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F. FANTA.

FILAMENT ATTACHMENT FOR ELECTRIC GLOW LAMPS.

APPLICATION FILED NOV. 2, 1903.

NO MODEL.

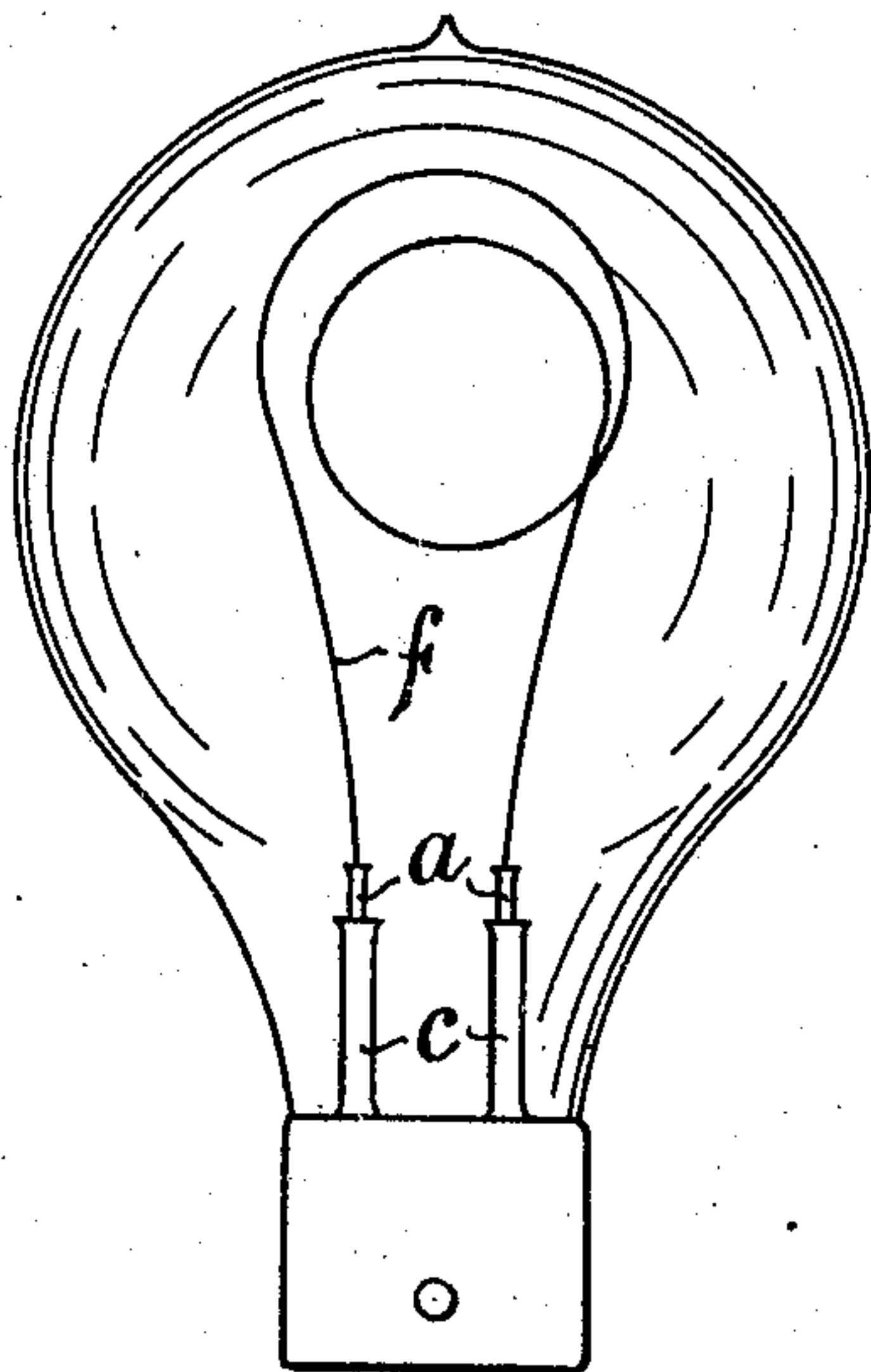


FIG. 1.

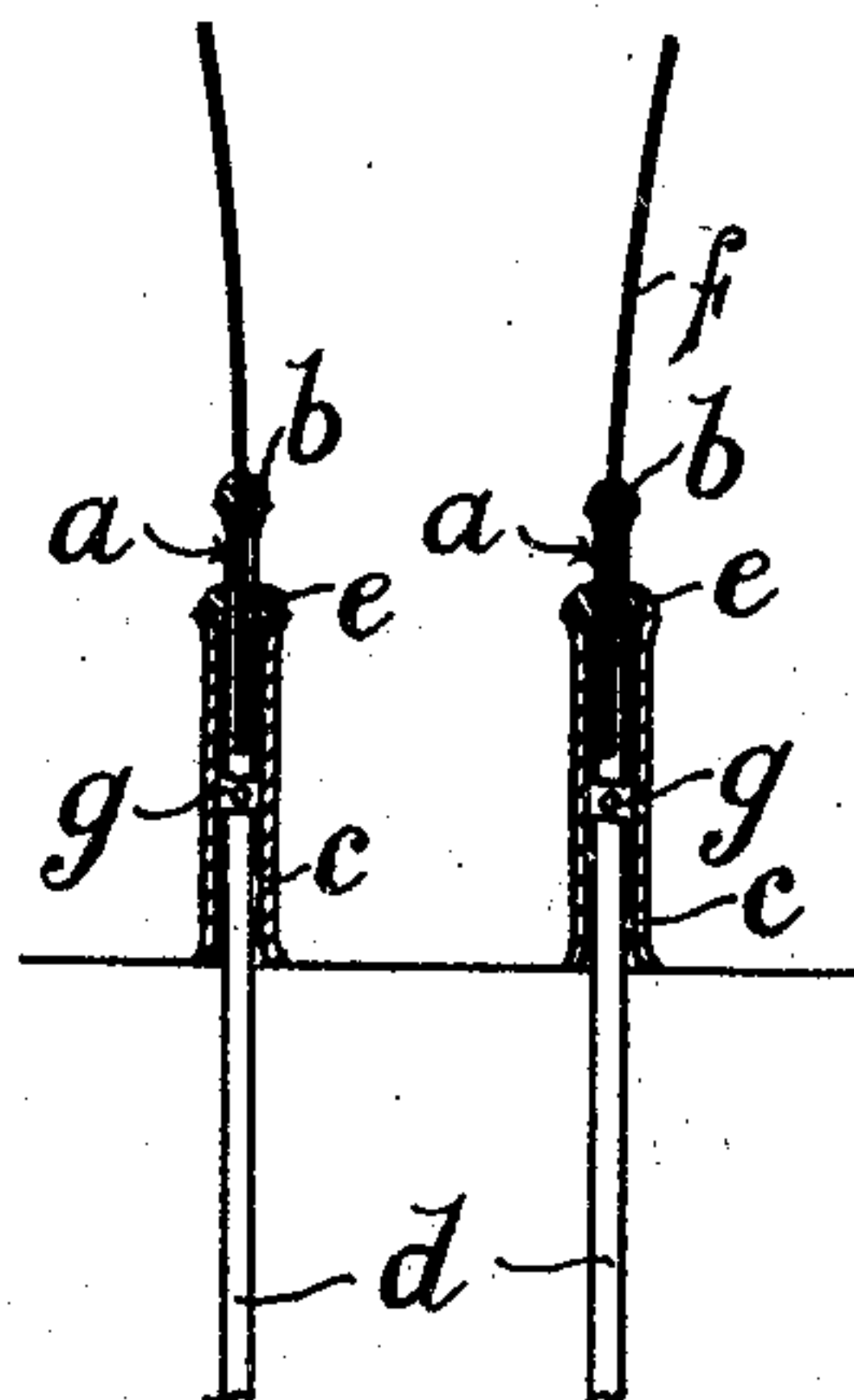


FIG. 2.



FIG. 3.

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FILAMENT ATTACHMENT FOR ELECTRIC GLOW-LAMPS.

SPECIFICATION forming part of Letters Patent No. 768,173, dated August 23, 1904.

Application filed November 2, 1903. Serial No. 179,584. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND FANTA, a subject of the King of Great Britain and Ireland, residing at London, England, have invented a certain new and useful Improvement in and Relating to Filament Attachments for Electric Glow-Lamps, of which the following is a specification.

This invention relates to novel means for attaching a carbon filament with a predetermined length and resistance to the platinum conductors of incandescent electric lamps held by the glass bulb, whereby a great saving in labor is obtained and the filament may be renewed in a lamp any number of times.

I am aware that new filaments have been introduced into the bulbs of old lamps and that the said filaments have been joined to the platinum conductors within the bulbs of such lamps, but the methods and devices hitherto used for this purpose have been such that great disadvantages and difficulties have been experienced in producing a satisfactory result. For example, the filament when flashed is very much more brittle and fragile than when unflashed. Hence the risk of damage during the action of inserting the new flashed filament into an old bulb through a small hole made therein is very great, and, further, it is very difficult to insure the jointing of the ends of the filament to the platinum conductors under these conditions in such a manner that a predetermined length of filament with a given resistance is established from one point to the other point of connection. This would result in a considerable want of uniformity and standardability in the lamps so treated. Again, when a metallic sleeve only is used on the filament the replacing of the filament can only be effected once, as the said sleeve must be firmly gripped onto the platinum ends in the bulb and cannot afterward be withdrawn therefrom. This invention entirely overcomes these disadvantages and enables new lamps to be manufactured with ease and economy hitherto unattainable and old lamps to be readily renewed with new filaments in a certain and reliable manner as to the uniformity of result.

Figure 1 is a general view of the glow-lamp

with filament fixed therein. Fig. 2 is an enlarged section through the joints, and Fig. 3 shows detached details of the tubes.

To carry this invention into effect, a predetermined length of preferably unflashed filament *f* is taken, and to each end thereof a metallic tube or jointing device *a* of sufficient diameter to have its exterior face accurately turned or gaged is attached by any known or combination of known means, these jointing devices insuring that a definite length of filament is disposed between the metallic terminals as such jointing devices are affixed to the filament when easily handled outside the lamp. The jointing devices are in the form of a compressible tube or socket, gripped onto the end of the filament and secured there by carbon paste *b* to insure continuity of electrical conduction. They are of such an external diameter as to allow of their being accurately turned or gaged, so as to be inserted with metallic contact into a hollow accurately-bored metallic sleeve *c*, previously gripped onto the platinum conductors or leads *d* in the base of the lamp-bulb.

In this improved manufacture of new lamps the bulbs have the platinum conductors secured therein with their free ends projecting into the bulb without filament attached thereto, contrary to existing practice, and instead of the filament a small metallic sleeve *c*, having an accurately-bored interior, is fixed onto such platinum ends *d*, and this can be done either before the platinum is annealed into the glass bulb or it may be fixed at a later period in the manner hereinafter described. In the case of old lamps a hole is made in the bulb, the old filament is abstracted, metallic terminals in the bulb are cleaned by means of a small tool, such as an adjustable chuck with cleaning devices carried thereby, mounted upon a tube or handle and adapted so that the chuck can be inserted into the bulb and can be adjusted to press upon the said conductors and then revolved or reciprocated in order to clean the platinum wires. The platinum ends are then cut to a uniform length by a cutting-tool provided with a gage, and a small sleeve *c*, having an accurately-bored interior approximately twice as long as the remnant parts of the

platinum wires, is placed on each. These two sleeves are first perforated with small transverse pin-holes *g* about the center in order to place the inside of these sleeves in free communication with the vacuum. The sleeves are then pinched and firmly secured onto the platinum ends by a specially - constructed compressing-tool in such a way as to permanently grip them onto the same, while leaving the upper part of the sleeve open for the reception of the metallic terminals *a* of the new filaments. The filament with its end furnished with metallic terminals *a* is now introduced into the bulb, and the terminals *a* are engaged into the sleeves *c* upon the platinum conductors, and the joint between the two metallic parts is made in any known manner, but in such a manner that electrical continuity is insured and that the metallic terminal of the filament may be afterward withdrawn from the sockets on the platinum conductors. This may be conveniently done by using a carbon paste *e*. When an unflashed filament has been used, the lamp can then be placed on the photometer and flashed in any convenient manner, or if the flashed filaments are used the lamp can then be exhausted and sealed up in the usual manner.

It may be pointed out that in manufacturing new lamps in this way a great economy in labor obtains, owing to the much greater facility in sealing platinum conductors without any filament attached thereto into the glass of the bulb as compared with the usual method in which the very brittle flashed filament is attached to the platinum conductors before sealing the latter into the glass bulb. The character of labor required for this inven-

tion is therefor not of such a delicate and high class as is necessary at present, and is therefore much cheaper. It will, moreover, be self-evident that while lamps manufactured in accordance with this invention may have their filaments replaced time after time old lamps of any make that have been allowed to burn out can be provided with the sleeve attachment and thereafter be repeatedly provided with new filaments at a trifling cost.

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

1. In combination in an incandescent electric lamp, a filament, tubular metallic tips carried by the ends of the filament, metallic tubes secured to the platinum leads protruding from the lamp-socket, said tubes extending beyond the platinum leads and having the metallic tubes on the filament ends accurately filling in and secured thereto, substantially as described.

2. In combination in an incandescent electric lamp, a filament, tubular metallic tips carried by the ends of the filament, metallic tubes secured to the platinum leads protruding from the lamp-socket, and transverse openings through the said tubes situated between the ends of the platinum leads and the tubular metallic tips of the filaments, the said tubes extending beyond the platinum leads and leaving the tubular tips of the filament accurately fitting in the extended parts thereof.

In witness whereof I have hereunto set my hand in presence of two witnesses.

FERDINAND FANTA.

Witnesses:

RICHARD A. HOFFMANN,
CHARLES CARTER.