C. O. HARRINGTON.

ADJUSTING INCANDESCENT LAMPS

APPLICATION FILED MAR. 13, 1914.

1,241,512.

Patented Oct. 2, 1917.

2 SHEETS—SHEET 1.

FIG. 5

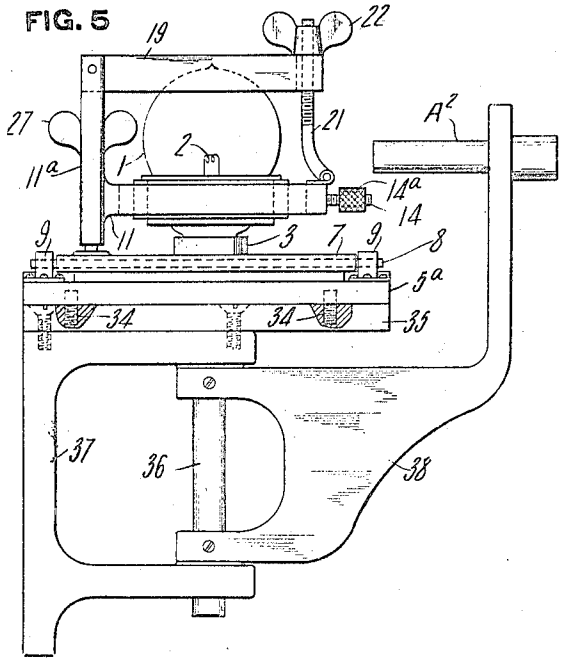


FIG. 1

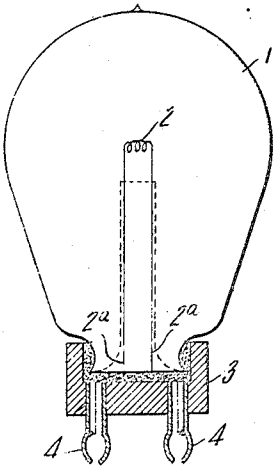


FIG. 7

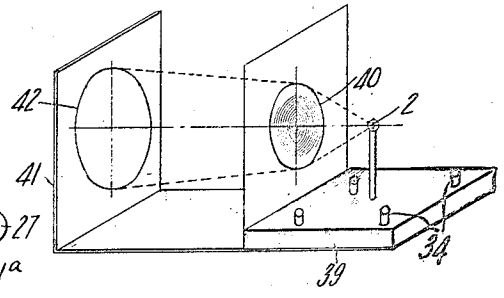
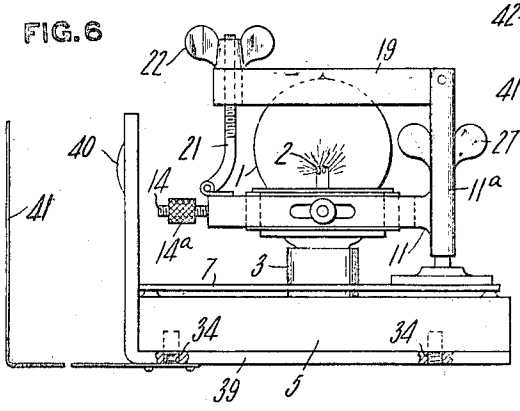


FIG. 6



WITNESSES

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2 SHEETS—SHEET 2.

FIG. 2

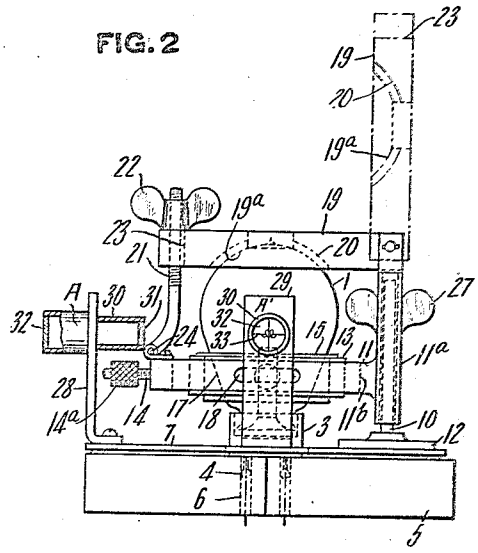


FIG. 3

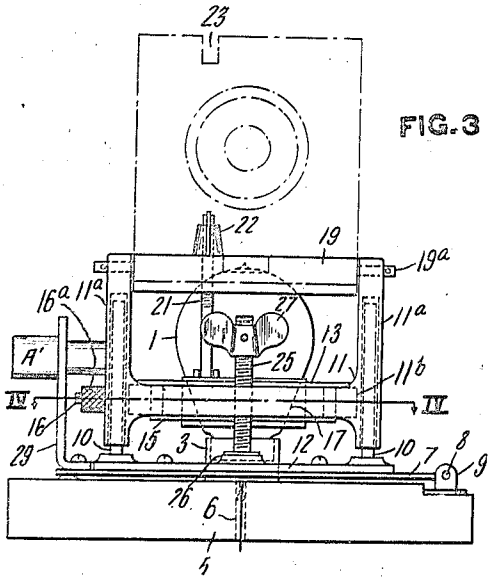
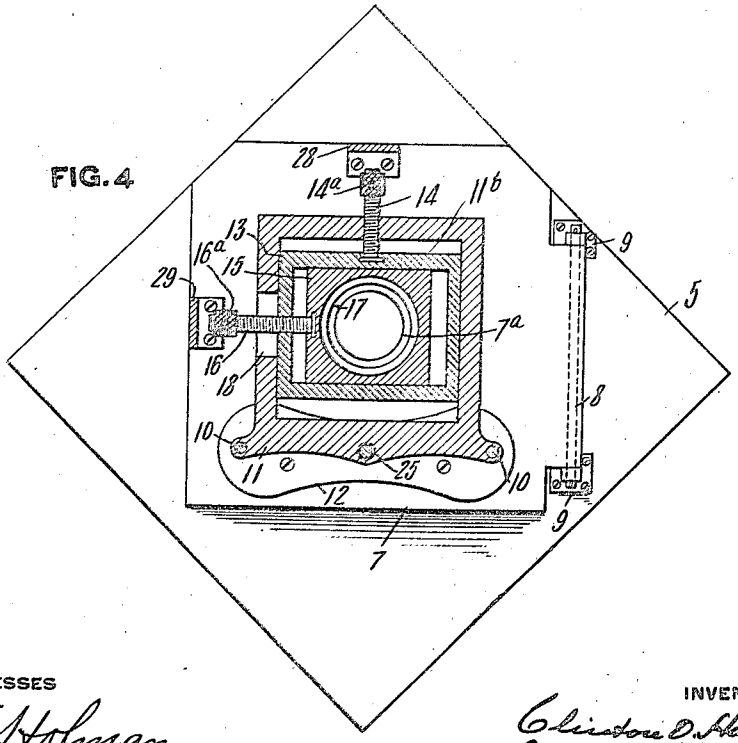


FIG. 4



WITNESSES

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ADJUSTING INCANDESCENT LAMPS.

1,241,512. Specification of Letters Patent. Patented Oct. 2, 1917.

Application filed March 13, 1914. Serial No. 824,469.

To all whom it may concern:

Be it known that I, CLINTON O. HARRINGTON, a citizen of the United States, residing at Edgewood Borough, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Adjusting Incandescent Lamps, of which the following is a specification.

My invention relates to methods of, and means for, adjusting the parts of incandescent electric lamps so that the filament thereof will always occupy a given position with relation to the lamp base.

Incandescent electric lamps which have been adjusted in accordance with my invention are particularly adapted for use in light signals comprising a lamp and an optical device—such as a reflector or a lens or both—for projecting a beam of substantially parallel rays from the lamp. In signals of this kind it is desirable to employ what is known as "concentrated filament" lamps, that is, lamps whose filaments are concentrated as nearly as possible at a point. Hence, in order to obtain the highest efficiency it is necessary that the filament be located at a definite point with relation to the reflector or lens, this point usually being the focus. In the manufacture of these lamps, however, it has been found difficult to locate the filament accurately in a given position with relation to the bulb, and that this position varies with different lamps. Hence, even if the bulbs are all mounted in the same position in their bases and the bases all mounted in the same position in the signal, the filaments of the several lamps will vary in position with respect to the reflector or lens.

In my invention I provide means for, and methods of, constructing the lamps so that the filament of each lamp occupies a given position with relation to the lamp base; means can then be provided in the signal for mounting the lamp bases in a given position, hence the filament of each lamp will occupy the desired position with relation to the optical device of the signal.

I will describe certain methods and certain forms of apparatus embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a view showing an incandescent electric lamp which may be adjusted in accordance with my invention. Fig. 2 is a view showing in side elevation one form of apparatus embodying my invention for locating the bulb so that the filament bears a definite location with respect to the base before cementing the two together. Fig. 3 is a view looking at the right-hand end of the apparatus shown in Fig. 2. Fig. 4 is a sectional view on the plane indicated by line IV—IV in Fig. 3. Fig. 5 is a view showing a modification of the apparatus shown in Fig. 1 and embodying my invention. Fig. 6 is a view showing still another modification of the apparatus shown in Fig. 1 and also embodying my invention. Fig. 7 is a view showing in perspective and partly diagrammatic, a portion of the apparatus shown in Fig. 6.

Similar reference characters refer to similar parts in each of the views.

Referring first to Fig. 1, the lamp here shown comprises a bulb 1 which supports and incloses a concentrated filament 2, to which are attached wires 2^a, 2^a projecting from the bulb. 3 is a lamp base of insulating material to which the bulb is attached by means of cement as indicated in the drawing. Fixed in the lamp base 3 are two tubes 4 of conducting material such as brass, through which the wires 2^a extend and in which they are soldered. It is apparent that if the lamp be so assembled that the filament 2 occupies a given position with relation to the lamp base 3, then by locating the lamp base at a given point in a signal the filament will be in the desired position with relation to the optical device of the signal.

Referring now to Figs. 2, 3 and 4, the apparatus here shown comprises a base 5 provided with two holes 6 so spaced as to receive the tubes 4 of the lamp base 3, the size of the holes being such that the tubes fit snugly therein. It will be seen, therefore, that the lamp base 3 can be located in a definite position with respect to the base 5. 7 is a plate which is mounted to swing on a pin 8 supported in bearings 9 which are secured to the base 5. This plate is provided with a central aperture 7^a, through which the lamp base 3 projects when the plate lies close to the base 5. Plate 7 carries means for adjustably holding the lamp bulb 1 and also means for determining when the

filament 2 occupies a given position with respect to the plate 7, which means I will now describe.

Fixed to the plate 7 is a smaller plate 12, in which are mounted two upright rods 10. A frame 11 is provided with two upright tubes 11^a, which fit over the rods 10, whereby the frame may slide longitudinally on these rods. The frame may be reciprocated on the rods 10 by means of a screw 25, which passes through a threaded hole in the frame 11, and which is provided with a T-shaped head which is retained in a socket 26 on the plate 12. Fixed to the upper end of this screw is a wing nut 27, by means of which the screw may be turned by hand. The frame 11 has a central rectangular aperture 11^b in which slides a hollow rectangular member 13, the latter being held in place by flanges which extend short distances over the upper surface of frame 11, as shown in Fig. 3. Member 13 may be reciprocated by a screw 14 which passes through a threaded hole in frame 11 and which has a head which fits freely in a T-shaped slot in the member 13. Fixed to the outer end of this screw is a knurled nut 14^a, by means of which the screw may readily be turned by hand. Located within the member 13 is a second rectangular member 15 which slides therein and is held in place by flanges which extend short distances over the upper surface of member 13 as shown in Fig. 2. Member 15 may be reciprocated by a screw 16 which passes through a threaded hole in member 13 and is provided with a head which fits freely in a T-shaped slot in member 15. The screw is also provided with a knurled nut 16^a by means of which it may be turned by hand. This latter screw also passes through a slot 18 in frame 11 whereby member 13 may be reciprocated without interference between the frame 11 and screw 16. Member 15 is provided with a conical aperture 17 of such size and shape as to accommodate the lamp bulb 1, so that this member serves as a cradle in which the bulb may rest. The bulb is held in place in the cradle by a cap 19 which is journaled on a rod 19^a carried in the upper ends of the tubes 11^a and which is hollowed out as shown at 20 to fit the upper end of the bulb. A thick pad 19^a of felt or similar material is preferably located between the bulb and the cap 19 to permit adjustment of the bulb without danger of breakage. The cap 19 is held in place by a screw 21 which is pivotally connected with the frame 11 at 24 and which fits into a slot 23 in the cap; a wing nut 22 serves to clamp the cap in place over the bulb.

It will be seen from the foregoing that the bulb 1 may be adjusted in any direction with relation to the plate 7 by turning screws 25, 14 and 16.

To determine when the filament 2 occupies the proper location with respect to the plate 7 I provide suitable optical means which I will now describe. The means shown in Figs. 2, 3 and 4 comprises two finders A and A′ fixed respectively in supports 28 and 29 mounted on plate 7. Each finder comprises a tube 30 which carries a lens 31 and a ground glass plate 32 on which an image of the filament 2 is projected by the lens. The ground glass is provided with cross-hairs 33. The parts of the finders are so located and adjusted that when the filament 2 is in the desired position with relation to the plate 7 the center of the image of the filament on each ground glass plate lies at the intersection of the cross-hairs. Inasmuch as the two finders are disposed 90° apart it will be seen that the location of the filament is absolutely determinable in all three planes.

The method of adjusting a lamp by the apparatus shown in Figs. 2, 3 and 4 is as follows: The cap 19 is raised, a lamp bulb is inserted in the cradle 17, and the cap is then clamped down over the bulb. The bulb is then adjusted by screws 25, 14 and 16 until the filament occupies the proper location as determined by the finders A and A′. Plate 7 is then swung away from the base 5, and a lamp base 3 which contains fresh cement is placed in position on the base 5. Plate 7 is then swung back into the position shown in the drawings and the apparatus is allowed to stand until the cement has become hard. The assembled lamp may then be removed by raising cap 19.

Referring now to Fig. 5, the apparatus here shown comprises a base 5^a on which is mounted the same apparatus as that on base 5 in Figs. 1, 2 and 3, except that the finders A and A′ are omitted from plate 7. Base 5^a is provided with suitable holes which fit snugly over dowel screws 34 fixed in a block 35. Block 35 is fixed on a bracket 37, in which is journaled a shaft 36 which carries an arm 38 whereby the arm may be swung through a considerable angle, preferably 90° or more. Mounted in arm 38 is a finder A^2, which may be similar to finders A and A′ shown in Figs. 1 and 2 and described hereinbefore. The parts are so adjusted and located that when the lamp filament occupies the proper position with relation to the block 35 the center of the image of the filament coincides with the intersection of the cross-hairs in finder A^2 when the latter occupies any position to which it may be swung. Since the finder may be swung through a considerable angle, only one finder is necessary in this form of apparatus, the filament being located by viewing it with the finder in two or more different positions. The apparatus is used in the same manner

as that shown in the preceding views, except that after the bulb has been properly located the base 5^a and the parts carried thereby are removed, plate 7 is swung out, a lamp base properly supplied with cement inserted in base 5^a, and the plate 7 is then swung back and left in place until the cement is dry. During this process another base 5^a, with similar apparatus thereon, may be placed on block 35 so that another lamp may be adjusted while the cement in the first lamp is drying. I thus economize in the number of finders required to adjust a given number of lamps in a given period of time.

Referring now to Fig. 6, the base 5 and parts mounted thereon are the same as the apparatus shown in Figs. 2, 3 and 4, except that the finders A and A′ are omitted and other means are substituted for determining the location of the bulb, which means I will now describe. The base 5 is provided with holes which fit snugly over dowel screws 34 fixed in a plate 39. This plate is upturned on one side and carries a lens 40 which projects a beam of light from filament 2 on a screen 41 carried by plate 39. A circle 42 (see Fig. 7) is marked on screen 41, which circle is so located and is of such size that it coincides with the beam projected by the lens 40 when the filament occupies the proper location with respect to the base plate 39. It will be seen, therefore, that the filament may be definitely located in all three planes by means of a single lens and screen. In using the apparatus shown in Fig. 6, a lamp bulb is properly adjusted and the base 5 is then removed and a similar base substituted therefor, so that as with the apparatus shown in Fig. 5, one lamp may be adjusted while the cement in the preceding lamp is drying.

It is understood that the signal in which the lamp is to be used is provided with a socket which accommodates the lamp base 3, which socket is so located that when a properly adjusted lamp is placed therein the filament will occupy the desired position with respect to the optical device of the signal. Then it is evident that an old lamp may be removed from the signal and a new one inserted without any adjustment being necessary at the signal.

Although I have herein shown and described only a few forms of apparatus embodying my invention, and have explained only a few methods embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. The method of adjusting incandescent electric lamps which consists in locating the bulb by optical means in such position that the filament occupies a predetermined position with relation to a given member, locating the lamp base also in a predetermined position with relation to said member, and then securing the bulb and the base together.

2. In combination, a base member, means associated therewith for mounting a lamp base in a predetermined position in said base member, means for adjustably mounting a lamp bulb, and optical means for determining when the filament in said bulb occupies a predetermined position with respect to said base member.

3. In combination, a base member, means associated therewith for holding a lamp base in a predetermined position thereon, a frame movable with relation to said base member, means for constraining said frame to move in a given path with relation to said base member, means carried by said frame for adjustably mounting a lamp bulb therein, and optical means for determining when the filament in said bulb occupies a predetermined position with relation to said frame.

4. An incandescent electric lamp comprising a bulb, a filament located therein with usual commercial accuracy, and a member attached to said bulb and located in a predetermined position with respect to said filament.

5. An incandescent electric lamp comprising a bulb, a concentrated filament located therein with usual commercial accuracy, and a member attached to said bulb and located in a predetermined position with respect to said filament.

6. In combination, a member, means for mounting a lamp base in a predetermined position with respect to said member, means for adjustably mounting a lamp bulb having a filament therein, and means for determining when the filament occupies a predetermined position with respect to said member.

7. An incandescent electric lamp including a bulb, a filament located therein with usual commercial accuracy, and a member rigidly mounted with reference to said bulb and located in a predetermined position with respect to said filament.

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

CLINTON O. HARRINGTON.

Witnesses:

A. HERMAN WEGNER,

R. L. KISTLER.