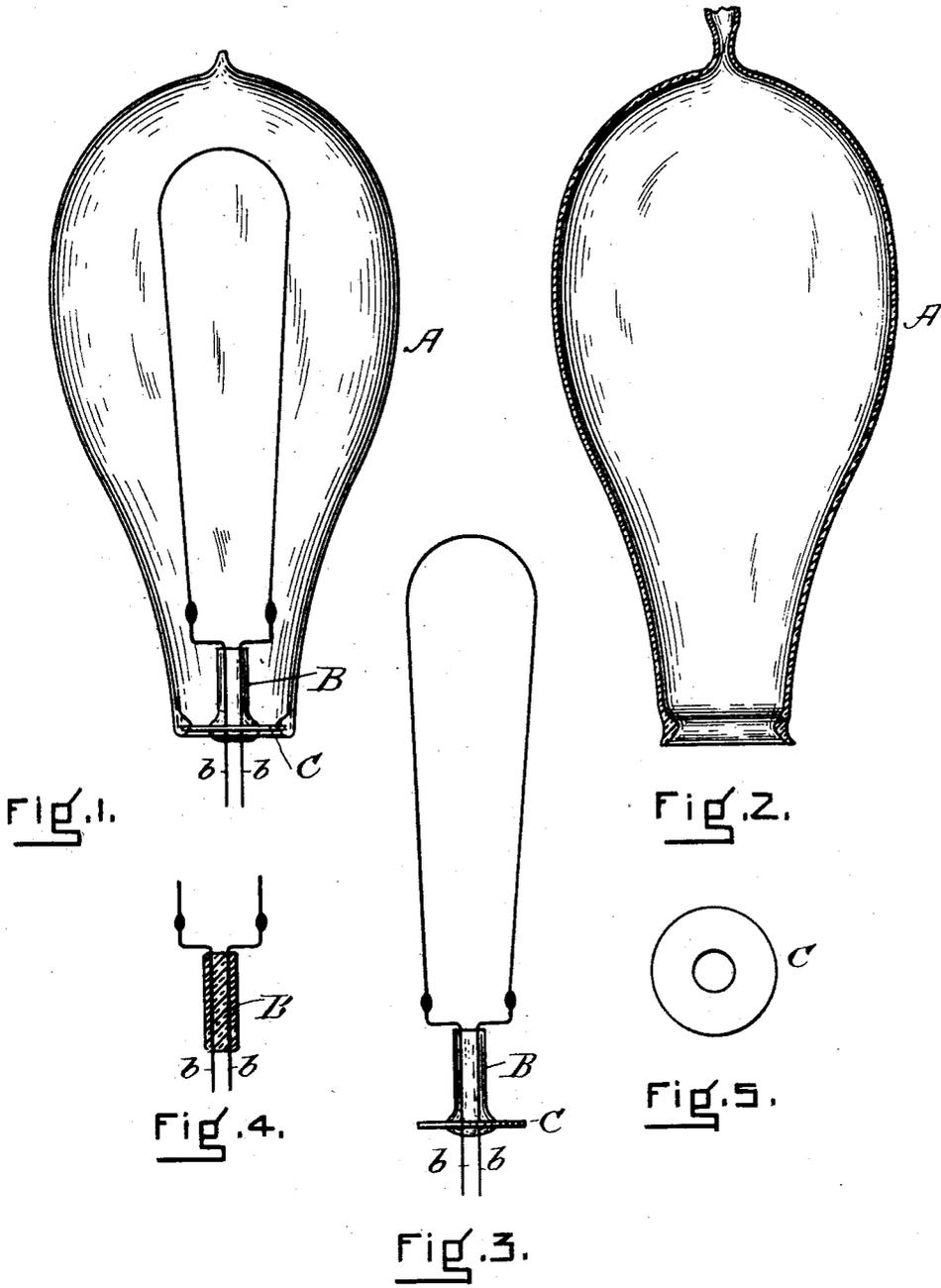


(No Model.)

G. C. SWAN.  
INCANDESCENT LAMP.

No. 516,689.

Patented Mar. 20, 1894.



WITNESSES

Frank G. Parker.  
Eva A. Guild.

INVENTOR

G. C. Swan  
By Wm. O. G. Brall  
Atty -

# UNITED STATES PATENT OFFICE.

GEORGE C. SWAN, OF BROCKTON, MASSACHUSETTS, ASSIGNOR OF TWO-FIFTHS TO FREDERICK C. RUSSELL, OF SAME PLACE.

## INCANDESCENT LAMP.

SPECIFICATION forming part of Letters Patent No. 516,689, dated March 20, 1894.

Application filed December 30, 1893. Serial No. 495,279. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE C. SWAN, of Brockton, county of Plymouth, and State of Massachusetts, have invented a new and useful Improvement in Incandescent Lamps, of which the following is a specification.

My invention relates to that class of incandescent lamps in which there is a bulb, a stem of some material carrying the leading in wires and means for joining the stem with the bulb. It is obvious that in a lamp of this kind, it is absolutely necessary for the life of the lamp that there shall be no leak and that the expansion of those parts subjected to heat shall be substantially equal; that is to say, if the leading in wires tend to expand and contract, the material of which the stem is made should expand and contract to a like degree so that all the parts shall remain constantly in the same relation to each other, and this is true also of the stem and bulb. They must expand and contract equally unless they are connected by a material which can take up the differences of expansion and contraction, that is to say, which will expand and contract to a degree substantially equal to each. This difference in expansion and contraction exists between glasses of different makes and also between glasses of different colors, and is one important item of breakage which has caused much trouble and expense in the lamp business, and it is this fault which my invention is designed to counteract.

I have shown in the drawings a lamp embodying my invention.

Figure 1 is the completed lamp. Fig. 2 is the bulb before the stem is inserted. Fig. 3 shows all the parts except the bulb. Fig. 4 shows the stem in section and Fig. 5 the disk.

A is the bulb.

B is the stem through which pass the leading in wires *b* and C is the disk.

The bulb A is made in any convenient manner and the stem is preferably made of glass and is so constructed that the leading in wires are held during their entire length from contact so that they may be carried away from the bottom of the bulb in opposite directions and hence any possibility of short circuiting be obviated without the use of a cork or other such expedient. Such a stem can be used in

my lamp because of the manner of connecting it with the bulb. It is obvious however, that the stem may be made of any material which will fuse satisfactorily with platinum or such other metal as may be used for the disk, and hence by my construction I am enabled to make my stem of a certain class of cements or other materials, which are well known and are otherwise very useful in lamp manufacture, but which cannot be successfully fused with glass. My disk however is made flat and is provided with a single hole through which the stem, as a whole is inserted, and to the edges of which the stem is fused.

In manufacture the stem and disk are suitably connected and fused together. I next place this structure so formed, within the bulb so that the outer edge of the disk rests against the bottom of the bulb, and these two are thereupon fused together. The lamp is then completed in the ordinary manner.

The mode of connecting the bulb and disk is of great value. Heretofore it has been generally considered necessary to turn over the edge of the bulb, which weakens and thins the glass so that the bulb is more apt to snap.

Various other means have been contrived for standing the leading in wires in the bulb and holding them in place, but none of them, so far as I know, are as simple or as satisfactory as that which I have described. The disk being flat, while it will expand and contract with the glass to which it is fused, lying as it does between the outer surface of the stem and the inner surface of the bulb, and being joined to each at practically right angles with its surface, it cannot work loose nor can it so yield as to cause any change in the cubical contents of the bulb, so that when the same lamp is once made, its contents always remain exactly the same and its work therefore is constant.

The lamp such as I have described is very simple and easy of construction, being made preferably of materials of well known character and easily procurable. It is extremely durable.

I prefer to make the disk of platinum, but my invention consists in connecting the stem with the bulb by a flat metallic disk having

substantially the same expansive quality as glass, the stem being in like manner made of some material which has a like expansive quality with the disk, and being so constructed  
5 that the leading in wires which it carries shall be insulated from each other and from the disk, so that the disk may take up the variations of expansion and contraction between the bulb and stem and thus prevent waste by  
10 breakage, and at the same time so that its general direction of greatest expansion and contraction shall be in the same general direction as the expansion and contraction of the bulb, namely:—toward and from its axis. It  
15 is apparent that in this lamp when the filament is broken, the bulb can be broken so as to leave the disk carrying its leading in wires still fused together. A new filament can be easily affixed to the leading in wires and the  
20 stem and disk used a second time as a completed article for introduction into a new bulb. Moreover it will be seen that the stem is not a mere globule of glass but is a support of suitable length carrying the leading in wires  
25 and supporting them for a greater part of

their length, thereby bringing the lower ends of the filament well within the bulb, so that but a small portion of the light from the filament is lost, and at the same time forming a more perfect seal than when a short stem or  
30 button is used.

What I claim as my invention is—

In an incandescent lamp, in combination with a bulb, a stem carrying two leading in  
35 wires embodied therein for a greater part of their length, said wires being provided with a suitable filament attached thereto, and a flat metallic disk lying substantially at right angles to the longitudinal axis of the bulb, the  
40 periphery of said disk being fused to the inner surface of said bulb, and the periphery of the stem being fused to the edge of the hole through the disk, all as and for the purposes set forth.

In testimony whereof I have hereunto set  
45 my hand this 14th day of December, 1893.

GEORGE C. SWAN.

Witnesses:

C. HERBERT MCLEAN,  
EDDISON RIETH.