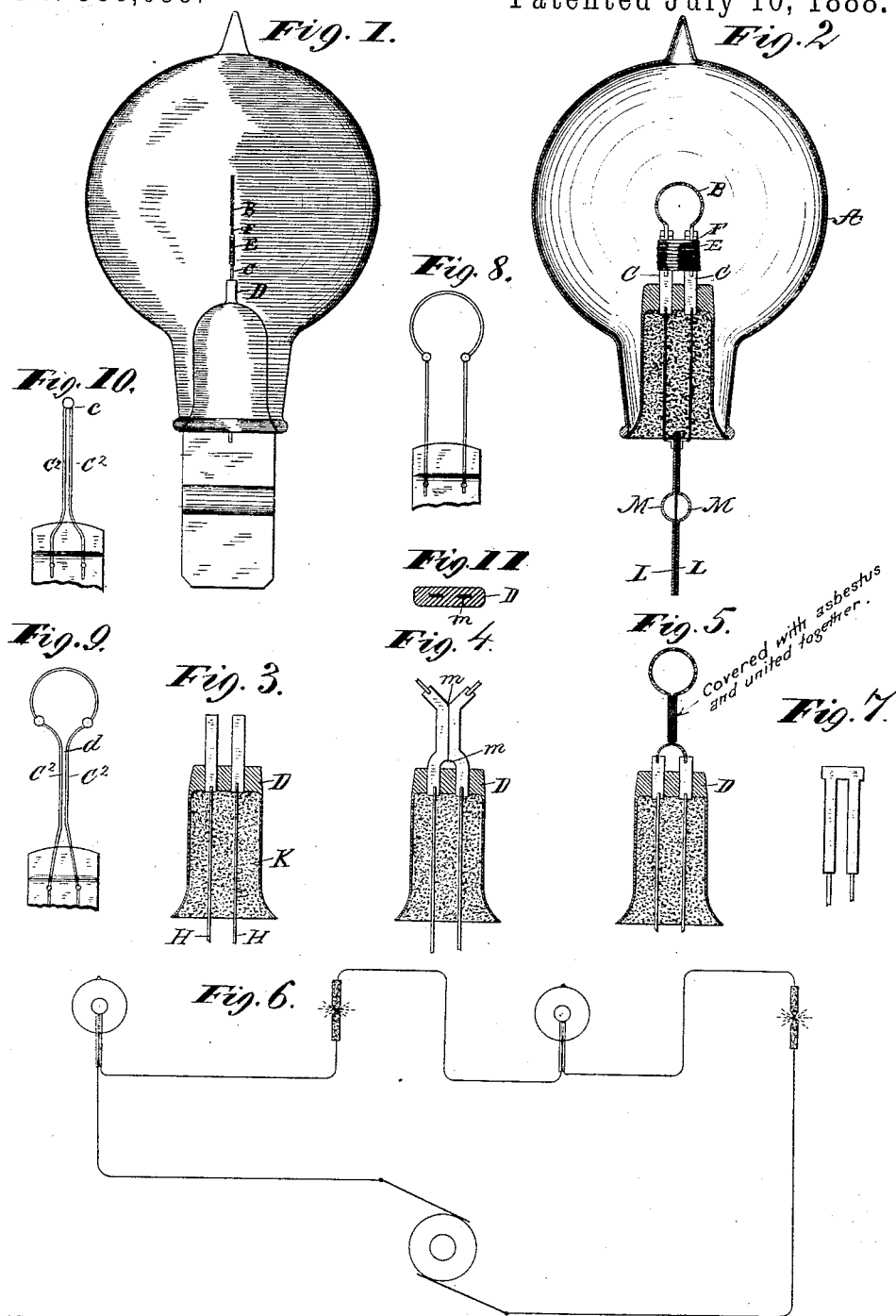


(No Model.)

M. J. WIGHTMAN & H. LEMP.  
AUTOMATIC CUT-OUT FOR INCANDESCENT LAMPS.

No. 386,099.

Patented July 10, 1888.



Witnesses:  
Gabriel J. W. Galster.  
Wm. H. Capel

Made J. Wightman  
 Hermann Lamp.  
 By  
 J. H. Townsend  
 Attorney.

# UNITED STATES PATENT OFFICE.

MERLE J. WIGHTMAN AND HERMANN LEMP, OF HARTFORD, CONNECTICUT.

## AUTOMATIC CUT-OUT FOR INCANDESCENT LAMPS.

SPECIFICATION forming part of Letters Patent No. 386,099, dated July 10, 1888.

Application filed March 2, 1886. Serial No. 193,752. (No model.)

### *To all whom it may concern:*

Be it known that we, MERLE J. WIGHTMAN and HERMANN LEMP, citizens of the United States, and residents of Hartford, in the county of Hartford and State of Connecticut, have invented a certain new and useful Automatic Cut-Out for Incandescent Lamps, of which the following is a specification.

Our invention relates to the construction of incandescent lamps, and involves, more particularly, features of improvement in the sealing of the lamp and in the arrangement of conductors within the lamp, whereby the same is especially adapted for use on circuits carrying heavy currents.

The objects of the invention are more especially to improve the sealing of the lamp, and also to so construct the same that in case of rupture of the filament or conductor another path for the current on the circuit shall be automatically formed.

The lamp is designed for working with a current of as much as nine amperes, or the amount that is ordinarily employed in working electric-arc lamps. Incandescent lamps constructed in accordance with our invention may be run on circuits in series with one another in just the same manner as electric-arc lamps; or arc and incandescent lamps of our invention may be run on the same circuit in series with one another.

The features of invention will be first described in connection with the accompanying drawings, and then more particularly specified in the claims.

Figure 1 is a side elevation of a lamp embodying our invention. Fig. 2 is a partial vertical section taken in a plane at right angles to Fig. 1. Figs. 3, 4, 5, and 7 show various arrangements of conductors that enter the lamp-globe for supplying current to the incandescent carbon. Fig. 6 is a diagram illustrating arc lamps and incandescent lamps of our invention arranged in series on the same circuit. Figs. 8, 9, and 10 illustrate the principle of that part of our invention which relates to the arrangement of the conductors in the lamp, so that rupture of the main circuit by breakage of the incandescing conductor

or strip may be avoided. Fig. 11 is a cross-section through the point of sealing.

A indicates the globe of the lamp, and B the incandescing conductor made of carbon and having a comparatively low resistance.

C C are entering conductors, sealed in the manner to be hereinafter described, and connected, respectively, with the general circuit at opposite sides of the filament.

Heretofore the entering conductors have been placed at a considerable distance apart, as indicated in Fig. 8. Our invention consists in placing the two entering conductors connected with the circuit at opposite sides of the lamp, very near together at some point within the lamp, as indicated in Fig. 9, which can be easily done, since the difference of potential on opposite sides of the lamp need not exceed eight to nine volts. The proximity of the conductors is made such that when the filament breaks the arc that is established between the two broken ends will, when it reaches the two conductors C C at the point *d*, where they are brought close together, fuse the two conductors together into a ball or mass, C, Fig. 10, thus short-circuiting the break by a solid joint. The proximity of the conductors at *d* before the joint is formed must of course be varied with differences in the resistance of the incandescent conductor B and the strength of the current in the circuit. The measure of the distance is, on the one hand, a separation, such as will maintain a proper insulation with a given resistance of conductor B and consequent differences of potential between the conductors C C, and, on the other, a proximity such as will permit the arc forming to fuse one or both of the conductors, so as to establish an electric connection between them.

The necessary conditions are readily followed with a low-resistance conductor, B, such as we employ, since the small difference of potential permits us to place the conductors C C in proper proximity for becoming fused together when the conductor B breaks, without, however, sacrificing the integrity or safety of the insulation between the conductors C C, so long as the incandescing conductor B remains intact.

We have found that when the lamp is made with large entering conductors C C, sealed close together in the glass, the tendency of the latter to crack is greatly increased. To overcome this difficulty, the conductors C C are made of flat conductors, and the glass at the point of sealing is compressed against the flat or plane surfaces of the same in the process of sealing by means readily understood by those skilled in the art, thus making a perfectly tight seal. The conductors are made of sheet-platinum or other metal. The mass of glass compressed against the plane surfaces of the sheet metal at the point of sealing is indicated at D, Figs. 1, 2, 3, 4, 5, and 11. We have found in practice that by this means we effectually overcome the tendency to cracking at the points of sealing when a current of as much as ten amperes is employed.

In order to cause the formation of a fused joint between the conductors on rupture of the incandescent B, fine copper or other wire E may be wrapped around them, as shown in Fig. 2, a piece of mica or other insulating material being interposed between one of the conductors C and the wire. By this wire E conducting parts, connected, respectively, with opposite sides of the lamp, are brought into proper proximity to be fused together by the arc, as already explained. Outside the lamp-globe the conductors C C are connected to or form continuations of the conductors H H, of any suitable material. The glass cavity in which the latter lie is packed with asbestos, plaster-of-paris, or other material, and the lower end of the chamber at the end of the lamp-neck is sealed with wax or other sealing material. These devices add to the security of the sealing.

Outside the sealing the wires or conductors H H are secured to two broad flat plates of metal, L L, separated by a sheet of mica. These plates serve to make connection with a spring-socket of peculiar construction, as described and claimed in another application for patent filed by us of even date herewith. Enlargements or projections M M are formed on these plates to enter corresponding cavities in a spring-socket, as more particularly specified in the application referred to.

The conductors C C may conveniently be constructed by stamping out a single piece of sheet metal, of the general form shown in Fig. 4, which is divided along the line m m to form the two single conductors in proper proximity to be fused together by the arc.

The single sheet-metal piece is preferably formed with a bifurcated lower end, whose two portions are at a considerable distance apart, so that when the piece is sealed in the glass, as shown, and divided the two conductors shall be separated a considerable distance at the point of sealing. The cutting or dividing of the piece in the longitudinal line passing between the two arms of the bifurcation leaves

two conductors in proximity, as before described, so that they may be fused together on rupture of the incandescent B.

The inner portion of the sheet metal is properly formed for making connection with the ends of the incandescent. A convenient conformation is one in which the piece is given lateral ears or enlargements, as indicated in Fig. 7, which may be bent around the ends of the incandescent B to support the same and form electrical connection therewith.

The incandescent may be attached either before or after the sealing of the bifurcation into the glass. By means of the flat conductors the heat will be more distributed and liability to cracking much lessened.

In order that the entering conductors may be separated as far as possible at the point of sealing, so as to lessen the accumulation of heat that would result from their proximity at such point, and in order that there may at the same time be such proximity of the conductors as will permit a fused joint to be formed on breakage of the conductor B, we sometimes employ the construction shown in Fig. 5. In this case the platinum conducting-wires that are sealed in the glass at a proper distance apart have their ends joined to two wires that are insulated with some non-inflammable material like asbestos, and are twisted together, as shown. The incandescent B is supported from the ends of the latter wires. The advantage of this arrangement, as of the other, is that the leading-in wires are a good distance apart at the point of sealing, while at the same time there is very close proximity of the wires, for the purpose previously described.

What we claim as our invention is—

1. An incandescent lamp having conductors within its globe connected to opposite ends of the lamp and placed in proper proximity to be fused into electric contact with one another by an electric arc formed across the space between them on rupture of the incandescent conductor.

2. An incandescent lamp having its entering conductors brought into proximity electrically, as described, and sufficiently near to be electrically united by fusion through the influence of an electric arc forming between them on rupture of the incandescent conductor.

3. The combination, with the conductors within the lamp, of a wrapping, of copper or other metal, enveloping both conductors, and an insulating material applied in proper manner to prevent said wrapping from forming a circuit while the lamp is operating normally.

4. In an incandescent electric lamp, an entering conductor formed at the point of sealing from a thin metal plate and having the glass compressed against its flat or plane surfaces, as and for the purpose described.

5. The herein-described improvement in methods of constructing incandescing lamps,

consisting in forming a sheet-metal blank with  
two legs or bifurcations separated from one  
another, sealing the said bifurcated portion of  
the blank, and dividing the blank longitudi-  
nally on a line passing between the two legs  
or bifurcations to make the separate insulated  
5 supports for attachment to the ends of the in-  
candescing conductor.

Signed at Hartford, in the county of Hart-  
ford and State of Connecticut, this 19th day of 10  
February, A. D. 1886.

MERLE J. WIGHTMAN.  
HERMANN LEMP.

Witnesses:

OSCA WOBAN,  
JOHN TREGONING.