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(54) VEHICLE DOOR HANDLE ASSEMBLY

(57) Vehicle door handle (1) assembly comprising:
- a bowl (5) configured to be mounted in an opening (9) of a door panel (3),
- a bracket (7) configured to fasten the bowl (5) to the door panel (3),
- a switch module (15) mounted on the bracket (7) in an opening of the bowl (5) so that the switch module (15) can be activated by a finger of a user introduced within a recess of the bowl (5) to open the vehicle door,
- a plastic intermediate force-transmitting member (17) inserted between the door panel (3) and the switch module (15), the plastic intermediate force-transmitting member (17) being in contact with the door panel (3), at least along a contact surface (19) of the plastic intermediate force-transmitting member (17), in order to transmit efforts coming from the switch module (15) to the door panel (3), to ' prevent the deformation of the switch module (15).

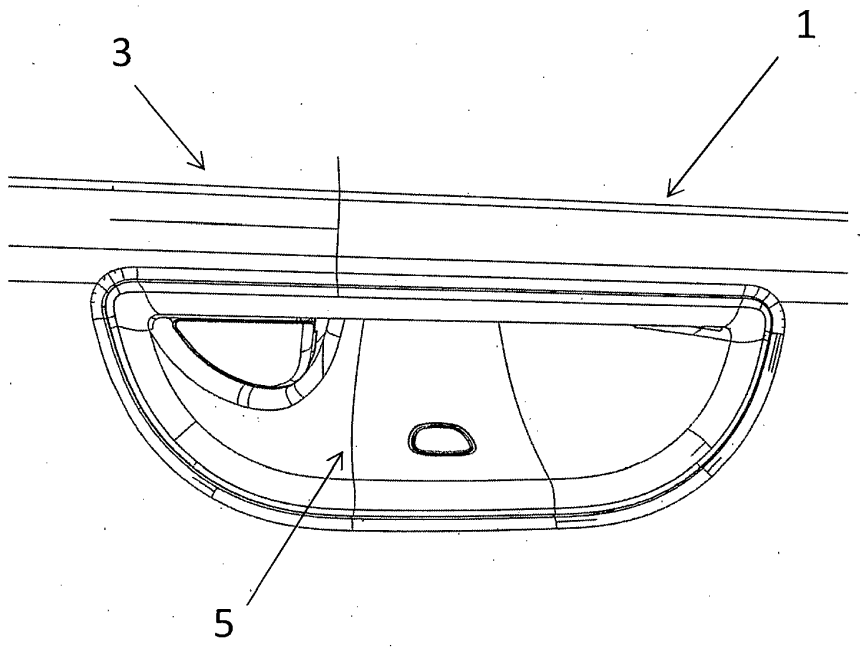

Fig. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to the field of vehicle door handles to control the opening of vehicle doors and in particular to vehicle door handles comprising a bowl configured to be fastened to the door panel and automatic door latches that are controlled via electric means to lock or release vehicle door panels in an automated fashion. Automated door latches, under normal circumstances, do not require bulging handle levers on the exterior surface of the vehicle. The air drag of the vehicle can consequently be reduced, while the visual aspect of the vehicle can be streamlined.

BACKGROUND OF THE INVENTION

[0002] In the vehicle door handles of the state of the art, a bowl is disposed in an opening of a door panel and the bowl is fastened to the door panel, for example via a bracket and a slider positioned inside the door panel. The bowl provides a recess and a switch is disposed within the recess. To open the door, the user puts his fingers within the recess to reach the switch.

[0003] The switch is mounted on a printed circuit board (PCB) which is placed on the bracket behind the door panel. This switch has to withstand a high activation force without any damage on the PCB, even when the user applies a very strong force onto the switch, up to 400N.

SUMMARY OF THE INVENTION

[0004] The purpose of the invention is therefore to provide a vehicle door handle assembly that can withstand a high activation force in a small footprint.

[0005] Thus, the present invention refers to a vehicle door handle assembly comprising:

- a bowl configured to be mounted in an opening of a door panel,
- a bracket configured to fasten the bowl to the door panel,
- a switch module mounted on the bracket in an opening of the bowl so that the switch module can be activated by a finger of a user introduced within a recess of the bowl to open the vehicle door,

  wherein the vehicle door handle assembly further comprises:

  a plastic intermediate force-transmitting member inserted between the door panel and the switch module, the plastic intermediate force-transmitting member being in contact with the door panel, at least along a contact surface of the plastic intermediate force-transmitting member, in order to transmit efforts coming from the switch module to the door panel, to prevent the deformation of the switch module.

[0006] The plastic intermediate force-transmitting member may be directly in contact with the door panel (without intermediaries) or indirectly, for example via a gasket. In use, when the user applies an excessive activation force on the switch module, the force is transferred from the switch module to the door panel via the plastic intermediate force-transmitting member. Use is made of the metal sheet of the door panel, which is already rigid, to support the excessive force of the user. As the plastic intermediate force-transmitting member is made of plastic, it is not expensive and light. No specific plastic material is thus requested and basic cheap plastic such as POM material can be used for the plastic intermediate force-transmitting member.

[0007] The vehicle door handle assembly can also comprise one or more of the features which are described hereinbelow, taken alone or in combination.

[0008] The external volume of the plastic intermediate force-transmitting member may fully fill the gap between the door panel and the switch module.

[0009] The cross-section of the plastic intermediate force-transmitting member may have a trapezoidal shape. This shape may particularly well fit the volume available between the door panel and the switch module. Furthermore, it has the advantage to provide the largest surface contact on both sides of the plastic intermediate force-transmitting member (switch module and door panel).

[0010] The plastic intermediate force-transmitting member may have a hollow shape. A hollow shape is lighter and easier to obtain by casting. The plastic intermediate force-transmitting member may further have at least one vertical reinforcing arm, which ends by a contact surface with the door panel.

[0011] The plastic intermediate force-transmitting member may comprise between two and five vertical reinforcing arms, ending each by a respective contact surface with the door panel. It may also comprise at least one horizontal reinforcing arm crossing the vertical reinforcing arms.

[0012] The at least one contact surface may form a plane.

[0013] The plastic intermediate force-transmitting member may have been cast. A cast plastic intermediate force-transmitting member allows providing a good modularity as different shapes of the plastic intermediate force-transmitting member might easily be obtained, for example by means of an adaptative mould, in order to match several vehicles door panels shapes.

[0014] The switch module may comprise at least two pins which are in contact with the plastic intermediate force-transmitting member:

The vehicle door handle assembly may further comprise at least a gasket inserted between the switch module and the plastic intermediate force-transmitting member and/or between the plastic intermediate force-transmitting member and the door panel. The gasket minimizes the clearances between the module switch and the plas-

tic intermediate force-transmitting member and/or between the plastic intermediate force-transmitting member and the door panel. Minimizing the clearances ensures a good transmission of the force to the door panel.

[0015] The bracket or the switch module may comprise a retaining leg configured to retain the plastic intermediate force-transmitting member from moving upwardly. This retaining leg allows avoiding the plastic intermediate force-transmitting member from escaping in the vertical direction when the switch module is activated by the user. Indeed, if not held in the vertical direction, it may tend to escape upwards, especially if it has a trapezoidal cross-section. The retaining leg thus acts as a stop that protrudes from the bracket. Preferably, this retaining leg is made of one piece with the switch module.

[0016] The plastic intermediate force-transmitting member may be fixed to the bracket or to the switch module by glue or by clipping or by screwing.

[0017] In another embodiment not shown, the plastic intermediate force-transmitting member is made in one piece with the bracket. In this case, a retaining leg is no longer needed. However, the plastic intermediate force-transmitting member is more difficult to adapt to the particular door panel as it is cast with the bracket.

[0018] The invention will be better understood in view of the following description, referring to the annexed figures in which:

Figure 1 is a perspective view of a vehicle door handle assembly mounted in a door panel.

Figure 2 is a perspective view of the vehicle door handle assembly of figure 1 in a disassembled state and without the door panel shown.

Figure 3 is a vertical and partial cut view of the vehicle door handle assembly of figure 2.

Figure 4 is a perspective view of the plastic intermediate force-transmitting member of the vehicle door handle assembly of figure 2.

DETAILED DESCRIPTION OF THE INVENTION

[0019] The following achievements are examples. Although the specification refers to one or several embodiments, it does not imply that each reference refers to the same embodiment or that the features apply only to a single embodiment. Simple features of different embodiments can also be combined to provide other embodiments.

[0020] In the following of the description, the terms up, upper, low, lower, vertical, horizontal refers to relative positions or directions when the door handle is assembled to a vehicle.

[0021] Figure 1 represents a perspective view of a vehicle door handle 1 assembly being assembled on a vehicle door panel 3.

[0022] As it can be better seen in figures 1 to 3, the vehicle door handle 1 assembly comprises a bowl 5 and a bracket 7. The bowl 5 is mounted on the bracket 7 to be fastened in an opening 9 of the door panel 3, for example by means of a slider 13 (figure 3). Here, the bowl 5 forms a recess together with the bracket 7. The door panel 3 is made of a metal sheet. The bowl 5 and the bracket 7 may be made of plastic.

[0023] The vehicle door handle 1 may also comprise a strip configured to be positioned on the upper part of the bowl 5 to hide the upper junction between the bowl 5 and the bracket 7 and to make the vehicle door handle 1 smooth and streamlined.

[0024] The vehicle door handle 1 also comprises a switch module 15.

[0025] The switch module 15 comprises a switch, for example a membrane, and a printed circuit board (PCB) comprising electric means connected to the switch to lock or release the vehicle door panel. The switch module 15 has a general parallelepipedal shape. The switch module 15 may be filled by potting allowing avoiding water, moisture or other corrosive agents from penetrating into the switch module 15.

[0026] The switch module 15 is mounted on the bracket 7 in an opening of the bowl 5 and behind the door panel 3, so that it can be activated to open the vehicle door by a finger of a user introduced within the recess of the bowl 5. Thus, to open the door, the user puts his fingers within the recess of the bowl 5 to reach the switch module 15. In order to make it easier for the user to reach the switch module 15, the switch module 15 is placed near the door panel 3 so that a small space, for example less than 5mm wide, remains between the switch module 15 and the door panel 3.

[0027] The vehicle door handle 1 assembly further comprises a plastic intermediate force-transmitting member 17 inserted between the door panel 3 and the switch module 15. The plastic intermediate force-transmitting member 17 is in contact with the door panel 3, at least along a contact surface 19 (figure 4) of the plastic intermediate force-transmitting member 17, in order to transmit efforts coming from the switch module 15 to the door panel 3, to prevent the deformation of the switch module 15 (figure 3).

[0028] The plastic intermediate force-transmitting member 17 may be directly in contact with the door panel 3 (without intermediaries) or indirectly, for example via a gasket as it will be described later. In use, when the user applies an excessive activation force on .the switch module 15, the force is transferred from the switch module 15 to the door panel 3 via the plastic intermediate force-transmitting member 17. Use is made of the metal sheet of the door panel 3, which is already rigid, to support the excessive force of the user. As the plastic intermediate force-transmitting member 17 is made of plastic, it is not expensive and light. No specific plastic material is thus requested and basic cheap plastic such as POM material can be used for the plastic intermediate force-transmitting member 17.

[0029] The plastic intermediate force-transmitting member 17 may be cast. A cast plastic intermediate

force-transmitting member 17 allows providing a good modularity as different shapes of the plastic intermediate force-transmitting member 17 might easily be obtained, for example by means of an adaptative mould, in order to match several vehicles door panels 3 shapes.

[0030] The external volume of the plastic intermediate force-transmitting member 17 may fully fill the gap between the door panel 3 and the switch module 15.

[0031] For example, the cross-section of the plastic intermediate force-transmitting member 17 has a trapezoidal shape. This shape may particularly well fit the volume available between the door panel 3 and the switch module 15. Furthermore, it has the advantage to provide the largest surface contact on both sides of the plastic intermediate force-transmitting member 17 (switch module 15 and door panel 3).

[0032] In an embodiment, the bracket 7 or the switch module 15 comprises a retaining leg 20 configured to retain the plastic intermediate force-transmitting member 17 from moving upwardly (figure 3). This retaining leg 20 allows avoiding the plastic intermediate force-transmitting member 17 from escaping in the vertical direction Z when the switch module 15 is activated by the user. Indeed, if not held in the vertical direction Z, it may tend to escape upwards, especially if it has a trapezoidal cross-section. The retaining leg 20 thus acts as a stop that protrudes from the bracket 7. Preferably, this retaining leg 20 is made of one piece with the switch module 15.

[0033] In an embodiment, the plastic intermediate force-transmitting member 17 has a hollow shape and has at least one vertical reinforcing arm 21, which ends by a contact surface 19 with the door panel 3 (figure 4). A hollow shape is lighter and easier to obtain by casting.

[0034] For example, the plastic intermediate force-transmitting member 17 comprises between two and five vertical reinforcing arms 21, here three, ending each by a respective contact surface 19 with the door panel 3. The vertical reinforcing arms 21 may be regularly disposed along the plastic intermediate force-transmitting member 17. The plastic intermediate force-transmitting member 17 may also comprise at least one horizontal reinforcing arm 23, here one, crossing the vertical reinforcing arms 21.

[0035] The at least one contact surface 19, here the three contact surfaces 19, may form a plane (figure 4). More generally, the shape and angles of these contact surfaces 19 may be adapted to the door panel 3 by casting.

[0036] According to an embodiment, the switch module 15 comprises at least two pins 25, four pins 25 for example (three of which are visible in figure 2), that might be aligned, on the rear face of the switch module 15 facing the plastic intermediate force-transmitting member 17. The switch module 15 may also comprise a frame 27 or a frame part, that surrounds at least in part the rear face. Those pins 25 and frame 27 are in contact with the plastic intermediate force-transmitting member 17. They allow withstanding the forces applied on the switch module 15 to the plastic intermediate force-transmitting member 17.

[0037] The vehicle door handle 1 assembly may further comprise at least a gasket (not shown) inserted between the switch module 15 and the plastic intermediate force-transmitting member 17 and/or between the plastic intermediate force-transmitting member 17 and the door panel 3. The gasket minimizes the clearances between the pins 25 of the module switch 15 and the plastic intermediate force-transmitting member 17 and/or between the plastic intermediate force-transmitting member 17 and the door panel 3. Minimizing the clearances ensures a good transmission of the force to the door panel 3.

[0038] The plastic intermediate force-transmitting member 17 may be fixed to the bracket 7 or to the switch module 15 by glue or by clipping or by screwing. The plastic intermediate force-transmitting member 17 is for example glued to the pins 25 and frame 27 of the switch module 15.

[0039] In another embodiment not shown, the plastic intermediate force-transmitting member 17 is made in one piece with the bracket 7. In this case, the retaining leg 20 is no longer needed. However, the plastic intermediate force-transmitting member 17 is more difficult to adapt to the particular door panel 3.

Claims

1. Vehicle door handle (1) assembly comprising:

   - a bowl (5) configured to be mounted in an opening (9) of a door panel (3),
   - a bracket (7) configured to fasten the bowl (5) to the door panel (3),
   - a switch module (15) mounted on the bracket (7) in an opening of the bowl (5) so that the switch module (15) can be activated by a finger of a user introduced within a recess of the bowl (5) to open the vehicle door,

   wherein the vehicle door handle (1) assembly further comprises:

   - a plastic intermediate force-transmitting member (17) inserted between the door panel (3) and the switch module (15), the plastic intermediate force-transmitting member (17) being in contact with the door panel (3), at least along a contact surface (19) of the plastic intermediate force-transmitting member (17), in order to transmit efforts coming from the switch module (15) to the door panel (3), to prevent the deformation of the switch module (15).

2. Vehicle door handle (1) assembly according to claim 1, wherein the external volume of the plastic intermediate force-transmitting member (17) fully fills the gap between the door panel (3) and the switch mod-

ule (15).

3. Vehicle door handle (1) assembly according to one of the previous claims, wherein the cross-section of the plastic intermediate force-transmitting member (17) has a trapezoidal shape.

4. Vehicle door handle (1) assembly according to one of the previous claims, wherein the plastic intermediate force-transmitting member (17) has a hollow shape and at least one vertical reinforcing arm (21), which ends by a contact surface (19) with the door panel (3).

5. Vehicle door handle (1) assembly according to the previous claim, wherein the plastic intermediate force-transmitting member (17) comprises between two and five vertical reinforcing arms (21), ending each by a respective contact surface (19) with the door panel (3), and comprises at least one horizontal reinforcing arm (23) crossing the vertical reinforcing arms (21).

6. Vehicle door handle (1) assembly according to one of the previous claims, wherein the at least one contact surface (19) form a plane.

7. Vehicle door handle (1) assembly according to one of the previous claims, wherein the plastic intermediate force-transmitting member (17) has been cast.

8. Vehicle door handle (1) assembly according to one of the previous claims, wherein the switch module (15) comprises at least two pins (25) which are in contact with the plastic intermediate force-transmitting member (17), the vehicle door handle (1) assembly further comprising at least a gasket inserted between the switch module (15) and the plastic intermediate force-transmitting member (17) and/or between the plastic intermediate force-transmitting member (17) and the door panel (3).

9. Vehicle door handle (1) assembly according to one of the previous claims, wherein the bracket (7) or the switch module (15) comprising a retaining leg (20) configured to retain the plastic intermediate force-transmitting member (17) from moving upwardly.

10. Vehicle door handle (1) assembly according to one of the previous claims, wherein the plastic intermediate force-transmitting member (17) is fixed to the bracket (7) or to the switch module (15) by glue or by clipping or by screwing.

11. Vehicle door handle (1) assembly according to one of claims 1 to 8, wherein the plastic intermediate force-transmitting member (17) is made in one piece with the bracket (7).

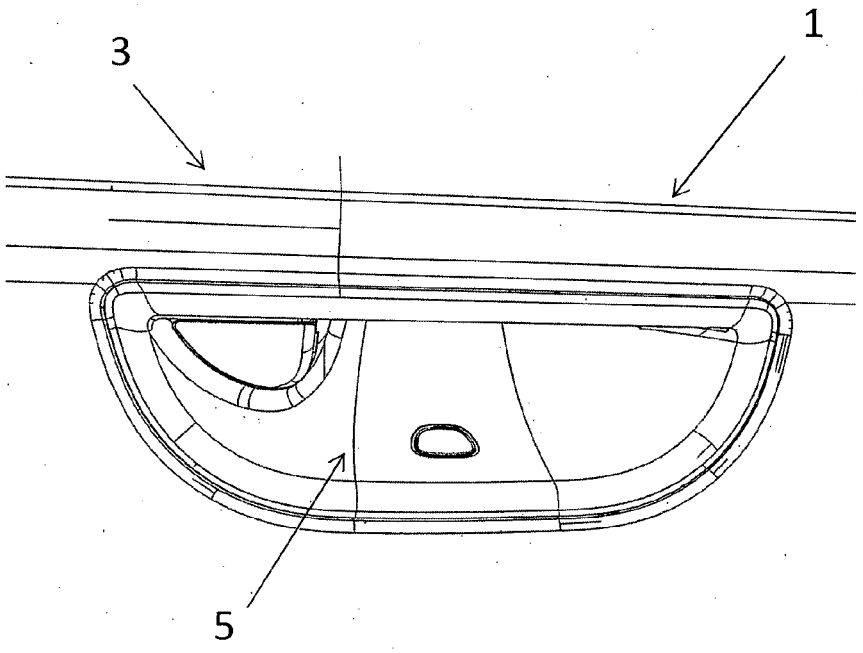

Fig. 1

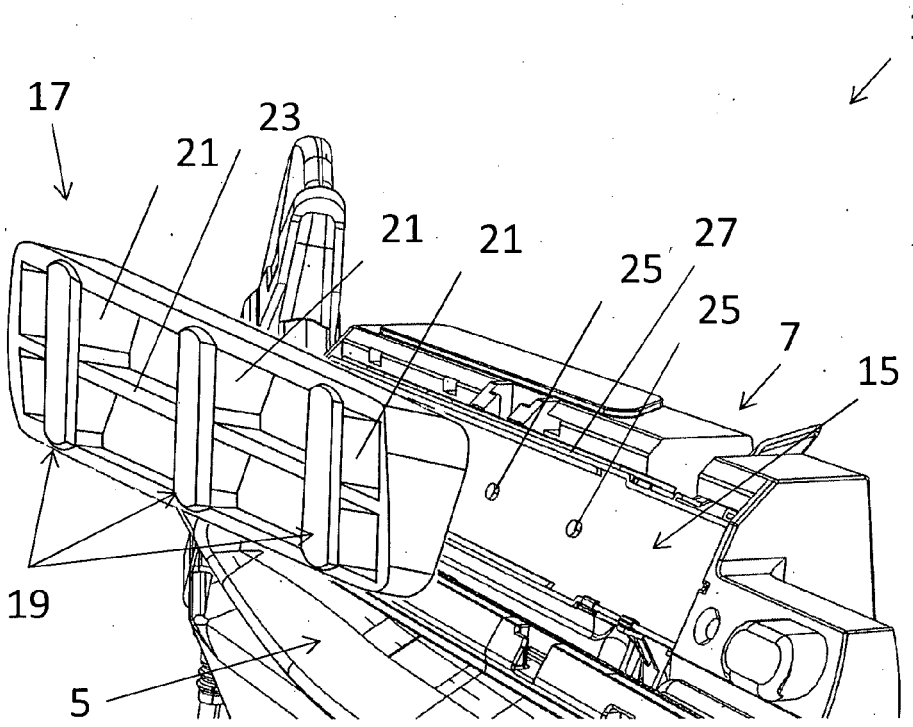

Fig. 2

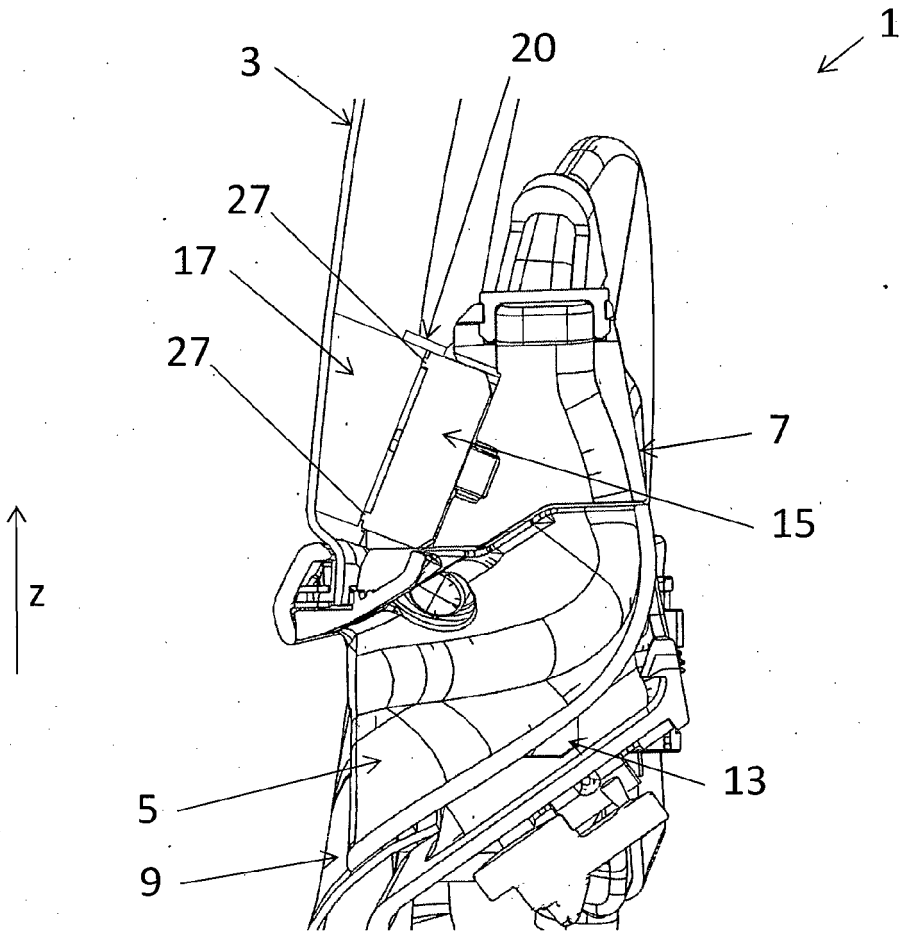

Fig. 3

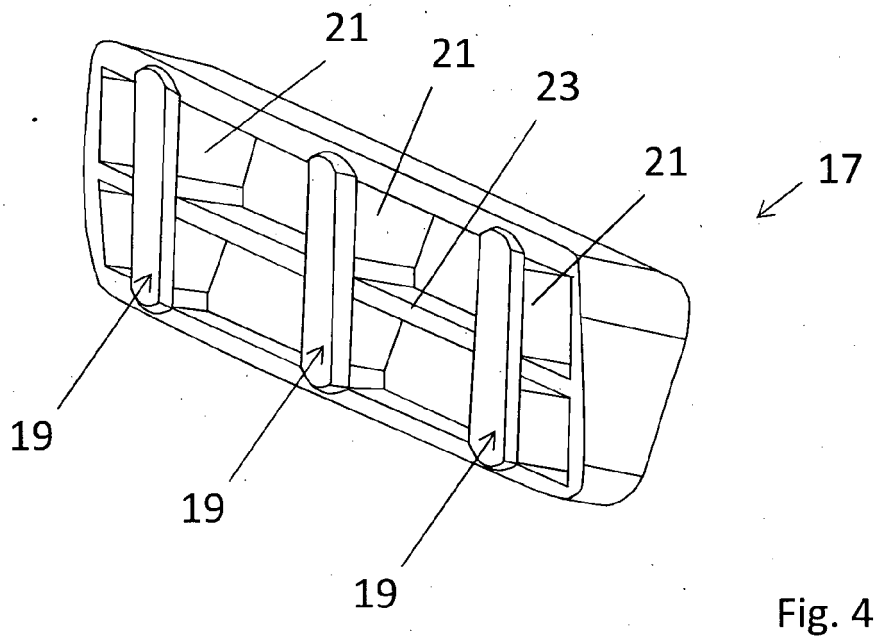

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 21 31 5108

DOCUMENTS CONSIDERED TO BE RELEVANT

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TECHNICAL FIELDS SEARCHED (IPC)

E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 November 2021	Ansel, Yannick

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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