

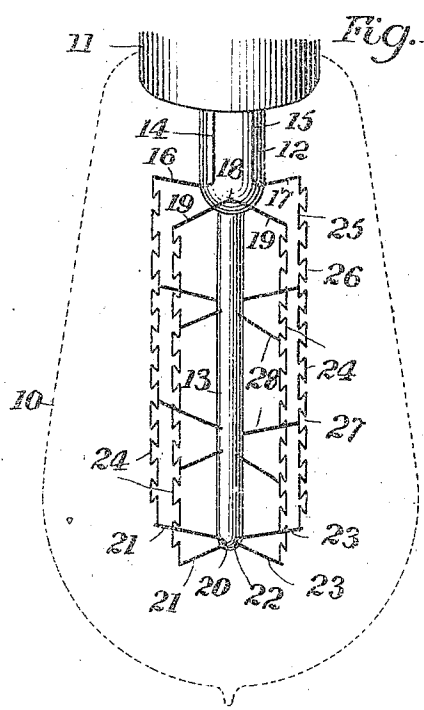


Fig. 1.

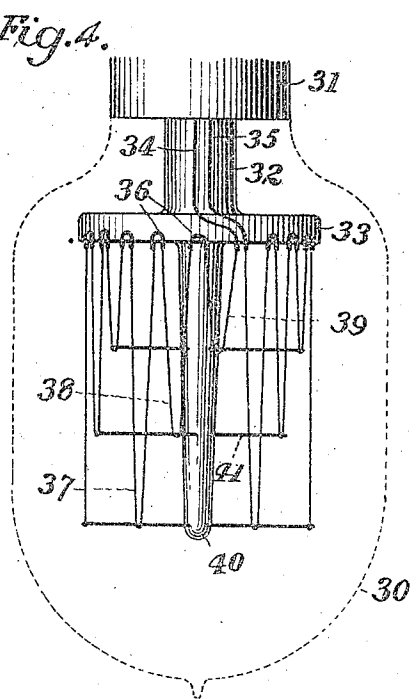


Fig. 4.

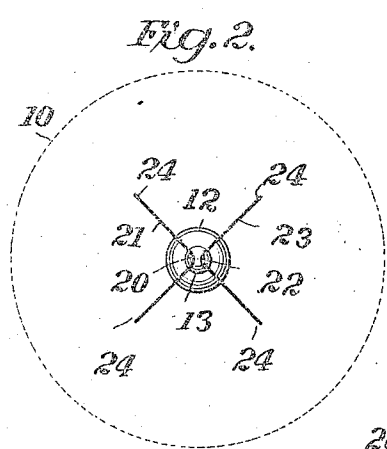


Fig. 2.



Fig. 6.

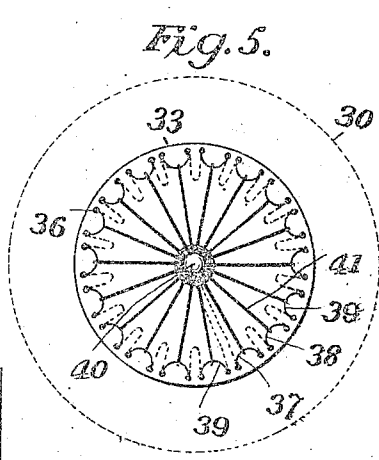


Fig. 5.

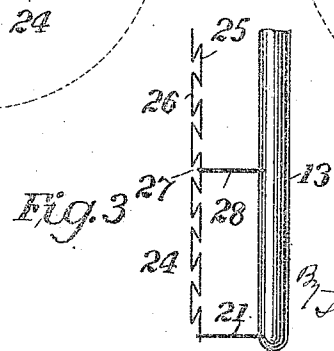


Fig. 3.

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UNITED STATES PATENT OFFICE.

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INCANDESCENT-LAMP FILAMENT.

1,014,878.

Specification of Letters Patent.

Patented Jan. 16, 1912.

Application filed May 6, 1909, Serial No. 494,377. Renewed June 12, 1911. Serial No. 632,770.

To all whom it may concern:

Be it known that I, GWYLLYM R. HOLMES, a citizen of the United States, and resident of Baltimore, Maryland, have invented certain new and useful Improvements in Incandescent-Lamp Filaments, of which the following is a specification.

This invention relates to electric lamps having an illuminant which is raised to incandescence by means of an electric current.

The objects of this invention are to construct a lamp which will be efficient and durable, and in particular to construct a filament which will be of high resistance, of comparatively short length, and so constructed as to have a maximum light radiating capacity.

Metallic filaments as now constructed are of great length, for instance a tantalum 22 cp. 110 volt lamp has a filament of .002" in diameter and is over two feet long. Therefore in most metallic filament lamps it is difficult to support such a long filament and allow the lamp to be used in all positions.

The conductor in this lamp consists of alternate sections of different metals, one of these metals being used as the incandescing body or filament and the other as the high resistance to increase the total resistance of the conductor. Iron, on account of its high resistance, high temperature coefficient and on account of its cheapness, is preferred. In order to still further decrease the length of conductor which is to be supported, without decreasing the radiation or the resistance, the filament is corrugated so as to form a number of oppositely facing and nearly closed loops. I have found by experiment that by constructing the filament in this way, *i. e.* forming nearly closed loops therein, the radiating capacity is increased.

In the drawings: Figure 1 shows in perspective one form of this invention; Fig. 2 is an end view of the lamp; Fig. 3 is a detail view showing the form of filament; Fig. 4 is a side view showing another form of lamp; and Fig. 5 is an end view. Fig. 6 is a detail view showing another form of filament.

Referring to Figs. 1, 2 and 3: 10 designates a bulb which is mounted in the base or socket 11 in the usual way. A central base 12 is mounted in the base 11 and has a central filament supporting member 13.

Both 12 and 13 are preferably formed of glass and are of hollow construction. The leading-in wires 14 and 15 extend through the hollow base 12 and project outwardly, forming supporting members 16 and 17. A wire 18 is sealed into the support 12, forming outwardly projecting supports 19, 19. Into the top end of the central support 13 are sealed the wires 20, 22, forming outwardly projecting members 21, 21 and 23, 23, respectively. A series of thin metallic wires 24 are supported, as shown, by the arms 16, 17, 19, 20 and 23. These wires 24, as shown in Fig. 3, form the filament and are corrugated so as to form a plurality of oppositely facing loops 25, 26, the gap 27 in the loop being comparatively short. A number of anchor wires 28 project from the central support 13 and engage the innermost loops 25, thereby forming a rigid structure for the filament 24.

The supporting members 16, 17, 19, 21 and 23 are formed of some high resistance material, preferably iron, which as is well known is of high resistance and has a high temperature coefficient. The supporting wires perform a double function; first, that of supporting wires, and second, conducting wires to increase the resistance of the conductor. These supporting wires however are of larger diameter than the wires 24 so that they do not perform the function of an incandescing conductor glower, but merely the function of supporting and conducting wires so as to increase the total resistance of the conductor. The wires 24 may be secured to the supporting members in any convenient manner.

Referring to Fig. 1 it will be noted that all the wires are connected in series to the leading-in wires 14, 15. By corrugating the wire 24 so as to form the loops 25, 26, the total length of the filament which must be supported is decreased and its stiffness is increased. I have also found that by forming such nearly closed loops in the wire the light radiating capacity is increased. I preferably form the filament of platinum and the supporting and conducting wires of iron, but this wire 24 may be formed of other metals than platinum and may be a conductor of the built-up type, that is one having a metallic core and incandescing body of any other non-ductile material having high light radiating capacity. Al-

though the loops 25 and 26 are shown as angular in section it is not essential that these should be angular. They may be circular in form, as shown in Fig. 6. These loops are located as shown in Fig. 1 in radial planes.

Referring to Figs. 4 and 5; 30 designates the bulb attached to the usual base or socket 31, provided with a central support 32 widened out so as to form a central filament support 33 of large diameter. The leading-in wires 34, 35 lead in through the support 32 and are connected with the conductor which is composed of alternate sections of iron wires 36 and platinum or other metallic wires 37, 38, 39 connected in series. These platinum wires, as shown in Fig. 4, are of different lengths. A central support 40, attached to 32 and 33, is provided with a number of anchor wires 41 for supporting the different filaments. In this type of lamp the entire filament is split up into a large number of loops (in this case twenty or more) all connected in series. By giving the filaments the construction shown in Figs. 4 and 5 I have found that the best results are produced.

In the claims the term "conductor" is used. This term is to be construed to mean the entire conductor which is attached to the leading-in wires and in this case includes both the iron and platinum sections. It is

to be noted that the iron sections perform a different function from the ordinary leading-in wires. In this case they increase the actual resistance of the conductor itself and are not used primarily as connectors between the filament and the lamp base as is the case with the leading-in wires.

What I claim is:

1. A filament for electric lamps, composed of an elongated conductor corrugated so as to form a plurality of nearly closed loops, said loops being in the same plane, and a plurality thereof facing outwardly and in the same direction.

2. A filament for electric lamps, composed of an elongated conductor corrugated so as to form a plurality of oppositely facing angular and nearly closed loops, said loops being in the same plane, and a plurality thereof facing in the same direction.

3. An incandescent lamp having a support and anchor arms radiating therefrom, a filament composed of an incandescing conductor shaped so as to form a plurality of outwardly facing nearly closed loops, said anchor arms engaging the loops.

In testimony whereof I affix my signature in presence of two witnesses.

GWYLLYM R. HOLMES.

Witnesses:

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