Dec. 9, 1930. C. S. RICKER 1,784,539

LAMP

Filed Feb. 28, 1929

Fig. 1.

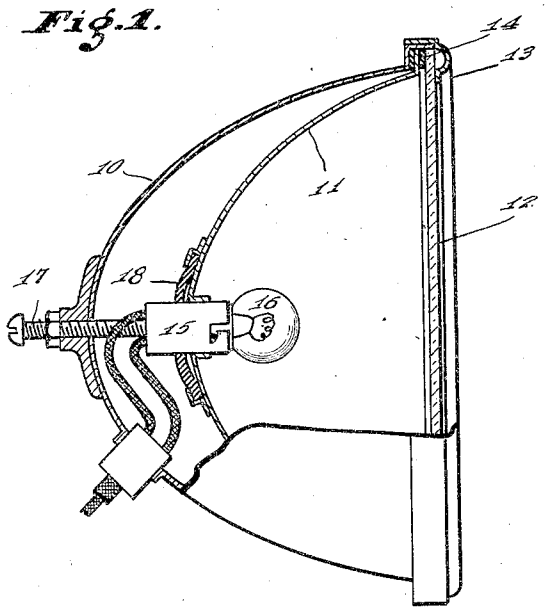


Fig. 3.

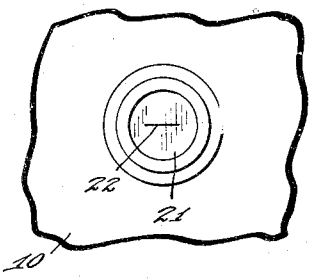


Fig. 2.

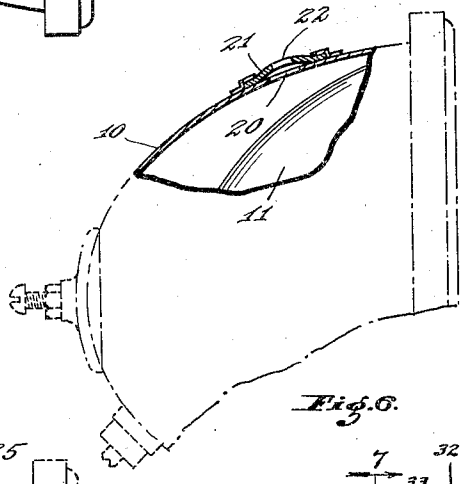


Fig. 5.

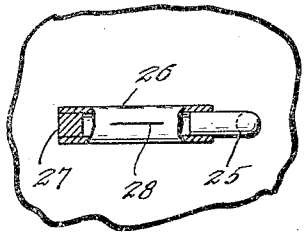


Fig. 6.

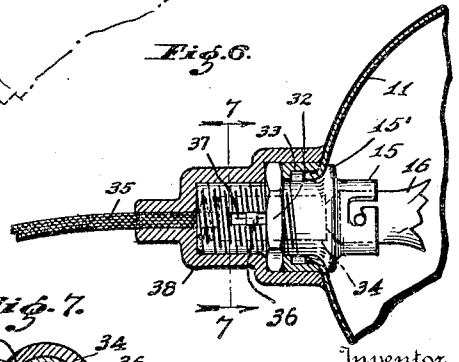


Fig. 4.

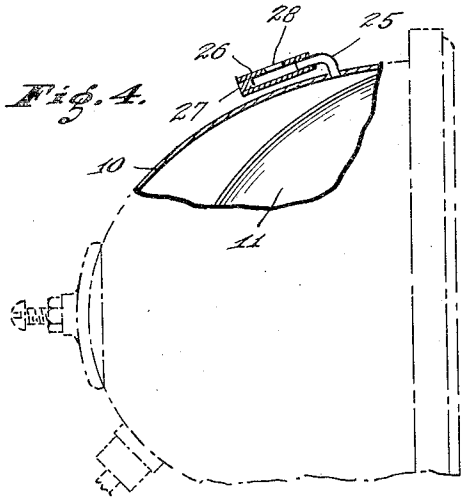
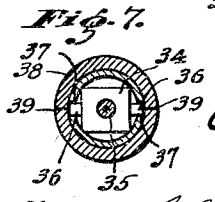


Fig. 7.



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UNITED STATES PATENT OFFICE

CHESTER S. RICKER, OF WAUKESHA, WISCONSIN

LAMP

Application filed February 28, 1929. Serial No. 343,376.

Automobile headlamps and other illuminating devices for similar purposes commonly embody a highly polished reflector. To prevent damage to the highly polished surface of this reflector, it is customary to protect it from the ready access of air. This result is usually accomplished either by forming the reflector as a sealed enclosure or by enclosing it in a sealed protective casing. In most cases, where the reflector itself is sealed, the sealing is not absolute; as the practice of providing for focusing adjustment of the light-source relative to the reflector usually results in leaving a more or less restricted passage through which air can enter or escape from the reflector. Ordinarily, however, any such passage is restricted to the greatest possible extent in order to exclude air which might damage the highly polished reflecting surface. In such lamps, the air within the sealed enclosure, whether that enclosure be the reflector itself or a surrounding casing, is at a temperature higher than atmospheric temperature as a result of the heat generated by the light source. Because of this relatively elevated temperature, the air may also be at a somewhat higher pressure than atmospheric.

When the atmospheric temperature undergoes a comparatively sudden drop, it not infrequently happens that moisture is precipitated on the inner face of the headlamp lens or cover glass, such moisture precipitation causing distortion and a marked decrease in the strength of the emitted light-beam. In some instances, when a severe temperature drop is experienced, this precipitated moisture may be frozen in a manner analogous to the production of frost on the inner surface of the windows of a building the interior temperature of which is greater than the atmospheric temperature. The fact that the pressure within the lamp enclosure may be somewhat higher than atmospheric tends to facilitate this precipitation of moisture.

It is the object of my invention to provide a headlamp or similar device with means which will inhibit the precipitation of moisture on the inner surface of the headlight lens or cover glass. In carrying out my invention, I provide the enclosure of the lamp with an air outlet with which there is associated a check-valve preventing the ingress of air.

The accompanying drawing illustrates several ways in which my invention can be applied to headlamps: Fig. 1 is a fragmental section through a lamp of the type commonly employed as an automobile headlight and in which the reflector itself forms the sealed enclosure; Fig. 2 is a similar view of a headlamp showing the application of my invention where a casing surrounding the reflector forms the sealed enclosure; Fig. 3 is a fragmental plan view illustrating the check-valve shown in Fig. 2; Fig. 4 is a view similar to Fig. 2 and showing a similar headlamp, but in which I illustrate a different form of check valve; Fig. 5 is a fragmental plan view on a slightly larger scale showing details of the check valve illustrated in Fig. 4; Fig. 6 is a fragmental axial section through a lamp illustrating still another form of check valve; and Fig. 7 is a section on the line 7—7 of Fig. 6.

The headlamp illustrated in Fig. 1 embodies an open-ended casing 10 of any convenient shape. In the open end of this casing is mounted the reflector 11 which is covered by the usual lens or cover glass 12. A retaining ring 13 serves to hold the reflector and lens 12 in place, a gasket 14 normally being positioned between the lens 12 and the rim of the reflector 11 to prevent access to the reflector of air or gas fumes which might tarnish the silver of the reflector.

Slidably mounted at the base of the reflector 11 is an airtight lamp socket 15 adapted to receive and support the usual electric lamp 16. A screw 17 projecting through the wall of the casing 10 permits adjustment of the socket 15 and lamp 16 to secure proper focusing of the light.

The construction so far described is that which may be found in many lights of the type commonly employed as automobile headlamps. Because of the presence of the gasket 14, the space within the reflector 11 is sealed except for the possibility of leakage around the socket 15. Any air passage at this point, is considerably restricted, so that the interior

of the reflector 11 may be regarded as a sealed space.

When my invention is applied to the type of lamp described, the possibility of air leakage between the socket 15 and the base of the reflector 11 is immaterial, and in fact it is better for my purpose if there is a possibility of the passage of air at this point. In such a lamp, I may employ as a check valve a disk 18 of some resilient material such as soft rubber which is secured at its periphery to the back of the reflector 11. This disk bulges rearwardly and at its center is provided with an opening the edges of which closely surround the socket 15.

When such a disk surrounds the socket 15 and when the air pressure within the reflector 11 is greater than that outside the reflector, the center of the disk may be forced outward to permit the escape of air from the reflector. However, if the air pressure within the reflector is less than that outside the reflector the effect of the higher pressure on the outer surface of the disk 18 tends to force it firmly into contact with the socket 15 and prevents ingress of air.

In a lamp of this type, no effort is made to seal the exterior casing 10, and the space between it and the reflector is in free communication with the atmosphere.

In the construction illustrated in Figs. 2 and 3, the reflector, as shown, does not form the desired sealed enclosure. The interior of the reflector 11 is in communication with the interior of the casing 10, the latter forming the enclosure which prevents damage and deterioration of the reflecting surface. In such a lamp, I may provide the casing 10 with an air outlet opening 20 covered by a bulged disk 21 of rubber or other resilient material having near its center a slit 22. When the exterior air pressure on the disk 21 is greater than the interior pressure, it tends to collapse the disk and to close the slit 22; but when the interior pressure is greater than the exterior, the disk tends to bulge outwardly and open the slit 22 to permit the escape of air.

In the construction illustrated in Figs. 4 and 5, the casing 10 is again shown as forming the sealed enclosure, the space within the reflector 11 being in communication with the interior of the casing. In this structure, I have shown the casing 10 as provided with an air outlet tube 25 the end of which is received within a tube 26 of soft rubber or other similar material. The opposite end of the tube 26 is closed as by means of a plug 27 and the wall of the tube is provided with a slit 28. This device functions in substantially the same manner as that illustrated in Figs. 2 and 3, an excess pressure within the casing tending to bulge the tube 26, open the slit 28, and permit the escape of air, whereas excessive pressure exteriorly of the tube 26 tends to collapse it to close the slot 28.

It will be appreciated that either of the check valves just described can be embodied in the type of lamp shown in Fig. 1 where the reflector forms the sealed enclosure. In such a case, however, the passage of air around the socket must be prevented, the interior of the outer casing 10 must communicate with the atmosphere, and the check-valve would be applied to the reflector 11.

In the lamp structure shown in Fig. 6, the reflector 11 forms the sealed enclosure, and has at its base an opening in which the socket 15 is mounted. The socket 15 is provided with a flange 15′ which rests against the inner surface of the reflector, and is held in place by a nut 32 that bears against a spacer ring 33 located between the nut and the reflector 11.

Slidably mounted within the socket 15 is a wire carrier 34 which carries the wire 35 by means of which electric current is supplied to the lamp 16. On opposite sides, the wire carrier 34 is provided with outwardly projecting ears 36 which are slidably received in slots 37 formed in the projecting portion of socket 15.

In such a lamp, the interior of the reflector 11 is sealed, as in the lamp illustrated in Fig. 1, and the only possible path of communication between the interior of the reflector 11 and the atmosphere is either outside of the socket 15 or inside the socket 15 around the base of the lamp bulb 16.

In embodying my invention in such a lamp structure I may apply a cap 38 which is formed of some yieldable material such as soft rubber and which is molded to the desired shape. The cap 38 is so formed that air leakage at its ends is prevented, as by forming it to provide tight fits against the outer surface of the cylindrical reflector at one end and against the wire 35 at the other end. In line with the slots 37, the cap 38 is provided with slits 39, which serve the same purpose as do the slits 22 and 28 in the structures illustrated in Figs. 2 and 4. In other words, the resilience of the cap 38 normally keep the slits 39 closed, the cap 38 having a loose fit on the socket 15 in the vicinity of the slots 37 in order to avoid straining it in a manner which would tend to open the slits 39. Any excessive pressure within the lamp tends to distend the walls of the cap 38 and to open the slits 39, to permit the escape of air from within the reflector. If, on the other hand, the air pressure within the reflector is lower than the atmospheric pressure the excess exterior pressure tends to collapse the walls of the cap 38 to close the slits 39, and thereby to prevent any ingress of air.

The advantage possessed by my lamp will be evident if it is compared with a lamp of the ordinary type. Should the atmospheric temperature undergo a decrease while the lamps are in use, there will be an accompanying decrease in the temperature of the air within the enclosure of both lamps. In the case of

the lamp of the usual type, this decrease in temperature will result in drawing some atmospheric air into the lamp enclosure; whereas the presence of the check valve prevents this result in my lamp. After such a temperature drop there are now two important differences between the state of the air in my lamp and that of the air in the ordinary type of lamp. In the first place, since the decrease in temperature in my lamp has not been accompanied by any ingress of air, the pressure within the lamp is sub-atmospheric; whereas in the ordinary lamp, the pressure is substantially atmospheric. In the second place the air drawn into the ordinary lamp when its temperature drops brings some moisture with it; and as no such air is drawn into my lamp, the air in the ordinary lamp has a higher moisture content than has the air in my lamp. As the atmospheric temperature continues to drop, more air and more moisture will be drawn into the ordinary lamp, whereas the only change in the condition of the air in my lamp will be a further increase in pressure difference. If the temperature drop is sufficient, a point will be reached where the air immediately adjacent the inner surface of the lens in the ordinary light will be saturated with moisture, and a further temperature drop will cause the precipitation of moisture on the inner surface of the lens, thus decreasing and interferring with the amount and direction of light emitted. At this temperature, and even at a considerably lower temperature, such a result will not occur in my lamp; for the air within it does not contain so much moisture, and the reduced pressure tends to inhibit such precipitation of moisture as might otherwise occur.

I claim as my invention:

1. In combination, a light-source, a housing therefor, a concave reflector for said light-source, and an outwardly opening check-valve, the space within said reflector being substantially sealed against communication with the atmosphere except through said outwardly opening check valve.

2. In combination, a light-source, a housing therefor, a concave reflector for said light-source, means permitting egress of air from the interior of said reflector but preventing ingress of air there-into, the interior of said reflector being sealed against communication with the atmosphere except through said air-controlling means.

3. In a lamp, a light source, a light-source enclosure including a reflector, and an outwardly opening check-valve the interior of said enclosure being sealed against communication with the atmosphere except through said outwardly opening check valve.

4. In a lamp, a light source, a light-source enclosure including a reflector, and means permitting egress of air from the interior of said enclosure but opposing ingress of air thereto, said enclosure being sealed against communication with the atmosphere except through said air-controlling means.

In witness whereof, I have hereunto set my hand at Waukesha, Wis., this 5th day of February, A. D. one thousand nine hundred and twenty-nine.

CHESTER S. RICKER.