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(54) Title: FASTENING DEVICE

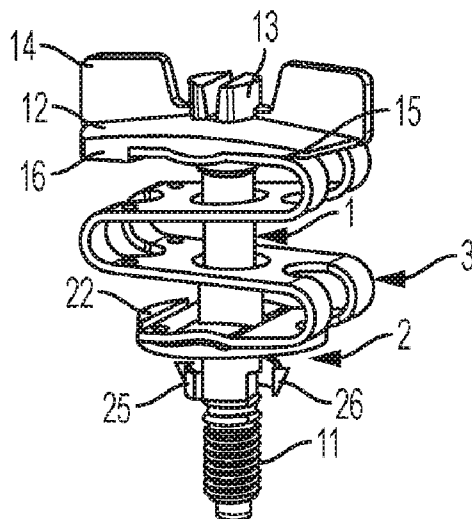


FIG. 1

(57) **Abstract:** FASTENING DEVICE, of the type directed
towards the utilization thereof in the installation of the rear
lights of vehicles, of the type of fastenings which must real-
ize an anchorage by means of a screw threaded into the bulb
support or lampholder, establishing a sealing tension against
the supporting panel, being formed solely by a bolt (1) of
plastic material, a washer (2) and a spring, said device dis-
posing of means of fastening to the supporting panel.



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FASTENING DEVICE

FIELD OF THE INVENTION

The present invention reveals a fastening device
5 directed towards the utilization thereof in affixing the
rear lights of vehicles, being of the type which must
maintain a sealing tension against the panel or surface
of the structure of the lampholder and fastened by means
of a screw threaded into the bulb support or lampholder,
10 having the particularity that the design of the device
has been optimized to render it lighter and reduce the
number of components, to permit the fastening thereof
into the panel such as to prevent the dropping and
mislaying thereof when the support screw of the lamp is
15 loosened.

BACKGROUND

The requirement is known of affixing the lights of
vehicles, especially the rear lights, and of affixing
20 said lights permitting the repair thereof, including by
a user, that is to say having few tools or none. This
fastening has an elastic pressure component by virtue of
the fact that the perfect sealing of the join with
respect to the panel is required and having the
25 objective of covering slight variations of the distance
between the lampholder and said panel.

To meet both objectives it is customary to utilize bolts
having a collar compressed by action of a spring against
30 the panel. The bolt is screwed into the lampholder,
threadwise, whilst the collar compresses and seals the
affixation panel.

When drivers are obliged to replace the bulb of the lamp they unscrew the aforementioned fastening and extract the body of the lampholder, proceeding to the replacement thereof by a bulb in good condition. Several problems are presented at this point, one thereof being that on extracting the fastening, by virtue of the fact that this may normally be undertaken at night and on the road, it is not uncommon to mislay said fastening and become incapable of executing the installation thereof by virtue of the fact that said fastening has had to be completely extracted, detaching it from the support panel thereof, to free the lampholder.

A further disadvantage is that some of these fastenings require the utilization by the user of unusual tools, the involvement of a professional being required; in other cases the mere requirement for a simple tool, such as a screwdriver of a determined type, is an insuperable problem in road conditions and little or no light.

Finally, the solutions known in the industry utilize a variety or plurality of parts to cover the requirements of this type of fastenings, rendering them complex and costly to manufacture and install.

It is for this reason that one of the principal objects of the present invention is the simplification of the same, reducing the number of elements composing them, this representing a greater simplicity in the installation and utilization thereof together with a reduction in the manufacturing costs thereof.

Another of the objects of the present invention is that once the fastening has been installed upon the vehicle during the assembly thereof, it will no longer be
5 necessary to completely extract the fastening to loosen the affixing of the lampholder of the bulb or bulbs to be replaced, consequently preventing the loss of the same when operating under precarious conditions.

10 Another of the objects of the present invention is that the same may be loosened and tightened without the utilization of any tool whatsoever.

These and other advantages of the present invention will
15 become evident in the course of the following description.

BRIEF DESCRIPTION OF THE INVENTION

The present invention is a fastening device directed
20 towards the utilization thereof in the fastening of the rear lights of vehicles, of the type of fastenings required to maintain a sealing tension against the panel or surface of the structure of the lampholder and also be affixed by means of a screw threaded into the bulb
25 support or lampholder, having the particularity that the design of the device has been optimized to render it lighter and reduce the number of components, permitting the fastening thereof into the panel such as to prevent the dropping and mislaying thereof when the support
30 screw of the lamp is loosened.

It is a matter of a composite part, bringing together elements of plastic and of metal. Specifically, in order to realize the device of the invention three elements are required, two of them of plastic material and in
5 some embodiments being constructed in the same operation in a single part which, on being installed, separates into two.

The device brings together a bolt of plastic material
10 having the extremity of the shank thereof filleted for threading into a lampholder. The head of said bolt presents a rectangular surface supporting a hexagonal head having a central recess to accept different points of the tightening tools, and wings to facilitate the
15 manual utilization of the device.

It presents a mobile washer retained by lugs or feet upon the shank of the bolt, there being an axial spring acting between the surface of the head of the screw and
20 said mobile washer. This washer presents different means of engaging onto the surface of the panel where, on installation, it remains embedded.

In this manner, through the device of the present
25 invention, all the objects envisaged for the same have been realized, resulting in a simple and economic fastening permitting the manual utilization thereof in precarious conditions, at the same time that the fastening remains in the panel when it is necessary to
30 loosen the retainment of the lampholder of the bulb or bulbs to be replaced.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, the same is accompanied by four sheets of drawings being purely illustrative of the invention and not limitative.

5

Figure 1 is a perspective representation of a preferred method of embodiment of the fastening device of the present invention.

10 Figure 2 is a frontal view of the embodiment of the foregoing figure.

Figure 3 is a frontal view of the bolt of the embodiment of the foregoing figures.

15

Figure 4 is an upper view of the bolt of the embodiment of the foregoing figures.

Figures 5, 6 and 7 are each representations of the
20 washer of the embodiment of the foregoing figures. They are a perspective view, a frontal view and an upper view, respectively.

Figure 8 is a perspective representation, similar to
25 that of figure 1, however of another manner of preferable embodiment within the present invention. The difference, in this specific embodiment, resides in the claws of different type of the washer.

30 Figure 9 is a perspective representation of a washer corresponding to the manner of embodiment of the foregoing figure.

Figures 10 and 11 are, respectively, a perspective representation and a frontal view of another possible manner of embodiment within the present invention.

5

Figure 12 represents a further example of embodiment within the invention, having a blind part on the bolt and utilizing a spring as spring.

10 Figure 13 is the isolated representation of the bolt of the embodiment of the foregoing figure.

Figure 14 is a washer such as that represented in figure 5, adapted to the example of embodiment of figures 12
15 and 13.

DETAILED EXPLANATION OF THE INVENTION

The present invention consists of a fastening device, directed towards the utilization thereof in the
20 installation of the rear lights of vehicles, of the type of fastening requiring realizing an anchorage by means of a screw threaded into the bulb support or lampholder, establishing a sealing tension against the supporting panel, being formed by a bolt of plastic material (1), a
25 washer (2) and a spring.

This spring may be realized in different forms, for example such as a metal strip (3) as represented in figures 1, 2, 8 and 9. It may also be realized with a
30 spring (34) as represented in figure 12.

This plastic bolt (1) has a filleted zone (11) approximately at the extremity of the shank thereof, whilst the other extremity thereof includes an approximately rectangular surface (12) supporting a
5 hexagonal head with recess (13) and wings (14). This disposition of the head of the bolt (1) permits its utilization both manually, thanks to the wings (14), and as a flat headed screw, by virtue of the recess, and also with a pneumatic tightening spanner, by virtue of
10 the hexagonal head thereof. The invention may be realized having other types of head, apart from hexagonal, for the purpose of fitting different points or automatic tightening tools.

15 In the preferred embodiment of the invention, as shown in figures 1 to 7, on the shank of the bolt (1) and prior to the threaded zone (11) of the same there are disposed lugs (18). These lugs permit supporting said washer (2). In other possible embodiments, as shown in
20 figures 10 and 11, feet (19) are disposed to realize said function of supporting the washer (2).

In the embodiment shown in figures 12 to 14, the shank of the bolt (1) disposes of a surface (30) delimiting
25 the zone of positioning of the spring (34), at the same time as it provides a blind zone (31) on said shank of the bolt (1), directed towards overcoming a distance between panels previously determinable in each case of application and parameterized in the manufacture of the
30 bolt, for the purpose of locating the fastening device.

This bolt (1) includes fins (32) utilized both to stiffen it and to center the spring (34).

The bolt (1) is of plastic material and is manufactured
5 in a single molding operation. In some embodiments, as is the case of that shown in figures 10 and 11, in the same operation there is constructed, simultaneously, a washer axial to the shank of the screw (1), the washer also plastic, being released during the utilization of
10 the device and being retained by said feet (19).

The washer (2) is formed by a surface (21) having the objective of acting against the spring (3 or 34) to maintain the tension of the fastening. In the
15 corresponding embodiments, this surface (21) presents, on one side, a lug zone (22) and centrally a protrusion (23) to support the spring (3).

For its part, in the embodiment of figures 12 to 14,
20 said washer disposes of a lip (33) perimetric to its axial orifice, contributing to the centering of the spring (34).

In turn the head of the bolt (1) disposes, in the
25 embodiments constructed with a laminar strip (3) as spring, at the inferior zone of the surface (12) thereof a surface (15) symmetrical to that of the washer (2). That is to say, it includes an extremity lug (16) zone and a central protrusion (17) to seat the steel laminar
30 strip spring (3).

The washer (2), also realized of plastic material, may incorporate means of fastening to the supporting panel such that when the filleting (11) of the screw (1) of the lampholder of the light to be replaced is loosened,
5 the device of the invention does not become free but is retained by the panel, preventing the possible mislaying of the same.

These fastenings to the panel consist, in one type of
10 case of embodiment, in legs (27) having hooks (28) at the extremity thereof, such that on passing through the orifice of the panel they lock against the edge thereof, retaining the assembly of the device upon said panel.

15 In other embodiments, and especially in other manners of preferential embodiment of the inventions shown in figures 1 to 7, and figures 12 to 14, "French" feet are utilized as an alternative. It is a matter of a dual flexion mechanism, permitting an additional, axial,
20 elasticity along the line or direction between the interior or shank of the screw, and the exterior. This foot is formed by a first descending section (24), having an elbow in the circumferential direction (25) at the extremity whereof there is disposed a flange (26).

25

The spring providing the tension and elasticity, the pressure on the fastening of the washer (2) against the supporting panel, is in some examples of embodiment, a steel laminar strip spring (3) or, in other embodiments,
30 a helicoidal spring (32). The spring is confined between the two surfaces (15 and 21) of the head of the screw and of the washer (2). As appropriate, when the spring

is a laminar strip (3), the respective lugs (16 and 22), together with the respective protrusions (17 and 23), stably seat said strip.

- 5 The different embodiments represent two basic manners of mounting said spring (3) on the device as claimed in the present invention: axially or laterally.

In the embodiment of figures 10 and 11, as may be
10 clearly appreciated in the perspective of figure 10, the part is mounted laterally. The washer (2) is constructed in the same molding operation which manufactures the bolt (1) and detached from the latter. The descent thereof along the shank of the bolt (1) meets the lug of
15 the feet (19). For its part, the steel laminar strip (3) is inserted laterally and confined between the surfaces (15 and 21).

On the other hand, in the other embodiments shown in the
20 figures the assembly is axial. Once the screw (1) has been constructed, the steel laminar strip (3) spring is inserted by the extremity thereof, as shown in figures 1 and 8. Subsequently, the washer (2) is axially inserted upon the shank of said screw. The washer presents
25 recesses (29) permitting it in this assembly operation to pass beyond the lugs (18) and, as relevant, the feet (19) of the shank of said screw (1).

Once the obstacle has been passed a rotation of a
30 quarter turn is realized as a result whereof the washer (2) is now supported on said lugs (18). The spring (3) is trapped between the surface (15) of the head of the

screw and the surface (21) of the washer (2). The lugs (16 and 22) and the protrusions (17 and 23) seat the strip (3) between both surfaces (15 and 21).

5 In the embodiment of figures 12 to 14, the feet (19) are overcome elastically by pressure. The screw is consequently constructed axially, in a manner similar to the preceding case, passing firstly the spring (32) and then the washer (2), which by tension overcomes the feet
10 (19) of the bolt (1), the device being thus assembled.

In this manner, with the aforescribed embodiments, all the objects proposed by the invention are resolved. A fastening device has been obtained permitting its being
15 anchored to two distant points or structures, the lampholder support and the affixing panel and which, being unjoined, maintains the union of the device in the panel, preventing the mislaying of the device when the lampholder is loosened to replace the bulb.

20

The device of the invention is straightforward to manufacture and of reduced cost by virtue of the simplification of elements forming it and the constructive disposition thereof.

25

It is clearly understood that in the present case as many details of finish and form may be variables, they do not represent an essential variation of the invention.

30

CLAIMS

1. A FASTENING DEVICE of the type directed towards the utilization thereof in the installation of the rear
5 lights of vehicles, of the type of fastenings which must realize an anchorage by means of a screw threaded into the bulb support or lampholder, establishing a sealing tension against the supporting panel, CHARACTERIZED in that it is formed solely by a bolt (1), a washer (2) and
10 a spring, said washer incorporating means of retention configured for the anchorage of said device to the panel having installed the device, maintaining said join when said threaded screw is loosened with the objective of replacing said bulb or lampholder.
- 15 2. The FASTENING DEVICE as claimed in the preceding claim, CHARACTERIZED in that said spring is a steel laminar strip spring (3).
- 20 3. The FASTENING DEVICE as claimed in any one of the preceding claims, CHARACTERIZED in that said bolt includes on the shank thereof a supporting lug (18) for said washer (2).
- 25 4. The FASTENING DEVICE as claimed in any one of claims 1 and 2, CHARACTERIZED in that said bolt includes on the shank thereof anchoring feet (19) for said washer (2).
- 30 5. The FASTENING DEVICE as claimed in any one of the preceding claims, CHARACTERIZED in that said bolt (1), has proximate to the extremity of the shank thereof a

filleted zone (11), whilst the other extremity thereof includes an approximately rectangular surface (12) supporting a hexagonal head with recess (13) and wings (14).

5

6. The FASTENING DEVICE as claimed in the preceding claim, CHARACTERIZED in that said head of said bolt (1) includes a lower surface (15) presenting a protrusion (17) and a lug (16).

10

7. The FASTENING DEVICE as claimed in any one of claims 1 to 5, CHARACTERIZED in that said bolt (1) disposes of a limiting surface (30) delimiting a blind area (31) parameterizable as claimed in the configurational requirements of each application.

15

8. The FASTENING DEVICE as claimed in the preceding claim, CHARACTERIZED in that said bolt (1) disposes of fins (32) for stiffening and for centering a spring (34) acting as a spring, said spring (34) being captive between said limiting surface (30) and said washer (2).

20

9. The FASTENING DEVICE as claimed in any one of the preceding claims, CHARACTERIZED in that said washer (2) is formed by a surface (21) acting as limit against said spring.

25

10. The FASTENING DEVICE as claimed in the preceding claim, CHARACTERIZED in that said washer (2) presents openings (29) in the central orifice thereof configured to pass beyond said lugs (18), or said feet (19), of said screw (1).

30

11. The FASTENING DEVICE as claimed in the preceding claim, CHARACTERIZED in that said washer (2) presents legs (27) having hooks (28) at the extremity thereof, 5 configured for the anchorage of said washer (2) to the panel.

12. The FASTENING DEVICE as claimed in any one of claims 1 to 10, CHARACTERIZED in that said washer (2) 10 incorporates feet formed by a first descending section (24) having an elbow in the circumferential direction (25) at the extremity whereof there is disposed a flange (26), said feet configured for the anchorage of said washer (2) to the panel, permitting some adjustment or 15 flexibility in the direction transverse to the axial shank of said screw (1).

13. The FASTENING DEVICE as claimed in any one of the preceding claims, CHARACTERIZED in that said washer (2) 20 presents at one extremity a lug (22) and a protuberant surface (23).

14. The FASTENING DEVICE as claimed in any one of claims 1 to 12, CHARACTERIZED in that said washer (2) 25 presents a lip (33) perimetrically to the axial orifice thereof, contributing to the centering of said spring (34).

15. The FASTENING DEVICE as claimed in any one of the 30 preceding claims, CHARACTERIZED in that said washer (2) is of plastic material.

16. The FASTENING DEVICE as claimed in any one of the preceding claims, CHARACTERIZED in that said bolt (1) is of plastic material.

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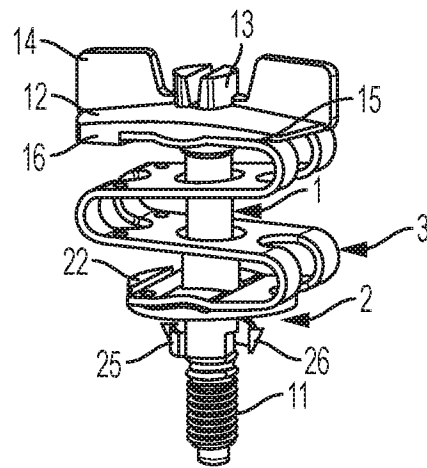


FIG. 1

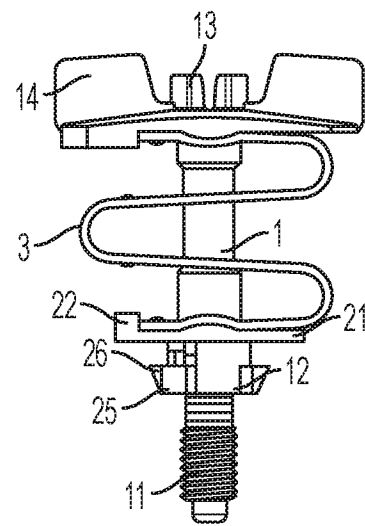


FIG. 2

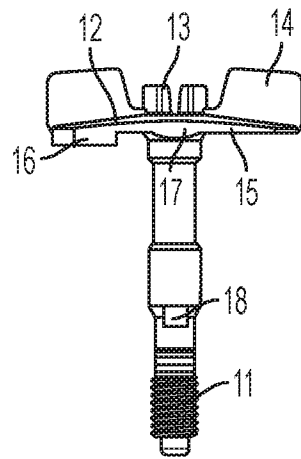


FIG. 3

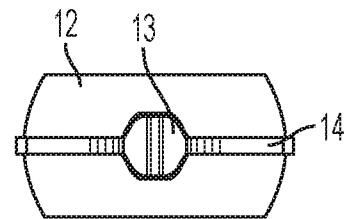


FIG. 4

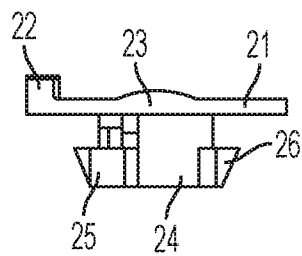


FIG. 6

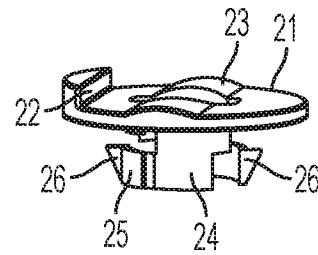


FIG. 5

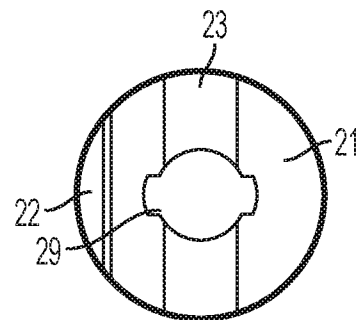


FIG. 7

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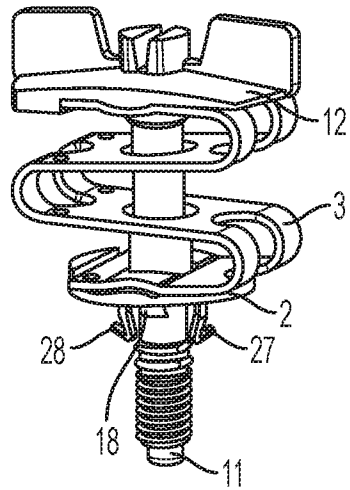


FIG. 8

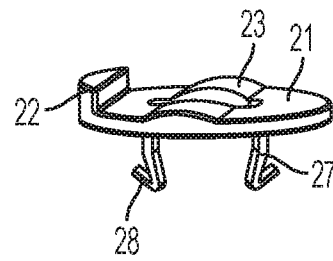


FIG. 9

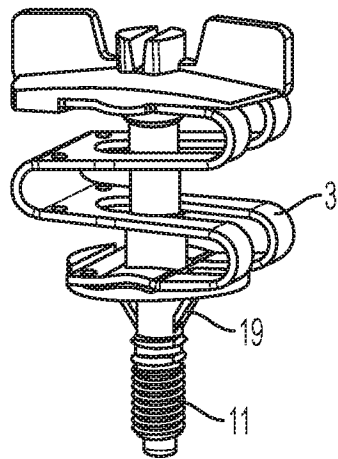


FIG. 10

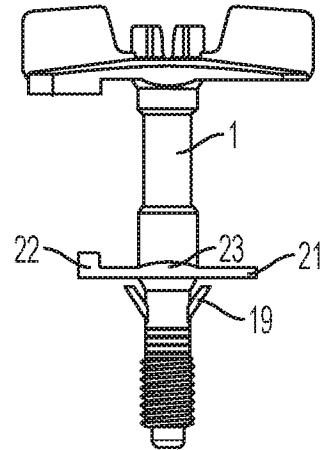


FIG. 11

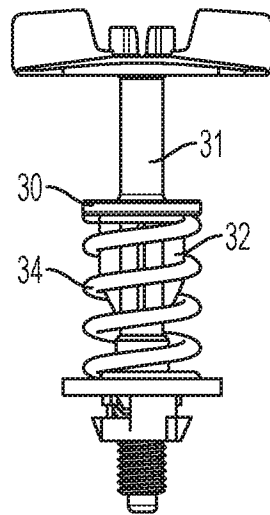


FIG. 12

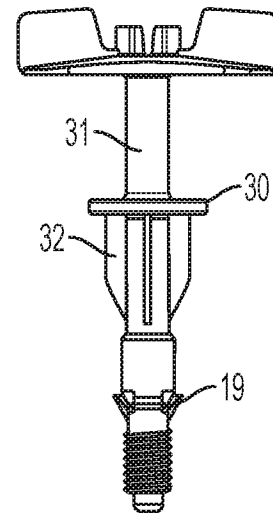


FIG. 13

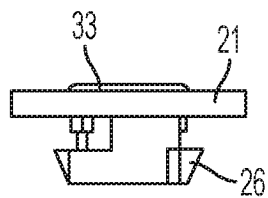


FIG. 14

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/017747

A. CLASSIFICATION OF SUBJECT MATTER INV. B60Q1/26 F16B5/02 F16B9/02 F16B21/02 F16B35/04 F21S8/10 F21V19/00 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 F16B F21S 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 practicable, search terms used) EPO-Internal, WPI Data																							
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>DE 10 2011 104386 A1 (VOLKSWAGEN AG [DE]; BOELLHOFF GMBH [DE]) 20 December 2012 (2012-12-20)</td> <td>1,2,7, 9-14</td> </tr> <tr> <td>A</td> <td>paragraphs [0001], [0002], [0003], [0004], [0005], [0009], [0010], [0011], [0016] - [0018], [0028] - [0043]; figures 1-8</td> <td>5</td> </tr> <tr> <td>X</td> <td>EP 2 168 811 A1 (VALEO VISION [FR]) 31 March 2010 (2010-03-31)</td> <td>1,3-9</td> </tr> <tr> <td>Y</td> <td>paragraphs [0001], [0011], [0014] - [0087]; figures 1-8</td> <td>15,16</td> </tr> <tr> <td>Y</td> <td>US 5 370 488 A (SYKES CHRISTOPHER C [CA]) 6 December 1994 (1994-12-06) column 3, lines 33-38; figure 1</td> <td>15,16</td> </tr> <tr> <td></td> <td>-/--</td> <td></td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	DE 10 2011 104386 A1 (VOLKSWAGEN AG [DE]; BOELLHOFF GMBH [DE]) 20 December 2012 (2012-12-20)	1,2,7, 9-14	A	paragraphs [0001], [0002], [0003], [0004], [0005], [0009], [0010], [0011], [0016] - [0018], [0028] - [0043]; figures 1-8	5	X	EP 2 168 811 A1 (VALEO VISION [FR]) 31 March 2010 (2010-03-31)	1,3-9	Y	paragraphs [0001], [0011], [0014] - [0087]; figures 1-8	15,16	Y	US 5 370 488 A (SYKES CHRISTOPHER C [CA]) 6 December 1994 (1994-12-06) column 3, lines 33-38; figure 1	15,16		-/--	
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