

19



Europäisches Patentamt
European Patent Office
Office européen des brevets



11 Publication number:

0 336 908 B1

12

EUROPEAN PATENT SPECIFICATION

45 Date of publication of patent specification: **16.02.94** 51 Int. Cl.⁵: **F21Q 1/00**

21 Application number: **89830145.2**

22 Date of filing: **04.04.89**

54 **A motor vehicle headlamp and an optical system, for motor vehicles including such a headlamp.**

30 Priority: **05.04.88 IT 6730188**

43 Date of publication of application:
11.10.89 Bulletin 89/41

45 Publication of the grant of the patent:
16.02.94 Bulletin 94/07

84 Designated Contracting States:
DE ES FR GB SE

56 References cited:
WO-A-85/04944
FR-A- 2 296 548
FR-A- 2 526 522

73 Proprietor: **FIAT AUTO S.p.A.**
Corso Giovanni Agnelli 200
I-10135 Torino(IT)

72 Inventor: **Cavalla, Claudio**
Via Taverna, 92
I-14019 Villanova d'Asti (Asti)(IT)
Inventor: **Ferrero, Giorgio**
Via Barletta, 56
I-10136 Torino(IT)
Inventor: **Di Salvo, Salvatore**
Corso Monte Cucco, 76
I-10141 Torino(IT)

74 Representative: **Bosotti, Luciano et al**
c/o Jacobacci-Casetta & Perani S.p.A.
Via Alfieri, 17
I-10121 Torino (IT)

EP 0 336 908 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

Description

The present invention relates to a motor vehicle headlamp of the type comprising:

- a body adapted to be mounted on the bodywork of the motor vehicle, 5
- a lamp within the body, 10
- a transparent glass having an inner prismatic surface for receiving the light rays emitted by the lamp and concentrating them into an outwardly-directed light beam with predetermined characteristics, the inner prismatic surface of the transparent glass including diffusing lenses for diffusing the light rays which pass through the transparent glass from the exterior into the body of the headlamp in all directions, 15
- a coloured filter interposed between the lamp and the transparent glass. 20

Motor vehicle headlamps of the type specified above are described and illustrated in the Applicant's European patent application no. EP-A-0 176 582 and enable the transparent glass of the headlamp to be made in a different colour from that envisaged for the light beam output by the headlamp.

The structure of the headlamp according to the Applicant's aforesaid application, to which reference is made here, has the disadvantage of requiring the headlamp to have different components according to the colour of the motor vehicle in which the headlamp is to be installed. This obviously causes complications in the management of the spare parts and the possibilities of errors during assembly.

The object of the present invention is to provide a headlamp with a simpler construction than that of the headlamp described in the aforesaid patent application, while allowing equivalent aesthetic results to be achieved at a lower cost and with easier organisation of spare parts.

According to the invention, this object is achieved by virtue of the fact that the body of the headlamp is mounted on an inner face of a flat portion of bodywork having at least one aperture for the passage of light rays emitted by the lamp, and in that an auxiliary member in the form of a frame is mounted on an outer face of the bodywork portion corresponding to the said inner face, the frame being interposed between the bodywork portion and the transparent glass and being adapted to be painted with the bodywork. The aperture in the flat portion of the bodywork has dimensions such as to allow the passage solely of light rays within a solid angle through which the transparent glass is visible from the centre of the lamp.

By virtue of these characteristics, the auxiliary member may be mounted on the bodywork before

the painting stage, simplifying the subsequent operations of installation of optical systems in the vehicle. Moreover, with the particular conformation of the transparent glass described in European patent application no. EP-A-0 176 582 mentioned above, it is possible to diffuse the light coming from the exterior so that, when the light is switched off, the transparent glass assumes the same colour as the bodywork.

The invention also provides an optical system for motor vehicles as defined in Claim 3, characterised in that it includes several headlamps of the type specified above, with the body, the auxiliary member and the transparent glass in common.

Further advantages and characteristics of the headlamp and of the optical system according to the invention will become clearer from the detailed description which follows, purely by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 is an exploded perspective view of an optical system according to the invention,

Figure 2 is a horizontal or vertical section of the optical system of Figure 1,

Figure 3 is a detail of Figure 2 on an enlarged scale, and

Figure 4 is a detail of Figure 2 on an enlarged scale.

With reference to the drawings, an optical system for motor vehicles, generally indicated 1, is adapted to be mounted on a flat bodywork portion C, normally disposed at the front or rear of the motor vehicle. The optical system 1 includes a body 2 in the form of a half-shell the interior of which is defined by partition walls 3 delimiting compartments 4. Each compartment 4 houses a lamp 5 connected to the body 2 and enclosed by a coloured filter 6 of the cap type.

The body 2 is connected by fixing systems of known type to the non-visible inner face C_1 of the bodywork C so that each lamp 5 is centred with respect to apertures A provided in the bodywork portion C.

An auxiliary member 7 is mounted on a visible outer face C_2 of the bodywork portion C and has a flat portion 7a delimited by a peripheral frame 8 of dimensions corresponding to those of the body 2 and to which walls 9 perpendicular to the surface of the flat portion 7a of the auxiliary member are fixed. The flat portion 7a has through-holes F of a diameter less than that of the apertures A of the bodywork C for the passage of the light.

Instead of the individual apertures A, the bodywork portion C may have a single aperture of a shape and dimensions substantially corresponding to those of the portion 7a of the auxiliary member 7.

A trough-like transparent glass 11 of plastics material is mounted in the frame 8 of the auxiliary member 7 and its inner wall 11a has, for each opening defined by the flat portion 7a and the walls 9 of the auxiliary member 7, a central zone 12 comprising refracting prisms 13 and a peripheral zone 14 comprising totally-reflecting prisms 15.

It is clear that the holes F in the flat portion of the auxiliary member 7 enable light from the lamps 5, coloured by the filter 6, to be incident directly on the inner surface of the transparent glass 11.

As is clear from Figure 2, the light outside the solid angle B, in which each portion of transparent glass 11 delimited by the walls 9 of the auxiliary member 7 is seen from the centres of the lamps 5, does not pass through the holes F.

The surface portions of the refracting prisms 13 which are not perpendicular to the general plane of the transparent glass 11 are shaped so as to define a series of diffusing lenses 16 (see Figure 3).

Similarly, flat zones 17 are interposed between the totally-reflecting prisms 15 and are shaped so as to define a plurality of diffusing lenses 18 (see Figure 4).

For a fuller description of the transparent glass 11 the reader is referred to the Applicant's European patent application mentioned above.

The auxiliary member 7 is mounted on the bodywork before painting, so that the flat portion 7a and walls 9 of the member itself assume the same colour as the bodywork C. After assembly of the body 2 on the one hand and of the transparent screen 11 on the other, with respect to the flat bodywork portion C, the functioning of the optical system described above is as follows.

When the lamp 5 is on, the light coming from the lamp is coloured by the filter 6 and then concentrated by the prismatic surface of the glass 11 into a light beam having the desired characteristics. As is known, the presence of the coloured filter 6 enables a colourless transparent glass 11 to be used. In some cases (reversing lights or side lights) the coloured filter 6 is not present.

When the lamp 5 is switched off and the respective headlamp of the optical system is illuminated from the exterior, the coloured filter 6 is not visible from the exterior since the light (for example sunlight) which enters the headlamp is reflected by the surface of the flat portion 7a and by the walls 9 of the auxiliary member 7 and is diffused over the entire surface of the transparent glass 11. In passing through the latter, the light coming from the interior is diffused by the diffusing lenses 16 and 18 so that, when the lamp is switched off and the headlamp is illuminated from the exterior, the transparent glass, while being colourless, takes on the colour of the bodywork C. In order to achieve good

aesthetic results, the transparent glass 11 must have a rebated profile so as to be as close as possible to the coloured bodywork in that, if it were too far away, the colour of the bodywork would be less visible.

When the lamp 5 is switched on, the totally-reflecting prisms 15 illuminate the zones 17 with the colour of the filter 6 much more intensely.

In the case of the optical system including several headlamps, as described and illustrated, the transparent glass 11 may be formed in a single colour or so that it includes several zones of different colours in correspondence with various headlamps.

Particularly in the case of vehicles with plastics bodywork, the auxiliary member 7 may be formed integrally with the bodywork C and may even be painted in a different colour from that of the rest of the bodywork (for example, two-colour motor car with a horizontal coloured stripe which includes the rear optical systems).

Claims

1. A motor vehicle headlamp comprising:
 - a body adapted to be mounted on the bodywork of the motor vehicle,
 - a lamp within the body,
 - a transparent glass having an inner prismatic surface for receiving the light rays emitted by the lamp and concentrating them into an outwardly-directed light beam with predetermined characteristics, the inner prismatic surface of the transparent glass including diffusing lenses for diffusing the light rays which pass through the transparent glass from the exterior into the body of the headlamp in all directions,
 - a coloured filter interposed between the lamp and the transparent glass, characterised in that the body (2) of the headlamp (1) is mounted on an inner face (C₁) of a bodywork portion (C) having at least one aperture (A) for the passage of light rays emitted by the lamp (5), and in that an auxiliary member (7) in the form of a frame is mounted on an outer face (C₂) of the bodywork portion (C) corresponding to the inner face (C₁), the frame being interposed between the bodywork portion (C) and the transparent glass (11) and being adapted to be painted with the bodywork (C).
2. A headlamp according to Claim 1, characterised in that the auxiliary member (7) has a portion (7a) facing the bodywork portion (C)

and at least one through-hole (F) in correspondence with the aperture (A), with dimensions such as to allow the passage of only those light rays in a solid angle (B) through which the transparent glass (11) is visible from the centre of the lamp (5).

3. An optical system for motor vehicles, including a body for mounting on the bodywork of a motor vehicle, a plurality of lamps within the body, a transparent glass having a prismatic surface for receiving light emitted by the lamps and for concentrating it outwardly into light beams having predetermined characteristics, the inner prismatic surface of the transparent glass including diffusing lenses for diffusing light passing through the transparent glass from the exterior into the body of the headlamp in all directions, and coloured filters interposed between the lamps and the transparent glass, characterised in that the body (2) is mounted on an inner face (C₁) of a bodywork portion (C) having apertures (A) associated with the lamps (5) for the passage of light emitted by the lamps (5), and in that an auxiliary member (7) is mounted on an outer face (C₂) of the bodywork (C) corresponding to the inner face (C₁) and has a flat portion (7a) delimited by a peripheral frame (8) and walls (9) which are substantially perpendicular to the said flat portion (7a), the auxiliary member (7) being adapted to be painted with the bodywork and being located so as to define with the transparent glass (11) a plurality of compartments associated with each aperture (A), the flat portion (7a) of the auxiliary member (7) having holes (F) associated with the apertures (A) and of such dimensions as to allow the passage solely of light rays within a solid angle (B) through which the portions of transparent glass (11) delimited by the walls (9) are visible from the centres of the lamps (5).
4. An optical system according to Claim 3, characterised in that the body (2) has a plurality of auxiliary walls (3) located perpendicular to and bearing against the inner face (C₁) of the flat bodywork portion (C) in an arrangement corresponding to that of the walls (9) of the auxiliary member (7).
5. An optical system according to Claim 3, particularly for motor vehicles having bodywork of plastics material, characterised in that the auxiliary member (7) is integral with the bodywork (C).

6. An optical system according to Claim 3, characterised in that the bodywork (C) has a single aperture (A) of a shape and dimensions substantially corresponding to those of the auxiliary member (7).

Patentansprüche

1. Kraftfahrzeugscheinwerfer, umfassend:
- einen zur Anbringung an der Karosserie des Kraftfahrzeugs ausgelegten Körper,
 - eine Lampe in dem Körper,
 - ein transparentes Glas mit einer prismatischen Innenfläche zum Empfangen der durch die Lampe emittierten Lichtstrahlen und Bündeln derselben in einen auswärts gerichteten Lichtstrahl mit vorbestimmten Eigenschaften, wobei die prismatische Innenfläche des transparenten Glases Streulinsen umfaßt, um die durch das transparente Glas von außen in den Körper des Scheinwerfers eintretenden Lichtstrahlen in alle Richtungen zu zerstreuen,
 - einen zwischen der Lampe und dem transparenten Glas angeordneten gefärbten Filter, **dadurch gekennzeichnet**, daß der Körper (2) des Scheinwerfers (1) an einer Innenfläche (C₁) eines Karosserieabschnitts (C) mit wenigstens einer Öffnung (A) für den Durchtritt von durch die Lampe (5) emittierten Lichtstrahlen angebracht ist, und daß ein Zusatzelement (7) in Form eines Rahmens an einer der Innenfläche (C₁) entsprechenden Außenfläche (C₂) des Karosserieabschnitts (C) angebracht ist, wobei der Rahmen zwischen dem Karosserieabschnitt (C) und dem transparenten Glas (11) angeordnet und zum Lackieren mit der Karosserie (C) ausgelegt ist.
2. Scheinwerfer nach Anspruch 1, **dadurch gekennzeichnet**, daß das Zusatzelement (7) einen dem Karosserieabschnitt (C) zugewandten Abschnitt (7a) aufweist sowie wenigstens ein Durchgangsloch (F) in Entsprechung zur Öffnung (A), welches derart bemessen ist, daß es den Durchtritt lediglich jener Lichtstrahlen in einem Raumwinkel (B) erlaubt, durch den das transparente Glas (11) vom Zentrum der Lampe (5) aus zu sehen ist.
3. Optisches System für Kraftfahrzeuge, umfassend einen Körper zur Anbringung an der Karosserie eines Kraftfahrzeugs, eine Mehrzahl Lampen in dem Körper, ein transparentes Glas mit einer prismatischen Fläche zum Empfangen

gen von durch die Lampen emittiertem Licht und Bündeln desselben nach außen in Lichtstrahlen vorbestimmter Eigenschaften, wobei die prismatische Innenfläche des transparenten Glases Streulinsen umfaßt, um durch das transparente Glas von außen in den Körper des Scheinwerfers eintretendes Licht in alle Richtungen zu streuen, sowie zwischen den Lampen und dem transparenten Glas angeordnete gefärbte Filter, **dadurch gekennzeichnet**, daß der Körper (2) an einer Innenfläche (C_1) eines Karosserieabschnitts (C) mit den Lampen (5) zugeordneten Öffnungen (A) zum Durchtritt von durch die Lampen (5) emittiertem Licht angebracht ist, und daß ein Zusatzelement (7) an einer der Innenfläche (C_1) entsprechenden Außenfläche (C_2) der Karosserie (C) angebracht ist und einen flachen Abschnitt (7a) aufweist, der von einem Umfangsrahmen (8) und Wandungen (9) begrenzt ist, die im wesentlichen orthogonal zu dem flachen Abschnitt (7a) sind, wobei das Zusatzelement (7) zum Lackieren mit der Karosserie ausgelegt und derart angeordnet ist, daß es mit dem transparenten Glas (11) eine Mehrzahl jeder Öffnung (A) zugeordneter Fächer festlegt, wobei der flache Abschnitt (7a) des Zusatzelements (7) Löcher (F) aufweist, die den Öffnungen (A) zugeordnet und derart bemessen sind, daß sie den Durchtritt lediglich von Lichtstrahlen innerhalb eines Raumwinkels (B) ermöglichen, durch den die von den Wandungen (9) begrenzten Abschnitte transparenten Glases (11) von den Zentren der Lampen (5) aus zu sehen sind.

4. Optisches System nach Anspruch 3, **dadurch gekennzeichnet**, daß der Körper (2) eine Mehrzahl Zusatzwandungen (3) aufweist, die orthogonal zu der Innenfläche (C_1) des flachen Karosserieabschnitts (C) angeordnet sind und gegen diese in einer Anordnung anliegen, die jener der Wandungen (9) des Zusatzelements (7) entspricht.
5. Optisches System nach Anspruch 3, insbesondere für Kraftfahrzeuge mit einer Karosserie aus Kunststoffmaterial, **dadurch gekennzeichnet**, daß das Zusatzelement (7) mit der Karosserie (C) einstückig ist.
6. Optisches System nach Anspruch 3, **dadurch gekennzeichnet**, daß die Karosserie (C) eine einzige Öffnung (A) aufweist, deren Form und Abmessungen im wesentlichen jenen des Zusatzelements (7) entsprechen.

Revendications

1. Feu pour véhicule automobile comprenant :
 un corps conçu pour se monter sur la carrosserie du véhicule automobile ;
 une lampe à l'intérieur du corps ;
 un verre transparent ayant une surface intérieure prismatique pour recevoir les rayons lumineux émis par la lampe et les concentrer en un faisceau lumineux dirigé vers l'extérieur ayant des caractéristiques prédéterminées, la surface prismatique intérieure du verre transparent comprenant des lentilles diffusantes pour diffuser, dans toutes les directions, les rayons lumineux qui pénètrent dans le corps du feu à partir de l'extérieur à travers le verre transparent ;
 un filtre coloré interposé entre la lampe et le verre transparent, caractérisé en ce que le corps (2) du feu (1) est monté sur une face intérieure (C_1) d'une partie de carrosserie (C) ayant au moins une ouverture (A) pour le passage des rayons lumineux émis par la lampe (5), et en ce qu'un élément auxiliaire (7) sous la forme d'un cadre est monté sur une face extérieure (C_2) de la partie de carrosserie (C) correspondant à ladite face intérieure (C_1), le cadre étant interposé entre la partie de carrosserie (C) et le verre transparent (11) et étant conçu pour être peint avec la carrosserie (C).
2. Feu selon la revendication 1, caractérisé en ce que l'élément auxiliaire (7) possède une partie (7a) tournée vers la partie de carrosserie (C) et au moins un trou traversant (F) en correspondance avec l'ouverture (A), avec des dimensions propres à permettre le passage de seulement ceux des rayons lumineux qui se trouvent à l'intérieur d'un angle solide (B) suivant lequel le verre transparent (11) est visible depuis le centre de la lampe (5).
3. Système optique pour véhicules automobiles comprenant : un corps pour se monter sur la carrosserie d'un véhicule automobile ; une pluralité de lampes à l'intérieur du corps ; un verre transparent ayant une surface intérieure prismatique pour recevoir la lumière émise par les lampes et pour la concentrer à l'extérieur en des faisceaux lumineux ayant des caractéristiques prédéterminées, la surface prismatique intérieure du verre transparent comprenant des lentilles diffusantes pour diffuser, dans toutes les directions, la lumière qui pénètre dans le corps du feu à partir de l'extérieur à travers le verre transparent ; et des filtres colorés interposés entre les lampes et le verre transparent, caractérisé en ce que le corps (2) est

monté sur une face intérieure (C₁) d'une partie de carrosserie (C) ayant des ouvertures (A), associées avec les lampes (5), pour le passage de la lumière émise par les lampes (5), et en ce qu'un élément auxiliaire (7) est monté sur une face extérieure (C₂) de la carrosserie (C) correspondant à la face intérieure (C₁) et possède une partie plate (7a) délimitée par un cadre périphérique (8) et des cloisons (9) qui sont sensiblement perpendiculaires à ladite partie plate (7a), l'élément auxiliaire (7) étant conçu pour être peint avec la carrosserie et étant situé de façon à définir avec le verre transparent (11) une pluralité de compartiments associés à chaque ouverture (A), la partie plate (7a) de l'élément auxiliaire (7) possédant des trous (F) associés aux ouvertures (A) et de dimensions propres à permettre le passage uniquement des rayons lumineux qui se trouvent à l'intérieur d'un angle solide (B) suivant lequel les parties de verre transparent (11) délimitées par les cloisons (9) sont visibles depuis les centres des lampes (5).

5

10

15

20

4. Système optique selon la revendication 3, caractérisé en ce que le corps (2) possède une pluralité de cloisons auxiliaires (3) disposées perpendiculairement à la face intérieure (C₁) de la partie de carrosserie plate (C) et portant contre celle-ci, dans un agencement correspondant à celui des cloisons (9) de l'élément auxiliaire (7).

25

30

5. Système optique selon la revendication 3, particulièrement pour des véhicules automobiles ayant une carrosserie faite de matière plastique, caractérisé en ce que l'élément auxiliaire (7) est d'un seul tenant avec la carrosserie (C).

35

6. Système optique selon la revendication 3, caractérisé en ce que la carrosserie (C) comporte une ouverture unique (A) de forme et de dimensions correspondant sensiblement à celles de l'élément auxiliaire (7).

40

45

50

55

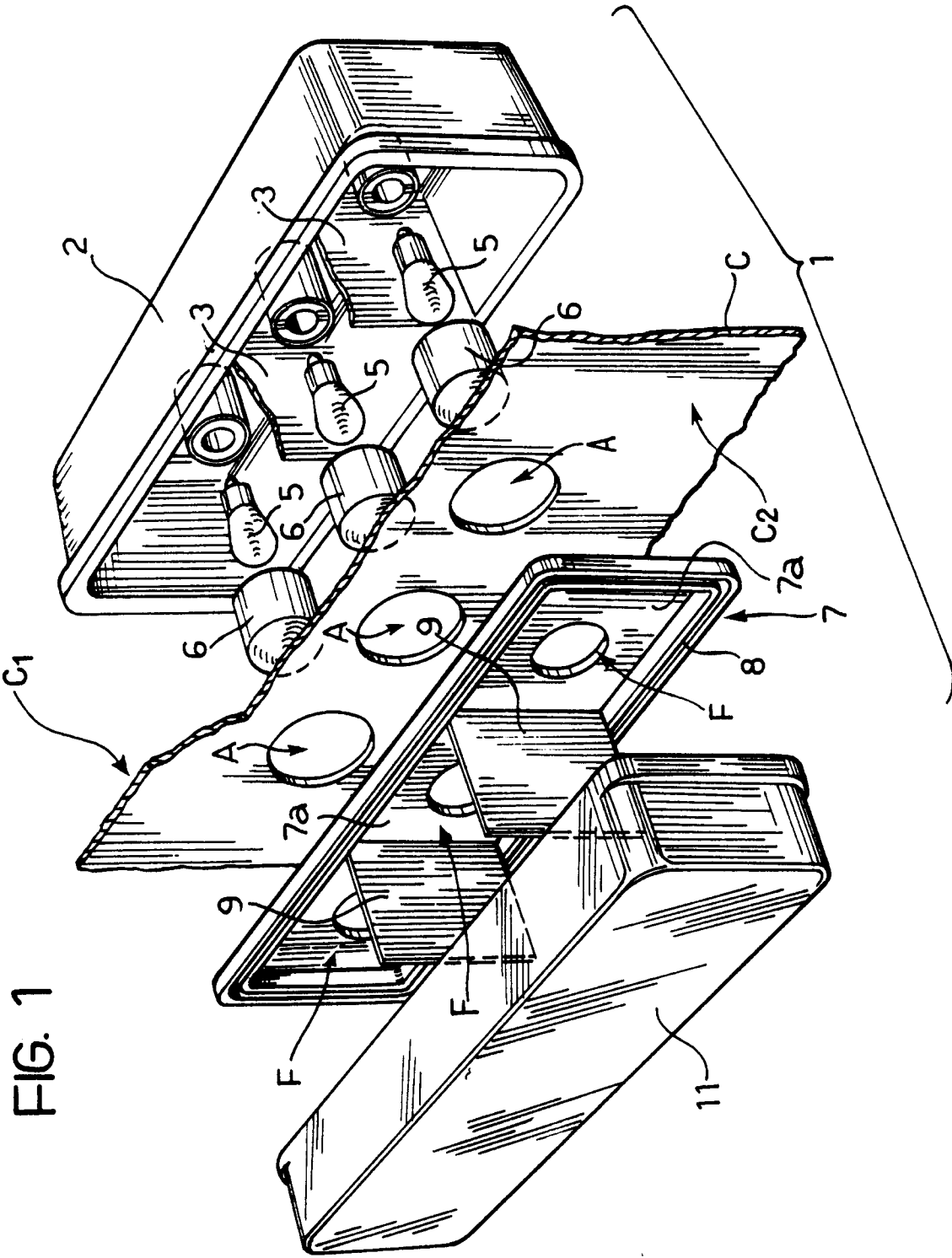


FIG. 1

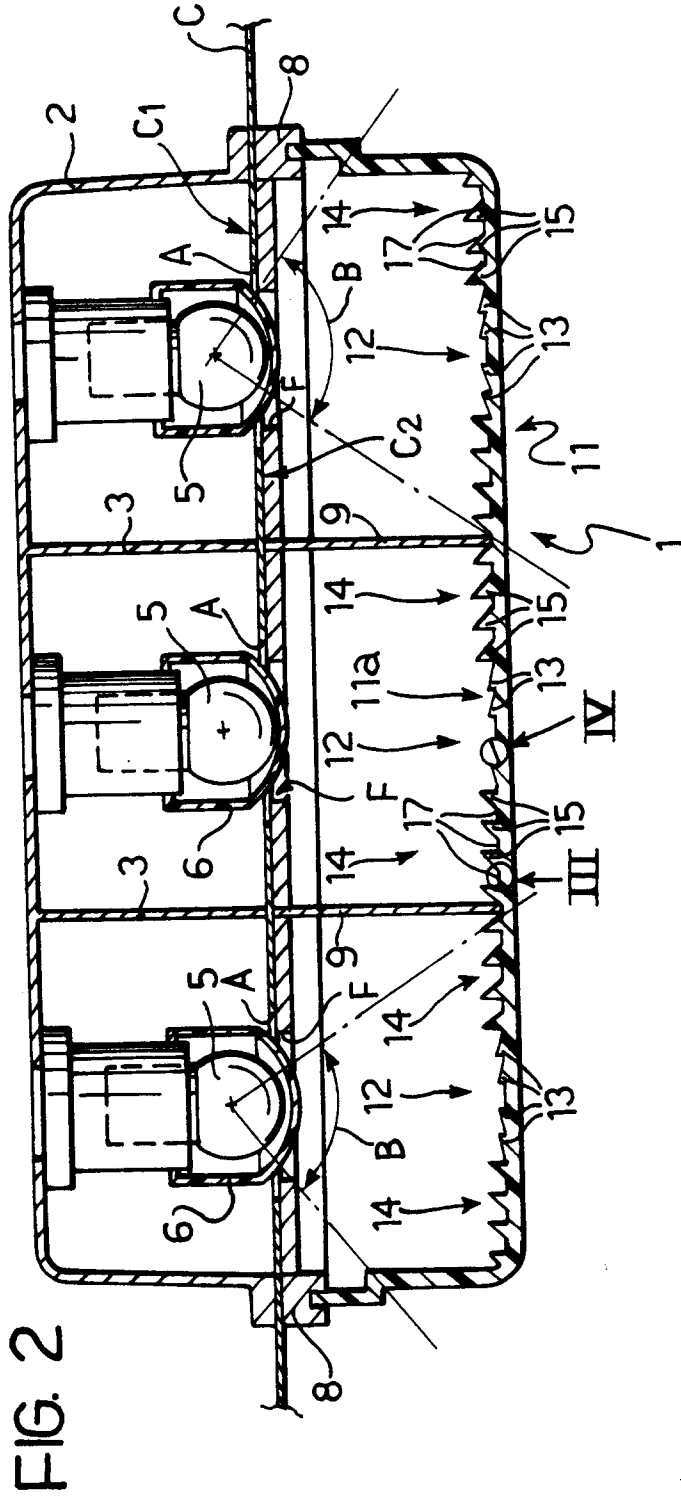


FIG. 2

FIG. 4

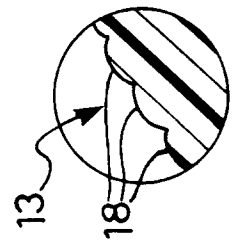


FIG. 3

