(No Model.)

G. A. FREI.

INCANDESCENT ELECTRIC LAMP.

No. 486,457. Patented Nov. 22, 1892.

Fig. 1.

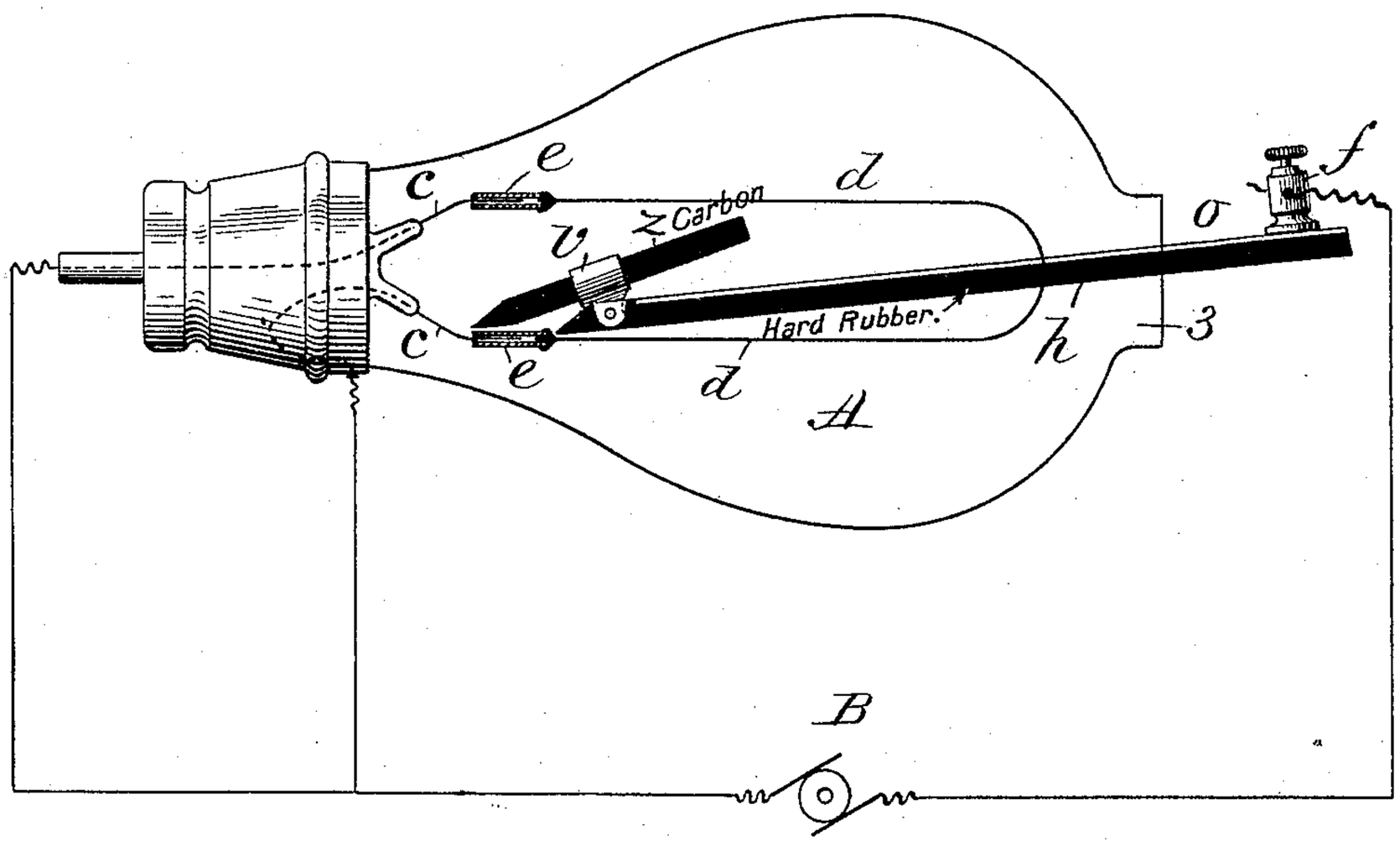
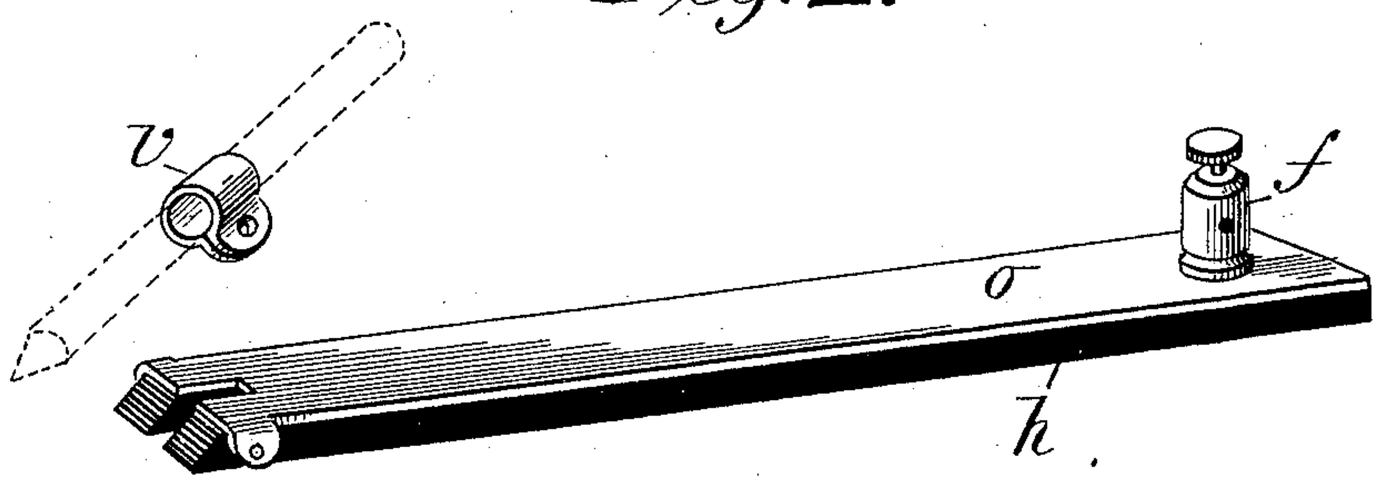


Fig. 2.



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INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 486,457, dated November 22, 1892.

Application filed March 14, 1892. Serial No. 424,836. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV A. FREI, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Incandescent Electric Lamps, of which the following is a specification.

This invention relates to incandescent electric lamps, the object being to provide improved means for renewing the incandescing filament thereof; and the invention consists in improved means for securing the new filament to the leading-in wires of the lamp, all as hereinafter fully set forth, and more particularly pointed out in the claim.

In the drawings forming part of this specification, Figure 1 is a side elevation of an incandescent electric lamp, showing an opening in its lower end, the usual leading-in wires, a filament, means for forming a uniting-joint between the ends of said filament and wires according to my invention, and electrical means for completing said joints, all as fully described below. Fig. 2 is a perspective view of certain of the parts of joint-forming implement shown in Fig. 1, and is below fully described.

In the drawings, A represents the globe of an ordinary incandescent lamp, in the lower end of which an opening 3 is made for the purpose of removing an old filament, for drawing the bulb and the leading-in wires, and for inserting and securing a new filament to the leading-in wires *c*. The lamp is held in the position shown for the manipulation of the filament and joint-forming devices by any suitable support. The ends of said wires *c* are well cleaned to prepare them to be secured to the new filament. To each end of said new filament *d* I cement a tube *e* of platinum, phosphor-bronze, or other suitable metal, either by a carbon cement or by the usual hydrocarbon deposit before it is put into the lamp or bulb. The filament and joint-tubes having been thus prepared, are introduced through the opening 3 made in the globe A, and the free ends of said tubes *e* are slipped over the ends of the leading-in wires *c*, which are electrically connected to one pole of a generator, which is indicated at B, while the other pole of the generator is connected with a carbon-pencil-holding device D. Said device consists of a carrier *h*, of hard rubber or other suitable insulating material, on which is secured a strip of metal *o* or a conducting-wire. A binding-post *f* is secured to one end of said carrier, and to its opposite end is hinged a metal sleeve *v*, which carries a carbon pencil *z*, which, owing to its said hinged support, can be adjusted to varying angles relative to the carrier *h*. Said carrier is made of suitable width to be easily passed through the opening 3 into the globe or bulb A and to be properly manipulated to secure the tubes *e* to the wires *c*, as below described.

The filament *d*, having the tubes *e* attached to its ends, having been introduced into the globe A and placed as shown in the drawings, whereby said tubes are caused to receive the ends of the leading-in wires *c*, and electrical connection having been made, as described, with said leading-in wires and one pole of the generator, said pencil-holding device is electrically connected with the other pole of the generator by a conducting-wire, as shown, one end of which is connected to said binding-post *f*. Electrical connection is made between said binding-post *f* and the carbon pencil *z* by means of the metal strip or wire *o*, with which post is in contact, and the metallic pencil-holding sleeve *v*, through the hinged connection of the latter with said strip *o*. Said pencil-holder is then introduced into the lamp, substantially as illustrated, and first one of the tubes *e* and then the other is touched with the carbon pencil, the electric circuit is closed, and the pencil is then slightly removed and an arc is drawn, which fuses the end of the leading-in wire firmly to said wire. Thus the new filament is firmly secured in the lamp. The opening in the globe through which the renewal of the filament is operated is then closed by fusion.

What I claim as my invention is—

In an incandescent electric lamp, leading-in or circuit wires, an incandescent filament, a joint for uniting said filament and said circuit-wires, consisting of a single tube, one end of which receives an end of the filament and is thereto secured, and the opposite end thereof receives an end of the leading-in wires and is fused thereto, substantially as set forth.

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