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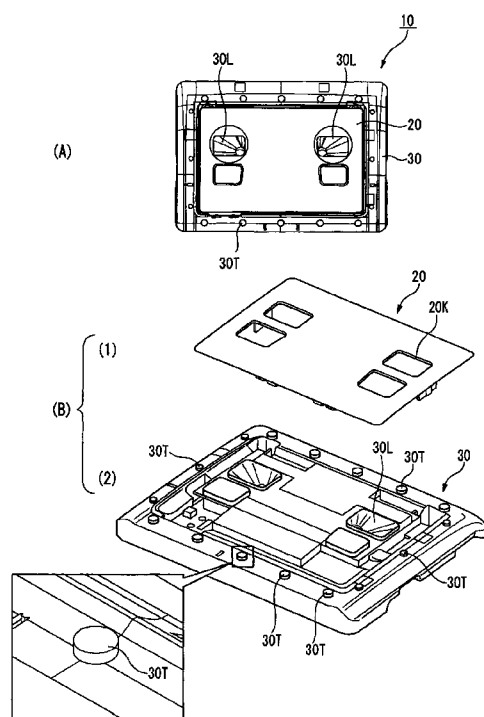
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[Continued on next page]

(54) Title: INTERIOR ILLUMINATION LAMP FOR VEHICLE

FIG. 1



(57) Abstract: An interior illumination lamp (10) for a vehicle is provided in which an appearance of a mated part of an outer periphery of a decorative surface of a lens (20) to be mated with a roof trim (40) can be easily enhanced, and looseness of the mated part is eliminated. In the interior illumination lamp 10 for a vehicle including a lamp unit 30 having a light source 30L, which is a functional part, and a lens 20 provided inside a vehicle room, which is a decorative part, the lens 20 is engaged with the lamp unit 30 through an inner peripheral edge of an opening 40K in a roof trim 40, thereby to clamp the roof trim 40 between them and to attach the interior illumination lamp 10 for a vehicle in a state where the roof trim 40 is clamped. The lamp unit 30 is provided with a plurality of positioning projections 30T at a position where the lamp unit 30 is contacted with the roof trim 40.



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GW, ML, MR, NE, SN, TD, TG).

DESCRIPTION

Interior Illumination lamp for Vehicle

5 Technical Field

The present invention relates to an interior illumination lamp for a vehicle, and more particularly, to a structure for preventing looseness of the interior illumination lamp for a vehicle with respect to a roof trim.

10

Background Art

As an interior illumination lamp for a vehicle to be attached to a roof trim of a ceiling in a vehicle room, the interior illumination lamp for a vehicle as disclosed in

15 JP-A-2007-203911 has been known.

Japanese Patent Publication No. JP-A-2007-203911 is discussed below.

<The interior illumination lamp for a vehicle disclosed in JP-A-2007-203911>

20 An object of the interior illumination lamp for a vehicle disclosed in JP-A-2007-203911 is to enhance its assembling workability and to facilitate maintenance works. For this purpose, specifically, in the interior illumination lamp for a vehicle which is composed of a functional part and a decorative
25 part, a locking claw is formed on a side face of a base housing

of the decorative part, and an elastically deformable operating panel having a locking part to which the locking claw can be locked is provided in a housing of the functional part. The operating panel is pressed from an inside of a bulb containing
5 room in the decorative part to be elastically deformed, thereby enabling a locked state of the locking part with respect to the locking claw to be released.

<Merit and demerit of the interior illumination lamp for a vehicle disclosed in JP-A-2007-203911>

10 <<Merit>>

According to the interior illumination lamp for a vehicle disclosed in JP-A-2007-203911, a lamp unit can be reliably assembled to a ceiling panel having a plurality of clamping thicknesses, only by exchanging clamping holders. Therefore,
15 constituent components of the lamp unit and a basic design of a wire harness which is connected to the lamp can be commonly used, and further, specs of the clamping holder can be exchanged according to the ceiling panel to which the lamp unit is to be attached. As the results, there is such a merit that
20 modification of the specs of the components to comply with diversification of the specs of the lamp unit can be restrained to the least extent, and cost for the components can be reduced.
<<Demerit>>

In case where the interior illumination lamp for a vehicle
25 is assembled by a clamp between a roof trim and a lens, utilizing

the art in JP-A-2007-203911, it is necessary to mold a whole contact face of the lens to be contacted with the roof trim with high precision, for enhancing an appearance of a mated part of an outer periphery of a decorative surface of the lens to be mated with the roof trim. This incurs an increase of the cost.

Summary of the Invention

Technical Problem

10 <Object of the invention>

This invention has been made in order to solve the above described drawback, and an object of the invention is to provide an interior illumination lamp for a vehicle in which there is no necessity of molding a whole contact face of a decorative part to be contacted with a roof trim with high precision, whereas an appearance of a mated part of an outer periphery of a decorative surface of a lens to be mated with the roof trim can be easily enhanced, and looseness of the mated part is eliminated.

20 Solution to Problem

In order to attain the above described object, a first invention of this application relates to an interior illumination lamp for a vehicle including a lamp unit having a light source, which is a functional part, and a lens provided inside a vehicle room, which is a decorative part, wherein the

lens is engaged with the lamp unit through an inner peripheral edge of an opening in a roof trim, thereby to clamp the roof trim between them and to attach the interior illumination lamp for a vehicle in a state where the roof trim is clamped, 5 characterized in that the lamp unit is provided with a plurality of positioning projections at a position where the lamp unit is contacted with the roof trim.

Moreover, a second invention of this application is characterized in that a plurality of the positioning projections 10 are provided at an equal interval, in the first invention.

Advantageous Effect of Invention

Advantageous Effect of the Invention

According to the first invention, there is no necessity 15 of molding the whole contact face of the decorative part to be contacted with the roof trim with high precision, whereas the appearance of the mated part of the outer periphery of the decorative surface of the lens to be mated with the roof trim can be easily enhanced, and looseness of the mated part is 20 eliminated. As the results, reduction of the cost can be achieved.

According to the second invention, the positioning projections are provided at an equal interval, and hence, the appearance of the mated part between the decorative part and 25 the roof trim can be further enhanced, and the looseness is

eliminated.

Brief Description of the Drawings

Fig. 1(A) is a plan view for explaining an interior
5 illumination lamp for a vehicle according to the invention,
and Fig. 1(B) is an exploded perspective view of the interior
illumination lamp for a vehicle in Fig. 1(A).

Fig. 2 is a perspective view showing a manner of attaching
the interior illumination lamp for a vehicle in Fig. 1 to a
10 ceiling of a vehicle.

Fig. 3(A) is a plan view of the interior illumination
lamp for a vehicle, showing a position where a roof trim is
clamped and held between a lens and a lamp unit, Fig. 3(B) is
a vertical sectional view taken along a line A-A in Fig. 3A,
15 and Fig. 3(C) is a vertical sectional view taken along a line
B-B in Fig. 3(A).

Fig. 4(A) is an enlarged view of an encircled part in
Fig. 3(B), and Fig. 4(B) is an enlarged view of an encircled
part in Fig. 3(C).

20

Description of Embodiments

Now, the interior illumination lamp for a vehicle
according to the invention, in which there is no necessity of
molding a whole contact face of a decorative part to be contacted
25 with a roof trim with high precision, whereas an appearance

of a mated part of an outer periphery of a decorative surface of a lens to be mated with the roof trim can be easily enhanced, and looseness of the mated part is eliminated, will be described referring to the drawings.

5 <Structure of the interior illumination lamp for a vehicle according to the invention>

Fig. 1(A) is a plan view for explaining the interior illumination lamp for a vehicle according to the invention, and Fig. 1(B) is an exploded perspective view of a lens (1)
10 and a lamp unit (2) detached from the interior illumination lamp for a vehicle in Fig. 1(A). An enlarged view of a part extracted from (2) shows a positioning projection which is provided according to the invention.

In Fig. 1, an interior illumination lamp 10 for a vehicle
15 according to the invention includes a lens 20 provided inside a vehicle room, which is a decorative part, and a lamp unit having light sources 30L, which is a functional part.

Fig. 1(B) shows a state where the lens 20 is detached from the interior illumination lamp 10 for a vehicle. Openings
20 20K for the light sources are formed in the lens 20. Both the lens 20 and the lamp unit 30 have a rectangular shape. The lens 20 is smaller in size than the lamp unit 30, and an outer periphery of the lamp unit 30 is exposed from an outer periphery of the lens 20 in a state where the lens 20 is assembled to
25 the lamp unit 30. According to the invention, a plurality of

positioning projections 30T are provided at an equal interval in an exposed part of the lamp unit 30.

Each of the positioning projections 30T has a columnar shape, and is formed with high precision. In Fig. 1, the positioning projections 30T are provided at sixteen positions in total, specifically, at five positions on a longer side of the rectangular shape, and at three positions on a shorter side.
<Attachment of the interior illumination lamp for a vehicle according to the invention>

Fig. 2 is a perspective view showing a manner of attaching the interior illumination lamp 10 for a vehicle in Fig. 1 to a ceiling of a vehicle. After the lens 20 is detached from the interior illumination lamp 10 for a vehicle, as shown in Fig. 1B, a roof trim 40 is disposed between the lens 20 and the lamp unit 30. Then, the lens 20 is moved near the lamp unit 30, and locking parts 20R (specifically, refer to Fig. 4) of the lens 20 are passed through an opening 40K for the lens in the roof trim 40 to be engaged with locking parts 30R (specifically, refer to Fig. 4) of the lamp unit 30 at the opposite side, thereby to hold the roof trim 40 by clamping it between the lens 20 and the lamp unit 30 like a sandwich.

<Engagement between the lens 20 and the lamp unit 30>

Fig. 3(A) is a plan view of the interior illumination lamp 10 for a vehicle, showing a region where the roof trim 40 is held in a state clamped between the lens 20 and the lamp

unit 30 like a sandwich, Fig. 3(B) is a vertical sectional view taken along a line A-A in Fig. 3(A), and Fig. 3(C) is a vertical sectional view taken along a line B-B in Fig. 3(A). Fig. 4(A) is an enlarged view of an encircled part in Fig. 3(B), and Fig. 4(B) is an enlarged view of an encircled part in Fig. 3(C).

In Figs. 3(C) and 4(B), the locking part 30R in a hook-like shape of the lamp unit 30 enters into an opening 20L which is formed in the locking part 20R of the lens 20 to be engaged with the locking part 20R. In this manner, by engaging the locking part 30R of the lamp unit 30 with the locking part 20R of the lens 20, the roof trim 40 is clamped between the lens 20 and the lamp unit 30, like a sandwich, and reliably held. <Contact between the roof trim 40 and the positioning projection 30T>

In a state where the lens 20 is engaged with the lamp unit 30, as shown in Figs. 3C and 4B, an edge part of the lens 20 is in contact with an upper face of the roof trim 40 without a clearance, as shown in Fig. 3B and 4A, and on a back side of the roof trim 40 (a lower side in the drawings), the roof trim 40 is in contact with the positioning projections 30T according to the invention which are provided on a peripheral edge of the lamp unit 30. Because the edge part of the lens 20 is in contact with the roof trim 40 without a clearance, the appearance is enhanced, and the looseness is eliminated. This utterly depends on whether or not the positioning

projections 30T are precisely formed.

According to the invention, only the positioning
projections 30T have to be precisely formed, and thus, contact
area with the roof trim can be reduced. As the results, the
5 appearance of a mated part between the outer periphery of the
decorative surface of the lens and the roof trim is enhanced,
and the looseness is eliminated.

To the contrary, in the conventional device, in order
to improve the appearance by bringing the edge part of the lens
10 into contact with the roof trim without a clearance, it has
been necessary to form the lens precisely along an entire
circumference (360 degree) of the lamp unit, and the production
has been difficult.

The present application is based on Japanese Patent
15 Application No. 2010-174657, filed on August 3, 2010, the entire
contents of which are incorporated herein by reference.

Industrial Applicability

As described above, according to the invention, only by
20 setting the positioning projections at desired positions in
the outer peripheral part of the lamp unit 30, the contact area
with the roof trim can be reduced. As the results, by molding
only the positioning projections with high precision, the
appearance of the mated part between the outer periphery of
25 the decorative surface of the lens and the roof trim is enhanced,

and the looseness is eliminated. Therefore, the necessity of molding the whole contact face of the decorative part with respect to the roof trim with high precision, which has been the problem of the conventional device, is eliminated, and
5 reduction of the cost can be achieved.

Reference Signs List

- 10 Interior illumination lamp for a vehicle according to the invention
- 10 20 Lens
- 20K Opening for light source
- 20R Locking part (opening)
- 30 Lamp unit
- 30L Light source
- 15 30R Locking part (hook)
- 30T Positioning projection
- 40 Roof trim
- 40K Opening for Lens

CLAIMS

1. An interior illumination lamp for a vehicle comprising
a lamp unit having a light source, which is a functional part,
and a lens provided inside a vehicle room, which is a decorative
5 part, wherein the lens is engaged with the lamp unit through
an inner peripheral edge of an opening in a roof trim, thereby
to clamp the roof trim and to attach the interior illumination
lamp for a vehicle in a state where the roof trim is clamped,
wherein the lamp unit is provided with a plurality of
10 positioning projections at a position where the lamp unit is
contacted with the roof trim.

2. An interior illumination lamp for a vehicle as claimed
in claim 1, wherein a plurality of the positioning projections
15 are provided at an equal interval.

FIG. 1

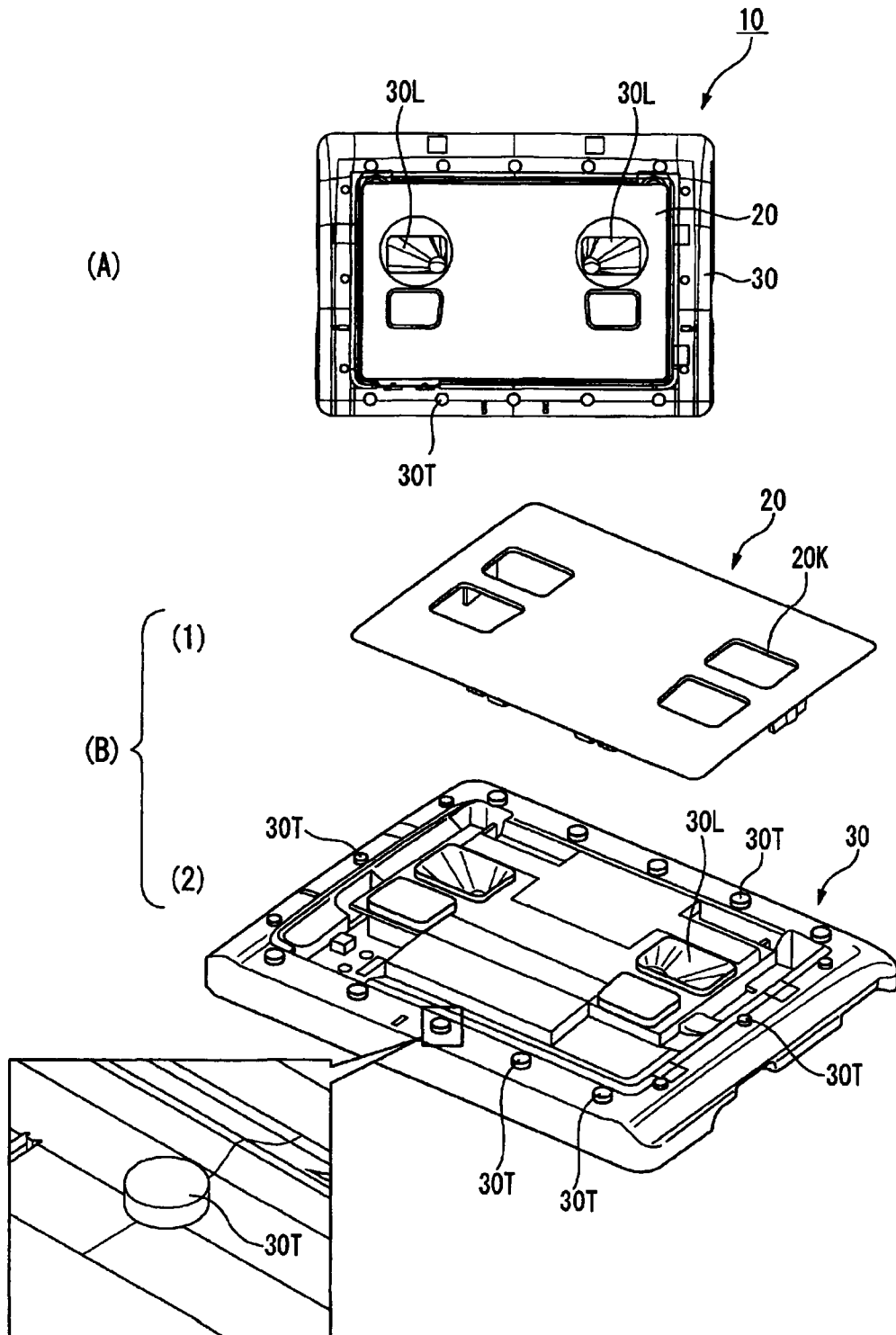


FIG. 2

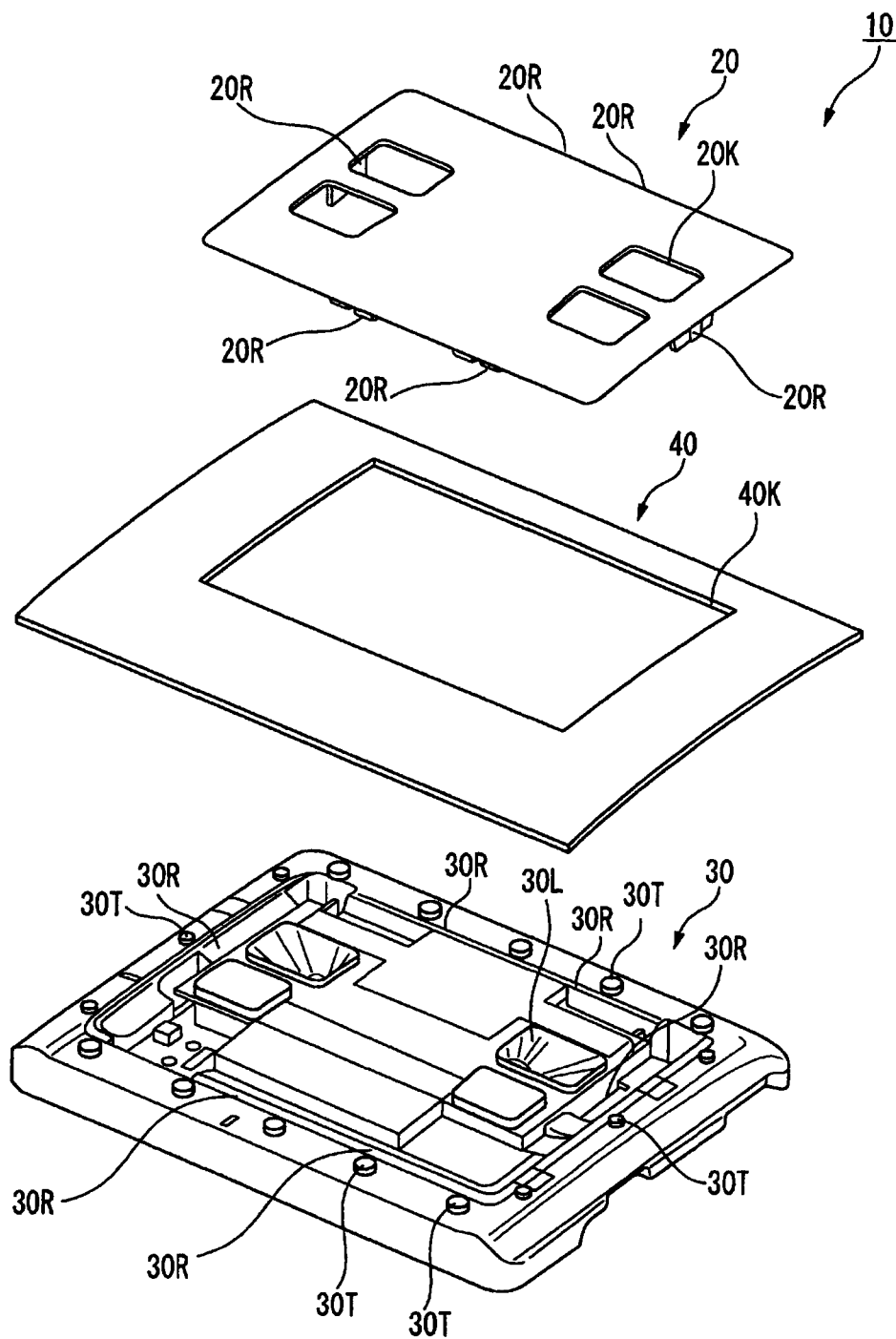


FIG. 3

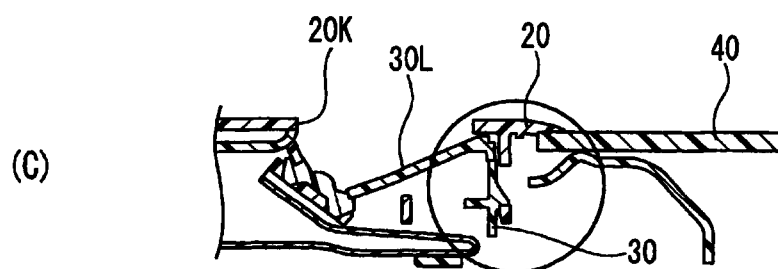
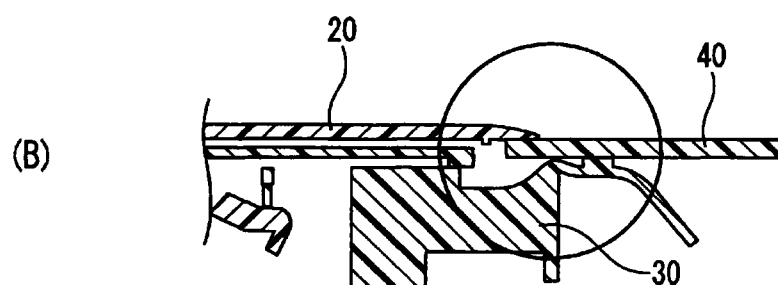
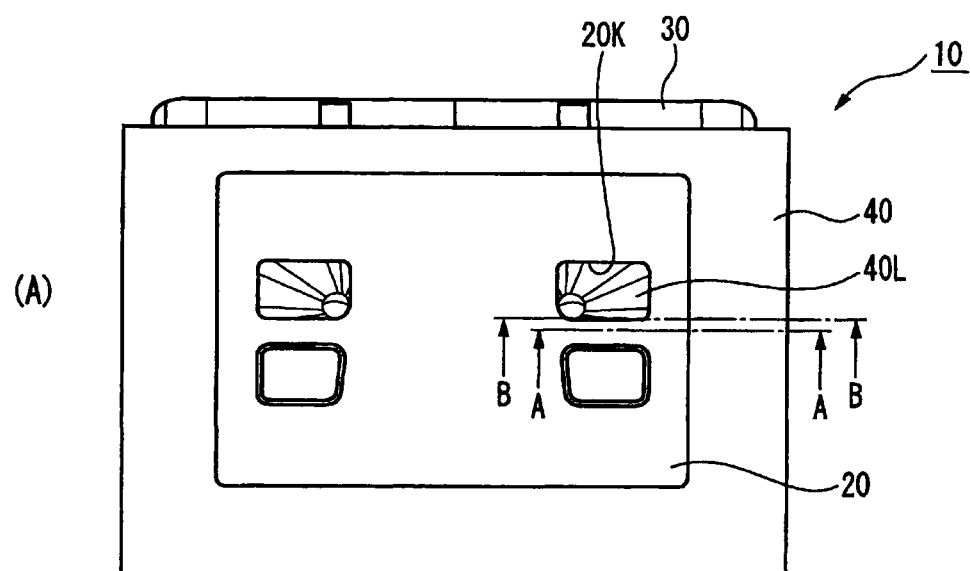
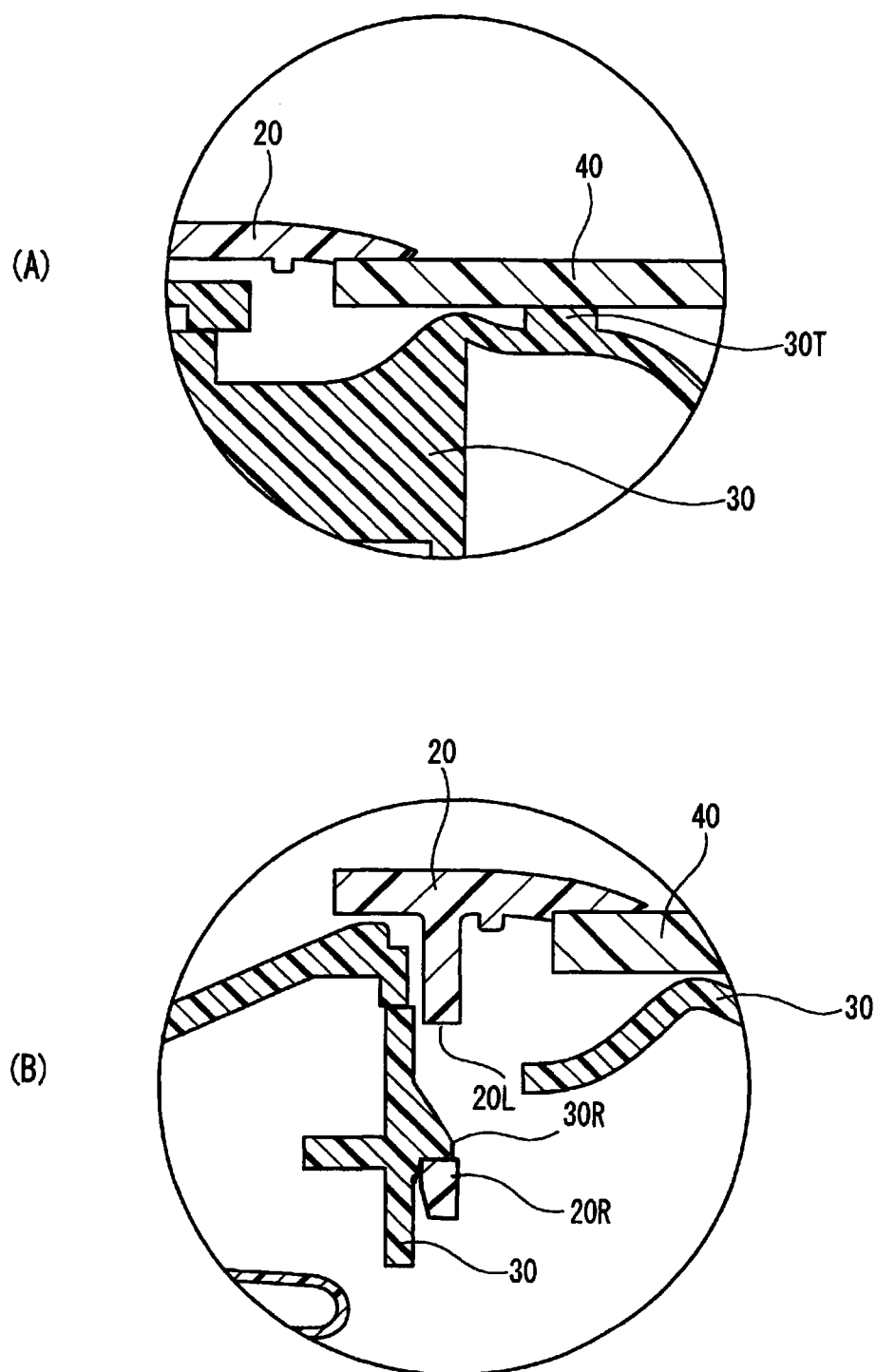


FIG. 4



INTERNATIONAL SEARCH REPORT

International application No
PCT/JP2011/068208

A. CLASSIFICATION OF SUBJECT MATTER
INV. B60Q3/02 B60R13/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B60Q B60R B29C B60J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/083700 A1 (OKABE TOSHIAKI [JP] ET AL) 21 April 2005 (2005-04-21) claims 1-6; figures 1,2 -----	1,2
X	US 2009/073707 A1 (NAGAI KENTARO [JP] ET AL) 19 March 2009 (2009-03-19) figures 1-7 paragraphs [0042] - [0062] -----	1,2
X	JP 2007 210545 A (YAZAKI CORP) 23 August 2007 (2007-08-23) abstract; figures 1-8 -----	1,2
A	JP 2008 155752 A (FUJIKURA LTD) 10 July 2008 (2008-07-10) abstract -----	1,2



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/JP2011/068208

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005083700 A1	21-04-2005	DE 102004041208 A1 FR 2859148 A1	07-04-2005 04-03-2005
US 2009073707 A1	19-03-2009	DE 102008046983 A1	30-04-2009
JP 2007210545 A	23-08-2007	NONE	
JP 2008155752 A	10-07-2008	NONE	