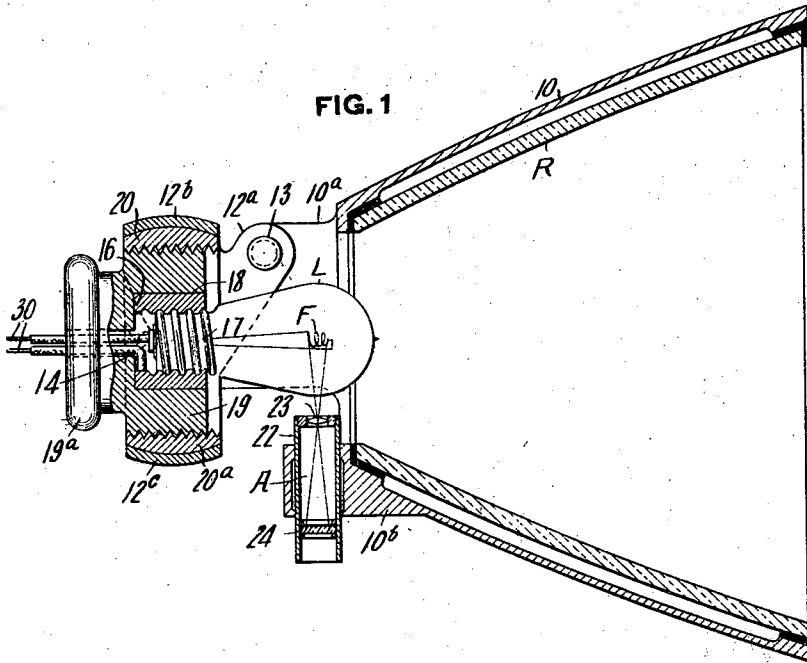
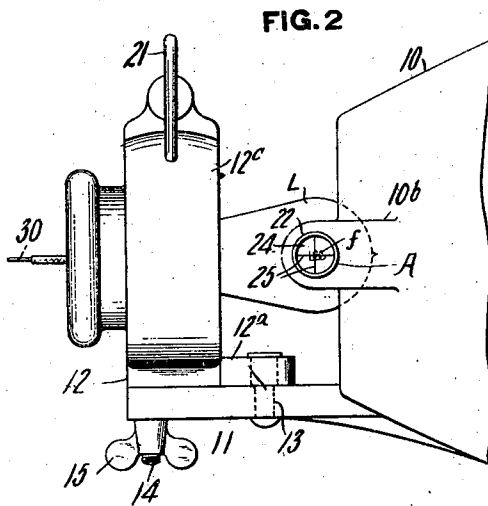
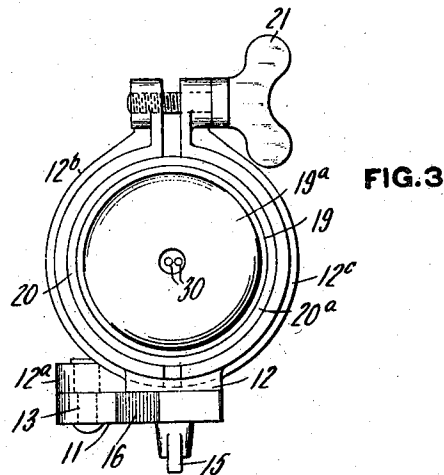


D. J. McCARTHY.
 MEANS FOR AND PROCESS OF ADJUSTING INCANDESCENT LAMPS.
 APPLICATION FILED MAR. 13, 1914.

1,157,020.

Patented Oct. 19, 1915.
 2 SHEETS—SHEET 1.



WITNESSES

W. T. Holman
A. L. Verrill

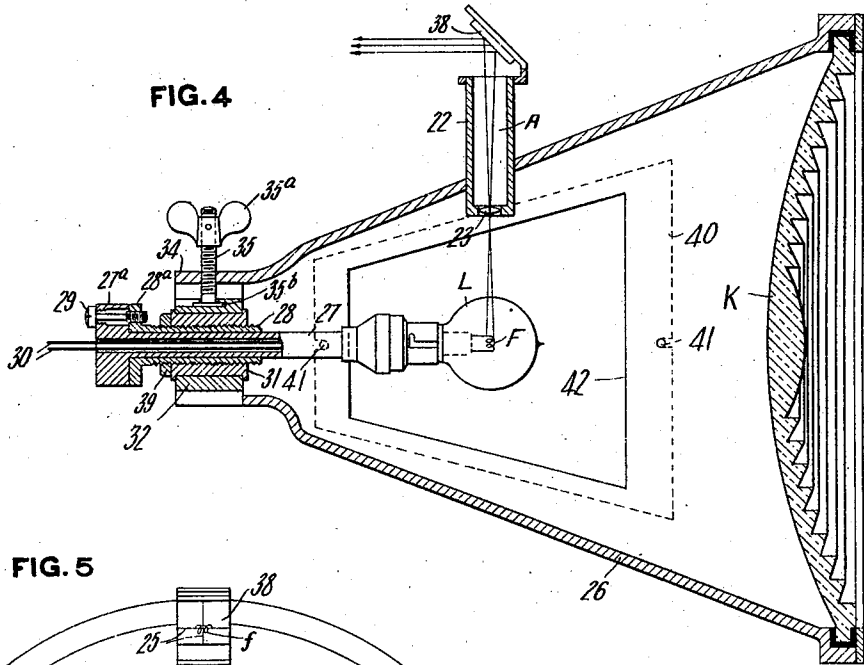
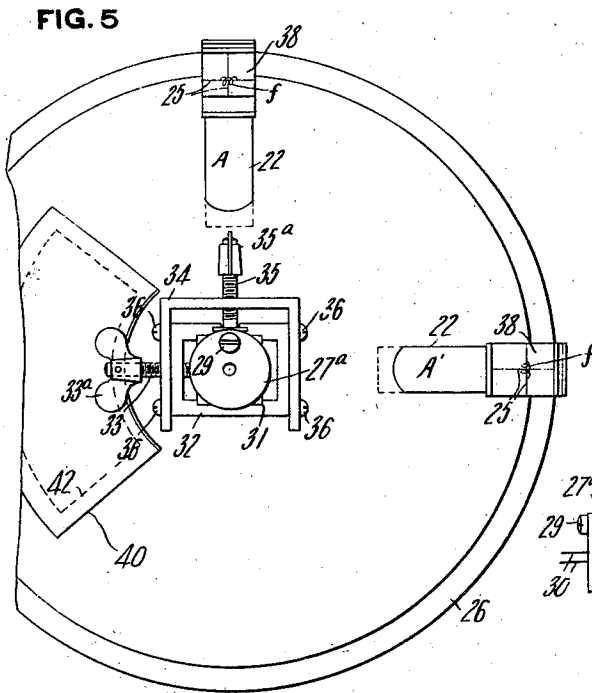
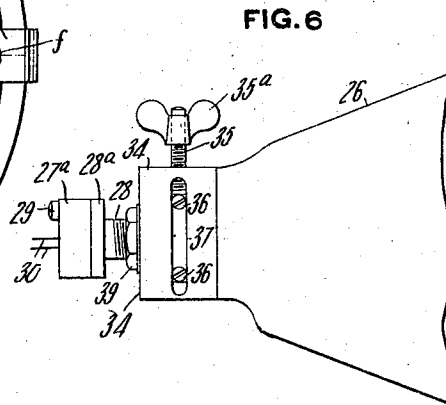
INVENTOR

Daniel J. McCarthy
By F. B. Crane
His Atty.

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WITNESSES

M. T. Bohman
A. L. Verrill

INVENTOR

Daniel J. McCarthy
 By *W. E. Lawrence*
His atty.

UNITED STATES PATENT OFFICE.

DANIEL J. McCARTHY, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MEANS FOR AND PROCESS OF ADJUSTING INCANDESCENT LAMPS.

1,157,020.

Specification of Letters Patent.

Patented Oct. 19, 1915.

Application filed March 13, 1914. Serial No. 824,472.

To all whom it may concern:

Be it known that I, DANIEL J. McCARTHY, a citizen of the United States, residing at Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Means for and Processes of Adjusting Incandescent Lamps, of which the following is a specification.

10 My invention relates to the fixing of the light emitting element of a lamp, such as an incandescent lamp, with regard to a focal point of an optical device, whereby the light emitting element and the optical device may
15 be used with the greatest efficiency.

My invention is particularly adapted for use in connection with light signals which comprise an incandescent electric lamp and an optical device, such as a reflector or a lens or both, for projecting a beam of light from the lamp. In signals of this type it is desirable to employ what is known as "concentrated filament" lamps, that is, lamps whose filaments are concentrated as
25 nearly as possible at a point, and obviously it is necessary to locate the filament accurately at a given point, usually the focus of the lens or reflector, in order to utilize the light in the most efficient manner. In
30 the manufacture of lamps of this character it has been found difficult to avoid variation in the position of the filament relative to the bulb, hence it is desirable to provide means for locating and fixing any lamp so
35 that the filament occupies a given position relative to the focal point of the optical device.

One object of my invention is the provision of means for and a method of accomplishing this result.

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

45 In the accompanying drawings, Figure 1 is a view showing in longitudinal section one form of signal comprising one form of apparatus embodying my invention. Fig. 2 is a view showing in elevation a portion of the apparatus shown in section in Fig. 1. Fig. 3 is a view showing in rear elevation a portion of the signal shown in Fig. 1. Fig. 4 is a view showing in longitudinal section another form of signal comprising a

modified form of apparatus embodying my 55 invention. Fig. 5 is a view showing in rear elevation the signal shown in Fig. 4. Fig. 6 is a view showing in side elevation a portion of the signal shown in Figs. 4 and 5.

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

Referring first to Figs. 1, 2 and 3, R designates an optical device, here shown as being a paraboloidal reflector, which is supported in and protected by a casing 10, this 65 casing being mounted by suitable means not shown in the drawing. L is an incandescent electric lamp having a concentrated filament F, which filament should be located exactly at the focus of the reflector in order that the 70 greatest efficiency may be obtained.

In Figs. 1, 2 and 3, the object of my invention may be carried out as follows: The lamp L is carried in a bracket 12 having an arm 12^a by means of which the bracket 75 is pivotally connected by a stud 13 with an arm 10^a integral with the casing 10. Bracket 12 carries a threaded pin 14 which projects through a slot 16 in the arm 10^a, and on the end of which is a wing nut 15 by means 80 of which the bracket may be secured to the arm 10^a. The slot 16 is radially disposed with relation to the pivot pin 13, so that the bracket may be swung outwardly to re-
85 new the lamp.

The lamp L is mounted in the bracket 12 in such manner that it can be adjusted in any direction with relation to the bracket. As here shown, the lamp base 17 is screwed into a metallic socket 18 which is fixed in 90 a cylindrical block 19 of insulating material, the outer surface of which is provided with screw threads. Wires 30 which supply current to the lamp pass through a hole in the block 19. The block 19 is inclosed 95 in a ring formed of two semi-circular metallic members 20 and 20^a, whose inside surfaces are threaded to match the threads on the block 19, and whose outside surfaces are spherical and are inclosed in a clamp comprising two clamp arms 12^b and 12^c forming 100 part of the bracket 12. The clamp arms may be drawn together by a wing screw 21, thereby squeezing together the ring members 20, 20^a, and the block 19. The block 19 105 is provided with a knob 19^a by means of which it may be screwed in the ring members and also swung in the clamp arms.

It will be seen from the foregoing that the lamp L may be adjusted in any direction with respect to the bracket 12; that is, it may be moved longitudinally by screwing block 19 in the ring members 20, 20^a, and it may be swung laterally in any plane by swinging the ring members in the clamp 12^b, 12^c. The parts inclosed in the bracket 12 constitute, therefore, a universal mounting for the lamp. In order to determine when the filament F is at the focal point of the optical device, I provide means which, as here shown, is a finder A which I will now explain. The casing 10 is provided with a lug 10^b, in which is mounted a tube 22. Fixed in the end of the tube nearest the lamp is a lens 23 which projects an image *f* of the filament on a ground glass 24 also fixed in the tube and provided with cross hairs 25. The parts of the finder A are located in a fixed position relatively to the focal point of reflector so that when the filament F is at the focus of the reflector, the center of the image *f* on the ground glass is at the intersection of the cross hairs. The cross hairs, therefore, determine the location of the filament except as to the position of the latter in the longitudinal axis of the finder A, and the proper location in this line can be determined by so proportioning the parts of the finder that when the filament is the correct distance from the lens the image *f* is sharply defined. The distance between the lens and the filament is short, so the lens is of short focal length, hence a slight movement of the filament toward or away from the lens will cause the image *f* on the ground glass to be blurred. After the finder A is properly located with respect to the casing 10, it is fixed rigidly to the casing by some suitable means, as by soldering the tube 22 to the lug 10^b.

The operation of the apparatus is as follows: When the lamp L is to be renewed, the operator first loosens wing nut 15, swings bracket 12 on its pivot so that the lamp projects from the side of the signal, removes the lamp from its socket 18, inserts a new lamp in the socket, swings the bracket back into place, and tightens wing nut 15. He then loosens wing screw 21, and grasps knob 19^a and adjusts block 19 until the center of the image of the filament on the ground glass 24 is at the intersection of the cross-hairs and the image is clear cut. He then tightens wing screw 21, and the signal is ready for service.

It will be seen that the finder A constitutes optical means, distinct from the reflector B but having a fixed relation thereto, for determining when the filament F is in the proper location with respect to the reflector.

Referring now to Figs 4, 5 and 6, the object of my invention may be carried out as

follows: The signal here shown comprises a lens K mounted in a conical case 26. Adjustably mounted also in the case 26, is an incandescent electric lamp L, the means here shown for mounting this lamp being as follows: The lamp is attached to a hollow stem 27 which slides freely in a threaded sleeve 28. The stem and sleeve are provided with flanged ends 27^a and 28^a which may be fixed together by a screw 29 for a purpose hereinafter explained. The wires 30 which supply current to the lamp pass through the stem 27. The sleeve 28 screws into a block 31 which slides horizontally in a yoke 32, the block 31 being provided with flanges as shown in Fig. 4 to guide it in the yoke. Block 31 may be reciprocated in the yoke by a screw 33 in a manner hereinafter explained. The yoke 32 slides in another yoke 34, which is formed integral with the case 26, and the yoke 32 is guided by screws 36 which are carried by the yoke and project into slots 37 in yoke 34.

Yoke 32 is reciprocated by a screw 35 which is provided with a head 35^b which fits freely in a T-slot in yoke 32. The screw passes out through a threaded hole in yoke 34 and carries a wing nut 35^a which is fixed to the screw, so that turning the wing nut causes reciprocation of yoke 32. The screw 33 is connected with block 31 in a similar manner and passes through a threaded hole in yoke 32 and also through one of the slots 37 in yoke 34. This screw is also provided with a wing nut 33^a which is fixed thereto so that by turning the wing nut, block 31 is reciprocated.

The line of reciprocation of yoke 32 in yoke 34 is perpendicular to the line of reciprocation of the block 31 in yoke 32, so it will be seen that by means of this structure the lamp may be moved in any direction in planes perpendicular to the axis of lens K. Furthermore, the lamp may be reciprocated in lines parallel to the axis of the lens by screwing sleeve 28 in block 31. Hence the lamp is universally adjustable with respect to the lens.

The means which I have here shown for determining the location of lamp L comprises two finders A and A', fixed in the case 26 and disposed at substantially 90° apart. Each finder, as here shown, comprises a tube 22 which carries a lens 23 and a screen 38 provided with cross-hairs 25. These screens are preferably located at such an angle that the images projected thereon will be visible from the rear of the signal so that they may both be seen at the same time by the operator. The finders are so located that when the filament F is in the desired position with respect to the lens K the center of the image *f* projected on each screen 38 will lie at the intersection of the cross-hairs.

To adjust the lamp longitudinally by the threaded sleeve 28, screw 29 is withdrawn from head 28^a and the sleeve 28 is then turned until the lamp is in the proper location, the stem being reciprocated in sleeve 28 so that flanges 27^a and 28^a are constantly in contact. The sleeve is then locked in position by a jam nut 39, and the sleeves 27 and 28 are again locked together by screw 29. In commercial lamps the center of the filament does not always lie in the axial line of the lamp base, hence after locating the filament in the focal axis of the lens it is desirable that longitudinal movement of the filament along this axis should be possible without turning the lamp. It will be seen that this is accomplished by the structure which I have shown and described. Furthermore, inasmuch as the lamp may be advanced toward and receded from the lens without turning it, I avoid twisting the wires 30.

In order to make the lamp L accessible for renewal, I provide a hole 42 in the bottom of case 26, which hole is covered by a plate 40 removably attached to the case by screws 41.

Although I have herein shown and described only two forms of apparatus 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. In combination, a body, an incandescent electric lamp, means for adjustably supporting said lamp on the said body, and optical means for determining when the filament of said lamp occupies a given position with relation to said body.

2. In combination, a body, an incandescent electric lamp, means for adjustably supporting said lamp on the said body, and optical means having a fixed relation to said body for determining when the filament of said lamp occupies a given position with relation to said body.

3. In combination, a body, an incandescent electric lamp, means for adjustably supporting said lamp on the said body, means for determining when the filament of said lamp occupies a given position with relation to said body, and means for locking the lamp in the adjusted position.

4. In combination, an incandescent electric lamp, an optical device for projecting a beam of light from said lamp, means for adjustably mounting the lamp with relation to said optical device, and means associated with the optical device for determining when the filament of said lamp occupies a given position with relation to said device.

5. In combination, an incandescent electric lamp, an optical device for projecting

a beam of light from said lamp, means for adjustably mounting the lamp with relation to said optical device, and optical means having a fixed relation to said optical device for determining when the filament of said lamp occupies a given position with relation to said optical device.

6. In combination, an incandescent electric lamp, an optical device for projecting a beam of light from said lamp, means for adjustably mounting the lamp with relation to said optical device, and a lens and a screen mounted in fixed relation to said optical device, said relation being such that when the filament of the lamp occupies a given position with relation to the optical device the lens projects a sharply defined image of the filament at a given point on the screen.

7. In combination, an incandescent electric lamp, an optical device for projecting a beam of light from said lamp, means for adjustably mounting the lamp with relation to said optical device, optical means for determining when the filament of said lamp occupies a given position with relation to said device, and means for locking the lamp in the adjusted position.

8. In combination, an incandescent electric lamp, an optical device for projecting a beam of light from said lamp, means for adjustably mounting the lamp with relation to said optical device, a lens and a screen mounted in fixed relation to said optical device, and a second lens and screen mounted also in fixed relation to the optical device, the relation between each lens and screen and the optical device being such that when the filament occupies a given position with respect to the optical device each lens projects an image of the filament at a given point on the corresponding screen.

9. In combination, an incandescent electric lamp, an optical device for projecting a beam of light from said lamp, means for adjustably mounting the lamp with relation to said optical device, and an optical finder focused on the focal point of said optical device for determining when the filament of the lamp is at said focal point.

10. In combination, an incandescent electric lamp, an optical device for projecting a beam of light from said lamp, means for adjustably mounting the lamp with relation to said optical device, and optical means for determining when the filament of said lamp occupies a given position relative to said device, said optical means comprising two finders disposed at an angle to each other.

11. In combination, an incandescent electric lamp, an optical device for projecting a beam of light from said lamp, means for adjustably mounting the lamp with relation to said optical device, and optical means for determining when the filament of said lamp

occupies a given position relative to said device, said optical means comprising two finders disposed at substantially ninety degrees.

12. In combination, an incandescent electric lamp, an optical device for projecting a beam of light from said lamp, means for adjustably mounting the lamp with relation to said optical device, and two finders disposed at an angle to each other for determining when the filament of said lamp occupies a given position relative to the optical device, each finder comprising a lens and a reflecting surface on which the lens projects an image of the filament, said reflecting surfaces being so disposed that the images may be seen from one location.

13. In combination, an incandescent electric lamp having a concentrated filament, an optical device for projecting a beam of light

from said lamp, means for adjustably mounting the lamp with relation to said optical device, and optical means for determining when the filament of said lamp occupies a given position with relation to said device.

14. In combination, a body, an incandescent electric lamp having a concentrated filament, means for adjustably supporting said lamp on the said body, and optical means for determining when the filament of said lamp occupies a given position with relation to said body.

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

DANIEL J. McCARTHY.

Witnesses:

A. HERMAN WEGNER,
R. L. KISTLER.