

(No Model.)

E. THOMSON.
INCANDESCENT LAMP.

No. 462,338.

Patented Nov. 3, 1891.

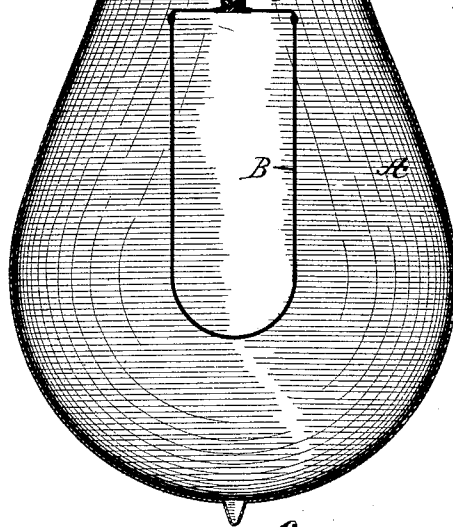
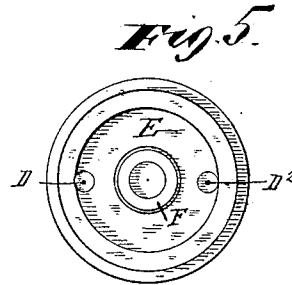
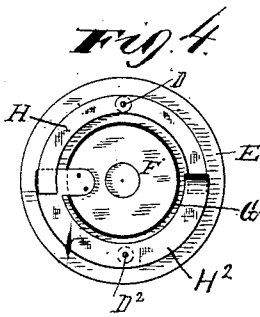
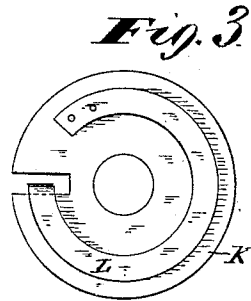
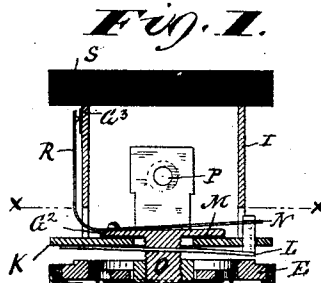
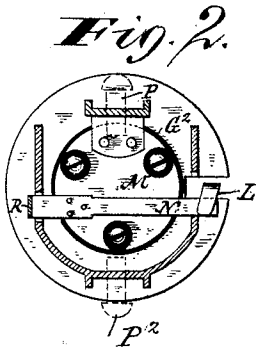
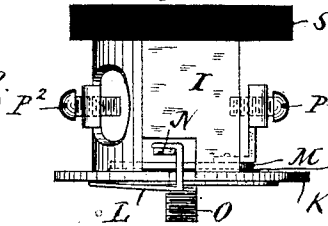


Fig. 6.

WITNESSES:

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

INCANDESCENT LAMP.

SPECIFICATION forming part of Letters Patent No. 462,338, dated November 3, 1891.

Application filed December 27, 1886. Serial No. 222,547. (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 Incandescent Lamps, of which the following is a specification.

My invention relates to incandescent lamps designed for use in series with one another or with arc lamps on circuits carrying currents of high tension.

The object of the invention is to provide means whereby the circuit shall be automatically completed in case of the rupture of the incandescing strip or conductor of the lamp, so as to preserve the circuit for other lamps or devices of the series.

My invention relates, further, to certain improvements in the devices for supporting the lamp and making electric connection with the lamp-electrodes, and also to a means for completing the circuit when the lamp is withdrawn from its support.

My invention consists in the novel combinations of devices and details of construction, that will be described in connection with the accompanying drawings, and then more particularly specified in the claims.

In the accompanying drawings, Figure 1 is a vertical cross-section of an incandescent lamp and support therefor constructed in accordance with my invention. Fig. 2 is a horizontal cross-section on the line X X, Fig. 1, showing a part of the automatic switch devices in plan. Fig. 3 is a view of the lamp-support, looking upward. Fig. 4 is a plan of the devices located at the base of the lamp, looking upward. Fig. 5 is a plan of the same devices, looking downward from the outside. Fig. 6 is a side elevation of the supporting devices of the lamp-socket.

In the drawings the usual casing surrounding the supporting parts is omitted.

A indicates the inclosing globe of the lamp, and B the incandescing conductor therefor, connected with wires or conductors, which lead to suitable plates, studs, or strips forming the lamp-electrodes for making connection or contact with suitable electrodes on the lamp-support, the latter being connected with the circuit, so that when the lamp is in place

the incandescing conductor B shall be supplied with current from such circuit.

One of the lamp-electrodes consists of a plate E, of conducting material, connected or otherwise secured to the base of the lamp, while the other electrode consists of the plate F, having a screw-threaded boss or projection at its center and insulated from the plate or electrode E by a thin film of mica or other insulating material, (indicated at G.)

The electrode or plate F is adapted to make connection with a screw O, carried by the support in the socket for the lamp and projecting from a plate or support M, which is carried by but insulated from another plate K by a thin film of insulating material, such as mica, (indicated at G².) Plate M carries a binding-screw P for connection with the exterior circuit, while plate K is in connection with the other pole of the circuit through a binding-screw P², which is carried by the frame or support I. Plate K also carries a spring L, which forms the other electrode of the lamp support or socket.

When the lamp is screwed upon the conducting-screw O, the plate E comes into contact with the spring L, thus connecting one pole of the exterior circuit with the lamp-electrode E at the same time that the other pole is connected with the lamp-electrode F through the screw O and plate M.

The spring L has a bias, which tends to cause its hooked free end to make connection with a contact-stop consisting of a spring N, carried by the plate M, so that when the lamp is removed from its support and the spring L is free to act the two poles of the exterior circuit are automatically connected together directly from one binding-screw P through plate M and spring N, spring L, plate K, and support I to the other binding-screw P². When, however, the lamp is screwed to its support, the circuit just described is broken at the stop N through the pressure of the electrode E upon spring L, such interruption of circuit not occurring, however, until circuit has been established through the lamp by contact of the lamp-electrodes, respectively, with the two electrodes of the lamp-support.

In order that there may be no interruption

of the general circuit in case the incandescing conductor B should break, I locate the conductors making connection therewith in such proximity to one another at the point where they pass through the glass that the electric arc forming on rupture of the conductor B shall unite the conductors together, and thus preserve the circuit. At the point C the entering conductors D D² or the extensions thereof are embedded in the glass or other sealing material, which is compressed around them and normally acts not only as the seal for the lamp-globe, but also as the insulating material of such conductors. In order to insure the union of the lamp-conductors at this point, I prefer to give them a twist around one another, as indicated.

The conductors D D² are united with the lamp-electrodes through devices which virtually constitute a thermostatic shunt-switch adapted to unite the two poles of the circuit in case on rupture of the filament B the lamp-conductors should fail to be united at the point C by the electric arc. A switch adapted to this purpose consists of two springs H H². The spring H, as more clearly shown in Fig. 4, is fixed at one end to the under side of the plate or electrode E, while its free end is located over the end of spring H² or a part connected to or formed on the plate or electrode F. Spring H² is attached to plate or electrode F, while its free end is located over the fixed end of spring H or electrode E. The result of this arrangement is obviously that if the springs are either of them released the two lamp-electrodes will be connected directly and independently of the incandescing conductor B. The springs are normally held from making contact by the lamp-conductors D D², which are soldered, as indicated, near their lower ends to the springs H H².

The plate E is perforated, as shown, to permit the insertion of an instrument for lifting the springs H H² away from contact and soldering or otherwise connecting the lamp-conductors to them. The springs H H² are normally sustained by the lamp-conductors D D²; but if the electric arc should fail to form the short circuit at the point C one or both of the conductors D D² will be melted at the point just outside the lamp-globe and one or both of the springs H H² will be released and complete the required short circuit, so as to preserve the general circuit.

The cut-out devices so far described will ordinarily act in case the rupture of the filament takes place, while the globe A remains intact, since in such case the arc may readily be established. If, however, the lamp-globe A should break and the filament B should be ruptured at the same time, there would be danger of an arc not forming, so that no short circuit would be established either at C or at the springs H H². To provide for such a contingency I combine with the lamp suitable cut-out devices, which may be operated by the disruptive action of the current on the circuit.

Such a device consists of a spring R, carried by the plate M, connected with one pole of the circuit and having its free end normally pressing toward a part connected with the other pole of the circuit—such, for instance, as the frame I. Interposed between the free end of the spring R and the frame I is a thin layer G³ of insulating material—such, for instance, as paper. If the circuit be interrupted at any portion thereof contained between the two poles of the lamp-support the electric current will force its way through the insulating-film G³ and establish a direct connection after the manner described in a prior patent granted to me, No. 305,413. Any other device adapted to work through the power of the current to force its way across an insulating-space, so as to establish a continued connection without initial contact, such as is ordinarily required to form an electric arc, will answer the purposes of this portion of the combination forming my invention. The purpose of this portion of my invention is also attained through the provision of the thin sheets G² of insulating material interposed between the two lamp-electrodes and the two support-electrodes, inasmuch as such sheets of material are sufficiently thin to allow an electric arc to form and metallically unite the parts which they hold separate. It will appear, also, that in case the thermostatic cut-out formed by the springs H H², normally held in position by the supporting-wires, should fail to act or should be entirely destroyed by the electric arc the electrodes E F may still act to preserve the circuit by being united through the fusing action of the electric arc.

I do not claim herein the construction of the socket-switch operated by the lamp when screwed into place, the manner of mounting the various parts so that their supporting parts shall be operated by a thin film of mica or other insulation adapted to be punctured by the disruptive action of the current on sudden interruption of the circuit in the lamp, or the combination, with the one or more cut-outs adapted to be operated by the electric arc, of a second cut-out operated by the disruptive action in case the arc should fail to form, as these devices form the subject of claims in another application for patent filed by me August 4, 1890, Serial No. 360,940, as a division of the present application.

I am aware that it has been before proposed to place the entering conductors of an incandescent lamp in such proximity that they will become electrically united automatically upon rupture of the incandescent filament, either through the action of the arc following such rupture or by the disruptive action of the spark following the rupture and forcing its way from one conductor to the other.

I am also aware that it has been proposed to twist the leading-in wires, which are situated in fusing proximity, around one another at a point outside the vacuous space, as

claimed in the patent of E. H. Johnson, No. 393,473, dated November 27, 1888.

What I claim as my invention is—

1. An incandescent electric lamp having its entering wires or conductors twisted around one another where they pass through and are embedded in the material of the lamp-globe, so as to be normally held apart by such material, as and for the purpose described.
2. The combination, with the lamp electrodes or contacts, of springs connected thereto and normally tending to make connection with one another, and entering conductors soldered to said springs and normally holding the same from contact, said conductors being properly arranged to be in the electric arc forming on rupture of the circuit through the lamp, as and for the purpose described.
3. In a series incandescent lamp, a short-circuiting or cut-out switch normally tending to close circuit and normally held open by a fusible material properly located to be fused by the electric arc forming on breakage of the incandescent conductor.
4. In combination with an incandescent electric lamp, a thermostatic shunting-switch located in proper position to be operated by the electric arc on continuation of the electric arc within the lamp, forming on rupture of the incandescing conductor.
5. The combination, with an incandescent electric lamp, of a thermostatic shunt-switch

normally tending to close a shunt and normally held open by a device placed in proper position to be acted upon by the electric arc forming on rupture of the incandescing conductor.

6. The combination, with an incandescent lamp, of a shunting-switch, and an entering conductor sustaining or holding the same normally open, said conductor being arranged in position to be involved in the electric arc forming on rupture of the incandescent conductor, as and for the purpose described.

7. In an incandescent electric lamp, a cut-out composed of members held apart by a destructible fastening located in the path of the arc, which passes down the circuit-wires when the filament is broken.

8. The combination, in an incandescent electric lamp, of a shunting-switch, a contact therefor, and a leading-in wire normally holding or detaining said switch from action, the portion of the leading-in wire used for such purpose being one that will be operated upon by the heat of the electric arc forming on rupture of the incandescing conductor.

Signed at Lynn, in the county of Essex and State of Massachusetts, this 21st day of December, A. D. 1886.

ELIHU THOMSON.

Witnesses:

W. O. WAKEFIELD,
E. WILBUR RICE, Jr.