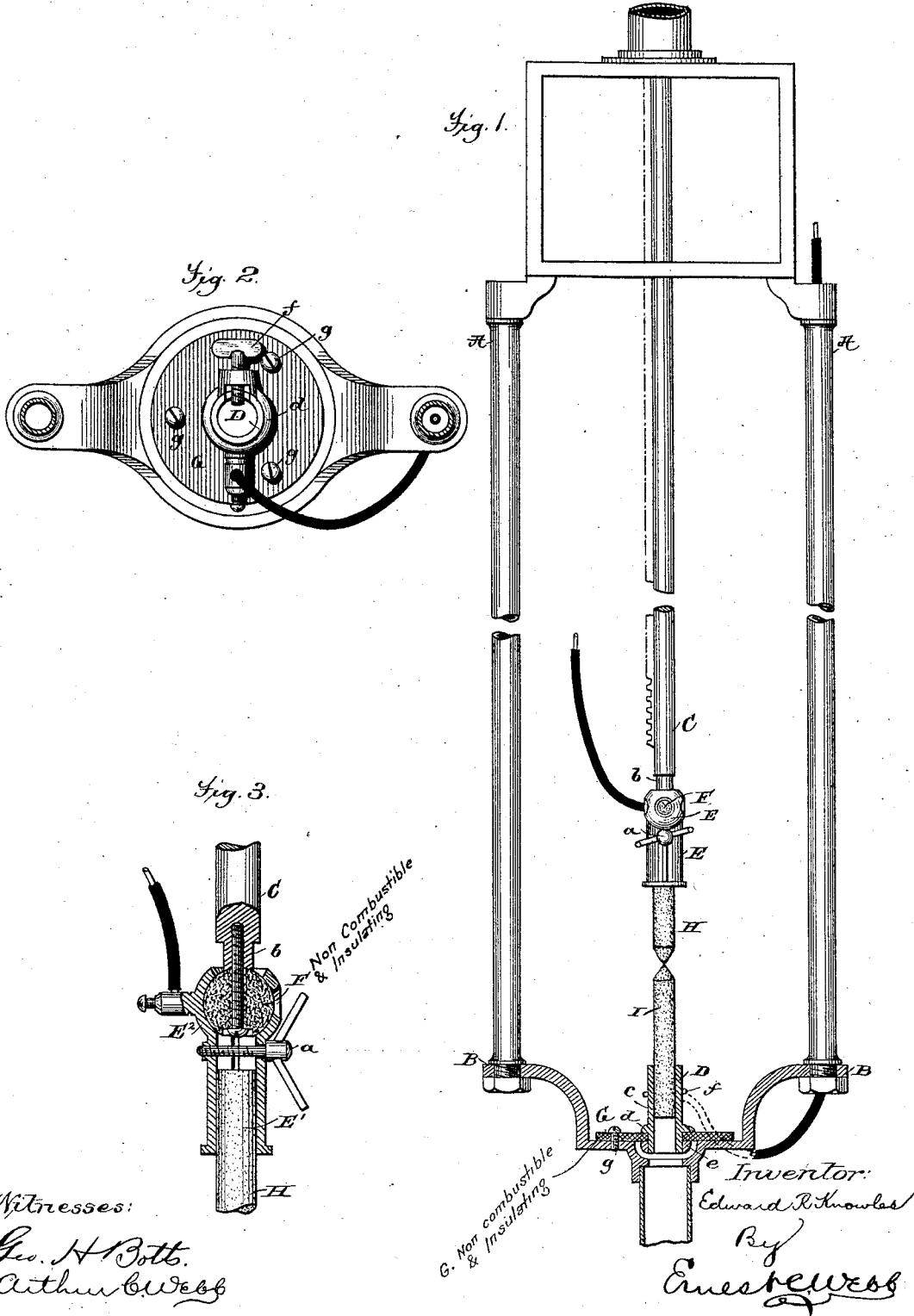


(No Model.)

E. R. KNOWLES.  
ELECTRIC ARC LAMP.

No. 379,792.

Patented Mar. 20, 1888.



Witnesses:  
 Geo. H. Bott.  
 Arthur C. Webb

Inventor:  
 Edward R. Knowles  
 By  
 Ernest Webb

ATTY

# UNITED STATES PATENT OFFICE.

EDWARD R. KNOWLES, OF BROOKLYN, NEW YORK, ASSIGNOR TO ALBERT M. KALBFLEISCH, OF NEW YORK, N. Y., AND THE MUTUAL ELECTRIC MANUFACTURING COMPANY, OF NEW YORK.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 379,792, dated March 20, 1888.

Application filed December 3, 1885. Renewed July 25, 1887. Serial No. 245,277. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD R. KNOWLES, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electric Lamps, of which the following is a full, clear, and exact description.

This invention relates to means whereby the carbons of an electric lamp are insulated from its frame in a simple and efficient manner; and the invention consists in the combination of a non-combustible insulating-ball with the upper-carbon rod and holder and a non-combustible insulating-plate with the lower-carbon holder and lamp-frame, as hereinafter particularly set forth and claimed.

In the accompanying drawings, in the several figures of which like parts are designated by similar letters of reference, Figure 1 is a front elevation, partly in section, of a lamp of the usual type, to which my improvements are applied. Fig. 2 is a top plan view of the lower part of the frame and the non-combustible insulating-plate for the lower carbon, and Fig. 3 is a detail in section of the lower end of the upper-carbon rod and holder and the non-combustible insulating-ball.

In the drawings, A B designate a lamp-frame with upper-carbon rod C, upper-carbon holder or clamp E, and lower-carbon holder D. The rod C, as shown, is reduced in diameter at its lower end, and said end is made concave to conform to the shape of a ball, F, against which it bears. This ball F is made of non-combustible insulating material, such as porcelain, and has drilled through it a hole to receive a screw, b, which also enters the lower end of the rod C and fastens the ball to the lower end of said rod, as shown. The upper-carbon holder E is made in two halves, which, when united, form a tubular socket, E', with a globular expansion, E<sup>2</sup>, at the upper end. The tubular socket receives the carbon H and the globular expansion the ball F, and when the two halves of the holder E are clamped together, as by a set-screw, a, as shown more par-

ticularly in Fig. 3, the ball and carbon H are securely held in place. The lower-carbon holder D consists of a tube, c, which passes through and is supported on a plate, G, of slate or other non-combustible insulating material. This tube is formed with a shoulder, d, which rests on the plate G, and the tube is secured in place by means of this shoulder and a nut, e, which surrounds the lower end of the tube and bears against the under side of the plate. The lower carbon, I, is held in this tube by means of a set-screw, f, and the plate G is secured to the frame by screws g g g, or in other suitable manner.

It will be seen that the ball F and plate G effectually prevent by insulation any electrical communication between the carbon-holders and the lamp-frame, and as they are non-combustible liability of damage to the frame is thereby avoided.

The line-wires are connected to the carbon-holders by binding-posts or like devices, as shown in the drawings.

I do not broadly claim insulating the lower-carbon holder from the lamp-frame, but restrict my invention in this particular to an insulating material or substance which is also incombustible.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in an electric lamp, of a non-combustible insulating-ball with the upper-carbon rod and holder, substantially as specified.

2. The combination, in an electric lamp, of a non-combustible insulating-ball and a non-combustible insulating-plate with the carbon-holders and lamp-frame, substantially as specified.

In testimony whereof I have hereunto set my hand this 10th day of November, A. D. 1885.

EDWARD R. KNOWLES.

Witnesses:

ARTHUR C. WEBB,  
CHAS. DE L. YOUNG.