Mar. 27, 1923. 1,450,079

E. A. HAWTHORNE

LIGHTING APPARATUS

Filed Aug. 28, 1918 2 sheets-sheet 1

Fig. 1.

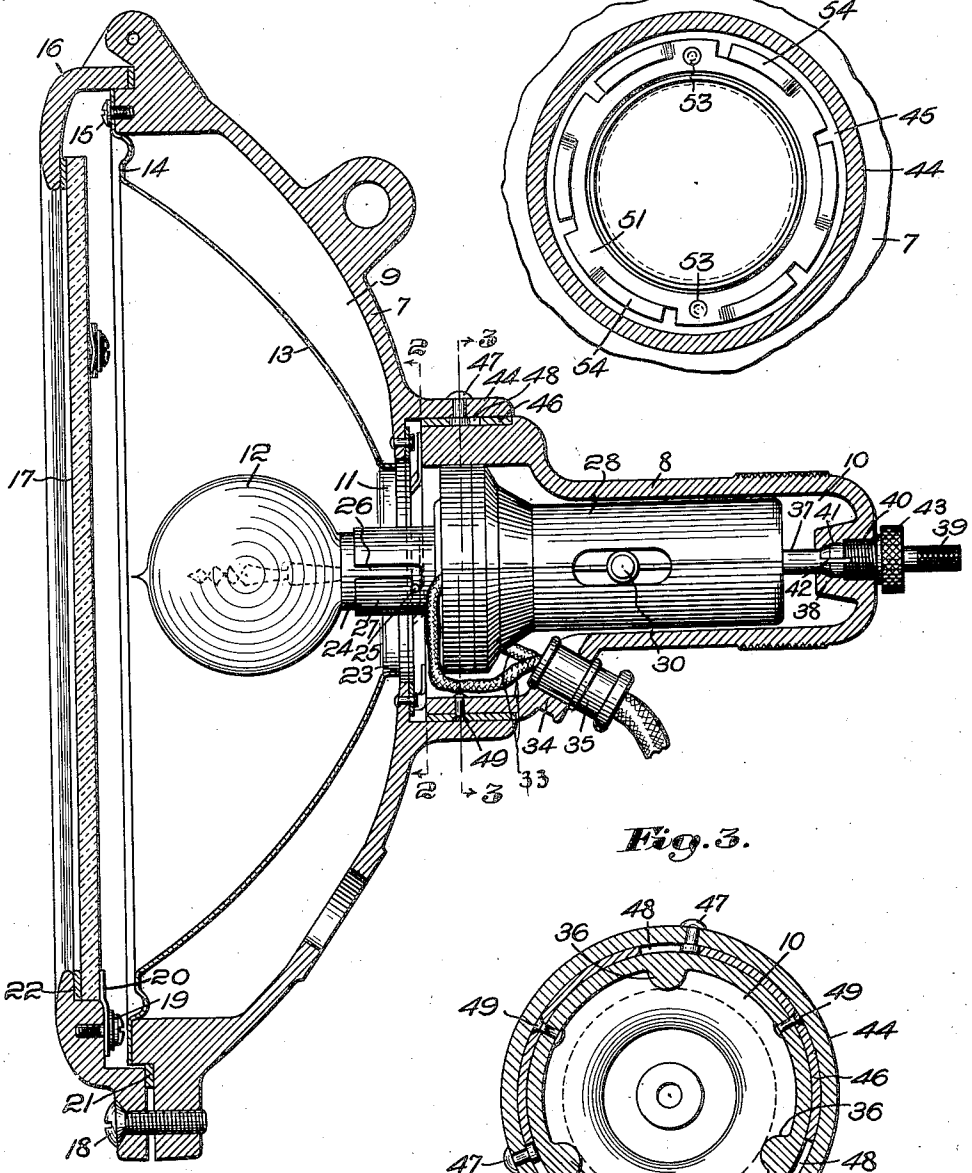


Fig. 2.

Fig. 3.

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Fig. 4.

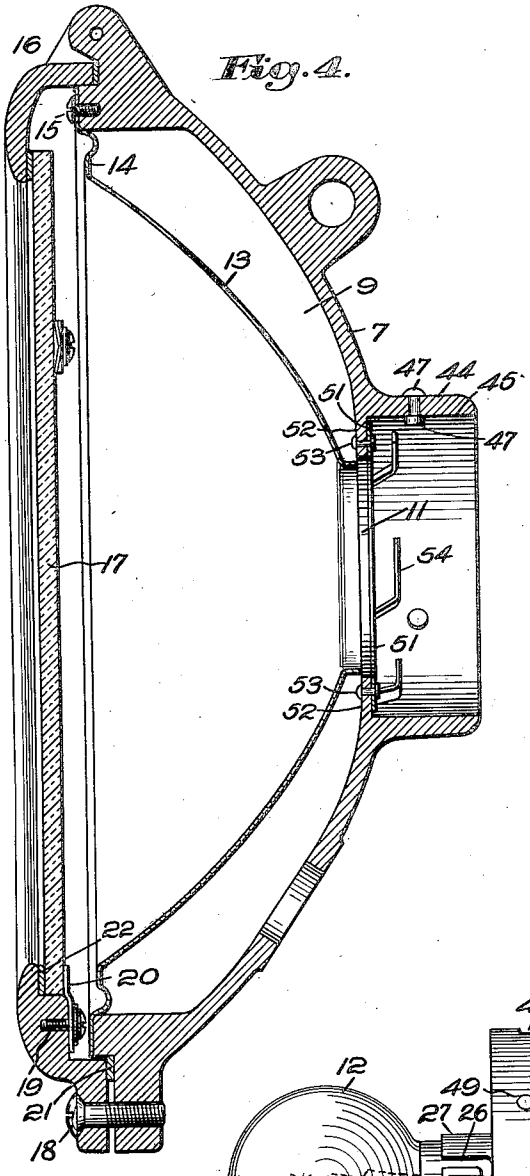


Fig. 6.

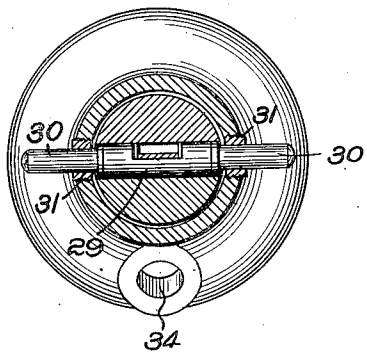
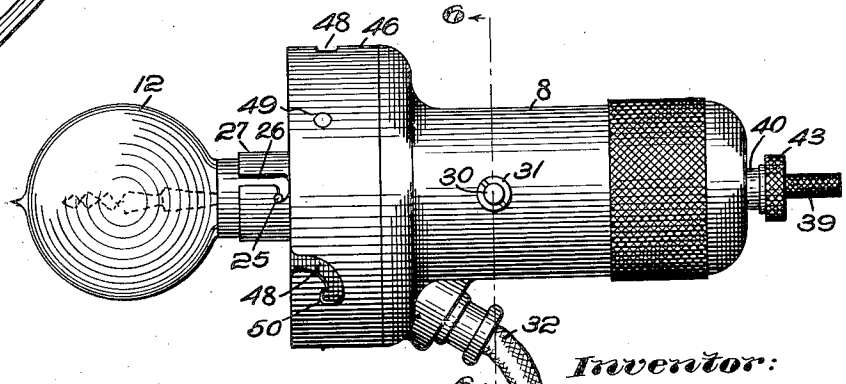


Fig. 5.



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UNITED STATES PATENT OFFICE.

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LIGHTING APPARATUS.

Application filed August 28, 1918. Serial No. 251,855.

To all whom it may concern:

Be it known that I, ELLSWORTH A. HAWTHORNE, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield and State of Connecticut, have invented an Improvement in Lighting Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to lighting apparatus, and is more especially concerned with a lamp of the class in which the light source, usually an electric bulb, is associated with a concave reflector, special provision being made for the removal and replacement of the light source and its controlling means through the rear of the reflector.

My invention will be best understood by reference to the following description, when taken in connection with the accompanying drawings of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a central, longitudinal section of the lamp embodying my invention;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a sectional view on line 3—3 of Fig. 1;

Fig. 4 is a central, longitudinal section of the light-reflecting unit only;

Fig. 5 is an elevation of the light-producing unit only; and

Fig. 6 is a sectional view on line 6—6 of Fig. 5.

Referring to the drawings, and to the specific lighting apparatus which is illustrated therein, I have shown for purposes of exemplification a lamp of the type commonly used as a searchlight or spotlight for vehicles and boats of various classes, more particularly motor cars and motor cycles. My invention, however, is susceptible of wide application.

In the present embodiment, the lamp has an outer casing comprising two axially separable parts 7 and 8, provided respectively with chambers 9 and 10, which communicate with each other through an aperture 11. The chamber 9 receives a suitable light source 12, with which is associated a light-reflecting surface 13, which may be, and in the present example is, in the form of a separate reflector, suitably secured to the casing part 7 as by providing said reflector with a marginal flange 14, which may be secured to the casing by appropriate means, such as screws 15. The front of the casing may be closed by any usual or desired closure, such as a door-frame 16 provided with a door-glass 17. The door-frame may be secured to the casing by suitable means, such as screws 18, and the door-glass 17 may be secured to the door-frame by appropriate means, such as screws 19 and clamping plates 20. Gaskets 21 and 22 are preferably provided to exclude dust and moisture.

It sometimes becomes necessary to replace the light-source, which in the present example is an electric lamp bulb. Usually this is accomplished by removing the door, but this is objectionable because considerable trouble and time are expended in marking the replacement, and there is serious danger of injury to the highly polished surface of the reflector, which is very sensitive to finger marks, dust, oil, and the like. In order to allow the bulb to be removed and replaced instantly, and without the necessity of disturbing the door, I have herein provided the reflector 13 with a rear axial aperture 23 of larger dimensions than the bulb 12, thereby to permit the latter to be removed axially therethrough. The bulb 12 will usually be spherical, and the aperture 23 circular and of a slightly larger diameter. It should here be noted that the aperture 11, through which the chambers 9 and 10 communicate with each other, registers with the aperture 23 in the reflector, and hence the casing part 8 can be removed in a rearward direction, thereby to withdraw the bulb through the apertures.

The bulb 12 may be of any usual or desired type and otherwise mounted, but in the present embodiment is provided with a base 24 of the Ediswan type, having laterally projecting pins 25 normally held in bayonet slots 26 of an electric socket 27. The latter may be carried by or formed as a part of a suitable light-source carrier, and appropriate means may be provided whereby the

light-source and carrier may be moved axially to focus the light-source with relation to the reflector. If desired, the light source carrier may embody controlling means for the supply of the light source, and since the latter in the present example is an electric light bulb, I have shown an electric switch 28, which constitutes a lamp carrier to which the lamp socket is secured. The switch may be of any desired type which it is unnecessary here to show or describe in detail, the type selected for illustration, however, having an actuating element comprising a transverse rod 29, best shown in Fig. 6, provided with push buttons 30 which extend from the chamber 10 through the walls of the casing part 8 to the exterior thereof. In the present example, these push buttons are mounted to slide in guides 31, which may be bushings threaded into the casing part 8. The current for the lamp may be supplied by conducting means including a flexible cable 32 having a pair of conducting wires 33 leading to the interior of the switch 28, by which the lamp circuit is controlled. The lamp casing part 8 is provided with an aperture 34 through which the cable 32 leads, and if desired a suitable bushing, herein a flexible rubber sleeve 35 encircles the cable and prevents the entrance of moisture and dirt into the interior of the casing.

Any suitable provision may be made to support and guide the light source and its carrier, to permit them to be adjusted axially for focusing purposes. In the present example, I have provided the casing part 8 with a plurality of interior projections 36, best shown in Fig. 3, preferably three in number, which center the light-source carrier, support its front end, and serve as a means to guide the same. The rear end may be supported and guided by a rod 37 secured to and projecting rearward from the light-source carrier, and extending rearwardly through a guide 38 to the exterior of the casing where said rod is provided with a grasping portion 39, by means of which it may be moved axially to focus the light-source. Any appropriate means may be provided to secure the latter in the selected position of adjustment, but I prefer to provide means cooperating with the focusing rod 37, normally to hold the latter in fixed position. One convenient way of accomplishing this is to provide a bushing 40, threaded into the casing at 8 and carrying an expanding and contracting rod clamping ring, herein formed as a frusto-conical projection 41, provided with one or more longitudinal slots 42. The sleeve 40 extends rearwardly through the casing part 8 to the exterior of the latter, where it is preferably provided with a knurled head 43, which may be grasped to turn the same. By rotating the sleeve in the proper direction, its tapered portion cooperates with the bearing to cause the sleeve to contract about and clamp the focusing rod, while on the other hand, the rotation in the opposite direction releases the focusing rod and allows the latter to be moved axially for focusing purposes.

The casing parts 7 and 8 may be attached to each other in various appropriate ways, and either may be provided with an opening to receive the other. In the present embodiment of my invention, the part 7 is provided with a rearwardly extending boss 44, having a cylindrical bore 45 to receive a corresponding cylindrical part 46 of the casing part 8. One convenient means of attachment is a bayonet joint comprising a plurality of projections carried by one part and cooperating with bayonet slots in the other. One desirable form of bayonet joint comprises a plurality of pins in the form of rivets 47 projecting inwardly from the inner peripheral surface of the bore 45, and cooperating with bayonet slots 48 formed in the part 46. For convenience of manufacture, the latter is preferably formed as a ring separate from the casing part 8 and suitably secured thereto as by rivets 49 best shown in Fig. 3. To assemble the parts, the entrances of the bayonet slots 48 are brought into registration with the projecting ends of the rivets 47, after which inward turning movement of the casing part 8 in the proper direction will seat the projections in the slots.

It is highly desirable to provide automatic means for locking and unlocking the two parts of the bayonet joint, so that the same may be quickly and conveniently manipulated by the use of one hand, without the necessity of an entirely independent locking and unlocking operation. I have therefore provided the bayonet slots 48 with offset portions 50 forming seats in which the pins 47 are yieldingly held as by means of one or more springs exerting an axial thrust in an outward direction against the casing part 8. In the present embodiment of my invention, I have provided for this purpose a spring ring 51, suitably interposed between the casing parts 7 and 8. In the present example, the part 7 is provided with an inwardly projecting annular flange 52, to which the ring 51 may be suitably secured as by rivets 53. The desired spring pressure may be furnished in various ways, as for example by providing the ring with a plurality of offset spring fingers 54, clearly shown in Figs. 2 and 4. The degree of offset when the spring fingers are not under tension is illustrated in Fig. 4, and is sufficient so that when the parts are assembled, the fingers are placed under the requisite tension to ensure the firm seating of the pins 47 in the offset seats 50 of the bayonet slots 48. The release of the parts may be effected by first

exerting an inward thrust to release the pins from their seats, and then turning one part with reference to the other in the proper direction to cause the pins to traverse the curved bayonet slots 48, whereupon the parts may be separated. The parts are reassembled by a reversal of the foregoing operation.

One highly desirable advantage of the described construction is that the light-producing unit, when removed from the light-reflecting unit as illustrated in Figs. 4 and 5, becomes a complete and self-contained portable light-producing unit, which may serve as an inspected lamp. If, as is usually the case, the casing part 7 is secured to a vehicle or other support, the light-source can be detached therefrom instantaneously for any desired purpose, and moved about from place to place, after which it may be restored to its proper position for cooperation with the reflector 13. Preferably, the casing part 8 is somewhat elongated as shown in Figs. 1 and 5, thereby to constitute a convenient handle which extends rearwardly beyond the laterally-extending cable 32, thus providing a convenient means for manipulating the light-producing unit when used alone, or the entire lamp when assembled. If the lamp is mounted on a universal bracket, as is frequently the case, the rearwardly-projecting handle may be used to direct the beam of light to and fro.

Having thus described one specific embodiment of my invention, what I claim and desire by Letters Patent to secure is:

1. In a lighting apparatus, the combination of a light-producing unit and a light-reflecting unit, one detachably carried by the other, said light-reflecting unit having an interior reflecting surface provided with an axial opening, and said light-producing unit comprising a light-source, a light-source carrier, light-source supply controlling means, light-source focusing means, means to hold said light-source and light-source carrier in various positions of axial adjustment, and a mounting in which said light-source and light-source carrier are axially adjustable, said mounting being provided with a handle, and said controlling means being provided with an actuator projecting from said handle.

2. In a lighting apparatus, the combination of a light-producing unit and a light-reflecting unit, one detachably carried by the other said light-reflecting unit having an interior reflecting surface provided with an axial opening, and said light-producing unit comprising an electric light bulb, a bulb-receiving socket, an electric switch controlling the current supply to said bulb, a carrier carrying said switch and socket, and a mounting for said carrier, said mounting being provided with a rearwardly extending handle, and said switch being provided with an actuator operable by the hand grasping said handle.

3. In a lighting apparatus, the combination of a light-producing unit and a light-reflecting unit, one detachably carried by the other, said light-reflecting unit having an interior reflecting surface provided with an axial opening, and said light-producing unit comprising an electric light bulb, a bulb-receiving socket, an electric switch controlling the current supply to said bulb, a carrier carrying said switch and socket, and bulb-focusing means connected to said carrier.

4. In a lighting apparatus, the combination of a light-producing unit and a light-reflecting unit, one detachably carried by the other, said light-reflecting unit having an interior reflecting surface provided with an axial opening, and said light-producing unit comprising an electric light bulb, a bulb-receiving socket, an electric switch controlling the current supply to said bulb, a carrier carrying said switch and socket, a focusing rod projecting rearwardly from said carrier, and a mounting having a chamber in which said carrier is axially movable, said rod extending from said chamber to the exterior of said mounting.

5. In a lighting apparatus, the combination of an outer casing comprising front and rear axially separable parts, said front part being provided with a chamber having a light-reflecting surface therein and an opening leading rearwardly therefrom, and said rear part having a rearwardly extending handle provided with a chamber at the rear of the front chamber, a light-source carried by said rear part and normally housed within said front chamber but removable rearwardly therefrom through said opening, and light-source controlling instrumentalities housed within said rear chamber, and including a carrier which carries said light-source, means also carried by said carrier to control the supply of energy to said light-source, and means to move said carrier axially to focus said light-source with reference to said light-reflecting surface.

6. In a lighting apparatus, the combination of an outer casing comprising front and rear axially separable parts, said front part being provided with a chamber, a reflector housed therein and having an opening leading rearwardly therefrom, and said rear part having a chamber at the rear of the front chamber, said casing parts having cooperating means to secure them together independently of said reflector, a light-source carried by said rear part and normally housed within said front chamber but removable rearwardly therefrom through said opening, light-source supply conducting means extending into said rear chamber, and light-

source controlling instrumentalities housed within said rear chamber.

7. In a lighting apparatus, the combination of a casing having a reflector therein and a rear axial opening, a light-source normally housed within said casing and associated with said reflector but removable rearwardly through said opening, and a light-source mounting extending into said opening, said casing and mounting being secured to each other independently of said reflector by an interlocking connection housed within said casing, and spring means also housed within said casing tending to maintain the connection between said casing and mounting.

8. In a lighting apparatus, the combination of a casing having a light-reflecting surface therein and a rear axial opening, a light-source normally housed within said casing and associated with said light-reflecting surface but removable rearwardly through said opening, and a light-source mounting extending into said opening, said casing and mounting being connected with each other by a bayonet-joint interlocking connection housed within said casing, and a yielding ring placed under compression by the inward thrust of said mounting.

9. In a lighting apparatus, the combination of a casing having a light-reflecting surface therein and a rear axial opening, a light-source removable axially through said opening, a light-source mounting, said mounting and casing having bayonet-joint connection with each other, and a spring ring urging said mounting in an outward direction and normally maintaining such connection.

10. In a lighting apparatus, the combination of a casing having a light-reflecting surface therein and a rear axial opening, a light-source removable axially through said opening, a light-source mounting, said mounting and casing having bayonet-joint connection with each other, and a plurality of spring fingers urging said mounting in an outward direction and normally maintaining such connection.

In testimony whereof, I have signed my name to this specification.

ELLSWORTH A. HAWTHORNE.