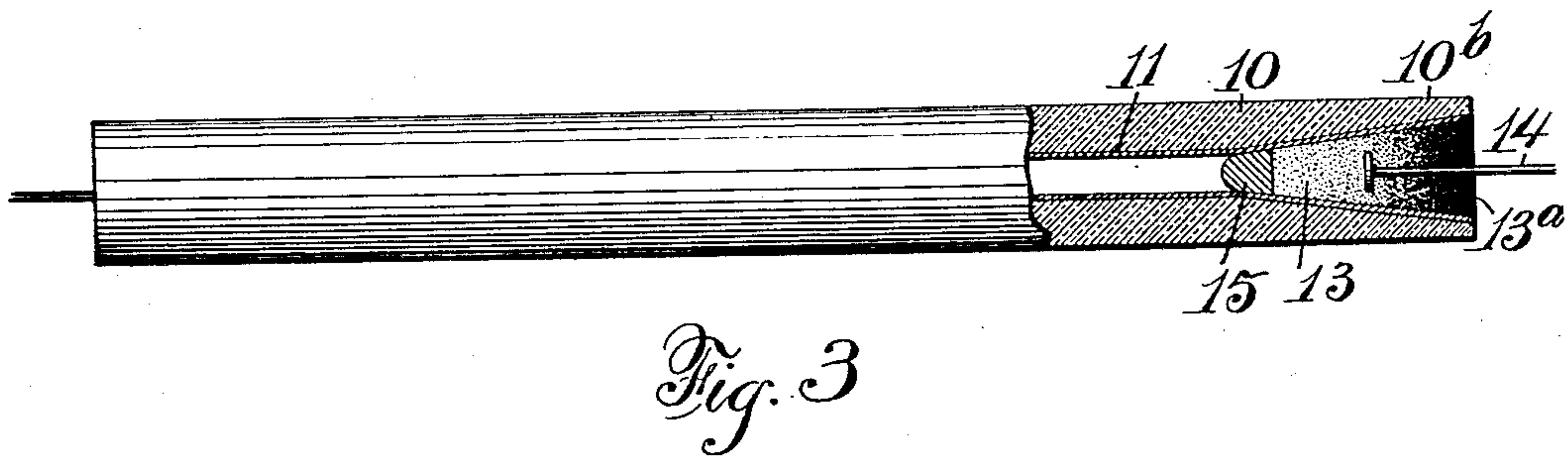
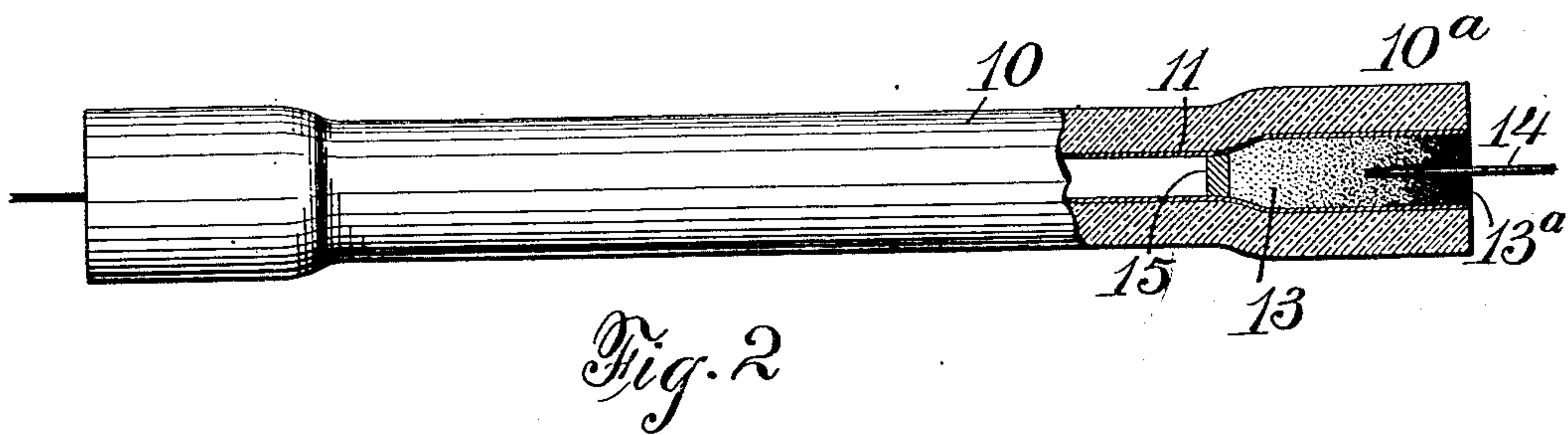
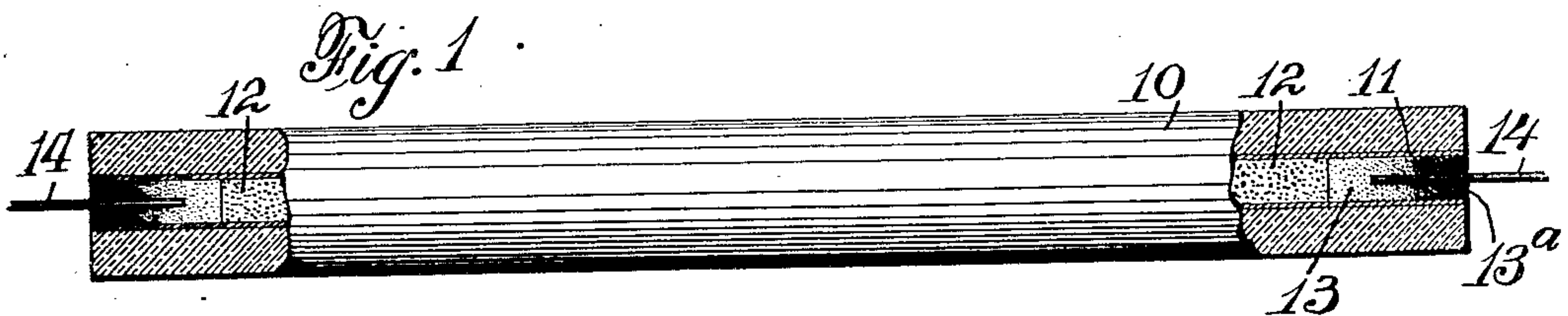


No. 876,390.

PATENTED JAN. 14, 1908.

H. C. PARKER & W. G. CLARK.  
INCANDESCENT ELECTRIC LAMP.  
APPLICATION FILED JAN. 24, 1906.



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# UNITED STATES PATENT OFFICE.

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## INCANDESCENT ELECTRIC LAMP.

No. 876,390.

Specification of Letters Patent.

Patented Jan. 14, 1908.

Application filed January 24, 1906. Serial No. 297,540.

*To all whom it may concern:*

Be it known that we, HERSCHEL C. PARKER, of New York, county of Kings, and State of New York, and WALTER G. CLARK, of the city, county, and State of New York, have invented a new and Improved Incandescent Electric Lamp, of which the following is a full, clear, and exact description.

Our invention relates to improvements in incandescent electric lamps and particularly to contacts therefor, and more especially to improvements in the contacts for that class of incandescent electric lamp in which a quartz or other refractory tube is provided with a refractory conductive film or lining. Lamps of this kind are sometimes made hollow and are sometimes provided with a non-conducting core or filler. In either case it is the practice to fill the ends of the tube or other hollow structure with a good conductor into which the leading-in wires extend. The difficulty with this arrangement is that the current follows the good conductor freely to the point of where it meets the core, or if the member is hollow, where it meets the sustaining plug, and here the current is suddenly deflected almost as a whole to the conducting refractory lining and the strain caused by the concentrated impact of current and the sharp temperature variations at a single point is apt to break or seriously strain the tube, filament or lining. We have found that by graduating the better conductor at the end portions of the tube or hollow member, making the inner portion comparatively high resistant, and the outer portion low resistant, that the current is taken up through a comparatively extended length of the refractory lining and so a contact is made which is perfect and which does not unduly strain the hollow member. We have applied this invention to lamps as stated and doubtless a contact may be made in a similar way with other conductors.

With these ends in view our invention consists of the combination with a refractory conductor of a better conductor lying against and making a side contact with said refractory conductor, and connecting with the leading-in wire and of graduated resistance, which arrangement will be hereinafter described in detail and claimed.

Reference is to be had to the accompanying drawings forming a part of this specifica-

tion, in which similar letters and figures of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation with the end portions in section, of a lamp showing our improvements; Fig. 2 is a side elevation with one end portion in section, showing a modification of the invention, and Fig. 3 is a view similar to Fig. 2, but showing another slight modification or variation.

In Fig. 1 is shown the more common form of lamp of the kind mentioned in which a tube 10 of highly refractory material is provided with a refractory conductive lining 11, and with a non-conducting core or packing 12, which fills the body portion of the tube to a point near the ends. As shown in this figure, the hollow member 10 is in the form of a straight tube and electrical connections are made by means of a conductor 13, 13<sup>a</sup>, filling the end portions of the tube and into which the leading-in wires 14 extend. It has been the practice to fill the end portions of the tube with graphite or some good conductor, extend the leading-in wires into the said conductor, then pack the ends with asbestos or some poor conductor of heat and seal the ends. The asbestos or other packing and the seal can be used with our invention, but we do not show it here, as it is immaterial.

With the good conductor or one of a uniform resistance it will be readily seen that the current will leave the said conductor at the point where it meets the non-conducting core 12 or the plug 15, shown in Figs. 2 and 3, in which case the strain, both by reason of current impact and temperature change, is opposite the said meeting point of the two parts. To overcome this we make the conductor 13 comparatively high resistant at its inner end where it meets the core 12 or plug 15 and comparatively low resistant at the outer end as shown at 13<sup>a</sup>. This can be easily done by mixing a good conductor, such as graphite, with any powdered poor conductor, such for instance, as quartz, carborundum or many other things and having a relatively large proportion of the poor conductor at the inner part of the conducting portion or member. The drawing shows the graduation, but in actual practice, as it would be difficult to graduate a complete mass, the parts 13, 13<sup>a</sup> may be



made in a series of strata with the inner stratum relatively high resistant and the outer stratum relatively low resistant, while the intermediate strata may be correspond-  
 5 ingly graduated, and the effect is exactly as shown in the drawing, and it will be seen that the current will leave the parts 13, 13<sup>a</sup> at all points between the inner and outer ends of said member and so no serious strain  
 10 results at any one point.

Obviously the shape of the hollow member 10 can be changed infinitely without affecting the invention. To illustrate this we show in Fig. 2, the member 10 left hollow  
 15 through its body portion and constricted slightly so that the end parts 10<sup>a</sup> are larger and the plug 15 is placed at the point of constriction and the conducting member consisting of the portions 13, 13<sup>a</sup>, inserted as al-  
 20 ready described. In Fig. 3, a like effect is obtained by leaving the member 10 straight on the outside but expanding it at the ends as shown at 10<sup>b</sup>. These several modifica-  
 25 tions show that still others may be made and that the essential thing is to graduate the resisting qualities of the conductor where it meets the relatively refractory and higher resisting conducting lining 11 or its equivalent.

30 Having thus fully described our invention, we claim as new and desire to secure by Letters Patent,—

1. The combination with a relatively high resistance electrical conductor, of a contact-  
 35 ing member lying against and making a side contact with the said conductor, the said contacting member being graduated from a higher to lower resistance from one end portion to the other.

40 2. The combination with a hollow member having a refractory conductive lining, of a contact member filling the end portions of the said hollow member, the contacting member being of gradually varying resist-

ance and contacting along its sides with said 45 conductive lining.

3. The combination with a hollow member having a refractory conductive lining, of a contact portion forming a closure in the end  
 of the said hollow member, the said contact 50 portion being relatively high resistant at its inner end and relatively low resistant at its outer end and contacting along its sides with the conductive lining.

4. The combination with a refractory con- 55 ductor, of contacts at the end portions of and making a side contact with the conductor, the said contacts being adapted to connect with a source of electrical supply and grad-  
 ually increasing in resistance from their outer 60 to their inner portions.

5. The combination with a hollow member having a refractory conductive lining, of a contact portion of gradually varying resist-  
 65 ance filling the end portions of said hollow member, and making contact along the sides of said contact member and conductor and means for limiting the inward extension of the said contacting portion.

6. The combination with an electric con- 70 ductor, of a contact portion lying against and making a side contact with the said conductor, the said contact portion being at one end of a resistance approximating that of the  
 said conductor and at the other end of a 75 higher resistance.

7. The combination with the non-conducting tube, expanded at the ends, and having a refractory conducting lining, of a contact conductor filling the said expanded ends 80 and having a higher resistance at one end than at the other,

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