C. S. SNAVELY.

ADJUSTMENT OF INCANDESCENT LAMPS.

APPLICATION FILED JUNE 23, 1917. RENEWED OCT. 3, 1919

1,329,640.

Patented Feb. 3, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

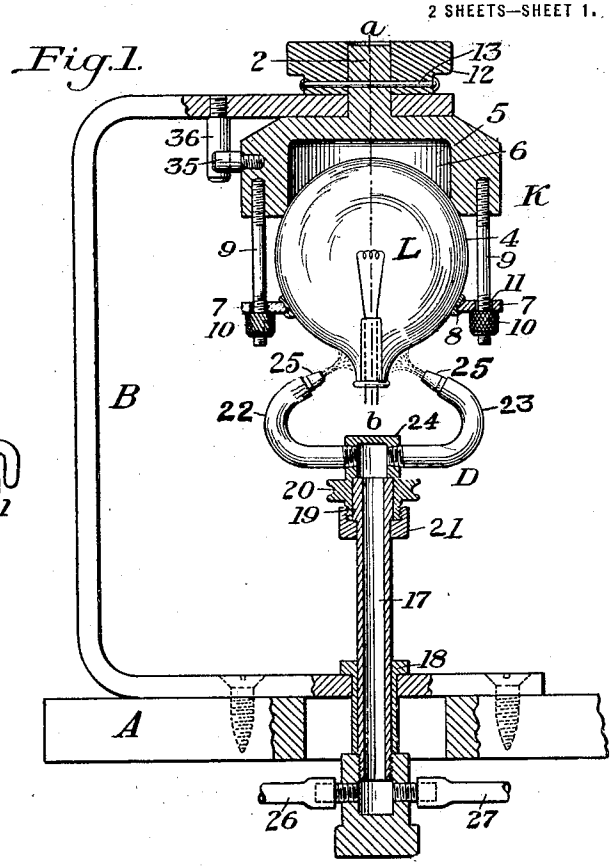


Fig. 2.

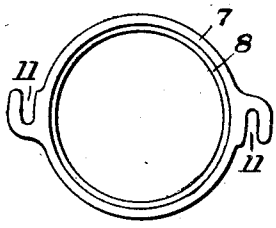


Fig. 4.

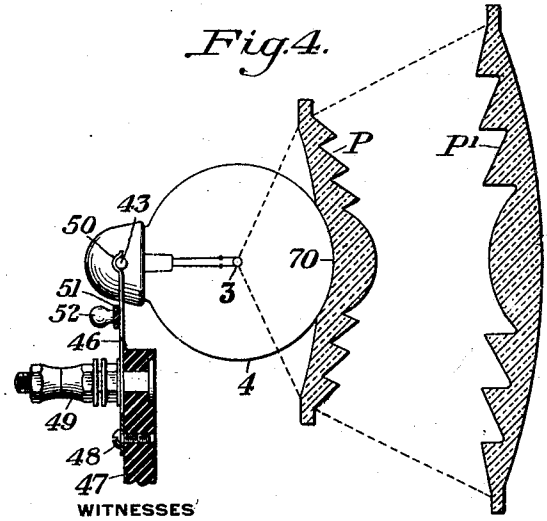
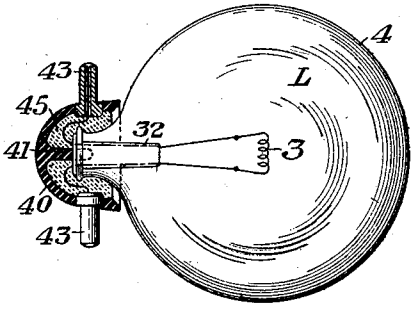


Fig. 3.



WITNESSES

A. Herman Wagner

Edwin D. Jones.

INVENTOR

Clarence S. Snavely,

by A. L. Venuell

His attorney

C. S. SNAVELY.

ADJUSTMENT OF INCANDESCENT LAMPS.

APPLICATION FILED JUNE 23, 1917. RENEWED OCT. 3, 1919.

1,329,640.

Patented Feb. 3, 1920.

2 SHEETS—SHEET 2.

Fig. 5.

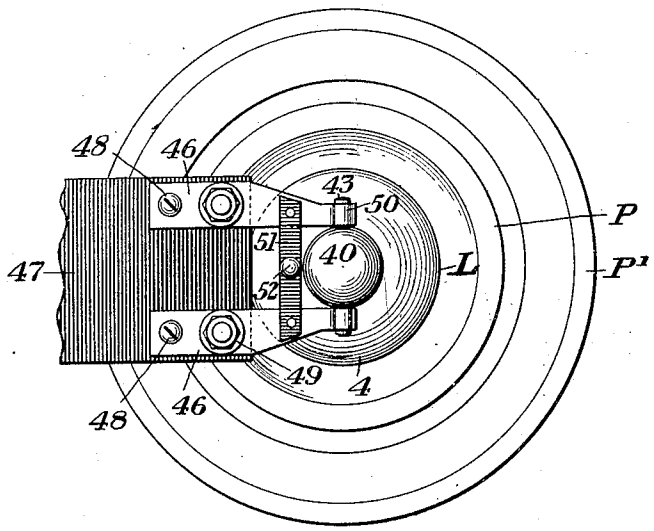


Fig. 6.

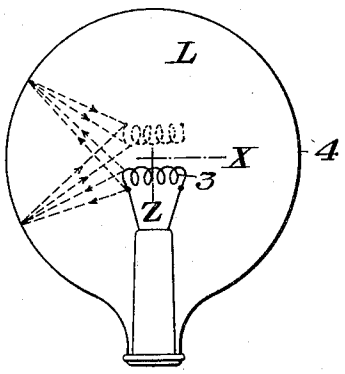
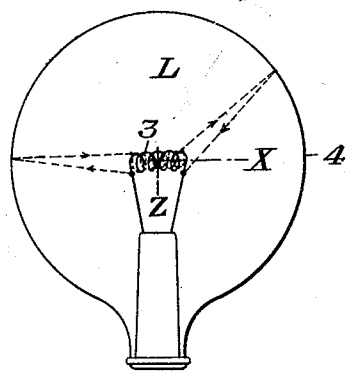


Fig. 7.



WITNESSES

G. Herman Wegner.

Edwin L. Jones.

INVENTOR

Clarence S. Snavely.

by A. L. Vencill

His attorney

UNITED STATES PATENT OFFICE.

CLARENCE S. SNAVELY, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ADJUSTMENT OF INCANDESCENT LAMPS.

1,329,640. Specification of Letters Patent. **Patented Feb. 3, 1920.**

Original application filed November 19, 1915, Serial No. 62,341. Divided and this application filed June 23, 1917, Serial No. 176,573. Renewed October 3, 1919. Serial No. 328,334.

To all whom it may concern:

Be it known that I, CLARENCE S. SNAVELY, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Adjustments of Incandescent Lamps, of which the following is a specification.

My invention relates to electric lamps and particularly to a method of adjusting the filament of a lamp to a predetermined position with relation to the lamp bulb.

This application is a division of my copending application filed Nov. 19, 1915, Serial No. 62,341, for light signals.

I will describe one method and 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 one form of apparatus for adjusting the filament of a lamp with respect to the lamp bulb and embodying my invention. Fig. 2 is a plan view of member 7 shown in Fig. 1. Fig. 3 is a view showing one form of base for the lamp bulb. Fig. 4 is a view showing in side elevation, one form of apparatus embodying my invention for locating the lamp bulb with respect to a lens. Fig. 5 is a view showing in rear elevation, the apparatus shown in Fig. 4. Fig. 6 is a view showing diagrammatically the manner in which a filament is reflected when the filament is off center with relation to the bulb, and Fig. 7 is a similar view showing the reflection of the filament when same is located directly in the center of the bulb.

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

Referring first to Fig. 1, the reference character A designates a base plate and B designates a substantially C-shaped frame secured to and upstanding from the plate A. Mounted in the upper end of the frame B is a clamping device K, which, as here shown, comprises an upper member 5 having a central hole 6 to receive the upper end of a bulb 4 of an incandescent lamp L, and a lower member (see also Fig. 2), which, as here shown, is a plate 7 having a central opening 8 to receive the lower part of the bulb 4. Two pins 9 are inserted into the lower face of member 5 and are adapted to enter slots 11 in plate 7, so that when nuts 10 are drawn up, the plate clamps the lamp bulb firmly against the upper member 5. By a counter-clockwise twist of the plate 7, lamp L may be readily removed from the clamp K and conversely a clockwise twist clamps the lamp in place. The firmness of the grip of the clamp can be adjusted by the nuts 10, as will be understood. Clamp K is rotatably mounted in the frame B by means of a stud 2 which extends upwardly from the center of member 5 through an opening in the frame. A head 12 is fixed to the upper end of the stud by a pin 13 so that the clamp suspends from the frame and is free to turn about a vertical axis *a*—*b*. For purposes which will appear hereinafter, it is desirable to limit the angular motion of clamp K to approximately a right angle. This is accomplished by means of pegs 35 screwed into the upper member 5 of clamp K approximately 90° apart (only one of these pegs appears on the drawing). The pegs are adapted to engage a stud 36 secured to frame B, so that movement of clamp K is limited to the angle between pegs 35.

Reference character D designates a blow pipe whose vertical tube 17 is adjusted to a sliding fit in a sleeve 18 extending through the lower horizontal position of frame B and base A. The lower end of tube 17 is adapted to receive gas and air from flexible tubes 26 and 27. The upper end of tube 17 has a shoulder 19 over which fits a hollow pulley 20. A collar 21 engages the lower edge of shoulder 19 and is screwed to pulley 20 so that the pulley is prevented from slipping off the top of the tube. Pulley 20 is provided with a tubular extension 24 closed at its upper end. Two diametrically opposite arms 22 and 23 branch out from extension 24 and terminate in nozzles 25. The mixture of gas and air flowing through tube 17 forms into two jets, one from each nozzle 25. If the pulley is revolved by suitable means not shown, these jets are set into rotation, and, when ignited, apply an even heat to an object inserted between them. The blow pipe normally slides downward by gravity until collar 21 is seated on the upper

flange of sleeve 18. When the blow pipe is raised to the position shown in the drawing, the flames impinge on the neck of bulb 4, so that the glass is readily heated to a ductile state.

Referring now to Figs. 6 and 7, I have here shown a method for securing an accurate adjustment of the lamp filament with relation to the lamp bulb, such method being employed in conjunction with the apparatus shown in Figs. 1 and 2. In Fig. 6 is shown a lamp L comprising a substantially spherical bulb 4 and concentrated filament 3. To secure this adjustment, I utilize the so-called reflex image of the filament which occurs in all spherical or elliptical lamp bulbs. In lamps of these types, the bulb is the equivalent of a concave mirror, the image of the filament 3 being projected upon the surface of the bulb and reflected inwardly at an angle depending upon the position of the filament with relation to the center of the bulb. As shown in Fig. 6, the filament is below the center of the bulb 4, the center being at the point of intersection of the lines X and Z. As a consequence, the image of the filament is projected to and from the surface of the bulb in the manner indicated in dash lines, wherefore, the reflex image appears as far to one side of the center of the bulb as the filament is displaced from the opposite side of the center. In Fig. 7, the filament is shown exactly in the center of the bulb. It therefore follows that the image of the filament is projected in the manner indicated in dash lines, so that the image appears in the center of the bulb, but in inverted relation to the filament, as shown in dotted lines. The reflex image is rather indistinct when the filament is cold but by heating the filament to a dull red glow, the image is clearly defined.

From the foregoing, it will be seen that the exact position of the filament with relation to the center of the bulb may be determined by comparing the position of such filament with the image thereof.

The operation of the apparatus thus far described is as follows:

A lamp L is fastened within the clamp K by first removing the plate 7, placing the lamp vertically within the opening 8 and returning the plate and lamp so that the lamp occupies a vertical position within the opening 6. The terminals of the filament are now connected to a source of current of sufficient voltage to heat the same to a dull red glow, whereupon a distinct image of the filament appears within the bulb. With the lamp L secured in place, the operator now proceeds to heat the neck of the lamp bulb 4, by raising the blow pipe to the position shown in the drawing. After the rapidly rotating flame of the blow pipe has heated the neck of the bulb to an even red heat, the filament may be readily adjusted within the bulb by inserting a suitable tool, such as shown and described in my co-pending application of which the present case is a division, within the neck and bending the neck until the filament occupies the desired position with relation to its reflex image. If for instance, it is desired to locate the filament centrally in the lamp bulb, the operator adjusts the filament until the image thereof coincides in position with the filament, as shown in Fig. 7. To obtain an accurate adjustment, the filament may be viewed from two different angles by turning the clamp K in one direction until one of the pegs 35 engages stud 36 and then turning the clamp in the opposite direction until the other peg 35 engages the stud.

From the foregoing operation it will be manifest that I have provided a simple and efficient method for accurately adjusting the filament of a lamp to a predetermined position with respect to the bulb.

Referring now to Figs. 3, 4 and 5, I have here shown a practical application of a lamp L to a light signal for use in railway signaling. In Fig. 3 I have shown one form of base for the lamp L, such base comprising a shell 40 of insulating material and having a central prong 41, the tip of which is inserted into the hollow stem 32. As here shown, the base is readily secured to the lamp bulb by means of cement 45. Lead-in wires pass through stem 32 and are connected to metallic studs 43 whose heads are fastened in the shell 40 and whose shanks extend outwardly from the shell, as shown.

In Figs. 4 and 5 I have shown the lamp placed in proper position with respect to a pair of Fresnel lenses P and P′, the inner or smaller lens being provided upon its outer surface with a recess 70 to receive one end of the lamp bulb 4. 46 designates a pair of springs attached by means of screws 48 and terminal posts 49 to a rigid supporting member 47 of insulating material. Member 47 and the Fresnel lens are mounted in a casing which I have not shown on the drawing, so that they are immovable with respect to each other. The free ends of the springs 46 are bent to form semi-circular recesses 50, while connecting the springs is a bar 51 of insulating material. This bar 51 is riveted to the springs as shown, and is provided with a stud 52 which serves as a handle whereby the springs may be conveniently bent. The lamp is inserted by placing the upper end of the bulb 4 into a recess 70 in the lens P, whereupon the springs 46 are pulled backward by means of the handle 52, thus permitting the studs 43 to be slipped into the recesses 50. The pressure of springs 46 not only holds the lamp in place with respect to the lens, but also causes a firm contact with

springs 46 and studs 43 so that the circuit is completed from one terminal post through the lamp filament to the other terminal post.

The filament of the lamp in Fig. 4 has been adjusted by the method previously described, so that the same is at the focal point of the Fresnel lens combination. It will, therefore, be seen that when the lamp L is clamped in position, the filament 3 will occupy a predetermined position with relation to the focal point of the lenses. Naturally, the filament of any lamp bulb similar in size and shape and similarly adjusted, will occupy the focal point when substituted for the first lamp.

Although I have herein shown and described only one method and apparatus embodying my invention, it will be 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 applying heat to render the filament movable with respect to the bulb, and moving the filament until it occupies a predetermined position with respect to the image thereof projected by the bulb.

2. The method of adjusting incandescent electric lamps which consists in applying heat to the portion of the bulb to which the filament is attached whereby the filament may be moved with respect to the bulb, and then moving the filament until it occupies a predetermined position with respect to the image thereof projected by the bulb.

3. The method of adjusting incandescent electric lamps which consists in applying heat to the portion of the bulb to which the filament is attached whereby the filament may be moved with respect to the bulb, passing current through the filament to heat the same to incandescence, and then moving the filament until it occupies a predetermined position with respect to the image thereof projected by the bulb.

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

CLARENCE S. SNAVELY.

Witnesses:
A. HERMAN WEGNER,
FAY GLASGOW.