

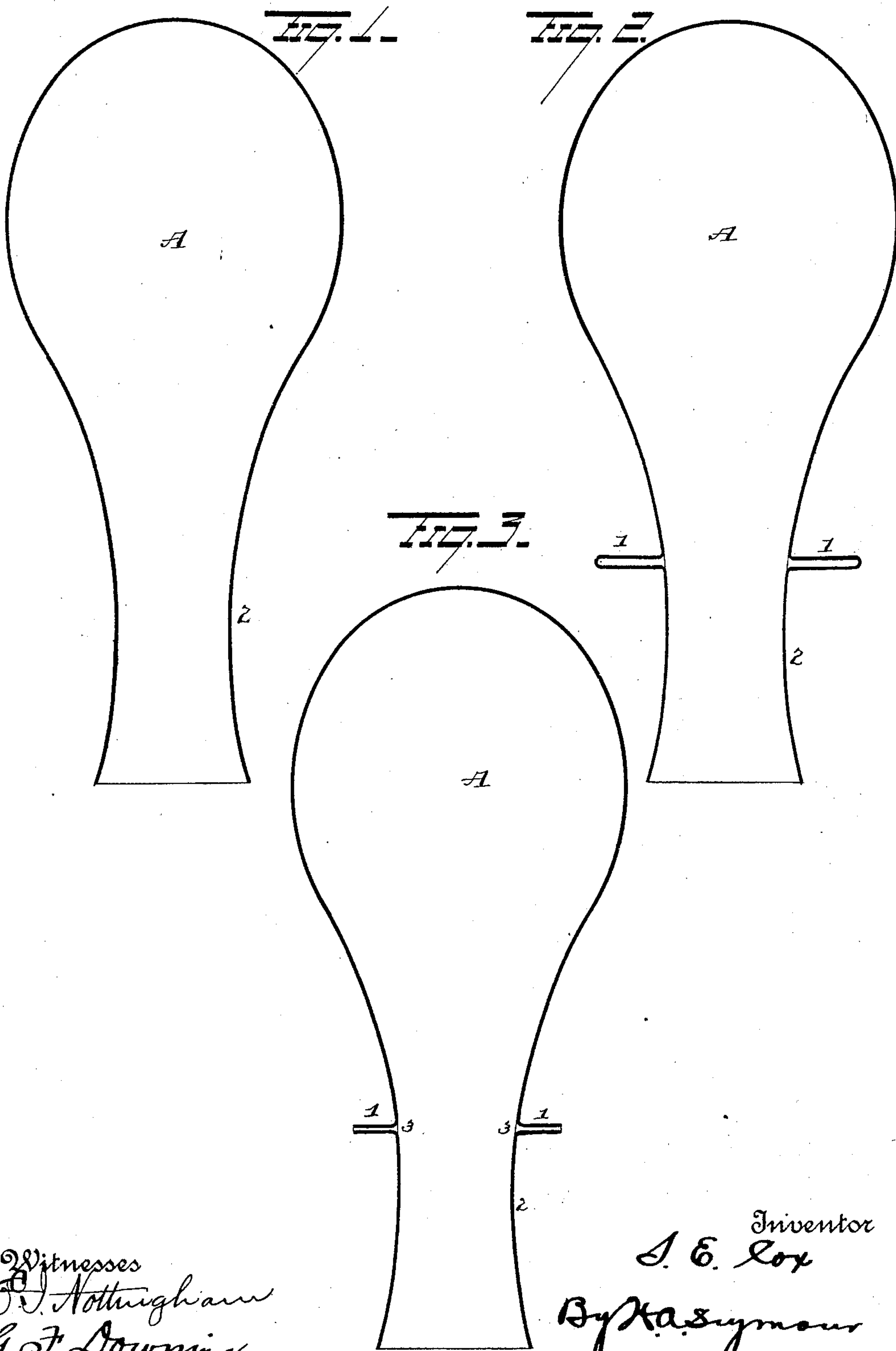
(No Model.)

3 Sheets—Sheet 1

S. E. COX.
INCANDESCENT ELECTRIC LAMP.

No. 548,036.

Patented Oct. 15, 1895.



Witnesses
C. Nottingham
G. F. Downing

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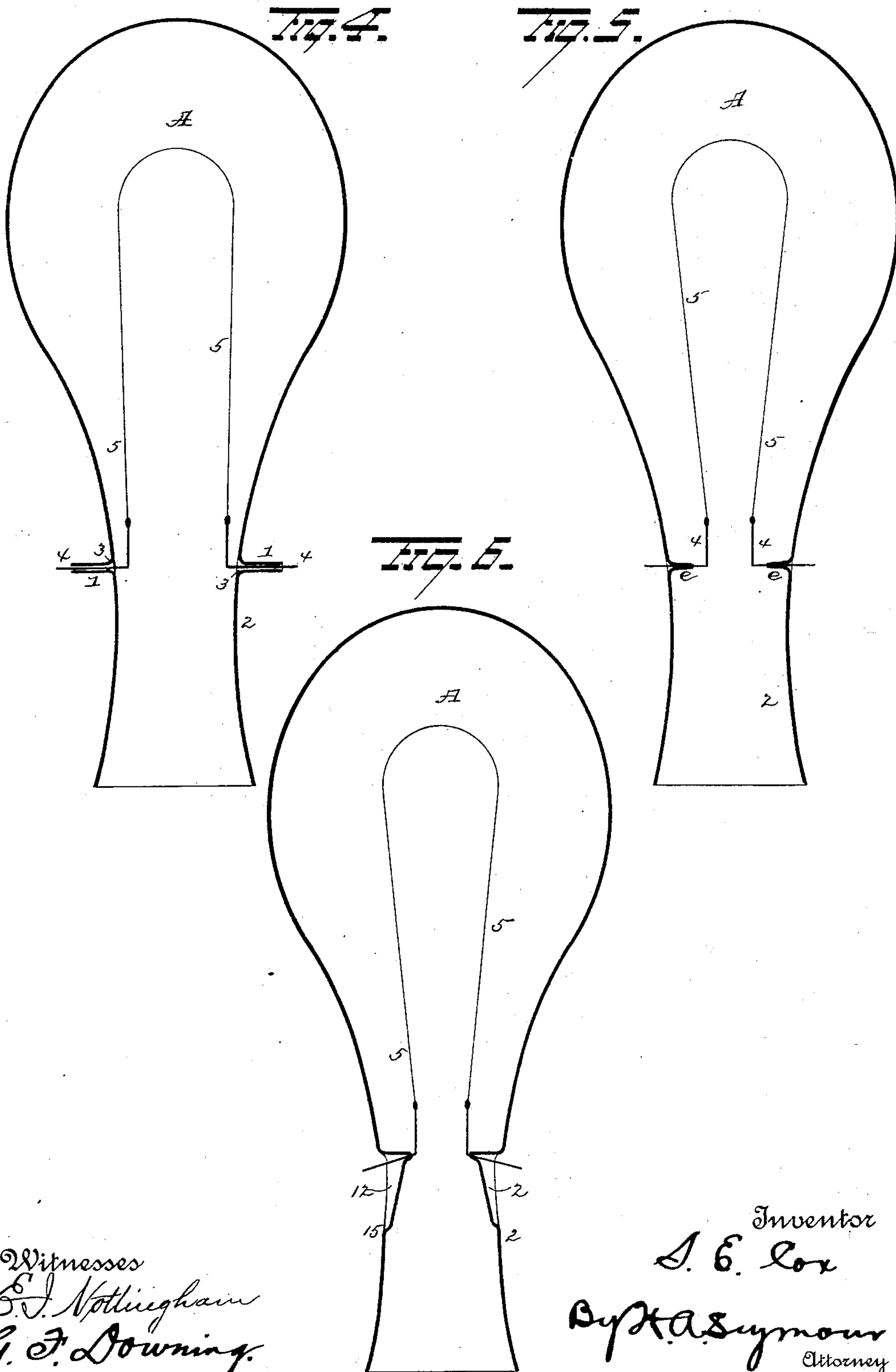
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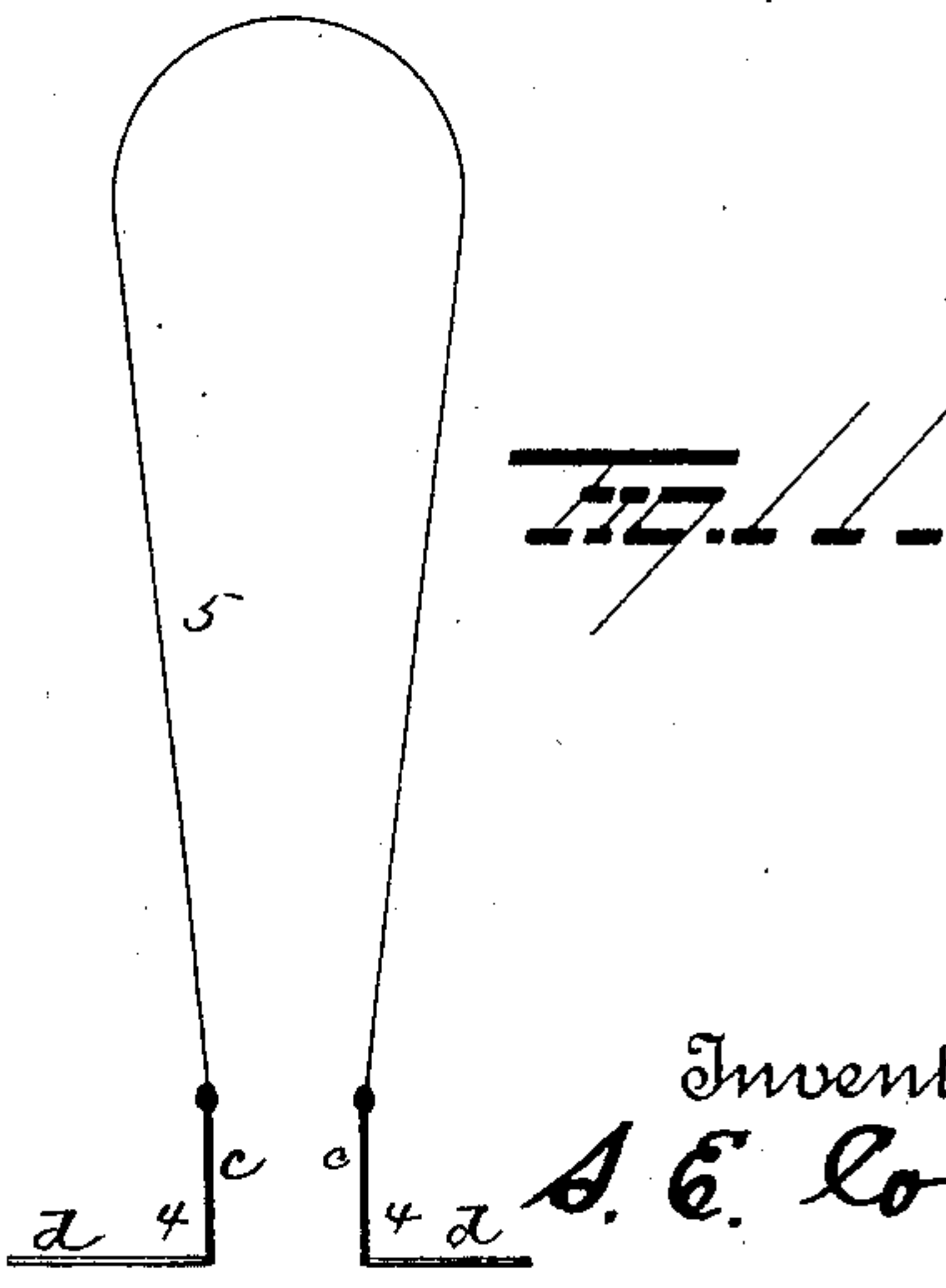
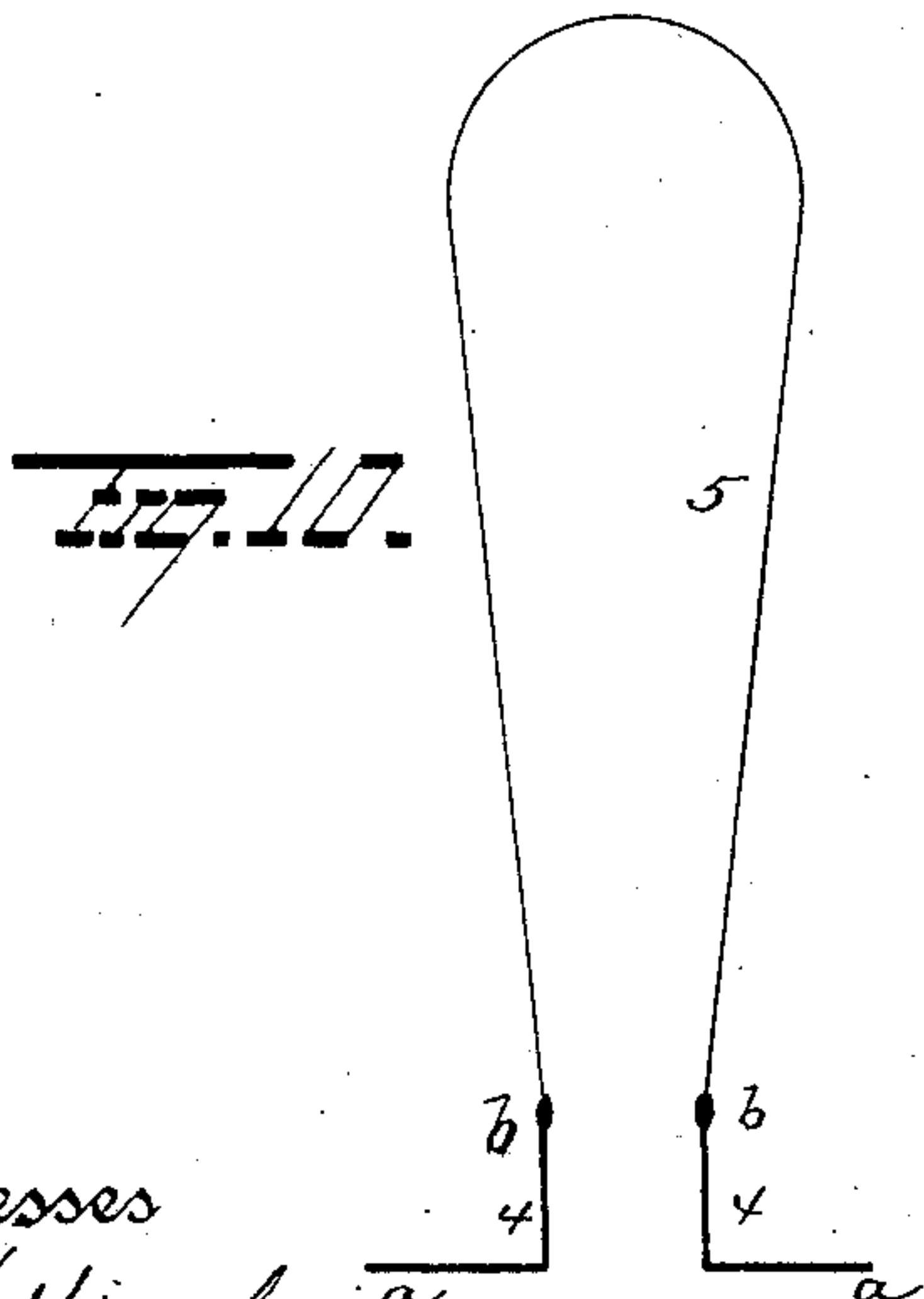
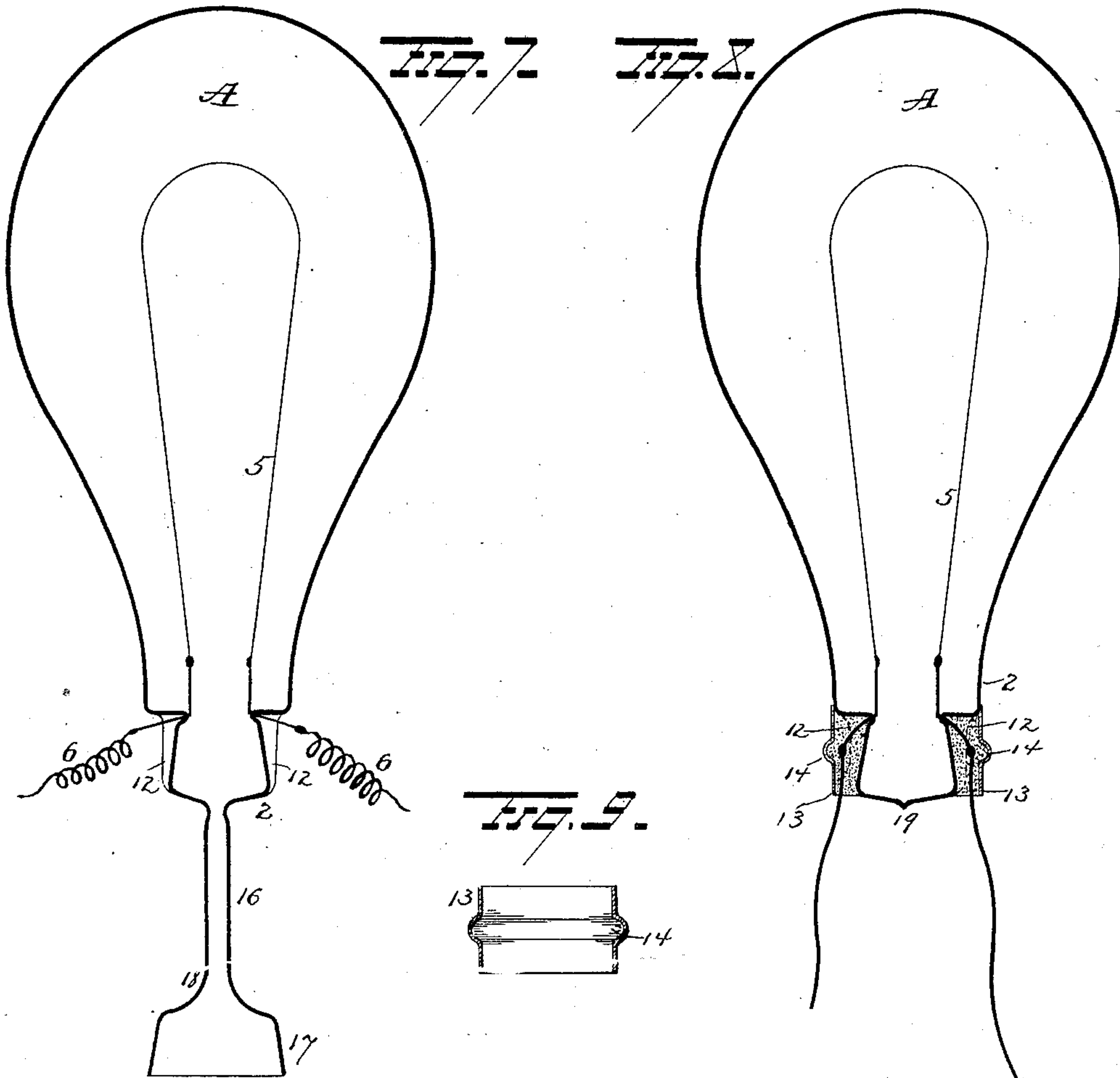
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UNITED STATES PATENT OFFICE.

SAMUEL EDWARD COX, OF CLEVELAND, OHIO, ASSIGNOR TO THE ADAMS-BAGNALL ELECTRIC COMPANY, OF SAME PLACE.

INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 548,036, dated October 15, 1895.

Application filed July 18, 1895. Serial No. 556,415. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL EDWARD COX, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Incandescent Electric Lamps and Methods of Making the Same; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in incandescent electric lamps and the method of making the same; and the invention consists in certain novel features of construction and certain novel steps in the method of making incandescent electric lamps, as herein set forth, and pointed out in the claims.

In the accompanying drawings, Figures 1, 2, 3, 4, 5, 6, and 7 are views illustrating the various stages during the manufacture of a lamp in accordance with my invention. Fig. 8 is a view of the finished lamp. Fig. 9 is a detail view of the ferrule, and Figs. 10 and 11 are separate views illustrating the leading-in wires and filament.

In the drawings I have shown the conventional form of bulb A, although any other desired form may be adopted, and in Fig. 1 the bulb is represented as it comes from the glass-manufacturer.

In carrying my improved method of making an incandescent electric lamp into effect I first form two small tubular protuberances 1 1, Fig. 2, which project outwardly about one-half to three-fourths of an inch from the neck 2 of the bulb and practically at right angles thereto. These protuberances may be conveniently made by means of a fine needle carried by a suitable holder (at right angles to the latter) and inserted into the neck of the bulb, the needle being pressed against the inner face of the glass while a jet of flame is made to play against the outer face. When the glass becomes soft or plastic, the pressure of the needle against it will cause it to be forced outwardly to form one of the protuberances 1, the same operation being repeated at a diametrically-opposite point on the neck of the bulb to form the other protuberance.

The tubular protuberances are then cut off to the desired length, preferably about one-eighth of an inch from the neck of the bulb, by means of any convenient device—such, for instance, as the ordinary glass-knife. There will now be two holes 3 3 in the neck of the bulb, as shown in Fig. 3, for the reception of the leading-in wires 4, the holes being of such size that the wires can be easily threaded through them, as shown in Fig. 4. The platinum leading-in wires 4 are each preferably about three-eighths of an inch in length from *a* to *b*, Fig. 10, and may be bent into L shape, the ends of the filament 5 being secured to them at *b* in any suitable manner.

The leading-in wires 4 may be entirely of platinum, as shown in Fig. 10; but in order to reduce the expense of the lamp it will probably be more desirable to make each leading-in wire in two parts *c d*, as shown in Fig. 11, the upper part *c*, to which the ends of the filament are attached, being of copper, and the lower part *d*, which passes through the wall of the bulb, being of platinum.

In Fig. 4 the free ends of the leading-in wires are shown as projecting loosely through the tubular protuberances on the bulb and the filament so disposed that its upright portions will be parallel with each other. A small flame applied to the outer ends of the protuberances will cause them to grasp and hold the leading-in wires in position. The flame is next applied for sealing the leading-in wires to the protuberances 1 1, the bulb being held at right angles to the flame.

When the glass surrounding the platinum wires becomes heated, it will fall onto said wires, effectually closing the bulb at these points and forming perfect seals. While the glass is still in a plastic state, the leading-in wires will be caught by a pair of small pliers from inside the bulb and pulled inwardly to any desired extent, or the wires may be grasped by the pliers from outside the bulb and pressed inwardly. When the leading-in wires are thus forced inwardly, the glass which previously formed the protuberances 1 1 will be carried with them and made to project into the bulb, as shown at *e*, Fig. 5.

It will be observed that the labor and skill

required to make the seals for the leading-in wires are very much reduced over the ordinary methods employed for accomplishing this purpose, and that there is no combination or multiplicity of pieces of glass with their attendant losses incident to the employment of the usual mounts and bridges.

In order to form a channel for the external wires 6, which must be connected to the exposed ends of the leading-in wires, I heat the glass wall for a convenient distance in a straight line directly under the points where the leading-in wires are sealed in the bulb. Then, by means of a carbon wedge or similar instrument, the walls of the bulb are pressed in to form channels or recesses 12, which are preferably made deeper at their upper than at their lower ends, or, in other words, said channels or recesses are made tapering. The joints between the external wires 6 and the outer ends of the leading-in wires are disposed in these channels or recesses. Another function of the tapering channels or recesses is to receive plaster-of-paris or similar sealing material, which forms an anchor for a metallic sleeve or ferrule 13, placed on the neck of the bulb, and prevent the detachment of said sleeve or ferrule. The sleeve or ferrule 13 is also made with an annular enlargement which forms an internal annular groove 14 for the reception of plaster or other sealing material. The joints between the external and leading-in wires are preferably located in the channels or recessed at the junction of the latter with the groove 14 in the sleeve or ferrule. The bulb is now placed in a suitable device and rotated, while at the same time a flame is allowed to play on the neck of the bulb at 15, Fig. 6. The walls of the bulb are thus softened at 15 and the portion below said point will descend. In order to prevent the wall of the bulb from thickening too much at the end of the neck of the bulb will be drawn out, so as to form a tube at 16 of proper length. The end 17 will then be cut off at 18, and a convenient means will thus be provided for the attachment of exhaust-pump. When a vacuum shall have been formed in the bulb, the tube 16 will be cut off and the neck of the bulb sealed, as at 19, Fig. 8. The sealing of the bulb at the neck end thereof gets rid of the small protuberance on the top of the bulb, which protuberance is not only unsightly, but cuts off some of the light.

It will be observed that only one piece of glass is used in the entire method of making an incandescent electric lamp as herein described, thus avoiding the necessity for the use of a separate glass mount or other separate part for supporting the filament and leading-in wires, as well as a special tube for outside purposes.

The metallic sleeve or ferrule 13, above referred to, is an important feature of my invention, for by its employment I am enabled to accomplish an object of much intrinsic value, at least from a commercial standpoint.

In manufacturing lamps for "stock" it is the usual custom to make up a quantity of lamps and place them in stock without "capping" or "basing." After an order is received to be filled the lamps are provided with special caps specified in the order. As this capping is done by the use of plaster-of-paris, a considerable time is required for drying and setting, thus necessitating much delay in shipping. It would be impractical to cap lamps as they are usually made for stock, as there are a great many different caps on the market. By means of my sleeve or ferrule 13 I can cap (provide them with ferrules) the lamps as soon as they are made and place them in stock with the plaster dry and set. The ferrule being of metal can be easily and quickly mechanically fitted to any cap in the market.

My improved lamp is simple in construction, cheap to manufacture, and effectual in all respects in the performance of its functions.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an incandescent electric lamp, the combination with a bulb, of leading-in wires passing through and sealed in the walls thereof and channels or recesses made in the wall of the bulb, in which channels or recesses the outer ends of the leading-in wires are disposed, substantially as set forth.

2. In an incandescent electric lamp, the combination with a bulb having channels or recesses in its neck, of a metallic sleeve or ferrule on said neck, and sealing material between said ferrule and neck of the bulb, said sealing material being made to enter said channels or recesses, substantially as set forth.

3. In an incandescent electric lamp, the combination with a bulb having tapering channels or recesses in its walls, of a sleeve or ferrule in said neck and sealing material between said sleeve or ferrule and neck and in said tapering channels or recesses, substantially as set forth.

4. In an incandescent electric lamp, the combination with a bulb having channels or recesses in its neck, of a sleeve or ferrule having an internal groove, on said neck, and sealing material between said neck and ferrule, and in said channels or recesses and groove, substantially as set forth.

5. The method of making an incandescent electric lamp, consisting in forming tubular protuberances on the neck of the bulb, cutting off the ends of said tubular protuberances, passing leading-in wires through said protuberances, sealing the glass on the leading-in wires, forcing the protuberances inwardly so that they will project into the neck of the bulb, and exhausting and sealing the bulb, substantially as set forth.

6. The method of making an incandescent electric lamp, consisting in sealing the leading-in wires with the filament attached there-

5 to, in the walls of the bulb, making channels or recesses in the wall of the bulb, in which the outer ends of the leading-in wires enter, exhausting the bulb, placing a metallic ferule on the neck of the bulb and inserting sealing material between said neck and ferule, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

SAMUEL EDWARD COX.

Witnesses:

EDWD. ABE,
S. W. ADAMS.