

No. 652,493.

Patented June 26, 1900.

N. A. TERRELL & A. MOSER.  
AUTOMATIC REFLECTOR FOR HEADLIGHTS.

(Application filed Oct. 12, 1899.)

(No Model.)

Fig. 1.

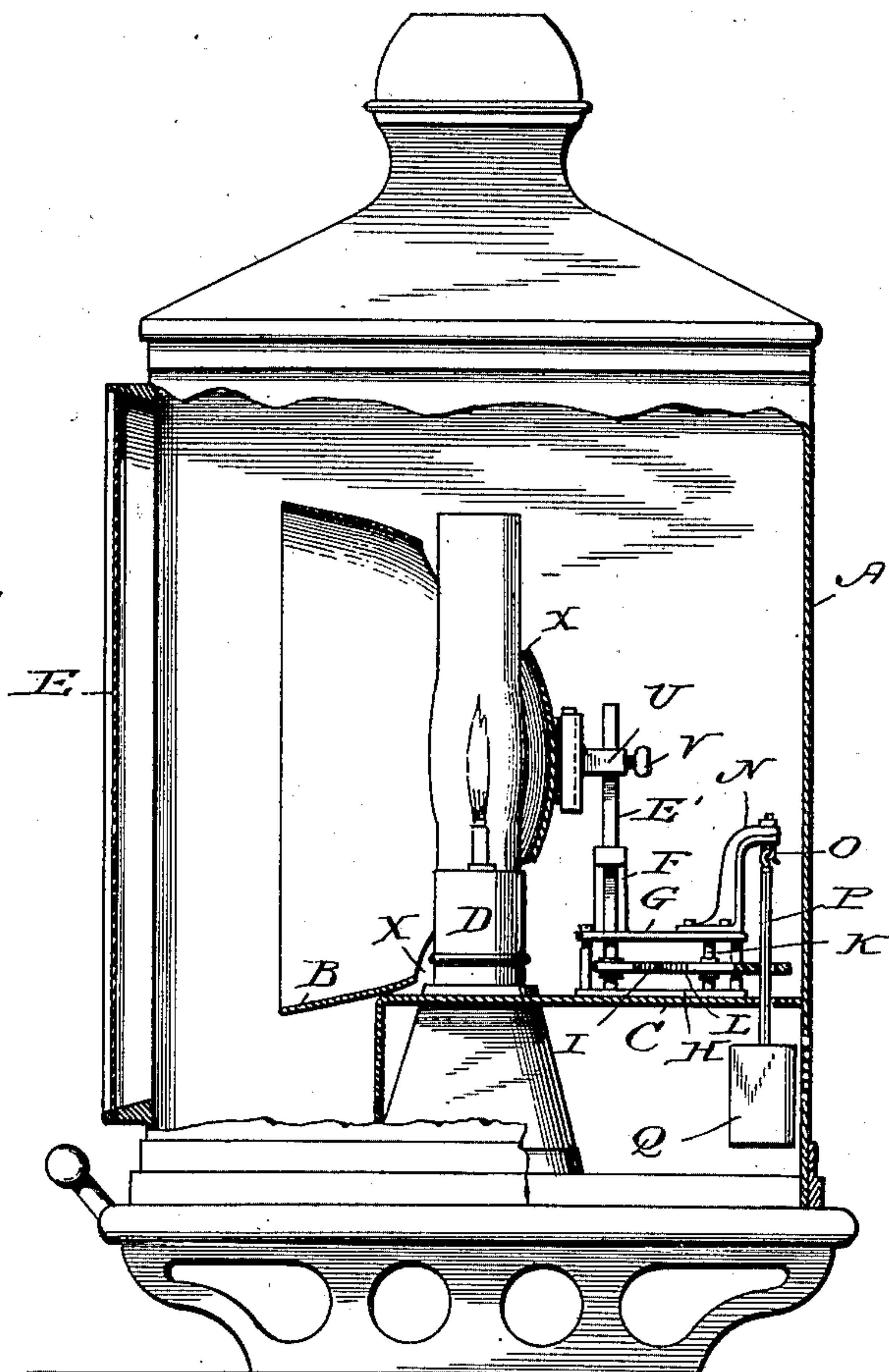
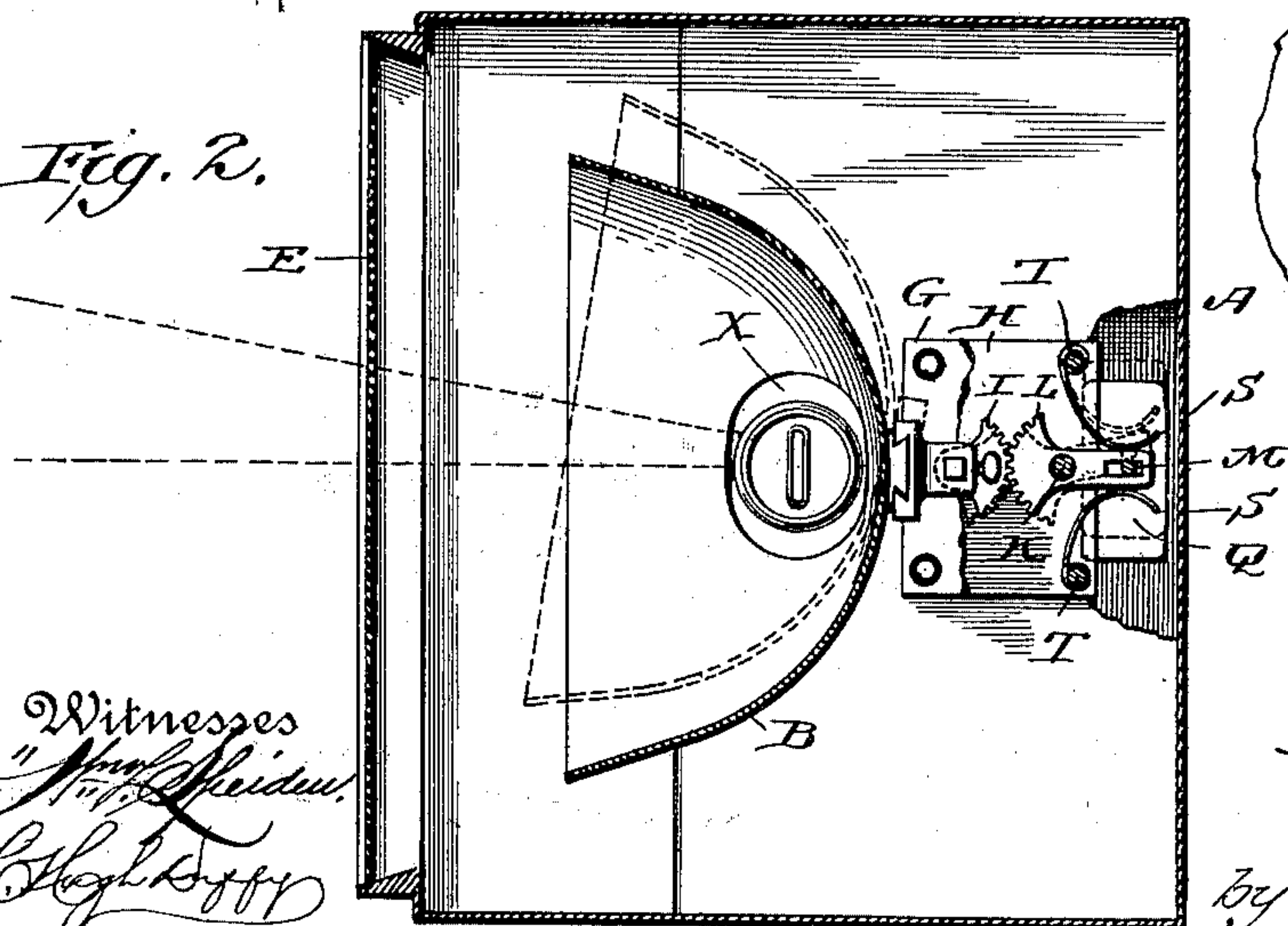
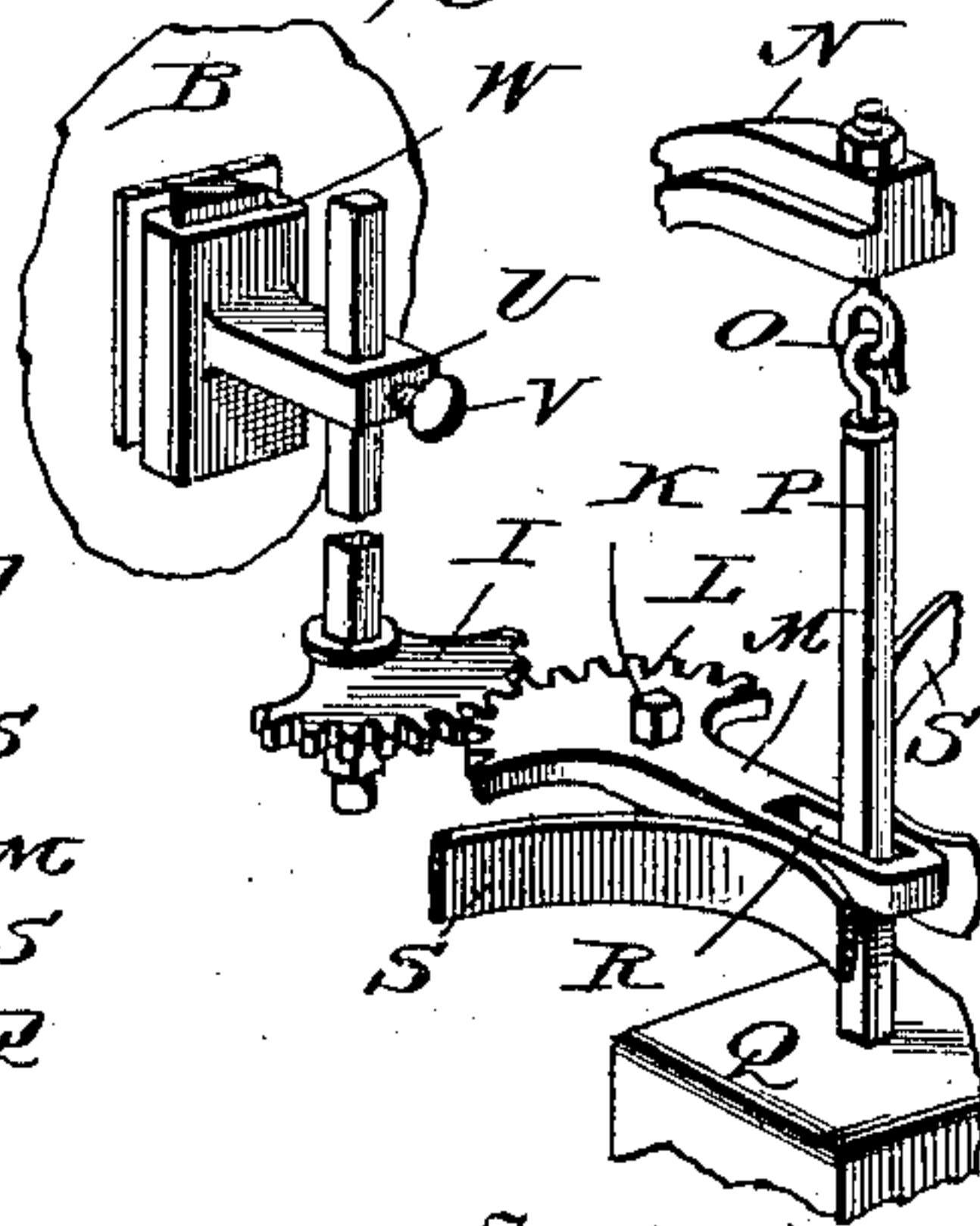


Fig. 2.



Witnesses  
"H. H. H. H. H."  
C. H. H. H. H.

Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC REFLECTOR FOR HEADLIGHTS.

SPECIFICATION forming part of Letters Patent No. 652,493, dated June 26, 1900.

Application filed October 12, 1899. Serial No. 733,385. (No model.)

*To all whom it may concern:*

Be it known that we, NATHANIEL ABBOTT TERRELL and AUGUST MOSER, citizens of the United States, residing at Charlottesville, in the county of Albemarle and State of Virginia, have invented certain new and useful Improvements in Automatic Reflectors for Headlights; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to locomotive-headlights, and has for one object to automatically adjust the reflection in such manner that the beam of light produced by the lamp on the reflector will be diverted to illumine the track when the engine strikes a curve.

A further object of the invention is to provide a neat and substantial removable self-adjusting reflector to be attached to the present construction of headlights now in general use without change or alteration.

It is well known that many railroad accidents occur on or at curves, and it is also well known that in the old way when the engine is rounding a curve the light is directed obliquely across the track, leaving the road-bed dark until the engine again resumes the straight line. Thus it will be seen that the curved portion of the track is not seen by the engineer, and therefore obstructions (should there be any) are not discovered, to the great danger of running off the track and the consequent wrecking of the train. Therefore to obviate these dangers and difficulties we have invented an apparatus for automatically turning the reflector to direct the light to the track just as soon as the engine turns on the curve. When an engine strikes a curve in a track, it tends, by reason of centrifugal force, to leave the track and go off in the direction of a tangent. To obviate this, the tracks are laid in such a manner that the outer rail will be higher than the inner, or, in other words, the plane of the rails will form an angle with the horizontal plane of the earth, this angle to depend upon the size of the arc formed by the tracks. When an engine is rounding one of these curves, its center of gravity is shifted from the center of the road-bed toward the

inner or lower rail, and it is this fixed and immovable principle which operates our invention, the combination and parts of which will hereinafter be fully described in the specification and specifically pointed out in the claims.

Our invention is in the construction and arrangement of an automatic adjustable and removable apparatus to be used in connection with the present headlight for locomotives by which the reflector is made to throw or reflect the light on the road-bed of the curves of railroads, and thereby enable the engineer to discover any obstructions that may be on the track.

In the drawings, Figure 1 shows a central vertical section of our device, parts being broken away. Fig. 2 is a horizontal central section, part of the upper plate being broken away; and Fig. 3, a perspective view looking from the rear of the headlight, having parts broken away, but fully illustrating the operating mechanism.

Like letters will indicate like parts throughout the several figures, in which—

A is the headlight-box, and B the reflector. C is the bench, D the lamp, and E the glass shield or screen. All these parts are old and well known and are shown for the purpose of illustrating the adaptability of our simple device to the well-known headlights now in general use.

We will now describe that part of our invention which we claim to be new.

The reflector B is adjustably mounted within the headlight-box on a post E', which passes through the support F and plate G and is stepped in the plate H, which is suitably secured to the bench C, said post carrying a toothed segment between the plates G and H. Another post K of less diameter is likewise stepped in the plate H and journaled in the plate G. This post also carries a toothed segment L, which meshes with the segment I of post E', as clearly shown in Fig. 3, the plates G and H being removed to more clearly illustrate operation of the parts. The segment L is provided with a slotted plate M, known as a "leader," and suitably secured thereto. On the upper side of the plate G is fixed a bracket N, which projects over the end of the plates



G and H. A pivoted eyebolt O is secured to the end of this bracket, which eyebolt suspends by a hook-rod P a weight Q of suitable dimensions. This hook-rod P passes through the slot R of the slotted plate or leader M. To each side of and in contact with the leader M are arranged springs S S, which are permanently secured to the posts T T, between the plates G and H, as clearly shown in Fig. 2. These springs S S are of sufficient strength and tension to hold the leader M in a central position when the engine is running straight away; but when the engine strikes a curve and the center of gravity is shifted toward the inner or lower rail, according to the angle of inclination of the track, the weight Q being suspended at O and being free to move will always take a position approximately underneath its point of suspension, and the leader M being between the weight and the point of suspension is controlled by the weight and being attached to the toothed segment L on the opposite side of the fulcrum moves it in an opposite direction, imparting its motion to the toothed segment I; but the reflector B being on the opposite side of the post E', which acts as a fulcrum, moves oppositely to the toothed segment I. Consequently when the engine is inclined to the right, as shown by dotted lines in Fig. 2, the weight moves toward the right, which by means of the levers described moves the reflector in the same direction and in the direction of the curve in the track.

The reflector B is attached to the post E' by means of the bracket U and thumb-screw V, the bracket U being provided with a dovetail groove W for the reception of the reflector B. By this construction the reflector can be detached and taken out or replaced. The reflector being a portion of an ellipsoid of revolution is provided with transverse slots X X above and below the focus, so as to admit the lamp D, which is fixed, as in the ordinary headlight now in use.

We are aware that there have been automatically-adjusted headlights constructed for the purpose of throwing light upon the curves of railroad-tracks. The main defect is that the mechanism or some part of it is exposed to the action of the wind, which when going at high speed will naturally diminish the efficiency of the automatic mechanism. Again, some are constructed with the reflector in front of the lamp, which reflector is automatically turned from side to side, according to the elevation of the track. This reflector being directly in front of the lamp obstructs and absorbs the light and throws a shadow to a greater or less extent when the engine is moving straight ahead; but when the reflector is turned obliquely in front of the lamp, so as to throw the light on the curve, the amount of light is diminished exactly one-half and then, too, when the light is most needed. Our invention is not open to these objections, the entire mechanism being within the head-

light-box and is not affected by the action of the wind.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an automatic reflector for headlights, the combination of the reflector B, adjustably secured to the post E', the toothed segments I and L, secured to posts E and K, the leader M, secured to toothed segment, L, and the weight Q and springs S S, permanently secured to posts T, T, all arranged substantially as set forth.

2. The combination of a fixed lamp D, a movable reflector B, the adjustable bracket V, the toothed segments I and L, the leader M and weight Q, substantially as set forth.

3. As an improvement in headlights, the combination of the base or bench, the supporting-post stepped therein, the lower end of said post carrying a toothed segment, the upper end carrying the reflector, said reflector-post and segment being adapted to be moved by the swing of the weight caused by the movement of the tilting of the car on the track, substantially as described.

4. An attachment for headlights for locomotives consisting of a framework of an upper and lower plate; a post stepped in said lowered plate and extending through and journaled in the upper plate, a shaft K stepped and journaled in and between said plates the shaft carrying toothed segment L and leader M, and the post-toothed segment I, said post also carrying bracket U, said bracket having dovetail slot W for carrying the movable reflector, substantially as described.

5. The combination in an attachment for headlights, consisting of a framework, the rotatable post and shaft, the toothed segments mounted thereon, the swinging weight Q adapted to impart motion to the reflector through the medium of said segments and a leader, the free end spring-governor S, S, all arranged for joint operation, as herein described.

6. In an automatic reflector for headlights, the combination of the reflector B, adjustably secured to the post E, by means of the brackets U, the toothed segment I immovably secured to the post E, the toothed segment L secured to the post K, said post being journaled in the upper and lower plates G and H, said segment L meshing with the segment I, and being provided with a leader M, said leader being provided with a slot R for the purpose of receiving the hook-rod P, the weight Q suspended below the leader M, the springs S, S secured to posts T, T and adapted to impart to the leader M a horizontal motion in conjunction with the weight Q, substantially as described.

7. As an improvement in headlights, the combination of the base or bench, the supporting-post stepped therein, the lower end of said post carrying a toothed segment, the upper end carrying the reflector behind the



lamp, said post and reflector being adjustably connected by means of the bracket U, and adapted to be moved by the action of gravity on the weight Q, substantially as described.

5 8. The combination in an attachment for headlights, consisting of a reflector B, of a framework, the rotatable posts E and K, the toothed segments I and L mounted thereon, the swinging weight Q adapted to impart  
10 motion to said reflector through the medium

of the intermediate mechanism, said weight and mechanism being contained within the headlight-box A, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

NATHANIEL ABBOTT TERRELL.  
AUGUST MOSER.

Witnesses:

HERBERT C. EMERY,  
O. E. DUFFY.