Jan. 18, 1955 P. H. J. BROUWER 2,700,098

ELECTRIC LIGHTING FITTING

Filed Oct. 26, 1949 2 Sheets-Sheet 1

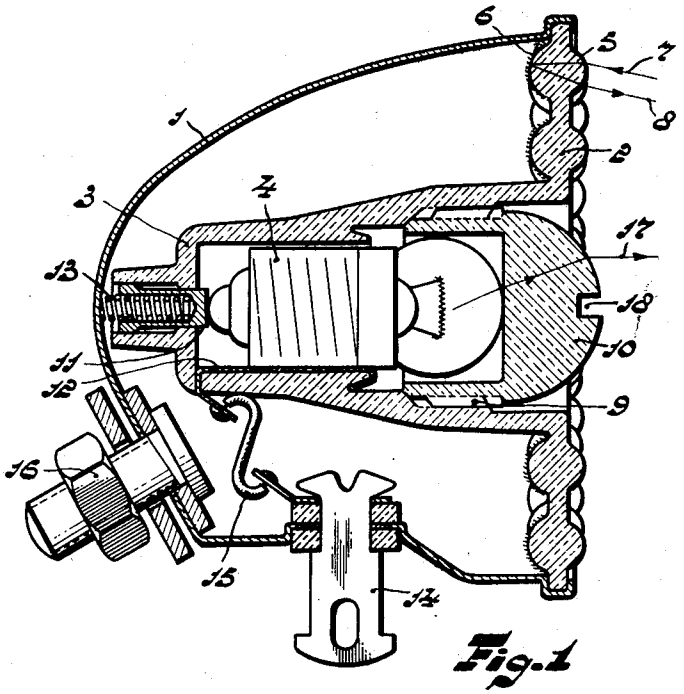


Fig. 1

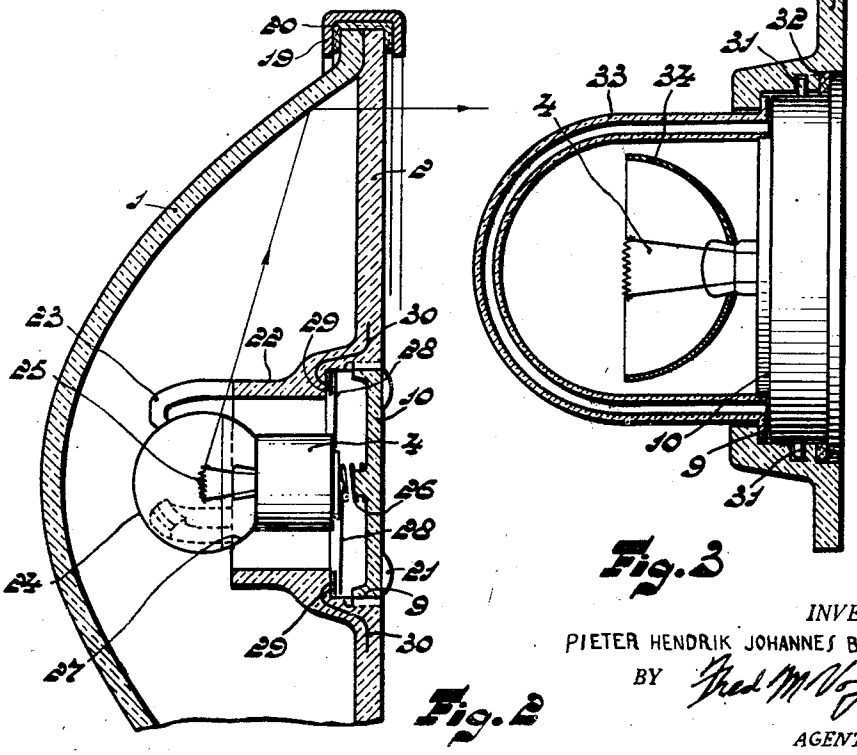


Fig. 2

Fig. 3

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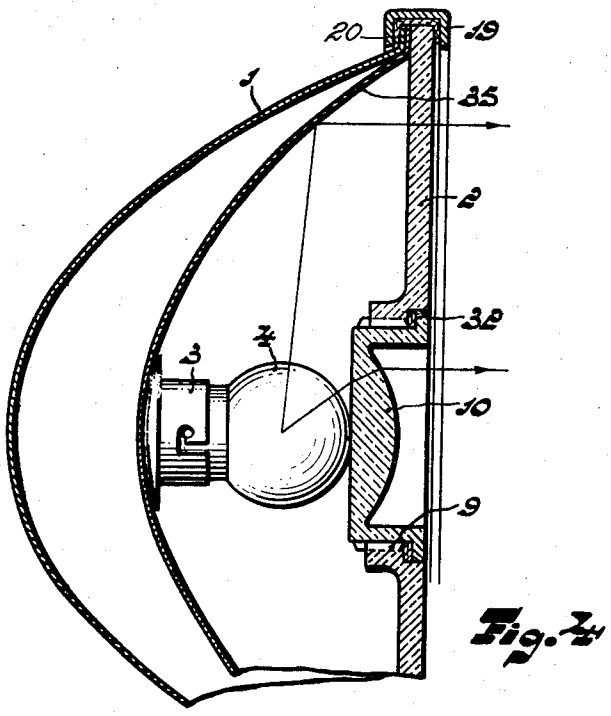


Fig. 4

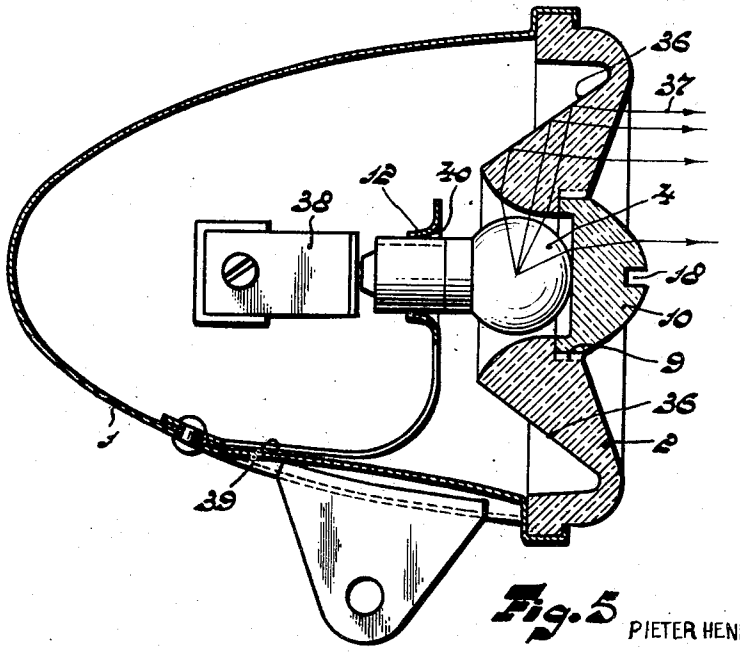


Fig. 5

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ELECTRIC LIGHTING FITTING

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7 Claims. (Cl. 240—41)

This invention relates to lighting fittings comprising a housing having an aperture which is closed by an optical element, the fitting comprising a holder for an electric incandescent lamp, and it relates more particularly to fittings of this kind which may be used as headlights or spotlights on vehicles or as signal lights, for example as tail lights on bicycles.

The said optical element may be merely a transparent front cover of uniform thickness or it may be of more complicated optical structure such as a lens arrangement.

Such fittings are, as a rule, constructed so that the incandescent lamp in the holder may be exchanged. This is often effected by constructing the optical element so that it may be removed from the housing. Constructions are also known in which the lamp and the holder as a whole can be removed from the rear of the housing.

The first arrangement has the disadvantage that a packing between the housing and the optical element has to be provided through a comparatively large circumference and this may allow moisture to penetrate into the housing.

With the second arrangement this is likewise often the case. Moreover, the current supply to the holder must then be arranged through detachable contacts, which may become dirty, and the rear side of the housing must be accessible, which is not the case, for example, with headlamps mounted in the body of a vehicle or with tail-lights arranged on the mudguard of bicycles.

According to the present invention, a lighting fitting, more particularly a headlight or the like, comprising a housing having an aperture closed by an optical element and a holder for an electric incandescent lamp, is characterized in that the optical element has an aperture through which the lamp can be introduced into the holder and which can be closed by a cover.

It is thus possible to make the circumference, at which the closure is effected, considerably shorter than that of the optical element by making the aperture only slightly larger than the lamp. The circumference of the cover at the region of closure is preferably smaller than half the circumference of the optical element.

The optical element and the cover may be made of molded material which ensures adequate securing of the cover and its packing.

Furthermore, the cover may itself be an optical element having a function different from that of the element in which it is secured.

In order that the invention may be readily carried into effect, a number of examples will now be described in detail with reference to the accompanying drawings of which:

Fig. 1 is a sectional view of a tail light for a bicycle;

Fig. 2 is a sectional view of a headlight for a motorcar;

Fig. 3 is a sectional view of an alternative construction of the lamp and holder for such a headlight;

Fig. 4 is a sectional view of an alternative form of headlight; and

Fig. 5 is a sectional view of a bicycle lamp.

The tail light shown in Fig. 1 comprises a cup-shaped housing **1**, which is made of thin sheet metal. The aperture of the housing is closed by an optical element **2**, which is integral with the holder **3** for an incandescent lamp **4**. The optical element performs the function of a reflector so as to reflect the lights of vehicles behind a bicycle on which it is fitted. For this purpose it has a number of spherical elements as at **5**, the rear of which

are made reflective as at **6** so that an incident ray **7**, after having been reflected, is invariably reflected to the source of an incident ray **8**.

Such so-called catadioptric reflectors are known per se. The term "catadioptric reflectors" is to be understood here to comprise also differently shaped reflectors having the property of reflecting part of the incident light in the same direction.

The optical element **2** may, if necessary, be formed by a metal plate which contains loose catadioptric elements. However, in the present example it is made of transparent synthetic resin, such as polystyrene.

The element **2** has a central aperture **9** into which a cover **10** is screwed. This cover presses the incandescent lamp **4** against the bottom contact **11** of the holder **3**, which holder is furthermore provided with a lateral contact **12**. The bottom contact **11** is connected to the housing **1** through a spring **13** and the lateral contact **12** to a contact member **14** through a conductor **15**. The housing **1** is adapted to be secured to a bicycle with the use of a screw **16**.

The cover **10** may be made, as is the optical element **2**, from a transparent synthetic resin. A central part is shaped in the form of a plano-convex lens which concentrates the light from the incandescent lamp **4** into a beam, as is indicated by a ray **17**. The cover is screwed into the aperture **9** and, in order to permit loosening and tightening, it is provided with a groove **18**, into which fits a screwdriver or a coin.

In connection with its function as a tail light, the optically active parts are made of red-coloured material.

The head-light shown in Fig. 2 comprises a housing **1** and an optical element **2**, which are held together at their periphery by a metal strip **19**, which is folded over the edges of the two parts after a resilient strip **20** has been interposed. The housing **1** is internally provided with a reflector. The housing, in this example, is made of glass and the reflector of an aluminium layer applied by evaporation. The optical element **2** has an aperture **9**, into which a cover **10** can be screwed by applying pressure against a number of moulded prominences **21**. The lamp holder comprises a cylindrical part **22** with three extensions **23**. The lamp **4** has a spherical bulb **24**, at the centre of which is a filament **25**. This lamp is pressed by means of a spring **26** against the extensions **23**, which are positioned so that the filament is at the focus of the reflector on the housing **1**. The bulb **24** is provided with a reflecting layer **27** on that part which adjoins the cap of the lamp; this layer reflecting the rays which would be absorbed by the part **22** and the cover, to the reflector of the housing **1**.

The bottom of the lamp cap is provided with two contact springs **28**, which engage contacts **29** secured in the optical element **2**. A pair of conductors **30** secured in the element serve as supply wires for these contacts.

The manner of securing the incandescent lamp as here indicated has the advantage that small lateral shifts of the lamp cap are permitted without the filament being shifted out of the focus of the reflector.

The optical element **2** is moulded from transparent synthetic resin. This element may alternatively be made of glass, in which event the part surrounding the aperture **9**, together with the cylindrical part **22** as a separate unit, made of metal or moulded material, may be secured in the glass. It is then not necessary for the comparatively complicated shape of this part to be made from glass, whilst maintaining the advantage that the comparatively small cover **10** may readily be secured in this part in a water-tight manner.

Fig. 3 shows a further method of securing the incandescent lamp in such a headlight. In the aperture **9** of the optical element are a few grooves which, together with studs **31** secured to the cover **10**, constitute a bayonet closure. The cover **10** is integral with the incandescent lamp **4**. In order to ensure satisfactory packing for the cover **10**, it is arranged with its edge abutting against an elastic ring **32**, for example of rubber. The aperture of the optical element **2** is furthermore provided with a cap **33**, which may be held in position by clamping and which surrounds the incandescent

lamp. It is thus ensured that dirt or moisture cannot penetrate into the interior of the headlight, even if the incandescent lamp and the cover are removed. The lamp is provided with an internal mirror 34 which is held by supporting wires (not shown).

The headlight shown in Fig. 4 has a housing 1 of moulded sheet metal in which a metal reflector 35 is arranged. The two parts are attached to the optical element 2 by means of a metal strip 19 and a folded elastic strip 20. The lamp holder 3 is secured to the bottom of the reflector 35. As is the arrangement previously described, the optical element 2 has a central aperture 9, which can be closed by the cover 10. This cover is made of transparent material and its centre part is shaped as a plano-convex lens which concentrates the light of the lamp into a beam.

Finally Fig. 5 shows a headlight having an optical element 2 partly surrounding the lamp 4 and shaped in the manner shown in the figure so that a large proportion of the light emitted radially from the lamp is concentrated into a parallel beam by refraction upon entering and leaving the element 2 and by total reflection at the surface 36, as shown for a few rays 37. The optical element 2 has a central aperture 9 which is shut by the cover 10. This cover presses the lamp against a blade spring 38, which, as shown diagrammatically, is secured in the housing on an insulator and is connected to a supply contact. A second metal strip 39 surrounding the lamp cap has an aperture 40 and is provided with one or more side-contacts 12 which engage the incandescent lamp 4. The cover 10 is provided with a slot 18 by which the cover may be removed or screwed back into the element 2. The lamp 4 is accurately positioned in relation to the cavity of the optical element 2, behind the cover 10, so that the correct position of the filament is ensured. If the cover 10 is removed, the lamp 4 is pushed forward by the spring 38 so that it can be gripped and removed from the aperture 40 of the metal strip 39.

What I claim is:

1. A lighting fitting comprising a housing having a first aperture, a first optical element permanently closing said first aperture and forming a waterproof closure therefor, said first optical element having a second aperture, a lamp to be introduced into or removed from said housing through said second aperture, a second optical element removably fitting into said second aperture for closing the same, and means operatively associated with the interior of said housing for biasing the bulb of said lamp which is introduced into said housing through said second aperture, toward abutting relationship with said second optical element closing said second aperture.

2. A lighting fitting comprising a housing having a first aperture, a first optical element permanently closing said first aperture, said first optical element forming a catadioptric reflector having a second aperture, a lamp to be introduced into or removed from said housing through said second aperture, a second optical element screw threaded into said first optical element for closing said second aperture, and means operatively associated with the interior of said housing for biasing the bulb of said lamp which is introduced into said housing through said second aperture, toward abutting relationship with said second optical element closing said second aperture.

3. A lighting fitting comprising a housing having a first aperture, a first optical element permanently closing said first aperture to thereby form a waterproof closure therefor and comprising means for supporting a lamp within said housing, said first optical element having a second aperture, a lamp to be introduced into or removed from said supporting means through said second aperture, a second optical element removably fitting into said second aperture for closing the same, said second optical element forming a lens and means operatively associated with the interior of said housing for biasing the bulb of said lamp which is introduced into said supporting means through said second aperture, toward abutting relationship with said second optical element closing said second aperture.

4. A lighting fitting comprising a housing having a first aperture, an optical element closing said first aperture, said optical element having a second aperture surrounded by a substantially thick wall, a lamp to be introduced into or removed from said housing through said second aperture, a second optical element removably fitting into the region of said second aperture remote from the interior of said housing for closing the same, and means operatively associated with the interior of said housing for biasing the bulb of said lamp which is introduced into said housing through said second aperture, toward abutting relationship with said substantially thick wall and said second optical element closing said second aperture.

5. A lighting fitting comprising a metallic housing having a first aperture, a first optical element permanently closing said first aperture, lamp holder means supported in said housing, said first optical element having a second aperture, a lamp to be introduced into or removed from said lamp holder means through said second aperture, a second optical element removably fitting into said second aperture for closing the same, means operatively associated with the interior of said housing for forming one electrical contact for the base of said lamp and for biasing the bulb of said lamp which is introduced into said lamp holder means through said second aperture, toward abutting relationship with said second optical element closing said second aperture, an electrical contact holder encircling said lamp and lamp base and provided with at least one other contact for engagement with said lamp base, and electrical conductor means connected to said other electrical contact means and passing through a a wall of said metallic housing while electrically insulated therefrom.

6. A lighting fitting comprising a metallic housing having a first aperture, a first optical element permanently closing said first aperture, said first optical element comprising a lamp holder formed integrally therewith and extending into said housing, said first optical element having a second aperture, a lamp to be introduced into or removed from said lamp holder through said second aperture, a second optical element removably fitting into said second aperture for closing the same, means supported in said lamp holder and operatively associated with the interior of said housing for forming one electrical contact for the base of a lamp and for biasing the bulb of said lamp which is introduced into said lamp holder through said second aperture, toward abutting relationship with said second optical element closing said second aperture, other electrical contact means in said lamp holder, and electrical conductor means connected to said other electrical contact means and passing through a wall of said metallic housing while electrically insulated therefrom.

7. A lighting fitting comprising a metallic housing having a first aperture, a first optical element permanently closing said first aperture, lamp holder means in said housing, said first optical element having a second aperture, a lamp to be introduced into or removed from said lamp holder means through said second aperture, a second optical element removably fitting into said second aperture for closing the same, means supported on the interior of said housing for forming one electrical contact for the base of a lamp and for biasing the bulb of said lamp which is introduced into said lamp holder means through said second aperture, toward abutting relationship with said second optical element closing said second aperture, said lamp holder being integral with said first optical element and encircling said lamp and lamp base, said lamp holder having at least one other electrical contact means for engagement with said lamp base, and electrical conductor means connected to said other electrical contact means and passing through a wall of said metallic housing while electrically insulated therefrom.

References Cited in the file of this patent

UNITED STATES PATENTS

1,448,434	Culver	Mar. 13, 1923
1,871,527	Hurley	Aug. 16, 1932
1,995,012	Rivier	Mar. 19, 1935
2,075,569	Burton	Mar. 30, 1937
2,081,703	Germonprez	May 25, 1937
2,332,246	Morehead	Oct. 19, 1943
2,337,237	Garberding	Dec. 21, 1943
2,423,664	Ryder	July 8, 1947
2,544,533	Holt	Mar. 6, 1951

FOREIGN PATENTS

456,520	Great Britain	Nov. 9, 1936
520,387	Great Britain	Apr. 23, 1940
422,146	Italy	June 11, 1947