intensity thereof from any cause became abnormally increased or the lamp was destroyed, and, third, with a mechanical switch for connecting or including the pole-pieces or terminal feet of the lamp in the dynamo or main circuit and for automatically closing the same when the lamp was removed; but in practice some or all of the devices or parts occasionally failed to perform their functions, so that in the event of the accidental destruction of the lamp or filament an arc was formed between the conductors either within or around about the lamp, and such arc not only destroyed the conductors, but in some instances even set fire to that which is of an inflammable nature in the path thereof.

The principal object of my present invention is to provide a simple, reliable, and efficient safety device adapted to automatically short-circuit the main or dynamo circuit within the lamp in case of failure of the cut-out thereof to operate by causing the mechanical switch to automatically perform the functions of the cut-out device.

In my invention use is made of a lamp provided with fusible pole-pieces or terminal feet connected with the ends of a suitable filament and adapted to engage with a mechanical or other suitable switch in order that when the resistance of the lamp is abnormally increased from any cause the pole-pieces or terminal feet melt or fuse through their contact with the mechanical switch, thereby permitting the same to short-circuit the main conductors through the lamp in the same manner as when the lamp is withdrawn from its socket.

My invention consists of a lamp provided with a mechanical or spring-actuated switch or clamps, and with a filament having fusible pole-pieces or terminal feet adapted to engage said clamps or switch.

My invention further consists of a lamp-socket having a mechanical switch and a lamp having hollow fusible pole-pieces or terminal feet adapted to engage said switch; and my invention further consists of the improvements hereinafter described, and pointed out in the claims.

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, in which—

Figure 1 is a section of a complete electric lamp embodying features of my invention and showing a lamp-socket provided with a combined manual switch and automatic cut-out and with a mechanical switch, and also showing a lamp provided with fusible pole-pieces or terminal feet and adapted to engage said mechanical switch. Fig. 2 is a transverse section on the line $x\ x$ of Fig. 1; and Fig. 3 is a vertical central section of a lamp embodying a modification of my invention and showing the filament of a lamp provided with hollow fusible pole-pieces or terminal feet for engaging with a mechanical switch.

In the drawings, $a$ is a circular plate of insulating material, such as hard rubber.

$b$ and $b'$ are vertical metal supports secured to the base $a$ and adapted to be connected with the line-conductors 5 and 6.

$e$ is a lever pivotally connected with the support $b$ and provided with a finger $e'$ and with a right angular projection $e^2$. A spring $f$, interposed between the lever $e$ and the support $b'$, is in compression and tends to force the finger $e'$ into close contact with the support $b$, so as to short-circuit the main conductors.

$d$ is an insulating thumb-piece mounted on or secured to a solid metal switch-plug $d'$. The switch-plug $d'$ is externally threaded and secured into a tapped orifice formed in the support $b$, and is provided with a piece of insulating material $d^2$, embedded in the side thereof. The extremity of this plug is pro-

vided with a pellet or disk $g$ of fusible material. In use this pellet $g$ contacts with the projection $e^2$ and retains the lever $e$ normally out of contact with the support $b$; but when the intensity of the shunt-circuit through the lever $e$, pellet $g$, and plug $d'$ is increased, for example, by the destruction of the lamp, the pellet $g$ is heated and softened, and the spring $f$ forces the lever $e$ into contact with the support $b$, so that the dynamo-circuit is short-circuited through the lever $e$.

$h$ is a spring attached to the support $b'$ and adapted to contact with the metal plug, so as to extinguish or cut out the lamp, or with the insulating-piece $d^2$, so as to permit the lamp to be included in the dynamo-circuit, and therefore to be lighted.

$i$ is a bulb or vacuum-chamber surrounding a filament $i'$.

$i^2$ is a plug or stopper fitted into the bulb.

Having briefly explained the parts of a known type of an incandescent lamp to which my invention is applicable, I will now proceeed to describe, first, the parts of a lamp that have special relation to my invention, and, second, the parts comprising the invention.

In the drawings, $l$ and $l'$ are mechanical switches pivotally attached to the supports $b$ and $b'$ and of such length as that the free extremities contact with the other supports in order to short-circuit the dynamo or main circuit.

$l^3$ are springs interposed between the switches $l$ and $l'$ and their respective supports $b$ and $b'$ in order to permit the switches to normally short-circuit the dynamo or main circuit when the lamp is not fitted into the lamp-socket. The pole-pieces $m$ and $m'$ are connected with the respective extremities of the filament $i$ in any preferred manner and extend through and project outside of the plug $i^2$, so as to be fitted between the supports $b$ and $b'$ and the mechanical switches $l$ and $l'$, Fig. 2, whereby the free extremities of the latter are shifted out of contact with said supports and the lamp retained to place in the lamp-holder.

My invention has relation especially to such type of electric lamps and consists in making the pole-pieces or terminal feet $m$ and $m'$ thereof of a fusible metal or alloy of a metal or metals in order that when the lamp is destroyed or the resistance of the lamp becomes abnormally high, the pole-pieces or terminal feet heat or soften sufficiently to cause the springs $l^3$ to shift the free ends of the mechanical switches or clamps $l$ and $l'$ to short-circuit the dynamo or main circuit in a similar manner, as they would do if the lamp was withdrawn from its socket. It will be observed that the pole-pieces or terminal feet $m$ and $m'$ are destroyed by the above operation, and hence I prefer to so construct or regulate the composition of the pallet $g$, as that it will yield or soften at a lower temperature than said pole-pieces or terminal feet, so that when the lamp is destroyed the dynamo circuit will be cut out by the lever $e$, and the fusible pole-pieces $m$ and $m'$ and mechanical clamps $l$ and $l'$ will only operate in case of a failure of the cut-out $e$ to perform its functions. My invention is not limited to such an arrangement of parts, because the fusible pole-pieces may be employed in connection with a lamp-socket which is provided with any other form of cut-out.

The modified form of my invention illustrated in Fig. 3 is especially adapted for use in connection with lamp-sockets that are not provided with cut-out devices, because in this instance the fusible pole-pieces or terminal feet $m$ and $m'$ are formed hollow in order that they may more readily yield, and thereby render the device much more sensitive than if they were made of solid metal or an alloy of a metal or metals.

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 electric lamp, a filament-holder having fusible terminal feet, substantially as and for the purposes described.

2. In an electric lamp, a filament-holder provided with hollow fusible metallic terminal feet, substantially as and for the purposes described.

3. An electric lamp having a filament-holder provided with fusible terminal feet and a switch adapted to contact therewith, substantially as and for the purposes described.

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

WALTER FRANCIS SMITH.

Witnesses:
THOMAS M. SMITH,
HERMANN BORMANN.