Nov. 3, 1925. 1,560,265

D. LELY, JR

INCANDESCENT ELECTRIC LAMP FOR PROJECTION PURPOSES

Filed March 30, 1921

Fig. 1.

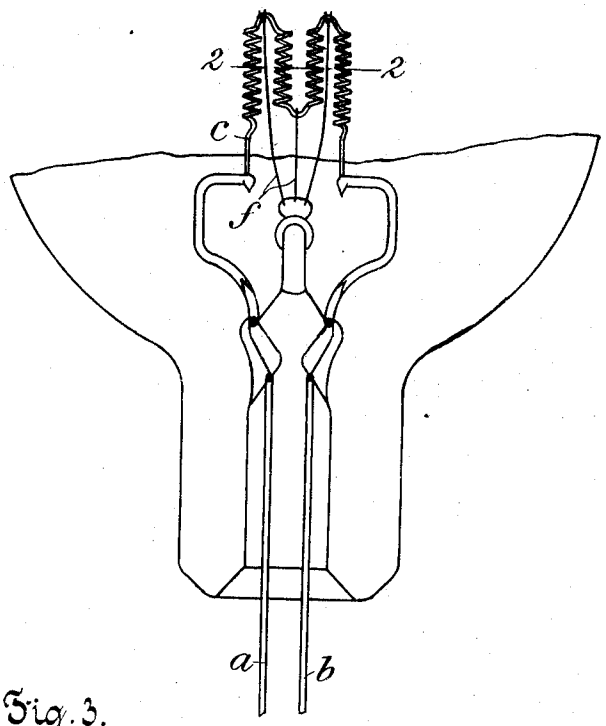


Fig. 3.

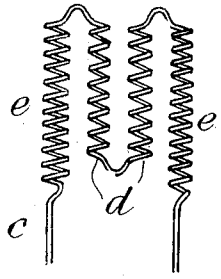
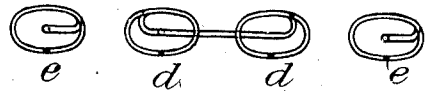


Fig. 2.



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UNITED STATES PATENT OFFICE.

DIRK LELY, JR., OF EINDHOVEN, NETHERLANDS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, OF SCHENECTADY, NEW YORK, A CORPORATION OF NEW YORK.

INCANDESCENT ELECTRIC LAMP FOR PROJECTION PURPOSES.

Application filed March 30, 1921. Serial No. 457,141.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, DIRK LELY, JR., a subject of the Queen of the Netherlands, residing in Eindhoven, Province of North Brabant, Kingdom of the Netherlands, have invented certain new and useful Improvements in Incandescent Electric Lamps for Projection Purposes (for which I have filed application in the Kingdom of the Netherlands on June 2nd, 1917, Serial Number 8,286; in Germany on December 21st, 1917; in England on January 8th, 1918; in France on January 29th, 1919; in Italy June 16, 1920; and in Czechoslovakia on February 9th, 1921), and of which the following is a specification.

Electrical incandescent lamps for projection purposes are preferably so arranged, that the greatest part of the light is emanated in the desired direction. All the rays not passing through the condenser are lost for the purpose. In a lamp which burns economically, the proportion between the light emanated in the favourable direction and the light totally emanated must of necessity be as large as possible.

The relative radiation in a certain direction is considerably increased when the incandescent member has not the usual circular section but is very much flattened, which may be done by shaping said member as a band and not as a wire with circular section. If several of these band-shaped incandescent members are provided adjacent to each other a source of light may be obtained which is approximately as favourable for the radiation in one direction as a plain surface.

With a flat radiating surface the luminous power, measured in a direction perpendicular to said surface, is just twice as great as the mean spherical candle power.

As it is very difficult to make band-shaped members, adapted for use in lamps used for projection purposes, they are hardly ever applied in the lamps now on the market. The older lamps are generally provided with one or more incandescent members each consisting of a circular wire helically wound around a circular mandrel. The luminous power of each of these incandescent members, measured in the most favourable direction, is about 27% stronger than the mean spherical luminous power. By providing several of these members adjacent to each other a source of light is obtained with a somewhat higher efficiency, as the lateral radiation is slightly hampered. In this case the percentage of 27% is somewhat increased.

According to the present invention, the windings of the incandescent member are flattened on the side, where the greatest radiation is desired.

The invention also comprises a construction having an incandescent member, the outer coils of which are wound with smaller distances between their convolutions than the more centrally situated parts.

In the accompanying drawings, which illustrate the invention by way of example only,

Fig. 1 is a front elevation of a lamp, part of the bulb being shown broken away.

Fig. 2 is a detailed view on a larger scale, showing the cross-section of the incandescent coils at 2—2 in Fig. 1, and

Fig. 3 is a detailed view on a larger scale, showing the different winding pitches of the coils.

In these drawings *a b* are the leading-in wires fused into the glass of the bulb in the usual manner, and *c* is the incandescing filament which is shown as coiled into four flattened helices, of which the two inner ones *d d* are loosely coiled, as shown in Fig. 3, while the two outer ones *e e* are coiled more closely. *f* in Fig. 1 are the usual supporting wires.

Evidently a lamp radiating a greater percentage of its light in the most favourable direction can very easily be manufactured by winding the circular wire helically in such a way that the section of the incandescent member differs considerably from a circular section.

This may be done by winding a circular wire round a band-shaped mandrel, or by winding it round a circular mandrel, removing the latter and giving the spiral a flattened shape by rolling it.

The wire may also be wound about a band-shaped mandrel and the spiral thus obtained may afterwards be further flattened by rolling.

In doing so it will be clear that the wire is bent more in some places than in others; the wire itself keeps its circular section and may consequently be manufactured without difficulty. Two or more of the incandescent members thus formed are placed adjacent to each other. A wire of 217 millionths of a meter (217 μ) may for instance be wound helically about a mandrel of 920 millionths of a meter (920 μ) width and 220 millionths of a meter (220 μ) thickness.

A lamp constructed in this way has been found to have a horizontal luminous power 92% stronger than the mean spherical luminous power. Compared with an incandescent member consisting of a round spiral, the saving in consumption of current will be about 33%, the horizontal luminous powers of both lamps being the same.

In order to obtain the smallest possible surface and a uniform radiation it is desirable to place the different parts, of which the source of light consists, and which are generally provided in a perpendicular direction, as near to each other as possible. Consequently in those lamps, wherein the source of light consists of more than two parts, the peripheral parts will radiate considerably more than the central parts of the radiating member, and will consequently be of lower temperature, which causes a somewhat unequal radiation, in those lamps. These differences in temperature may be prevented by winding the outer spirals somewhat tighter than the more centrally situated spirals.

According to the present invention the incandescent filaments or wires are naked in contradistinction to being enclosed or embedded in a mass which is heated by the filament and which in such cases becomes the light-emitting element instead of the filament.

What I claim is:

A metallic filament lamp for projection purposes comprising naked incandescent filaments of circular cross-section wound into coils of flattened form, having the outer coils wound into closer spirals than the more centrally situated coils.

In witness whereof, I have hereunto signed my name.

DIRK LELY, JR.