C. O. HARRINGTON.

SIGNAL.

APPLICATION FILED OCT. 6, 1913.

1,207,291.

Patented Dec. 5, 1916.

2 SHEETS—SHEET 1.

FIG. 1

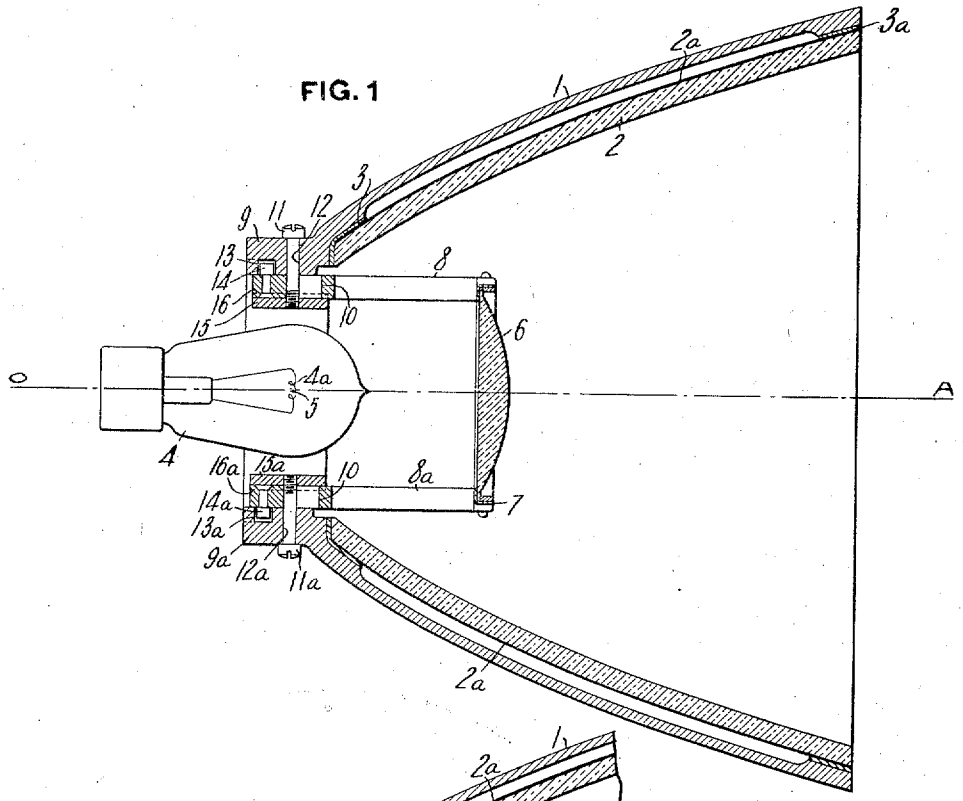
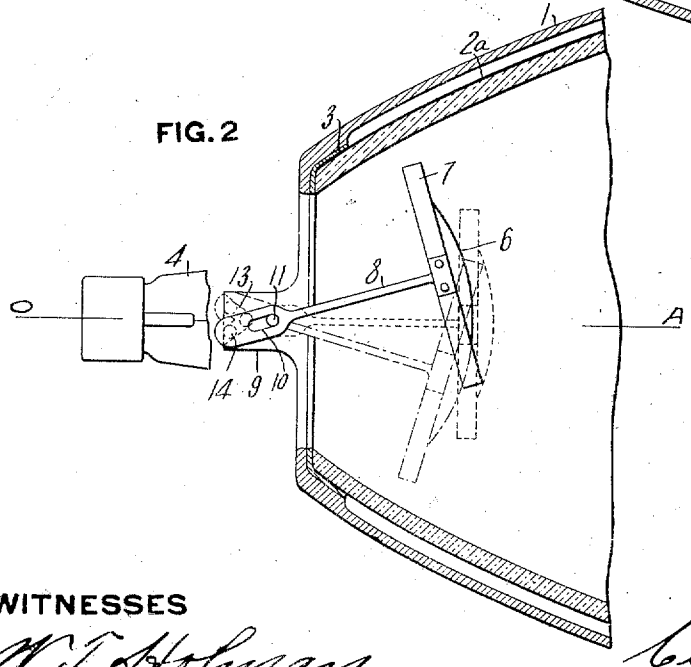



FIG. 2




WITNESSES

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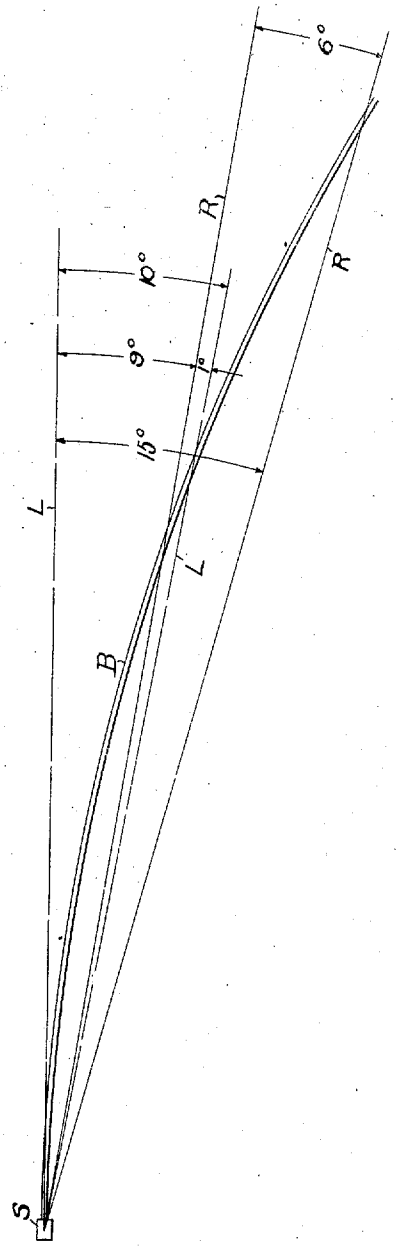



FIG. 3

WITNESSES

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# UNITED STATES PATENT OFFICE.

CLINTON O. HARRINGTON, OF EDGEWOOD BOROUGH, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

## SIGNAL.

1,207,291. Specification of Letters Patent. Patented Dec. 5, 1916.

Application filed October 6, 1913. Serial No. 793,511.

*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 Signals, of which the following is a specification.

My invention relates to signals. Signals embodying my invention are especially adapted for use in railway signaling, although their use is not limited to this particular adaptation.

I will describe one form of signal embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a diagrammatic view showing in longitudinal cross-section one form of signal embodying my invention. Fig. 2 is a sectional view on the line O—A of Fig. 1, parts of the signal being broken away. Fig. 3 is a diagrammatic view showing a portion of a railway having applied thereto the signal shown in Figs. 1 and 2.

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

Referring first to Figs. 1 and 2, the reference character 1 designates a shell, preferably of a metal such as brass, which supports and protects a reflector 2. This reflector, as here shown, is formed of glass, the outside surface of which is coated with silver $2^a$ as usual in the construction of mirrors. The reflector as here shown is paraboloidal in form, but I do not wish to be limited to this particular form of reflector. The reflector 2 is separated from the shell 1 by rings 3 and $3^a$ of felt or similar material to prevent injury to the reflector due to shocks.

The principal focus of reflector 2 is located at the point designated by 5. Located also at or adjacent this point is a source of light which, as here shown, is the concentrated filament $4^a$ of an electric incandescent lamp 4 which is mounted in a suitable manner (not shown) with relation to the reflector. As is well understood, with the apparatus thus far described a beam of light will be projected from the filament $4^a$ by the reflector, and the rays of this beam will be substantially parallel to the axis O—A of the reflector. It is desirable, however, for a reason which will hereinafter appear, that there should be a slight spread to the beam projected by the reflector; this spread will ordinarily be secured without special provisions because of inaccuracies in the reflector and also because of the fact that the filament $4^a$ is not concentrated at a point, but when this natural spread is not sufficient it can readily be increased by other means, such as by moving the lamp 4 so that the filament $4^a$ is a short distance behind (to the left of, as viewed in Fig. 1) the focus 5.

Located within the reflector 2 is a lens 6 for projecting another beam of light from the filament $4^a$. This lens is adjustably mounted with relation to the reflector 2 so that the angle between the axes of the beams projected by the two may be varied. As here shown, the lens is carried by a bracket which comprises a ring 7 in which the lens is fitted and to which are fixed two arms 8 and $8^a$, each of which is provided with a slot 10. Integral with the shell 1 are two ears or lugs 9 and $9^a$ located diametrically opposite each other and each provided with a hole 12, $12^a$, through which pass screws 11 and $11^a$ respectively. These screws also pass through the slots 10 in arms 8 and $8^a$ and thus serve as trunnions for the bracket which carries the lens 6. The trunnion screws 11 and $11^a$ are located diametrically opposite each other and the line through their centers passes substantially through the filament $4^a$. The lens 6 is so mounted in its bracket that its optical axis passes substantially through the filament $4^a$. It will be seen therefore that with the mounting as thus far described, the lens 6 may be swung around the filament $4^a$ as a center, and may also be moved longitudinally toward and away from this point within the limits imposed by the length of the slots 10. The length of arms 8 and $8^a$ is preferably such that when the lens is located as far from the filament $4^a$ as the slots 10 will permit, the principal focus of the lens substantially coincides with the filament $4^a$. Then obviously as the lens is moved toward the filament $4^a$, the principal focus of the lens moves back of the filament.

The movements of the lens with respect to the filament are preferably so controlled that when the optical axis of the lens coincides with the axis O—A of the reflector, the lens is located as far from the filament $4^a$ as the slots 10 will permit (so that the principal focus of the lens then coincides with the focus 5), and that as the lens is

swung in either direction from this position it is drawn a proportionate distance toward the filament. As here shown, this control is accomplished by V-shaped slots 13, 13ª, one in each lug 9 and 9ª, which slots coact with studs 14 and 14ª carried by the arms 8 and 8ª respectively. The apex of each slot 13, 13ª is located in the plane defined by the axis O—A of the reflector and the axis of the trunnion screws 11, 11ª, and the studs 14 and 14ª are so located that when the optical axis of the lens 6 coincides with the axis O—A of the reflector, the trunnion screws 11, 11ª are at the left hand ends of slots 10 (as viewed in Figs. 1 and 2), so that the principal focus of the lens then substantially coincides with the filament 4ª and the beam projected by the lens is then composed of rays of light all of which are substantially parallel to the axis O—A. Then as the lens is swung away from this position it is drawn a proportionate distance toward the filament 4ª by the slots 13, 13ª and studs 14, 14ª, so that the spread of the beam of light projected by the lens is proportionately increased. The parts of the signal are preferably so designed and proportioned that as the lens is swung away from its middle position (the position in which its optical axis coincides with the axis O—A of the reflector 2) the increasing spread of the beam projected by the lens is such that this beam always overlaps the beam projected by the reflector, so that the resultant beam of light projected by the signal is elongated in the plane defined by the axis O—A and a line passing through O—A and perpendicular to the axis of trunnion screws 11, 11ª. The elongation of this resultant beam is, of course, proportional to the angle between the axis O—A and the optical axis of the lens 6.

In order that the lens 6 and its supporting bracket may be clamped in any position relative to the reflector, I provide each arm 8 and 8ª with a block 15 or 15ª, each of which is drilled and tapped to receive the threaded end of the adjacent trunnion screw 11 or 11ª. These blocks also serve to hold the trunnion screws in place. The blocks are prevented from turning with relation to the arms 8 and 8ª by means of ribs 16 and 16ª on the blocks which slide in matching slots in the inside faces of the arms as shown in Fig. 1. These ribs and slots are omitted from Fig. 2 to avoid complicating the view.

Signals embodying my invention are especially adapted for use in railway signaling when it is desired to use lights for giving indications both at night and in daylight. When so used, the same signal may be adjusted to give indications along a straight track or on a curve, by merely adjusting the angle between the axis of the reflector and the axis of the lens. When the signal is employed to give indications along a straight track, the lens 6 is so located that its optical axis is coincident with the axis O—A of the reflector. The axes of the two beams of light projected by the reflector and the lens are then coincident, and the signal should be so located that this combined beam is projected along the trackway so that it can be seen by drivers of cars or trains. When the signal is to be used for giving indications on a curve, the lens 6 is swung so that its optical axis is at an angle to the axis of the reflector as shown in solid lines in Fig. 2, and, it being understood that the signal is so mounted that the axis of the trunnion screws 11, 11ª is vertical, the beam of light projected by the signal is then elongated so that it is visible from any point on the curve. This will be readily understood by reference to Fig. 3, in which B designates the track rails of a railway, the portion of track shown being a 2° curve, 1500 feet in length. Located at one end of this curve is a signal S which may be the same as the signal shown in Figs. 1 and 2, and which as here shown is suspended directly over the track rails. The lens in signal S has been swung so that the angle between the axes of the reflector and lens is 7°. The lines R, R′ are the limits of the beam of light projected by the reflector 2, this beam having as here shown a spread of 6°, which spread may be produced as hereinbefore explained. The lines L—L′ are the limits of the beam projected by the lens 6, this beam having as here shown a spread of 10°. The two beams overlap each other by 1°, so that the total horizontal spread of the resultant beam projected by the signal S is 15°, which is sufficient to be visible from all points on the curve. The angle between the axes of the reflector and lens may be varied to suit different curves.

It will be seen from the foregoing that a number of signals embodying my invention may be constructed, and that any one signal of such number may be employed for giving indications either along a stretch of straight track or along a curve.

Although I have herein shown and described only one form of signal 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. A signal comprising a source of light, a fixed reflector for projecting a beam in one direction from said source, and a lens for projecting another beam from said source, said lens being mounted to swing about said source of light as a center.

2. A signal comprising a source of light,

a reflector for projecting a beam of light from said source, a lens for projecting another beam of light from said source, and means for pivoting said lens on an axis passing substantially through said source of light.

3. A signal comprising a source of light, a reflector for projecting a beam from said source, a lens for projecting another beam from said source, and means for mounting said lens to swing relatively to the reflector, the axis of the lens being co-incident with the axis of the reflector when the lens occupies one position in its path, said means comprising a pin and slot trunnion and guides for drawing the lens closer to the source of light as the lens is swung away from said coincident position.

4. A signal comprising a source of light, a reflector for projecting a beam from said source, a lens for projecting another beam from said source, means for mounting said lens to swing in a curved path around the said source of light, said means also permitting the lens to move longitudinally with respect to the said source, and guides for constraining the lens to move in said longitudinal path when it is swung in the curved path, the said longitudinal movement being such that when the optical axis of the lens coincides with the axis of the reflector the principal focus of the lens substantially coincides with said source of light, and that as the optical axis of the lens moves away from the axis of the reflector the principal focus of the lens moves back of the source of light.

5. The combination with a signal comprising a reflector, a source of light, and a lens, of means for pivoting said lens about an axis passing substantially through said source of light, and means for varying the distance between said source and said lens when said lens is swung about said axis.

6. In combination, a signal comprising a reflector, a source of light, a lens, and means for pivoting said lens about an axis passing substantially through said source of light, said means comprising a pin and slot trunnion and guides for varying the distance between said lens and said source of light when said lens is swung in one direction or the other about said axis.

7. A signal comprising a reflector, a source of light, a lens, a bracket for pivoting said lens about an axis which passes substantially through said source of light, and means for varying the length of said bracket.

8. A signal comprising a source of light, an optical device for projecting a beam of light from said source, said beam having a constant spread, a second optical device for projecting another beam from said source, means for pivoting said second optical device about an axis which passes substantially through said source of light, and means for varying the spread of the beam of light from said second device when said second optical device is swung about said axis.

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

CLINTON O. HARRINGTON.

Witnesses:
A. HERMAN WEGNER,
R. L. KISTLER.