

E. F. HEARD.
 BEAM DEFLECTOR FOR SEARCH LAMPS.
 APPLICATION FILED DEC. 4, 1915.

1,209,155.

Patented Dec. 19, 1916.
 3 SHEETS—SHEET 1.

Fig. 1.

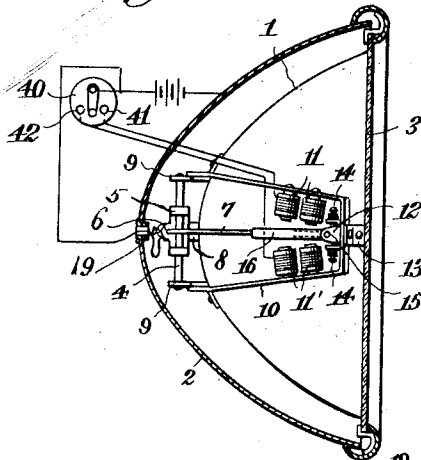


Fig. 2.

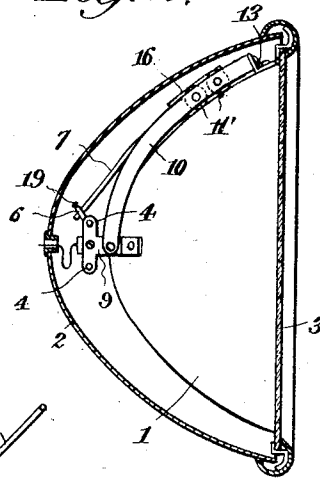


Fig. 5.

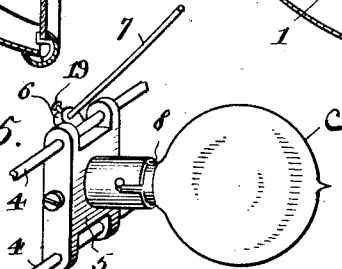


Fig. 3.

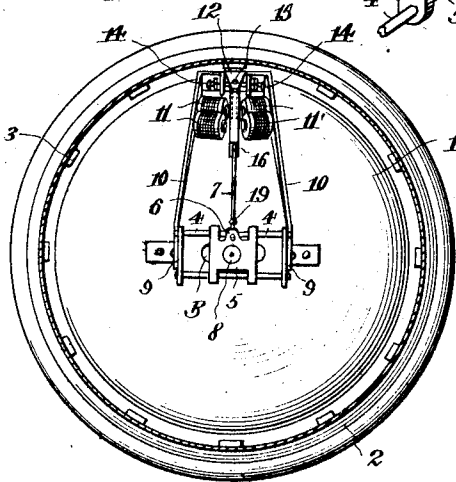
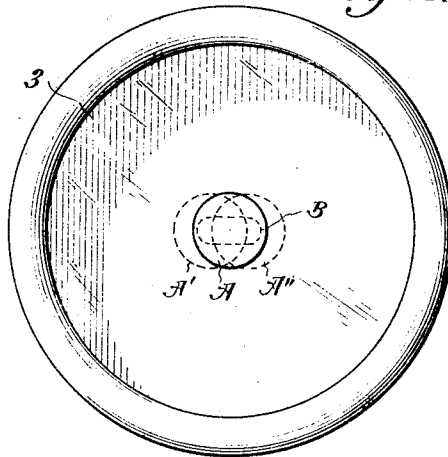


Fig. 4.



Witnesses: _____

C. Peinle, Jr.,
 R. M. Smith.

By

Victor J. Evans,

Attorney.

Inventor,
 Edmund F. Heard.

BEST AVAILABLE COPY

E. F. HEARD.
BEAM DEFLECTOR FOR SEARCH LAMPS.
APPLICATION FILED DEC. 4, 1915.

1,209,155.

Patented Dec. 19, 1916.
3 SHEETS—SHEET 2.

Fig. 6.

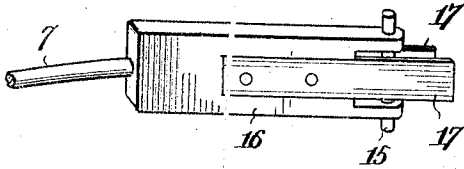


Fig. 7.

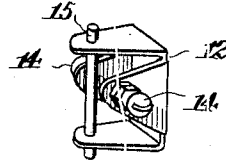


Fig. 8.

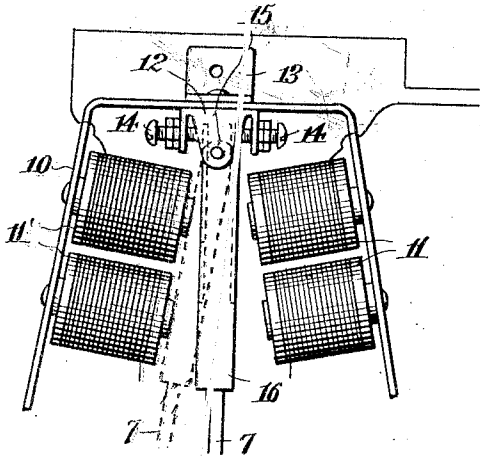


Fig. 10.

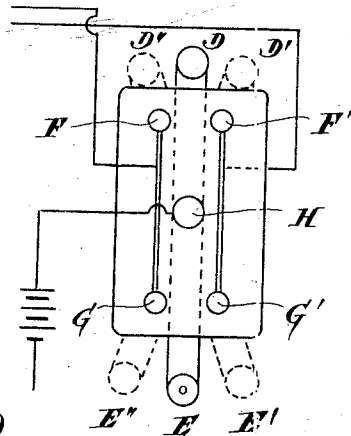
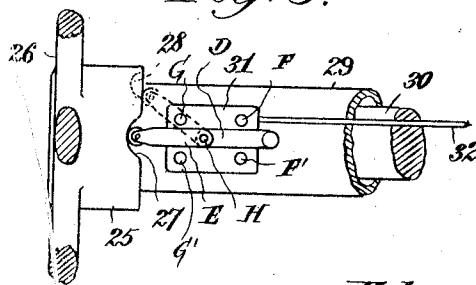


Fig. 9.



Witnesses:
C. Peinle, Jr.,
R. M. Smith.

Inventor,
Edmund F. Heard

By Victor J. Evans,

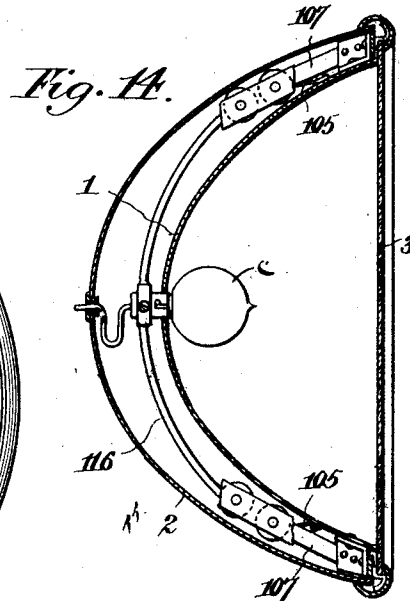
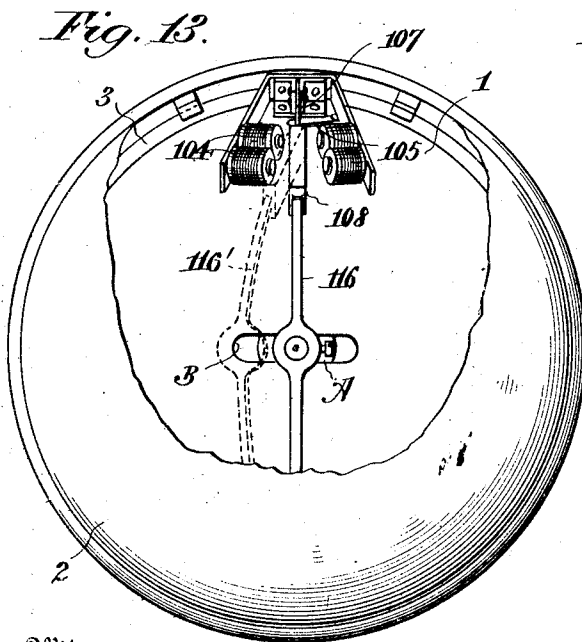
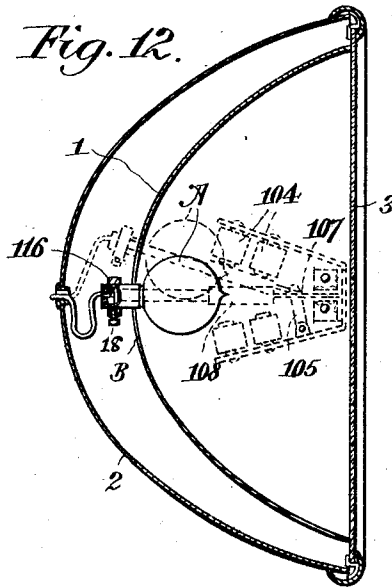
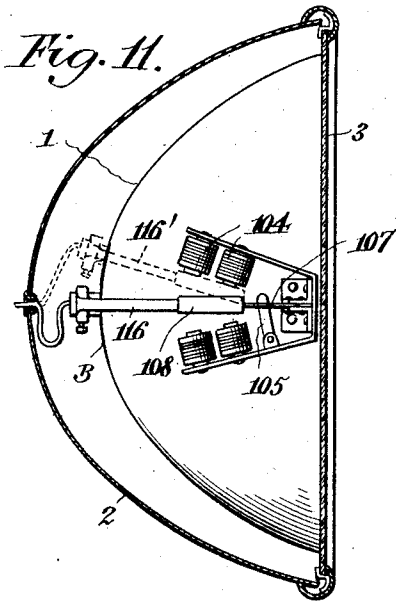
Attorney.

E. F. HEARD.
 BEAM DEFLECTOR FOR SEARCH LAMPS.
 APPLICATION FILED DEC. 4, 1915.

1,209,155.

Patented Dec. 19, 1916.

3 SHEETS—SHEET 3.



Witnesses:

C. Feinle, Jr.,
R. M. Smith.

By

Victor J. Evans,

Attorney.

Inventor,
Edmund F. Heard

UNITED STATES PATENT OFFICE.

EDMUND F. HEARD, OF NEWPORT NEWS, VIRGINIA.

BEAM-DEFLECTOR FOR SEARCH-LAMPS.

1,209,155.

Specification of Letters Patent.

Patented Dec. 19, 1916.

Application filed December 4, 1915. Serial No. 65,089.

To all whom it may concern:

Be it known that I, EDMUND F. HEARD, a citizen of the United States, residing at Newport News, in the county of Warwick and State of Virginia, have invented new and useful Improvements in Beam-Deflectors for Search-Lamps, of which the following is a specification.

This invention relates to beam deflectors for searchlamps, the object of the invention being to provide a simple inexpensive means for deflecting the beam of light projected from a headlight or searchlight in a given direction to one or the other side of the usual path of illumination, without moving the reflector or the lamp casing, this being particularly desirable in the lamp or lamps of an automobile or other vehicle when it is desired to illuminate to one or the other side of the usual path of illumination as would be required when driving over a rough, winding, dangerous or unknown road at night.

The device pertains particularly to the movement of the luminous part of the headlight or searchlight on a slide or swinging the same on a resilient support relatively to the reflecting device.

With the above and other objects in view, the invention consists in the novel construction, combination and arrangement of parts, as herein described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a horizontal section through a lamp, showing the mechanism of this invention in plan. Fig. 2 is a vertical fore and aft section through the lamp case, showing the mechanism of this invention in side elevation. Fig. 3 is a transverse section through the same, showing certain parts in elevation. Fig. 4 is a front elevation of the lamp. Fig. 5 is a fragmentary perspective view showing the lamp bulb, lamp carrier, and other parts immediately associated therewith. Fig. 6 is a detail perspective view of the armature centering springs and a fragment of the operating rod. Fig. 7 is a detail perspective view of the armature pivot and its bracket, showing the centering screws. Fig. 8 is an enlarged plan view showing the assembly of the operating mechanism. Fig. 9 is a fragmentary view of the steering column and wheel of a vehicle, showing the manual and automatic switch. Fig. 10 illustrates in diagram the wiring system employed in connection with the manual and automatic switch. Fig. 11 is a horizontal section similar to Fig. 1 showing another form of the

mechanism of this invention in elevation.

Fig. 12 is a horizontal section through the same taken in line with the slot which permits the movement of the lamp. Fig. 13 is a rear elevation partly in section of the same. Fig. 14 is a vertical fore and aft section taken centrally of the lamp case and showing the mechanism of this invention in side elevation.

Referring to Figs. 1 to 8 inclusive, 1 is a parabolic spherical or other projecting type of reflector, 2 is an outer casing or protecting cover over the reflector and device as further enumerated below, 3 is a glass protector or other transparent member, 4 is the guides upon which the lamp carrier 5 slides, 6 is a clip fastened to or forming a part of the slide 5 pierced by a hole through which passes the operating rod 7 by which movement of the slide 5 along the guides 4 is produced, 8 designates the lamp socket carrying the lamp bulb C, 9 designates brackets holding the guide rods 4 and suitably fastened to the reflector 1, 10 is a bent metal strip carrying the operating magnets or solenoids 11 and 11' also carrying the armature pivot holder 12, this strip being suitably fastened to the members 9 and 1, 13 is a clip for fastening the metal strip 10 to the reflector 1. 14 are the adjusting screws to be used in compressing or bending the springs 17 for adjusting armature 16 so that it will tend to maintain a central position. 15 is a pivot about which the armature 16 revolves. 17 are two pieces of spring metal suitably attached to the armature 16. 18 is a set screw or suitable locking device for holding the lamp socket 8 in the desired fore and aft position. C is an electric bulb or other source of light which under normal conditions is in, or approximately in, the focus of the normal reflector or mirror. B is a slot in the reflector 1. A' and A'' are positions occupied by the light bulb at the extreme limit of its travel away from the focus. 19 is a set screw to which may be attached a string or other suitable device for operating the lamp slide in case it is desired to use other than electric power for operating it or for hand use in case of failure of the electric device.

Referring now to Figs. 8, 9 and 10, 25 is a steering wheel hub or other movable part of the steering gear, 26 are spokes on 25, 27 is a cam surface on the moving part 25. 28 shown in dotted lines is a position assumed by the cam after the moving part of

the steering gear has been turned a given amount. 29 is a stationary part of the vehicle such as the steering post. 30 is a moving part of the steering gear. 31 shows a combination switch fastened to the steering post in Fig. 9, controlling the passage of an electric current through one or the other sets of electromagnets or solenoids 11 or 11'. Upon the insulating base 31 are mounted two switch arms D and E, pivoted about the point H and capable of movement independent of each other. The switch arm E is provided with two centering springs which tend to maintain E in its central position as shown in Figs. 9 and 10. The switch arm D is for manual control and E for use in connection with automatic control. F, F', G and G' are contact points connected by suitable wires to the operating magnets or solenoids. 32 is a cable of electric wires leading from the switch 31 to the controlling magnets or solenoids.

40 is an ordinary two point switch having a point 41 connected to one set of magnets or solenoids while a point 42 is connected to the other set.

When it is desired to deflect the beam of light to one side of the usual path of illumination, manual operation is as follows. Referring to Fig. 10 the switch lever is moved from D to D' thus making an electric circuit which in turn causes an electric current to flow through the magnet coils causing a magnetic attraction between the magnets or solenoids 11' shown in Fig. 8 with the result that the iron armature 16 is attracted toward the magnets or solenoids 11' and revolves about its pivot 15 to the position 16' shown in dotted lines this in turn through the rod 7 and clip 6 (shown in Figs. 1 and 5) transmits motion to the slide 5 the lamp holder 8 and bulb C causing the lamp bulb to move to the position A' shown in Fig. 4. During this action the member 7 acts as a resilient shock absorber to stop the lamp holder and bulb when 16 strikes the magnet thus bringing the lamp holder to rest without undue shock and preventing damage or breakage of the lamp bulb or filament. The rays of light, then instead of being thrown directly forward of the reflector as when the source of light was in position A will be deflected to the side opposite from that assumed by the lamp bulb; thus giving the desired illumination to one side of the usual path of illumination. When the switch arm is brought from D' to D the magnets are de-energized and the spring 17 which was compressed in the previous action causes the device to return to its original position and the lamp bulb again occupies the position at A in Fig. 4 and the beam is again thrown directly ahead.

If it is desired to direct the rays of light to the other side of the usual path of illu-

mination, the switch D is carried to D'' causing the electric current to flow through the magnets or solenoids 11 in which case the lamp bulb is moved to the position shown at A'' in Fig. 4 thus projecting the rays away from the usual path of illumination and in the desired direction. Furthermore, as long as the switch remains in either of the positions D' or D'' magnets or solenoids will continue to be magnetized and the lamp C will remain in the respective position shown at A' or A'' and the rays of light will continue to be deflected to the corresponding side of the axis of the reflector; when the switch arm is brought to D the lamp bulb again returns to its central position at A in Fig. 4.

When the movable part of the steering gear 25 is turned the cam surface in turn moves to some position 28 which causes the switch arm E (shown in Figs. 9 and 10) to move to E''; if the steering gear be turned still farther the switch arm remains at E'' due to pressure from its centering spring and the electric circuit is maintained through the magnets or solenoids 11' as described above and the light bulb is moved from A to A'' (in Fig. 4) with the result that the beam of light is deflected in the direction in which the vehicle is starting to turn. As the steering gear is brought back to its original or fore and aft position, the centering spring causes the switch arm to return to its original position E when the cam 27 returns to its position shown in Fig. 9, then the magnetizing circuit is broken and the lamp returns from A'' to A and the beam of light is again thrown directly forward. Thus either automatic or manual control may be provided for controlling the direction of the beam of light or a combination of both manual and automatic control may be provided.

The device shown in Figs. 11 to 14 inclusive is similar to the devices above described with the following exceptions. The sliding carrier is dispensed with and a swinging arm 116 is used to carry the lamp bulb. This arm is mounted to be swung upon the resilient pieces 107 which in this case are made of spring steel or bronze. These pieces tend to maintain the arm 116 and lamp bulb C in a central position with reference to the focus. However, when the magnetic circuit is made, the magnets 104 attract the iron armature 108 and the resilience of 107 allows the same to bend and 116 then goes to 116' shown by the dotted lines in Figs. 11, 12 and 13. When the magnetizing circuit is broken the springs 107 cause the lamp carrier to return to its central position. The small spring 105 is used to dampen the oscillations when the lamp holder springs back to central position. The springs 107 act as a shock absorber when

108 strikes the magnet keeping the lamp bulb from being broken.

A particular advantage of this construction just described is that the lamp bulb travels in a path practically concentric with the reflecting surface contour thus keeping the bulb from striking the reflecting surface and giving an extremely long range of travel. There are no pivoted or sliding parts as the gear swings upon a spring and hence no friction, doing away with oil. The gear is preferably installed in duplicate in top and bottom. All other features are similar to the device first described.

If desired, a small reversible electric motor may be employed for shifting or moving the bulb or lamp, the same to be controlled by means of a polarity changing switch.

Having thus described my invention, I claim:—

1. In a headlight, the combination of a concave reflector, an incandescent electric lamp normally in the focus of said reflector and mounted to move horizontally to the right and left out of the focus of the reflector selectively, steering mechanism, and means automatically controlled as the steering mechanism is turned to move the light either to the right or the left.

2. In a headlight, the combination of a concave reflector, an electric lamp normally in focus of said reflector and mounted on a vertical center for movement to the right or the left out of the focus of the reflector, a steering shaft, and means automatically operated upon the turning of the steering shaft for selectively tilting the lamp out of the focus to the right or the left for directing light in the direction in which the vehicle is turned.

3. In a headlight, the combination of a concave reflector, an incandescent electric lamp mounted to move horizontally to the right and left out of the focus of the reflector selectively, steering means, and electro-magnetic means automatically controlled as the steering means is turned to move the light either to the right or the left.

4. In a headlight, the combination of a concave reflector, an incandescent electric lamp mounted to move horizontally to the right and left out of the focus of the reflector selectively, electro-magnetic means to move the light either to the right or the left, a source of electric energy, a stationary support, an electric switch mounted on said support and electrically connected with said electro-magnetic means and source of electric energy, and steering means constructed and arranged to operate the electric switch to selectively move the light to the right or the left for directing light in the direction in which the vehicle is turned.

5. In a headlight, the combination of a concave reflector, an incandescent electric lamp normally in the focus of said reflector and pivotally mounted to swing horizontally to the right and left out of the focus of the reflector selectively, electro-magnetic means for so moving the lamp, and resilient means located at the center of movement of the lamp and constructed and arranged to return the lamp to its original position on deenergization of the electro-magnetic means.

6. In a headlight, the combination of a concave reflector, an incandescent electric lamp normally in the focus of said reflector and pivotally mounted to swing horizontally to the right and left out of the focus of the reflector selectively, electro-magnetic means for so moving the lamp, and resilient strips located at the center of movement of the lamp and constructed and arranged to return the lamp to its original position on deenergization of the electro-magnetic means.

7. In a headlight, the combination of a concave reflector, a light source normally mounted in the focus of said reflector and adapted for movement to the right or the left out of the focus, and means automatically operated as the steering shaft is turned for moving the light source to the right or the left out of the focus of the reflector.

8. In a headlight, the combination of a concave reflector, an incandescent electric lamp, an arm constituting an armature and carrying the lamp and mounted to swing to the right and left and move the lamp, electro-magnets arranged at opposite sides of the arm, and means for energizing the magnets alternately.

9. In a headlight, the combination of a concave reflector, a light source normally mounted in the focus of said reflector and adapted for lateral movement out of the focus, and an electro-magnet automatically actuated as the steering shaft is turned for moving the light source laterally out of the focus of said reflector.

10. In a headlight, the combination of a concave reflector, an incandescent electric lamp, an arm constituting an armature and carrying the lamp and mounted to swing to the right and left and move the lamp, electro-magnets arranged at opposite sides of the arm, means for energizing the magnets alternately, and spring strips located at the center of movement of the arm for returning the lamp to its normal position on deenergization of the magnets.

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

EDMUND F. HEARD.

Witnesses:

F. L. HOFFMAN,
J. T. HOLZBACH.