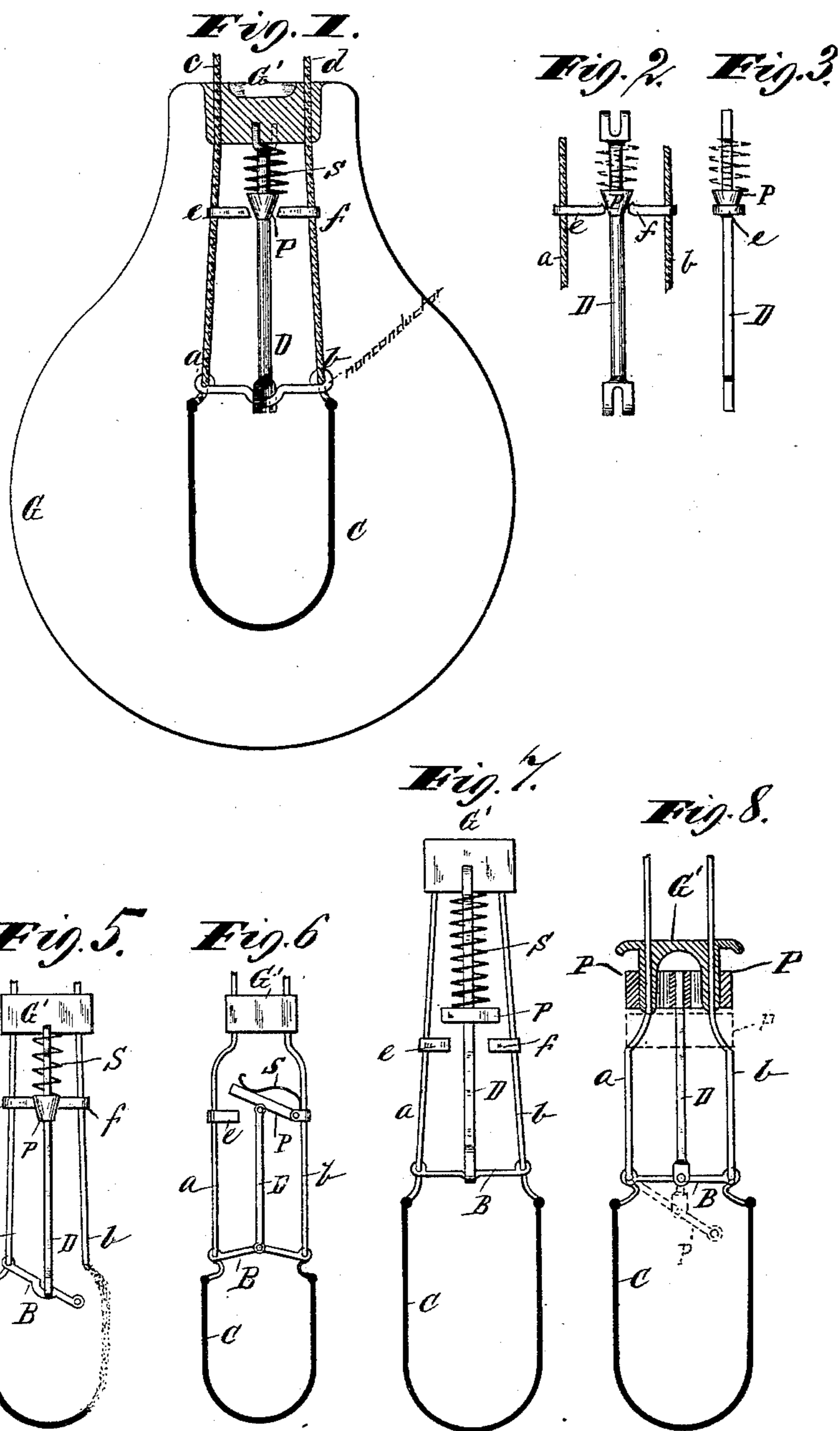


(No Model.)

E. THOMSON.  
INCANDESCENT LAMP.

No. 462,339.

Patented Nov. 3, 1891.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

## INCANDESCENT LAMP.

SPECIFICATION forming part of Letters Patent No. 462,339, dated November 3, 1891.

Application filed March 12, 1887. Serial No. 230,726. (No model.)

*To all whom it may concern:*

Be it known that I, ELIHU THOMSON, a citizen of the United States, and a resident of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Automatic Cut-Outs for Incandescent Lamps, of which the following is a specification.

The object of my present invention is to provide a novel means whereby a shunt or short circuit may be automatically formed in an incandescent lamp in case of rupture of the incandescing filament.

My invention is designed especially for application to incandescent lamps when run in series on arc-light circuits or on constant-current circuits, where in the absence of an automatic switch the rupture of the incandescent conductor would interfere with the action of other devices supplied from the same general circuit.

My invention provides for a mechanical closure of a shunting-switch upon the breakage of the incandescent conductor and the resultant melting or fusion of the parts near said conductor—as, for instance, the wires by which the conductor is normally supported.

In a prior patent granted to me, No. 335,158, I have described a mechanically-actuated switch arranged to close the short circuit on rupture of the incandescent conductor.

My present invention provides an improved arrangement of devices for accomplishing the same result; and the invention consists in the provision of a shunting-switch which shall come into operation to close a circuit independent of the incandescent conductor through the action of the electric arc existing within the lamp on rupture of the incandescent conductor, the switch being in the nature of a mechanical switch that shall close the circuit by being moved from one position to another position, where it will make connection with a contact or contacts connected to the pole or poles of the lamp.

In the accompanying drawings, Figure 1 shows a lamp and switch embodying my invention. Fig. 2 is a side elevation, and Fig. 3 is an edge view of details. Fig. 4 shows the parts of the switching device in the position

which they hold when the circuit through the incandescent conductor is complete. Fig. 5 illustrates the action on the rupture of the incandescent conductor. Figs. 6, 7, and 8 illustrate modifications of the invention.

G indicates the ordinary inclosing globe of an incandescent lamp, and C the incandescent conductor, of carbon or other material, which is connected in any suitable manner with the ordinary metallic conductors or leading-in wires *a b*, sealed at *c d* in the neck G' of the lamp.

At *e f* are indicated conducting projections or extensions, which may form parts of the wires themselves or may be otherwise electrically connected with the two poles of the lamp, so that if connection be formed between parts *e f* a shunt or short circuit will be made and a path preserved for the current independent of that ordinarily furnished by the incandescent conductor C. The connection between the parts *e f* may be conveniently formed by means of a piece P, of conducting material, attached to or forming a part of a rod or bar D, which rests normally upon a piece B, of non-conducting material, which preferably forms a bridge-piece spanning the conductors *a b* and normally held in position by bends or extensions of said conductors, as indicated.

The rod D may be formed out of a flat sheet of copper, as indicated in Figs. 2 and 3, and provided with forks at opposite ends, one of which holds the bar in place on the bridge-piece B, while the other holds the upper end in place on an internal projection at the neck of the lamp, as indicated.

A spring S tends to force the rod D downward, but is normally prevented from so doing by means of the piece B, which is supported or held from movement by the conductors *a b*. The piece B is preferably supported loosely at its opposite end on the conductors, as indicated, by providing it with hooks or eyes, through which the conductors *a b* pass.

If the incandescent conductor C should give way at any point, an arc is formed which speedily burns off one or the other of the conductors *a b*, according to the direction in which the current flows, thus releasing the piece B,

which is brought to take the position shown in Fig. 5, thereby allowing the spring S to close the switch and shunt the lamp.

In the modification shown in Fig. 6 the shunting-switch is formed by a movable conducting-piece P, supported on one leading-in wire *b* and adapted to make contact at its free end with the projection *e* when forced down by the spring S. The release of either end of the bar B will obviously allow the switch to operate.

In the modification shown in Fig. 7 the part P is formed as a flange or disk, and the ends of the rod D are held from lateral movement by being seated in openings in the cross-piece B and the part G. Instead of a spring, the effects of gravity may be employed, as indicated in Fig. 8, where the part P is made as a band or ring of conducting material actuated and kept out of contact with the entering conductors by the internal projection at the neck of the lamp. The entering conductors are bent outward, as shown, so that when the part P, which is normally held up by the rod D and bridge B, is allowed to fall it will come to rest upon the conductors *a b* and form a connection between them.

Other modifications embodying the principle of my invention will readily suggest themselves to those skilled in the art.

What I claim as my invention is—

1. The combination, with an incandescent lamp, of a shunting-switch having a bias toward its circuit-closing contact and normally held out of action by a part within the vacuum space of the lamp located to be acted upon by the heat of the electric arc forming on rupture of the incandescing conductor.

2. The combination, with an incandescent lamp, of a shunting-switch normally held out of action by a destructible part within the vacuum space of the lamp in the path of the arc forming on rupture of the incandescent conductor.

3. The combination, in an incandescent

electric lamp, of a shunting-switch normally held out of action by a lamp-conductor at a destructible part of the latter, located within the vacuum space within the lamp, where it will be fused by the arc forming on rupture of the incandescing conductor.

4. The combination, with an incandescent lamp, of a switch within the same, actuated by any suitable means and normally held out of action by a non-conducting support bridging the leading-in wires within the vacuum space of the lamp, as and for the purpose described.

5. The combination, with a switch contained within an incandescent lamp, of a detaining bridge-piece resting on bends or projections near the point of attachment of the incandescent conductor, as and for the purpose described.

6. The combination, in an incandescent lamp, of a shunting-switch, and a detaining bridge-piece B, loosely resting on bends or extensions from the leading-in conductors.

7. The combination, in an incandescent lamp, of a shunting-switch, a detaining-piece for holding said switch from action, and a leading-in wire by which said piece is supported at a point within the vacuum space of the lamp, so as to be released on rupture of the incandescing conductor.

8. The combination, with an incandescent lamp, of a shunting-switch, leading-in wires for said lamp, a detaining bridge-piece B for the switch loosely supported on said leading-in wires, all as set forth, so that on fusion of either wire the bridge-piece will be released and allow the shunting-switch to operate.

Signed at Lynn, in the county of Essex and State of Massachusetts, this 7th day of March, A. D. 1887.

ELIHU THOMSON.

Witnesses:

E. WILBUR RICE, Jr.,  
J. W. GIBBONEY.