

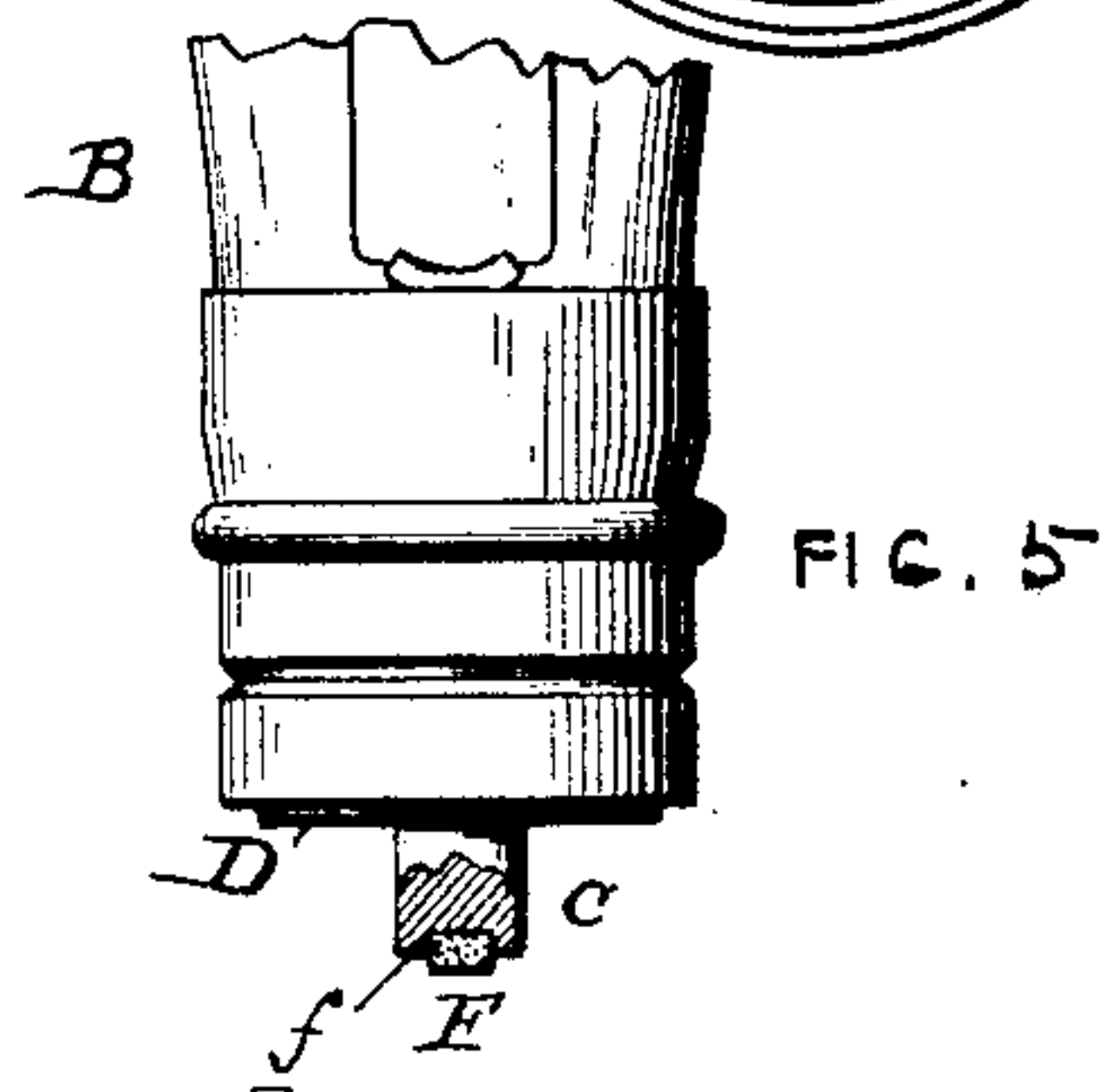
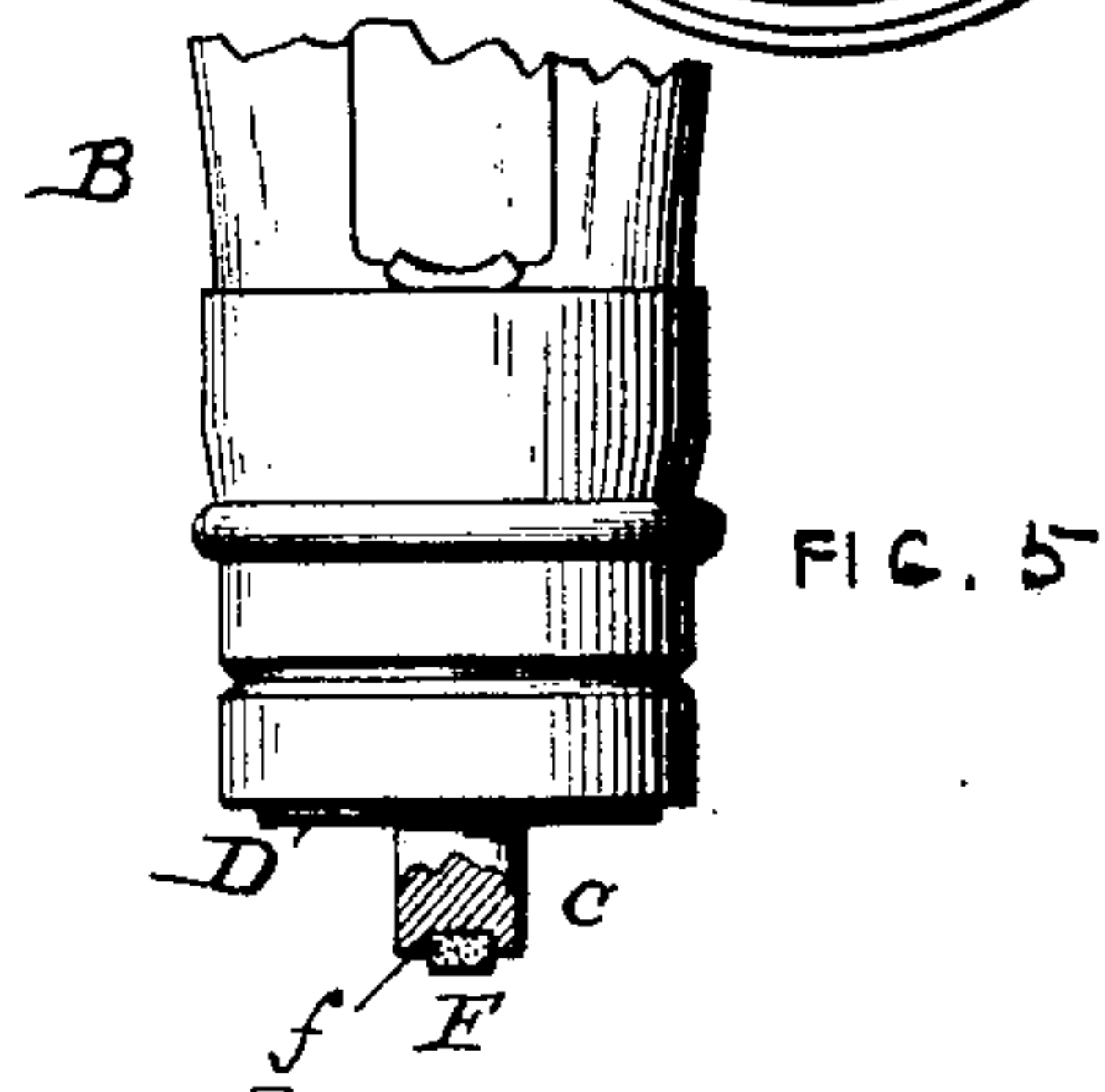
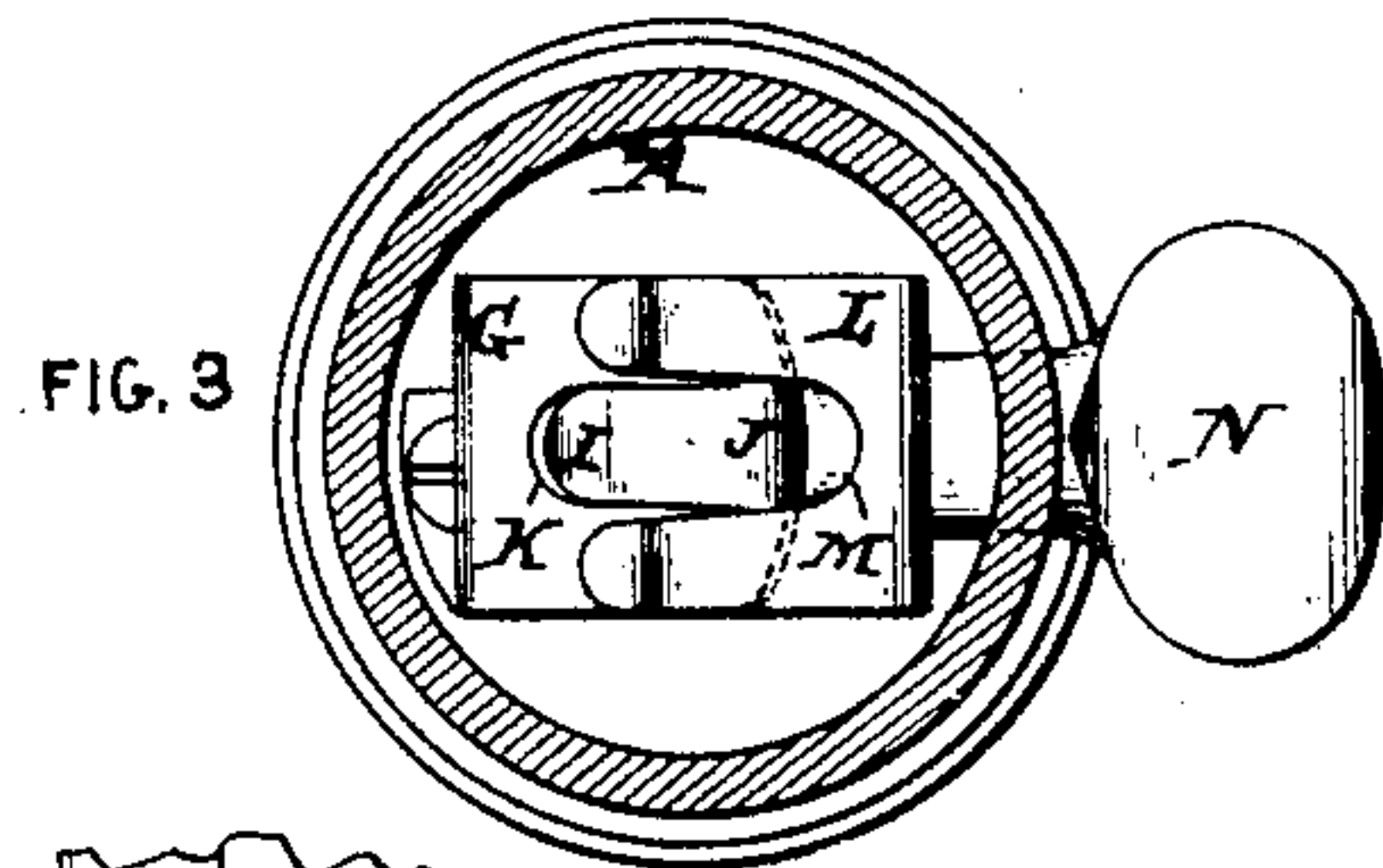
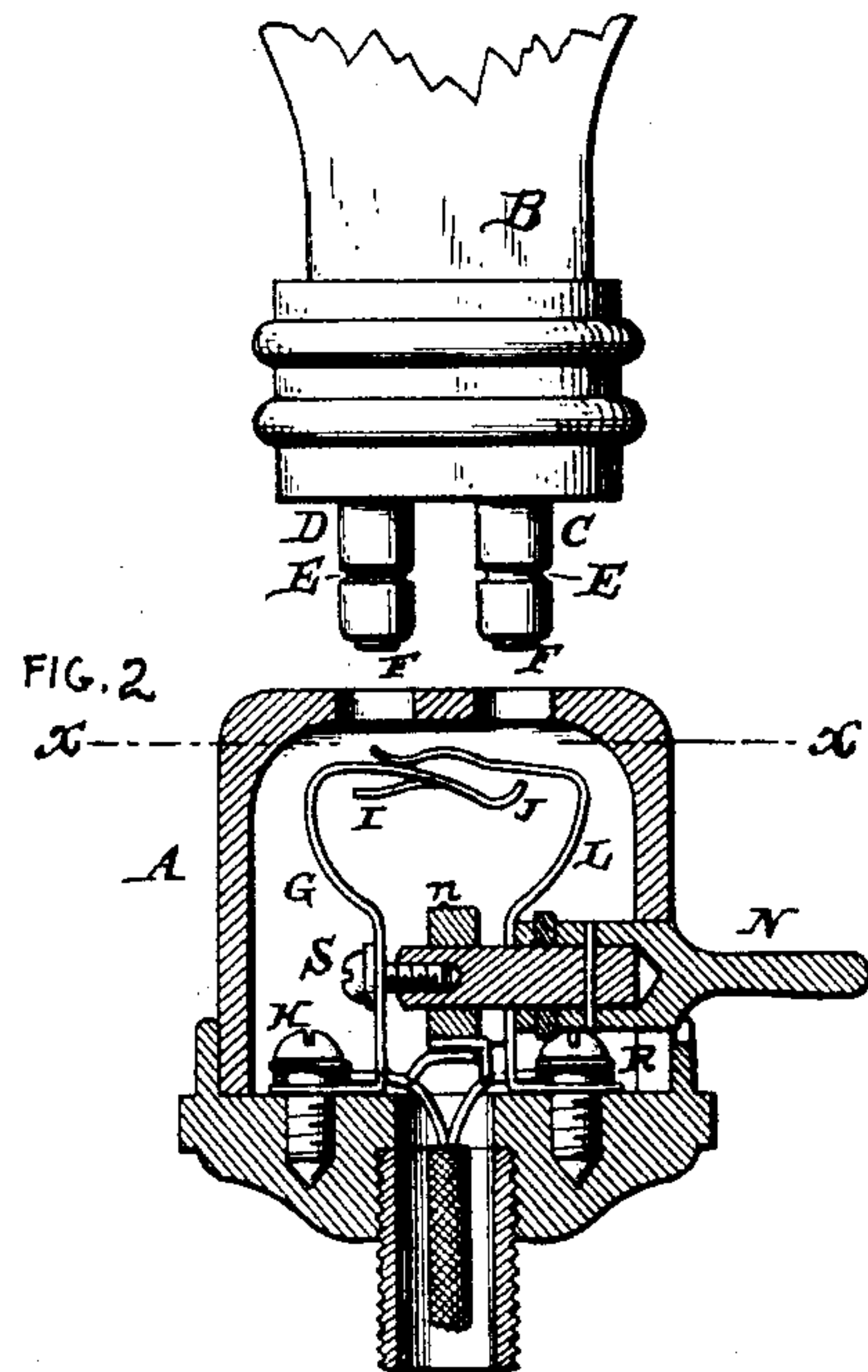
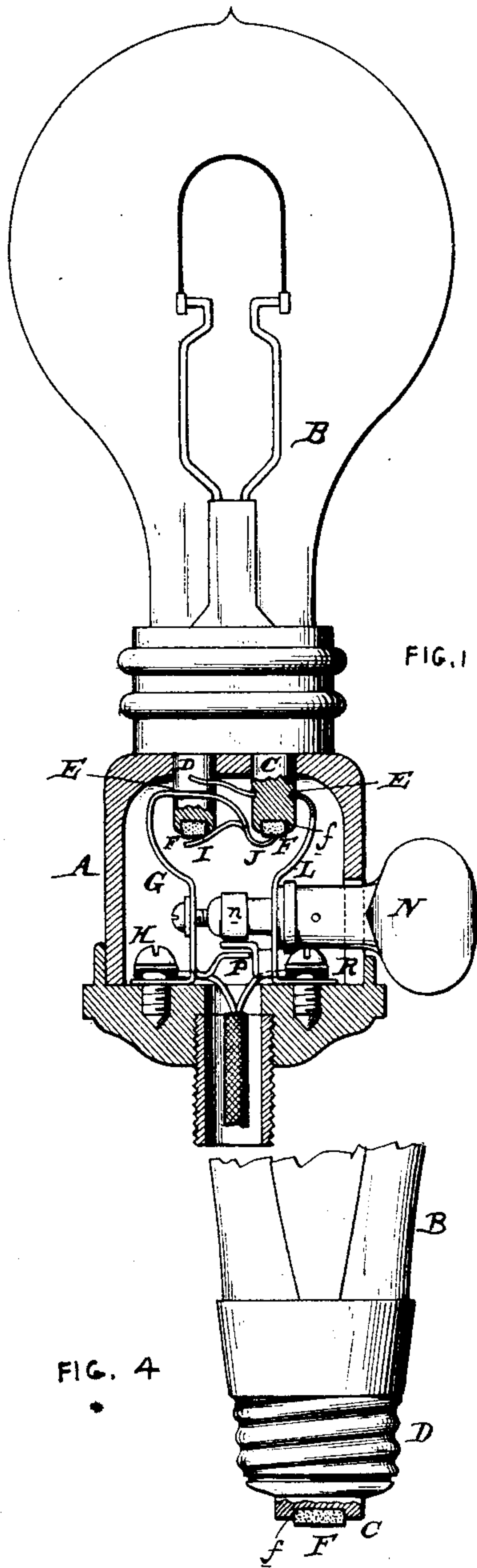
(No Model.)

B. FORD.

INCANDESCENT ELECTRIC LAMP AND LAMP SOCKET.

No. 481,019.

Patented Aug. 16, 1892.



Witnesses:  
Henry D. Dwyer  
S. J. Wykes.

Inventor:  
Bruce Ford  
By his atty  
*[Signature]*



# UNITED STATES PATENT OFFICE.

BRUCE FORD, OF GLOUCESTER, NEW JERSEY.

## INCANDESCENT ELECTRIC LAMP AND LAMP-SOCKET.

SPECIFICATION forming part of Letters Patent No. 481,019, dated August 16, 1892.

Application filed November 27, 1891. Serial No. 413,201. (No model.)

*To all whom it may concern:*

Be it known that I, BRUCE FORD, of Gloucester, in the county of Camden and State of New Jersey, have invented an Improvement in Electric Lamps, of which the following is a specification.

My invention has reference to electric lamps; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

My invention has particular reference to automatic cut-outs for incandescent lamps designed to be worked in series.

The object of my invention is to provide a construction in which the short-circuiting fusible plug or substance is arranged in the lamp proper in place of being arranged in the socket or key.

In carrying out my invention I provide one or both terminals of the lamp with a destructible substance of high resistance which offers sufficient resistance to the current during the normal operation of the lamp to insure the proper proportion of the current passing through the filament of the lamp, but which upon the rupture of the carbon filament of the lamp will become destroyed or fused by the excessive current forced through it and permit the closing of the circuit by means of metallic contacts. The metallic contact may take place directly through the spring-contacts in the socket, as in the case of the removal of the lamp, or through contact of one of the spring-contacts with one terminal of the lamp which is in contact with the other spring-contact within the socket-piece.

Referring to the drawings, Figure 1 is a sectional elevation of the socket-piece with the lamp shown in elevation in connection therewith and embodying my invention. Fig. 2 is a similar view of the same with the lamp slightly removed from the socket-piece. Fig. 3 is a sectional plan view of the socket-piece on line  $x x$ ; and Figs. 4 and 5 show other forms of bases for the lamps, such as those in common use, with my improvement applied thereto.

A is the socket-piece, and may be formed of any suitable material and in any manner desired.

B is the electric lamp, and may be of any construction found suitable, various kinds of lamps already in the market being adapted to the employment of my invention.

In the construction shown in Figs. 1 and 2, C and D are the terminals, and these are formed like two pins extending down from the base of the lamp, provided with annular grooves E and recessed at the bottom, as at F, in which recess the high-resistance material  $f$  is inserted. This high-resistance material  $f$  may be such as is well known in the market—for instance, a mixture of vulcanized rubber and graphite or prepared paper. It is immaterial what this material is so long as it forms a high-resistance path to the current for the purpose of causing a sufficient current to pass through the filament of the lamp, and yet at such a time to be of such a composition that it will be fused or destroyed the instant the filament becomes broken.

Within the socket I have the binding-posts H and R, connecting with the two terminals of the line-circuit.

P are two spring-contacts connecting with the binding-posts and adapted to be brought into contact by the action of a key N, of hard rubber, having a cam  $n$ , of metal, adapted to press the said spring-contacts P together to cut the lamp out of active circuit, or at least put it in shunt relation, which destroys its luminosity, owing to the high resistance of the filament and low resistance of the circuit through the contacts P.

G and L are two spring-contacts respectively connected to the binding-posts H and R, and also support the key N for simplicity, though this is not essential. The upper part of the spring-contact G is stamped, as shown in Fig. 3, so as to form a curved edge K as a boundary of the slot, the finger I arranged below the slot and the lip J. The spring-contact L is formed with a slot and curved edge M, but has no finger I or lip J.

When the lamp is thrust into the socket, the grooves E in the terminals C and D respectively receive the curved edges M and K of the contacts L and G, as shown in Fig. 1, and the edges of the terminals D press upon the finger I, producing a tendency to thrust the lip J upward and at the same time cause



the spring-contact G to be moved to the right to insure better contact. The terminal C of the lamp has its high resistance at the base of the terminal caused to press upon the lip J, and its groove E receives the edge M of the spring-contact L. The elasticity of the contacts L and G with reference to the grip upon the terminals C and D may be regulated by means of the adjusting-screw S, which extends through the contact G into the key N. When the lamp is out of the socket, the spring-contacts G and L come together, as shown in Fig. 2, thereby completing the line-circuit without reference to the operation of the key N. If the lamp is in place, as shown in Fig. 1, the turning of the key will throw the lamp into shunt relation and continue the current in the line without the interposition of the resistance of the carbon filament of the lamp. If the filament should become destroyed, the current will force its way through the high-resistance material F, causing it to become fused and permit the lip J to come in contact with the metal of the terminal C, thus completing a metallic line-circuit. The spring contacts L and G may be so proportioned that the upward movement of the lip J may permit them to come into contact directly, as shown in Fig. 2, though this is not essential. With the lamp shown in Figs. 1 and 2 the terminals C and D are alike, and consequently the lamp may be turned so that either terminal may be connected with the positive contact of the socket-piece.

In the cases of the lamps shown in Figs. 4 and 5 we have two well-known forms of terminals. C and D in these figures also correspond to the terminals of the lamp, and in both cases the terminal C projects downward and is formed with a recess *f*, in which the high-resistance material F is placed. The spring-contacts G and L would be slightly modified to suit these well-known forms of lamp-bases; but in principle they would remain the same. In this case there would be no necessity for the employment of the groove E.

It is immaterial to my invention, considered broadly, what the minor details of construction may be, as these details would be modified with the adaptation of my invention to any of the well-known forms of lamps in the market. The principle in all cases would remain the same—that is to say, the lamp proper would carry the high-resistance fusible or destructible material and the socket part would be provided with a spring-contact arranged to press upon the high-resistance fusible or destructible material of the lamp, while otherwise embodying the chief principles of the socket-pieces in incandescent series lighting. Therefore, while I prefer the construction shown, I do not limit myself thereto.

Having now described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. An electric lamp having two terminals, one of which is provided with a high-resistance substance capable of destruction upon the passage of an excessive current, in combination with a lamp-socket provided with a spring-contact adapted to electrical contact with one of the terminals of the electric lamp and pressing upon the high-resistance substance of the other terminal.

2. As an article of manufacture, an incandescent lamp having its base part provided with two terminals and a high-resistance substance in electrical connection with one of said terminals and capable of destruction upon the passage of an excessive current through it, in combination with a lamp-socket provided with a spring-contact adapted to electrical contact with one of the terminals of the electric lamp and pressing upon the high-resistance substance of the other terminal.

3. An incandescent lamp having its base provided with two terminals, one of which projects downward, is adapted to extend within the socket-piece, is recessed upon its end, and contains a high-resistance fusible or destructible substance.

4. As an article of manufacture, an incandescent lamp having its base part provided with two terminals and a high-resistance substance mechanically supported by and in electrical connection with one of said terminals, capable of destruction upon the passage of an excessive current through it, in combination with a socket-piece having contacts for connection with the contacts of the lamp when fitted to the socket-piece and in which one of said contacts is provided with a spring-extension or lip adapted to press upon the high-resistance material for the purpose of forming metallic contact about the lamp upon the destruction of the said high-resistance material.

5. The combination of an incandescent lamp having two terminals, high-resistance substance capable of destruction or fusion, mechanically supported by and electrically connected with one terminal of the lamp, and a socket-piece adapted to receive the lamp and provided with contacts connecting, respectively, with the terminals of the line-circuit and the terminals of the lamp and in which one of said contacts has a spring-extension on one of the contacts of the socket-piece, resting normally against the high-resistance substance of the lamp.

6. The combination of an incandescent lamp having two terminals, a high-resistance substance capable of destruction or fusion, mechanically supported by and electrically connected with one terminal of the lamp, a socket-piece adapted to receive the lamp and provided with contacts connecting, respectively, with the terminals of the line-circuit and the terminals of the lamp, one of said contacts



having a spring-extension resting normally against the high-resistance substance of the lamp, and a cut-out switch arranged within the socket-piece for shunting the lamp without the destruction of its filament.

5 7. An electric lamp having terminals C and D, formed with grooves E, combined with a support, spring-contacts G and L, connecting with the terminals of the line, the former being provided with the edge K, the finger I, and lip J and the latter with the curved edge M, and a high-resistance destructible substance arranged between the lip J and the terminal C of the lamp.

10 8. An electric lamp having terminals C and D, formed with grooves E, combined with a

socket-casing, spring-contacts G and L, connecting with the terminals of the line, the former being provided with the edge K, finger I, and lip J and the latter with the curved edge M, a high-resistance destructible substance arranged between the lip J and the terminal C of the lamp, and means for adjusting the pressure of the contacts G and L against the contacts C and D of the lamp.

25 In testimony of which invention I have hereunto set my hand.

BRUCE FORD.

Witnesses:

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C. M. DIETTERICH.