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(54) MOUNTING OF ANTENNA ELECTRONIC BOXES ON A TAIL LID OF A VEHICLE

MONTAGE VON ELEKTRONISCHEN ANTENNENBUCHSEN AUF EINER HECKKLAPPE EINES FAHRZEUGS

MONTAGE DE BOÎTIERS ÉLECTRONIQUES D'ANTENNE SUR UN HAYON D'UN VÉHICULE

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Description

Field of the Invention

[0001] The invention is directed to the field of vehicles, more particularly to the mounting of antenna electronic boxes on a vehicle.

Background Art

[0002] Antennas are nowadays increasingly integrated on vehicles so that they are no longer visible from outside of the vehicle. It is however important for antennas to be adequately positioned on the vehicles so as to achieve their function in a satisfactory manner. The radiative part of antennas can therefore be made up of electrically conductive line or strips printed or deposited on a window of the vehicle. The rear window is usually used for supporting such conductive strips. There is commonly provided an antenna box comprising electronics configured for interconnecting the antenna(s) on the glass sheet of the window with the radio reception device of the vehicle. In addition, the antenna box can be a multifunction one, i.e. with different antennas for different functions, like FM radio reception, AM radio reception and also remote keyless entry reception.

[0003] In certain vehicles, e.g. high end ones, FM radio reception can be enhanced by combining different antennas, for example up to two, three or even four antennas, called FM1, FM2, FM3 and FM4. These different antennas are provided on the same support, like the rear window, and are differentiated essentially by their collector points. These collector points create different electromagnetic responses to an emitted radio signal. These different antennas can be combined, by adding, subtracting and/or switching in rotation, in order to supply an output signal that is enhanced in comparison to a single antenna. Different antenna boxes can be used and have therefore to be mounted at the vicinity of the glass sheet of the window. The geometrical differences between the boxes can lead to difficulties for a proper and accurate mounting of these boxes on the vehicle, in particular when these boxes can be permuted depending on the vehicle configuration.

[0004] Prior art patent document US 2007/0120754 A1 discloses the arrangement of two pairs of vertical conductive strips on a rear window for providing two antenna aeriels FM1 and FM2, in addition to a defrosting network on the window. The two pairs of strips are connected to a single electronic box that comprises different circuits for the AM, FM1 and FM2 radio receptions and for the remote keyless entry function.

[0005] Prior art patent document CN104241847 discloses an antenna box with a fixing structure comprising a base plate and a box to be attached to said base plate in order to enclose an electronic circuit. The base plate comprises two recesses for receiving fasteners of the screw type.

[0006] Further ways to attach antenna electronic boxes to a vehicle are disclosed in prior art patent documents JP 2004/258044 A, US 2015/318608 A1, US 2016/013545 A1, FR 3 014 404 A1, US 4 819 001 A, US 2012/218155 A1 and US 6 351 242 B1.

Summary of the Invention

[0007] The invention has for technical problem to provide a solution to at least one drawback of the above cited prior art. More specifically, the invention defined by the appended claims, provides a solution for a proper and accurate mounting of antenna electronic boxes, especially for boxes which are geometrically different.

[0008] The invention is particularly interesting in that it provides a versatile mounting location for different antenna electronic boxes. This is particularly interesting for vehicles equipped with at least two such boxes at distinct locations. The support zone of the invention at these locations allows the mounting of different boxes, in particular boxes with two fixed fastening means at a relative distance which varies and depends on the box type. Such fastening means are in principle advantageous in that they provide an isostatic mounting of the box. They are however disadvantageous in that the distance between them varies and requires therefore the presence two holes at a specific relative distance on the support zone. Thanks to the invention, boxes of different sizes, in particular of different lengths, can be positioned and mounted in an isostatic way on the support zone. For the vehicles with at least two boxes at distinct locations, the invention allows these boxes to be very easily interchanged while still providing an isostatic or at least quasi-isostatic positioning.

Brief Description of the Drawings

[0009]

Figure 1 is a view of the inner and upper side of a tail lid of a vehicle, in accordance with the invention.

Figure 2 is a view of the lower sides of two different antenna electronic boxes that can be mounted on the tail lid of figure 1.

Figure 3 is a longitudinal sectional view of an antenna electronic box mounted on a support on the tail lid of figure 1.

Figure 4 is a top view of the antenna electronic box of figure 3.

Detailed Description of Embodiments

[0010] Figure 1 depicts the upper portion of a tail lid 2. The lid 2 comprises a body with a window frame 4 delimiting a window area 6. A support 8 is mounted on an

upper portion of the window frame 4. The support 8 comprises two support zones 8.1 and 8.2 for supporting, each, an antenna electronic box 10 or 10'. The support 8 can have additional supporting zones, including for other devices and/or functions. It can also feature a decorative function. The antenna electronic boxes 10 and 10' contain electronic circuits that are connected to electrically conductive strips or lines (not represented) printed or deposited on the glass sheet of the window and forming antennas. These antennas can be for FM radio reception. The use of such electronic boxes in connection with antennas deposited on a window is as such well known from the skilled person. The support zones 8.1 and 8.2 and the electronic boxes 10 and 10' will be detailed here after.

[0011] Figure 2 depicts two antenna electronic boxes 10 and 10', where each of these boxes comprises a box-shaped main portion 10.1 and a fastening tongue 10.2 extending from said main portion 10.1. The fastening tongue 10.2 comprises a hole 10.3 for receiving a fastener that can be of the screw type. The box 10, 10' comprises also a fastener 10.4 that extends from the lower face (i.e. the face visible in figure 2) of the main portion 10.1. This fastener 10.4 can be of the plug-type, i.e. with deformable portions that elastically deform when the fastener is inserted into a hole and that engage with said hole in order to retain the fastener in said hole. Such fasteners are as such well known from the skilled person. The box 10, 10' comprises also two electrical connectors 10.5 and 10.6, one being for a connection to the antenna(s) on the window and the other for a connection with the electrical circuit of the vehicle.

[0012] As is apparent in figure 2, the boxes 10 and 10' differ from each other essentially in their dimensions, more particularly in the distance d and d' between the fastener 10.4 and the hole 10.3. For instance the distance d can be 45mm and the distance d' can be 40mm. This difference is due to the fact that the boxes 10 and 10' are different by their electronic circuits and therefore also by their dimensions.

[0013] Figure 3 is a longitudinal sectional view of one of the support zones 8.1 and 8.2. The support zone 8.1 or 8.2 comprises a support surface 12 for receiving an antenna electronic box. In the illustration of figure 3, the antenna electronic box 10' at the right of figure 2 is mounted on the support zone. The support zone comprises also a hole 14 for receiving a screw fastener 16. The latter extends also through the hole of the fastening tongue 10.2 of the box 10'. The screw fastener 16 can engage with a nut or a threaded hole on the body part of the tail lid on which the support zone 8.1 or 8.2 is located. The support zone comprises also a deepening 18 on the support surface 12, said deepening being dimensioned for receiving the fastener 10.4 of the box 10'. As is apparent in figure 3, the deepening is dimensioned large enough so that the fastener 10.4 does not interact with said deepening. As is also apparent in figure 3, the deepening extends longitudinally so as to accommodate the

fastener 10.4 located at another distance from the hole of the fastening tongue 10.2, i.e. at a distance d that is larger than the distance d' (see figure 2).

[0014] Figure 4 is a top view of the support zone 8.1 or 8.2 of figures 1 and 3. As is apparent, the support zone comprises also two ribs 20 and 22 that extend from the support surface 12. The two ribs are generally planar and perpendicular to the longitudinal direction of the box 10'. They are also advantageously off-set along that axis so as to provide an accurate positioning of the box. The off-set can be by a distance comprised between 5 and 30mm, preferably between 8 and 20mm. The rib 20 is designed to abut against the fastening tongue 10.2 and to extend along a side of the box-shaped main portion 10.1, said side being adjacent to the tongue. The rib 22 abuts against an opposite lateral side of the box-shaped main portion 10.1. The screw 16 in the hole in the fastening tongue 10.2 and the two ribs 20 and 22 provide an isostatic positioning of the box against the support surface 12. Indeed, even if the screw would loosen, the pivoting of the box around the axis of the screw and the corresponding hole is prevented by the ribs 20 and 22. The fastener 10.4 (figure 3) of the box can therefore be accommodated in the deepening 18 (figure 3) without interaction with said deepening.

[0015] The support zone 8.1 or 8.2 illustrated in figures 1, 3 and 4 provide therefore a versatile fixation zone for antenna electronic boxes of different sizes, in particular with a fastener extending from the main portion of the box at different distances from a fastening hole. The ribs cooperate with external faces and/or portions of the box that are independent from the location of the fastener.

[0016] The support zone illustrated in figures 1, 3 and 4 can therefore also support the box 10 of figure 2, i.e. with a distance d between the fastening hole 10.3 and the fastener 10.4 that is larger than the corresponding distance d' of the box 10'.

40 Claims

1. Tail lid (2) of a vehicle, comprising :

- a body with a window frame (4);
- a support (8) mounted on the window frame (4);
- at least one antenna electronic box (10, 10') mounted on the support (8); the support (8) comprises at least one support zone (8.1, 8.2) for a respective antenna electronic box (10, 10') for the vehicle, the support zone (8.1, 8.2) comprising :
 - a support surface (12) for receiving the respective antenna electronic box (10, 10'); and
 - a hole (14) for receiving a screw fastener (16) for fastening the respective antenna electronic box (10, 10');

- at least two ribs (20, 22) extending from the support surface (12), opposed to each other and off-set so as to enable a positioning of the respective antenna electronic box (10, 10') against and between said ribs (20, 22), each of the at least one antenna electronic box (10, 10') comprises
 - a box-shaped main portion (10.1) and
 - a fastening tongue (10.2) extending from said main portion (10.1), said tongue (10.2) comprising a fastening hole (10.3) through which a respective screw fastener (16) of the antenna electronic box (10, 10') extends and fixes the antenna electronic box (10, 10') to the body, wherein one of the ribs (20) is designed to abut against the fastening tongue (10.2) and to extend along a side of the box-shaped main portion (10.1), said side being adjacent to the fastening tongue (10.2), and the other of the ribs (22) is designed to abut against an opposite lateral side of the box-shaped main portion (10.1), the respective screw fastener (16) and the two ribs (20, 22) are configured to provide an isostatic positioning of the antenna electronic box (10, 10') against the support surface (12).
- 2. Tail lid (2) according to claim 1, wherein the at least two ribs (20, 22) are off-set by a distance comprised between 5 and 30mm, preferably between 8 and 20mm.
- 3. Tail lid (2) according to one of claims 1 and 2, wherein said Z has at least one support zone (8.1, 8.2) further comprises a deepening (18) in the support surface (12), said deepening (18) being distant from the hole (14) and being configured for receiving a plug-type fastener (10.4) of the respective antenna electronic box (10, 10').
- 4. Tail lid (2) according to claim 3, wherein the deepening (18) is elongate along an axis parallel to the support surface (12) and intersecting the hole (14).
- 5. Tail lid (2) according to any one of claims 1 to 4, wherein said at least one support zone is integrally made of plastic.
- 6. Tail lid (2) according to one of claims 1 to 5, wherein the at least one support zone (8.1, 8.2) comprises a first support zone (8.1) supporting a first antenna electronic box (10) of the at least one antenna electronic box and a second support zone (8.2) supporting a second antenna electronic box (10') of said at least one antenna electronic box.
- 7. Tail lid (2) according to claim 6, wherein the first and second support zones are according to one of claims 3 and 4, and wherein the first antenna electronic box

(10) is different from the second antenna electronic box (10'), each of said first and second boxes (10, 10') comprising a fastener (10.4), said fastener being at a distance (d, d') from the fastening hole (10.3) of the tongue (10.2), said distances (d, d') being different on said first and second boxes (10, 10'), said fastener (10.4) being housed in the deepening (18) of the corresponding support zone (8.1, 8.2).

- 8. Tail lid (2) according to any one of claims 1 to 7, wherein the at least one support zone (8.1, 8.2) is located on an upper portion of the window frame (4).
- 9. Tail lid (2) according to any one of claims 1 to 8, wherein said lid comprises a window mounted in the window frame, the at least one antenna electronic box (10, 10') is connected to at least one antenna provided on said window.

Patentansprüche

1. Heckklappe (2) eines Fahrzeugs, umfassend:

- eine Karosserie mit einem Fensterrahmen (4);
- einen Träger (8), der am Fensterrahmen (4) angebracht ist
- mindestens eine Antennenelektronikbox (10, 10'), die an dem Träger (8) angebracht ist; die Halterung (8) mindestens eine Haltezone (8.1, 8.2) für eine jeweilige Antennenelektronikbox (10, 10') für das Fahrzeug umfasst, wobei die Haltezone (8.1, 8.2) umfasst
- eine Stützfläche (12) zur Aufnahme der jeweiligen Antennenelektronikbox (10, 10'); und
- ein Loch (14) zur Aufnahme eines Schraubverschlusses (16) zur Befestigung der jeweiligen Antennenelektronikbox (10, 10');
- mindestens zwei Rippen (20, 22), die sich von der Stützfläche (12) aus erstrecken, einander gegenüberliegen und versetzt sind, um eine Positionierung der jeweiligen Antennenelektronikbox (10, 10') gegen und zwischen den Rippen (20, 22) zu ermöglichen,
- jede der mindestens einen elektronischen Antennenboxen (10, 10') umfasst
- einen kastenförmigen Hauptteil (10.1) und
- eine Befestigungszunge (10.2), die sich von dem Hauptabschnitt (10.1) aus erstreckt, wobei die Zunge (10.2) ein Befestigungsloch (10.3) umfasst, durch das sich ein entsprechendes Schraubenbefestigungselement (16) der elektronischen Antennenbox (10, 10') erstreckt und die elektronische Antennenbox (10, 10') an dem Körper befestigt, wobei
- eine der Rippen (20) so gestaltet ist, dass sie an der Befestigungszunge (10.2) anliegt und sich entlang einer Seite des kastenförmigen

- Hauptteils (10.1) erstreckt, wobei diese Seite an die Befestigungszunge (10. 2) benachbart ist, und die andere der Rippen (22) so gestaltet ist, dass sie an einer gegenüberliegenden seitlichen Seite des kastenförmigen Hauptteils (10.1) anliegt, sind die jeweilige Schraubbefestigung (16) und die beiden Rippen (20, 22) so konfiguriert, dass sie eine isostatische Positionierung der elektronischen Antennenbox (10, 10') gegen die Stützfläche (12) bereitstellen.
2. Heckklappe (2) nach Anspruch 1, wobei die mindestens zwei Rippen (20, 22) um einen Abstand zwischen 5 und 30 mm, vorzugsweise zwischen 8 und 20 mm, versetzt sind.
3. Heckklappe (2) nach einem der Ansprüche 1 und 2, wobei die mindestens eine Stützzone (8.1, 8.2) ferner eine Vertiefung (18) in der Stützfläche (12) aufweist, wobei die Vertiefung (18) von dem Loch (14) beabstandet ist und zur Aufnahme eines steckbaren Befestigungselements (10.4) der jeweiligen Antennenelektronikbox (10, 10') ausgebildet ist.
4. Heckklappe (2) nach Anspruch 3, wobei die Vertiefung (18) entlang einer Achse, die parallel zur Auflagefläche (12) verläuft und das Loch (14) schneidet, langgestreckt ist.
5. Heckklappe (2) nach einem der Ansprüche 1 bis 4, wobei die mindestens eine Stützzone einstückig aus Kunststoff hergestellt ist.
6. Heckklappe (2) nach einem der Ansprüche 1 bis 5, wobei die mindestens eine Stützzone (8.1, 8.2) eine erste Stützzone (8.1), die eine erste elektronische Antennenbox (10) der mindestens einen elektronischen Antennenbox stützt, und eine zweite Stützzone (8.2), die eine zweite elektronische Antennenbox (10') der mindestens einen elektronischen Antennenbox stützt, umfasst.
7. Heckklappe (2) nach Anspruch 6, wobei die erste und die zweite Stützzone einem der Ansprüche 3 und 4 entsprechen und wobei sich die erste elektronische Antennenbox (10) von der zweiten elektronischen Antennenbox (10') unterscheidet, wobei sowohl die erste als auch die zweite Box (10, 10') ein Befestigungselement (10. 4) aufweist, wobei sich das Befestigungselement in einem Abstand (d, d') von dem Befestigungsloch (10.3) der Zunge (10.2) befindet, wobei die Abstände (d, d') an den ersten und zweiten Gehäusen (10, 10') unterschiedlich sind, wobei das Befestigungselement (10.4) in der Vertiefung (18) der entsprechenden Stützzone (8.1, 8.2) untergebracht ist.
8. Heckklappe (2) nach einem der Ansprüche 1 bis 7,
- wobei die mindestens eine Stützzone (8.1, 8.2) an einem oberen Teil des Fensterrahmens (4) angeordnet ist.
9. Heckklappe (2) nach einem der Ansprüche 1 bis 8, wobei die Klappe ein im Fensterrahmen angebrachtes Fenster aufweist und die mindestens eine Antennenelektronikbox (10, 10') mit mindestens einer an dem Fenster vorgesehenen Antenne verbunden ist.

Revendications

1. Capot arrière (2) d'un véhicule, comprenant :
- une carrosserie avec un cadre de lunette arrière (4) ;
 - un support (8) monté sur le cadre de lunette arrière (4) ;
 - au moins un boîtier électronique d'antenne (10, 10') monté sur le support (8) ;
- le support (8) comprend au moins une zone de support (8.1, 8.2) pour un boîtier électronique d'antenne respectif (10, 10') pour le véhicule, la zone de support (8.1, 8.2) comprenant :
- une surface de support (12) pour recevoir le boîtier électronique d'antenne respectif (10, 10') ; et
 - un trou (14) pour recevoir une fixation à vis (16) pour fixer le boîtier électronique d'antenne respectif (10, 10') ;
 - au moins deux nervures (20, 22) s'étendant depuis la surface de support (12), opposées l'une à l'autre et décalées de manière à permettre un positionnement du boîtier électronique d'antenne respectif (10, 10') contre et entre les dites nervures (20, 22),
- chacun des au moins un boîtier électronique d'antenne (10, 10') comprend
- une partie principale en forme de boîte (10.1) et
 - une languette de fixation (10.2) s'étendant à partir de ladite partie principale (10.1), ladite languette (10.2) comprenant un trou de fixation (10.3) à travers lequel une fixation à vis respective (16) du boîtier électronique d'antenne (10, 10') s'étend et fixe le boîtier électronique d'antenne (10, 10') au corps,
- dans lequel
- l'une des nervures (20) est conçue pour venir en butée contre la languette de fixation (10.2) et pour s'étendre le long d'un côté de la partie principale en forme de boîte (10.1), ledit côté étant adjacent à la languette de fixation (10. 2), et l'autre des nervures (22) est conçue pour venir en butée contre un côté

- latéral opposé de la partie principale en forme de boîte (10.1), la fixation à vis respectives (16) et les deux nervures (20, 22) sont configurées pour fournir un positionnement isostatique du boîtier électronique d'antenne (10, 10') contre la surface de support (12). 5
2. Capot arrière (2) selon la revendication 1, dans lequel les au moins deux nervures (20, 22) sont décalées d'une distance comprise entre 5 et 30 mm, de préférence entre 8 et 20 mm. 10
3. Capot arrière (2) selon l'une des revendications 1 et 2, dans lequel ladite au moins une zone de support (8.1, 8.2) comprend en outre un approfondissement (18) dans la surface de support (12), ledit approfondissement (18) étant distant du trou (14) et étant configuré pour recevoir une fixation de type bouchon (10.4) du boîtier électronique d'antenne respectif (10, 10'). 15
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4. Capot arrière (2) selon la revendication 3, dans lequel l'approfondissement (18) est allongé le long d'un axe parallèle à la surface de support (12) et coupant le trou (14). 25
5. Capot arrière (2) selon l'une quelconque des revendications 1 à 4, dans lequel ladite au moins une zone de support est intégralement réalisée en matière plastique. 30
6. Capot arrière (2) selon l'une des revendications 1 à 5, dans lequel l'au moins une zone de support (8.1, 8.2) comprend une première zone de support (8.1) supportant un premier boîtier électronique d'antenne (10) de l'au moins un boîtier électronique d'antenne et une deuxième zone de support (8.2) supportant un deuxième boîtier électronique d'antenne (10') du dit au moins un boîtier électronique d'antenne. 35
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7. Capot arrière (2) selon la revendication 6, dans lequel les première et deuxième zones de support sont selon l'une des revendications 3 et 4, et dans lequel le premier boîtier électronique d'antenne (10) est différent du deuxième boîtier électronique d'antenne (10'), chacun desdits premier et deuxième boîtiers (10, 10') comprenant une attache (10.4), ladite attache étant à une distance (d, d') du trou de fixation (10.3) de la languette (10.2), lesdites distances (d, d') étant différentes sur lesdits premier et second boîtiers (10, 10'), ladite attache (10.4) étant logée dans l'approfondissement (18) de la zone de support correspondante (8.1, 8.2). 45
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8. Capot arrière (2) selon l'une quelconque des revendications 1 à 7, dans lequel l'au moins une zone d'appui (8.1, 8.2) est située sur une partie supérieure du cadre de lunette arrière (4). 55
9. Capot arrière (2) selon l'une quelconque des revendications 1 à 8, dans lequel ledit capot comprend une lunette arrière montée dans le cadre de lunette arrière, l'au moins un boîtier électronique d'antenne (10, 10') est connecté à au moins une antenne prévue sur ladite lunette arrière.

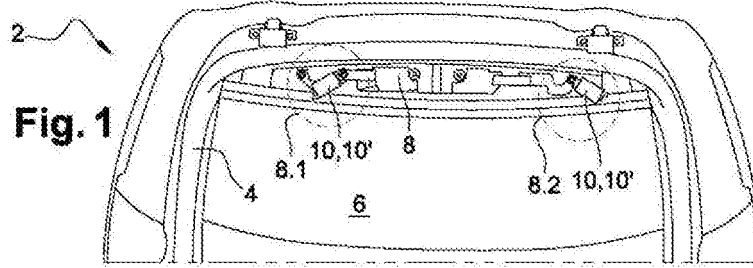


Fig. 1

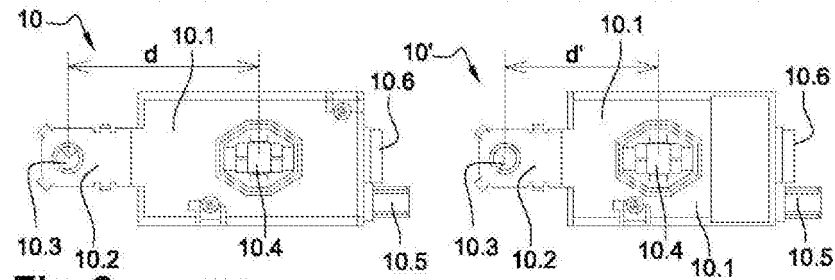


Fig. 2

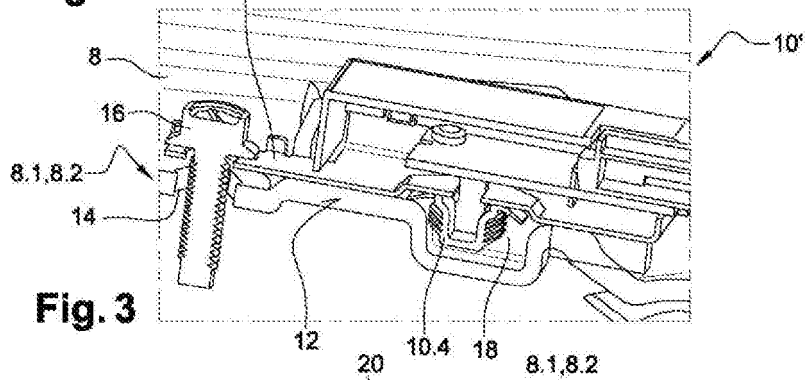


Fig. 3

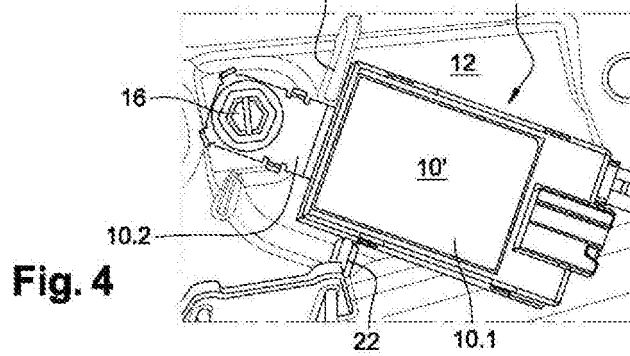


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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