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(54) VEHICLE DOOR HANDLE ASSEMBLY ATTACHMENT UNIT

(57) The invention concerns a vehicle door handle assembly (2) comprising a housing (6), a bracket (8) configured to attach the housing (6) to a vehicle panel (4), and an attachment unit (10) configured to attach the bracket (8) and the housing (6) together, the attachment unit (10) comprising a main body (12) extending in a first plan and configured to be placed against a first face (9) of the bracket (8) opposite to the housing (6), the attachment unit (10) comprising two curved ends (14a, 14b) relative to the main body, at least

one first curved end (14a) comprising at least two hooks (16, 18, 20), at least a first hook (16) or a second hook (18) extending in a second plan distant from the first plan, the first hook (16) or the second hook (18) being configured to slide on the first face (9) of the bracket (8), and at least one third hook (20) extending in a third plan more distant from the first plan than the second plan, the third hook (20) being configured to be inserted into a first hole (22) of a first retention member (21) carried by the housing (6).

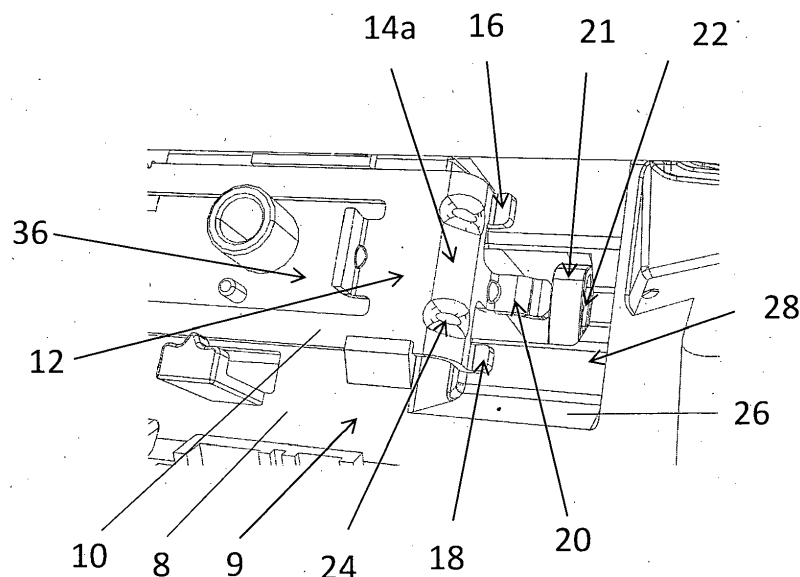


Fig. 3

EP 4 108 866 A1

Description

[0001] The invention relates to a vehicle door handle assembly to control the opening of a vehicle door.

[0002] A door panel is equipped with a handle in order to allow opening and closing a door. This handle can be formed by a housing that sits flush against an outer panel of the vehicle. A user can introduce his hand into a housing of the handle in order to open the door.

[0003] The door can be opened thanks to automated door latches that may selectively lock or release vehicle door panels in an automated fashion. By automated door latches are herein designated door latches where the user does not provide the energy to actuate the latch through grasping and moving a handle lever, knob or other.

[0004] Once the vehicle panel is released, the user or an electric panel actuator swings or slides the panel to grant physical access the vehicle. 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.

[0005] A door panel (for example made of metal) is disposed between the handle housing and a door handle assembly bracket. A gasket is placed between the housing edges and the door panel to ensure a sealing of this area: Furthermore, an attachment unit is placed on the side of the bracket opposite to the one placed against the door panel, the attachment unit comprising attachment means establishing a connection with the handle housing.

[0006] Thus, the door panel is compressed between the handle housing and the bracket (and the gasket is compressed between the handle housing and the door panel). Indeed, the attachment unit is placed on the side of the bracket opposite to the one placed against the door panel and allow, thanks to its interaction with the housing, to attach the bracket together with the handle housing (and with the door panel and the gasket placed between these latter).

[0007] In order to establish a connection between the attachment unit to the handle housing, it is necessary to slide the attachment unit relative to the handle housing. The attachment means of the attachment unit can thus be attached to other means carried by the handle housing.

[0008] The attachment unit is generally composed by a plate comprising to ends extending in the same plan than the plate. Each end comprises an embossing in which a leg carried by the handle housing is inserted. This configuration creates three contacts points for the attachment unit: two in contact with the face of the bracket opposite to the housing and one in contact with the housing leg (this configuration could be reversed with one in contact with the face of the bracket opposite to the housing and two in contact with the housing leg), these points allowing the compression described herein above. The

handle housing legs have to be in the same plan than the plate to interact with the attachment unit ends.

[0009] However, such a configuration leads to a lack of space issue. Indeed, the ends extend in the same plan than the plate, i.e. in the door length (in the longitudinal direction X when the door is mounted on a vehicle). However, it is interesting to place some elements (for example an emergency opening device) all around the handle in the door length. This placement can thus be in conflict with a translation of the attachment unit. In other words, it could be tough or even impossible to slide the attachment unit with some additional elements extending around the handle in the door length, i.e. in the same direction than the extension direction of the attachment unit ends.

[0010] The purpose of the invention is therefore to provide a vehicle door handle assembly that allows attaching the elements cited above together without any lack of space issue due to the placement of some other elements around the handle assembly.

[0011] To that end, the invention relates to a vehicle door handle assembly comprising a housing, a bracket configured to attach the housing to a vehicle panel, and an attachment unit configured to attach the bracket and the housing together, the attachment unit comprising a main body extending in a first plan and configured to be placed against a first face of the bracket opposite to the housing, the attachment unit comprising two curved ends relative to the main body, at least one first curved end comprising at least two hooks, at least a first hook or a second hook extending in a second plan distant from the first plan, the first hook or the second hook being configured to slide on the first face of the bracket, and at least one third hook extending in a third plan more distant from the first plan than the second plan, the third hook being configured to be inserted into a first hole of a first retention member carried by the housing.

[0012] In this configuration, the contact points between the attachment unit and the bracket or the housing do not extend anymore in the same plan than the main body (i.e. the plate) of the attachment unit thanks to the curved ends which extend into the door depth.

[0013] The contact points are thus dispersed in the door depth and not in the door length anymore. Furthermore, the holes carried by the housing have not to be on the same plan than the main body in order to interact with the attachment unit.

[0014] This configuration allows to free some space around the handle assembly in order to allocate this space to some additional elements such as an emergency opening device.

[0015] At least one curved end can form an angle with the main body substantially equal to 90°. This angle is optimal in order to prevent any lack of space issue in leading to a placement of the hooks in a direction perpendicular to the door length.

[0016] At least one stiffening recess can extend between the main body and each curved end. This allows

to keep the form of the attachment unit even when it is needed to assemble or disassemble the door handle assembly several times.

[0017] The attachment unit can be made of metal.

[0018] The bracket can comprise two sliding guides, each curved end extending into one sliding guide.

[0019] Each sliding guide can comprise a flat base and a through opening arranged in the flat base, the first hook or the second hook resting on the flat base, the first retention member crossing the through opening. Such a configuration allows a compression of the housing together with the bracket, the first hook or the second hook pushing down on the face of the bracket opposite to the face in front of the housing while the first retention member crosses the through opening in order to interact with the third hook.

[0020] The sliding guides can be scaled to allow a translation of the hooks along the sliding guides.

[0021] The third hook can rest on the sliding guide when it is inserted into the first hole of the first retention member. All the hooks rest on the flat base and the third hook locks the housing to the bracket via the hole.

[0022] The hooks can be formed at the end of the first curved end.

[0023] One second curved end can comprise two curved portions and at least one fourth hook configured to be inserted into a second hole of a second retention member carried by the housing.

[0024] The main body can comprise at least one through hole.

[0025] The bracket can comprise several guiding hooks configured to guide the attachment unit in translation.

[0026] The retention member can be a buckle shaped retention member.

Brief description of the figures

[0027] The invention will be better understood in view of the following description, referring to the annexed Figures in which:

- Figure 1 is a front view of a door panel and a vehicle door handle assembly according to the invention;
- Figure 2 is a backside view of the vehicle door handle assembly according to the invention;
- Figure 3 is a tilted perspective backside view of a part of the vehicle door handle assembly according to the invention;
- Figure 4 is a tilted perspective backside view of an attachment unit and a housing according to the invention;
- Figure 5 is a tilted perspective backside view of an attachment unit according to the invention; and

- Figure 6 is a backside view of the bracket according to the invention.

Detailed description

[0028] A vehicle door panel 4 and a vehicle door handle assembly 2 are shown on figure 1.

[0029] The vehicle door handle assembly 2 is disposed in an opening 5 of the vehicle door panel 4 and comprises a housing 6 (on its outer face) and a bracket 8 (on its inner face - see figure 2). The housing 6, which can be mounted from outside the door, cooperates through the opening of the panel 4 with the bracket 8. As explained below, the bracket 8 allows, thanks to an attachment unit 10, to attach the vehicle door handle assembly 2 to the panel 4. A gasket (not shown) is compressed between the edges of the housing 6 and the panel 4 in order to allow a sealing between those two elements. This construction leads to the placement of the door handle assembly 2 on either side of the panel (one side with the housing 6 and the other side with the bracket 8).

[0030] A trim element (not shown on the figures) can be placed at the junction of the panel 4 and the housing 6.

[0031] A user can introduce his hand into the housing 6 in order to interact with an actuation switch (not shown on the figures) generating an electrical signal to be sent to a vehicle opening element controller to release the vehicle opening element. This actuation switch can be electrical or mechanical. The electrical switch has the advantage, compared to a mechanical switch, of saving space in the door handle assembly as it there is no need to provide a specific space required by the stroke of a mechanical part to be displaced (this space is needed with a mechanical switch wherein a flap is displaced to generate the electrical signal).

[0032] The electrical signal generated is sent for example to a body controller in order to control the latch, in particular an opening element of the latch. The actuation switch can also be equipped with NFC and/or RFID readers in addition. Furthermore, the actuation switch can be attached on the bracket 8 and can be equipped with at least one reinforcement bar to protect the actuation switch against an excessive actuation effort.

[0033] The attachment unit 10 can be placed on the face 9 of the bracket 8 opposite to the face placed against the panel 4 and crosses the bracket 8 and the panel 4 (which is placed between the bracket 8 and the housing 6) to interact with the housing 6 via a third and a fourth hooks (20, 34) introduced into a first and a second holes (22, 22') of a first and second retention members (21, 21') (see figures 2 to 4) carried by the housing 6, for example a buckle shaped retention member. This allows a compression of the assembly bracket 8/panel 4/gasket/housing 6 together.

[0034] More precisely, the attachment unit 10 can slide relative to the housing 6 in order to allow insertion of the hooks into the holes. The first and second retention members 21 and 21' are preferably placed on both sides of

the housing 6 following a longitudinal axis of this latter.

[0035] The attachment unit 10 can be made of metal and comprises a main body 12 extending in a first plan and configured to be placed against a first face 9 of the bracket 8 opposite to the housing 6. This main body 12 has substantially flat shape. It can comprise through holes 36 (two are illustrated on figures 2, 4 and 5). These through holes can allow to make the main body 12 lighter (especially if the attachment unit 10 is made of metal) or can have an interest in the attachment unit 10 assembling and disassembly mechanism.

[0036] The attachment unit 10 also comprises two curved ends 14a and 14b relative to the main body. These curved ends 14a and 14b are bent to extend in a door depth and not in a door length. This configuration allows space optimization due to the positioning of supplemental elements around the door handle assembly 2. Preferably, at least one curved end 14a or 14b forms an angle with the main body 12 substantially equal to 90°. This angle is optimal in order to avoid any lack of space issue in leading to a placement of the hooks in a direction perpendicular to the door length.

[0037] Preferably, at least one stiffening recess 24 extends between the main body 12 and each curved end 14a and 14b. Only one stiffening recess 24 by curved end 14a or 14b is referenced on figures but several stiffening recesses 24 are illustrated. Stiffening recesses 24 can be made when an angle is formed, for example between the main body 12 and a curved end 14a or 14b, or when a curved end 14a or 14b comprises several portions inclined each other. The stiffening recesses 24 ensure the rigidity of the attachment unit 10 which is displaced to attach the housing 6 together with the bracket 8. Indeed, it is interesting to avoid any deformation of the attachment unit 10 in order to allow repeatability of the attachment/decoupling of the housing 6 with the bracket 8. The stiffening recesses 24 can be formed on the outer angle of any inclined portion, this leads to the formation of a rib in the inner angle of these portions.

[0038] One first curved end 14a and one first hole 22 (and one first retention member 21) are described below in more detail, in particular with reference to figure 3. The other second curved end 14b has generally the same configuration than the curved end 14a (with its hooks extending in the same direction than the first curved end 14a in order to allow an attachment with a translation in this direction). The housing 6 can have a second retention member 21' comprising a second hole 22' (see figure 4) similar to the first retention member comprising the first hole 22 cooperating with a third hook 20.

[0039] The first curved end 14a can comprise three hooks 16, 18 and 20 (it comprises at least two hooks). The first hook 16 and the second hook 18 extend in a second plan distant from the first plan, the first hook 16 and the second hook 18 being configured to slide on the first face 9 of the bracket 8. The first curved end 14a also comprises a third hook 20 extending between the first hook 16 and the second hook 18 in a third plan more

distant from the first plan than the second plan. This third hook 20 is configured to be inserted into the first hole 22 of the first retention member 21. This configuration allows, as explained below, to ensure an attachment between the housing 6 and the bracket 8.

[0040] Two hooks (the first hook 16 and the second hook 18) extend in a second plan and slide on the face 9 of the bracket 8 (more precisely, and as explain below, on a flat base 28) and the third hook 20, which is positioned between these latter, extends into the first hole 22 of the first retention member 21 when the housing 6 and the bracket 8 are attached together. Thus, the third hook 20 holds the housing 6 (via the retention member 21) while the first hook 16 and the second hook 18 prevent any detachment of the housing 6 from the bracket 8 in pressing the attachment unit 10 against the face 9 of the bracket 8 opposite to the face positioned in front of the housing 6 (this housing 6 being hold by the third hook 20).

[0041] The first retention member 21 extends form the housing 6 toward the bracket 8. Several stiffening ribs can be placed between the main portion of the housing 6 and the first retention member 21. The retention member 21 comprises a first hole 22 in which the third hook 20 can be introduced to attach the housing 6 and the bracket 8 together. The first hole 22 has an oblong shape. As explained below, the third hook 20 can have a form allowing to this latter to interact with one flat face of the oblong first hole 22.

[0042] All the description, above and below, relative to the first retention member 21 and to the first hole 22 is applicable to the second retention member 21' and to the second hole 22'.

[0043] The space between the third hook 20 on one side and the first hooks 16 and the second hook 18 in the other side can be dimensioned to ensure a compression between the housing 6 and the bracket 8 (the first retention member 21 (via first hole 22) exerting on the third hook 20 a compression force opposite to the reaction force exerted by the first hook 16 and the second hook 18 on the face 9 of the bracket 8).

[0044] Preferably, the bracket 8 comprises two sliding guides 26 (see figures 3 and 6), each curved end 14a or 14b extending into one sliding guide 26 (which form recesses into the bracket 8). The bracket 8 is thus formed to accommodate spaces dedicated to the curved ends 14a and 14b. In other words, the bracket 8 can comprise recesses (the sliding guides 26) in which each curved end 14a or 14b (curved relative to the main body 12 extending in a direction parallel to a longitudinal direction of the bracket 8) can be placed in order to be able to slide when the attachment unit 10 is displaced.

[0045] Each sliding guide 26 can comprise a flat base 28 and a through opening 30 arranged in the flat base 28, the first hook 16 and the second hook 18 resting on the flat base 28 (for the reasons explained above), the first retention member 21 crossing the through opening 30. The third hook 20 can thus be introduced into the first hole 22 of the first retention member 21 when the housing

6 and the bracket 8 are assembled together (i.e. when the first retention member 21 has crossed the through opening and the attachment unit 10 has slid in order to introduced the third hook 20 into the first hole 22).

[0046] The sliding units 26 can be scaled to allow a translation of the hooks 16, 18 and 20 along the sliding units 26. In other words, the attachment unit 10 can be placed with the curved ends 14a and 14b extending into the sliding units 26, and the first hook 16 and the second hook 18 resting on the flat base 28 even when the housing 6 and the bracket 8 are disassembled. These hooks slide along the flat base 28 when the housing 6 and the bracket 8 are assembled together.

[0047] Furthermore, the third hook 20 can rest on the bracket 8 when it is inserted into the first hole 22 (i.e. when the housing 6 and the bracket 8 are attached together). In other words, it is possible to design the third hook 20 in order to have a third hook 20 comprising two portions extending in two different plans (see for example figure 5). A first portion 40, closer to the main body 12, is able to rest against an inner face of the first retention member 21, preferably a flat face of an oblong first hole 22 in order to obtain the compression force described above. A second portion 42, (the portion furthest to the main body 12) is configured to rest against the bracket 8. The second portion 42 crosses the first hole 22 and extends thereafter this latter against the bracket 8. The sliding guide 26 comprises, in such a configuration, two levels (one constituted by the flat base 28 and another on which the second portion 42 the third hook 20 can rest). The third hook 20 has consequently two functions in such a configuration: a retention of the housing 6 (via the first portion 40) and a third reaction force point (via the second portion 42) together with the reaction force points via the first hook 16 and the second hook 18. The first portion 40 and the second portion 42 are linked by a deformable portion which can be deformed in order to create the reaction force.

Alternatively, the third hook 20 can have a flat shape with only one portion placed against an inner face of the first retention member 21 to obtain the reaction force described above.

[0048] As shown on figures, the hooks 16, 18 and 20 can be formed at the end of the first curved end 14a. This latter is thus cut and folded to form the hooks 16, 18 and 20.

[0049] As illustrated on figure 5, the second curved end 14b can comprise two curved portions 32a and 32b and at least one fourth hook 34 configured to be inserted into a second hole 22' of a second retention member 21' carried by the housing 6. The two curved portions 32a and 32b allow to place the fourth hook 34 in the same direction than the hooks carried by the first curved end 14a.

[0050] The fourth hook 34 can have the same shape than the third hook 20 and described above. The second curved end 14b could have hooks similar to the first hook 16 and the second hook 18. The curved portions 32a and 32b can have between them stiffening recesses 24 as

described above.

[0051] The bracket 8 can comprise several guiding hooks 38, the main body 12 being placed into these guiding hooks 38. The guiding hooks 38 extend along side-walls of the main body 12, each guiding hook 38 comprising an end extending above the main body 12. Thanks to this configuration, the main body 12 is guided by the guiding hooks 38 when it is translated to attach the housing 6 and the bracket 8 together.

List of references

[0052]

2 :	door handle assembly
4 :	panel
5 :	door panel opening
6 :	housing
8 :	bracket
10 :	attachment unit
12 :	main body
14a :	first curved end
14b :	second curved end
16 :	first hook
18 :	second hook
20 :	third hook
21 :	first retention member
21' :	second retention member
22 :	first hole
22' :	second hole
24 :	stiffening recesses
26 :	recesses
28 :	flat base
30 :	through opening
32a, 32b :	curved portions
34 :	fourth hook
36 :	through holes
38 :	guiding hooks
40 :	first portion
42 :	second portion

Claims

- Vehicle door handle assembly (2) comprising a housing (6), a bracket (8) configured to attach the housing (6) to a vehicle panel (4), and an attachment unit (10) configured to attach the bracket (8) and the housing (6) together, **characterized in that** the attachment unit (10) comprises a main body (12) extending in a first plan and configured to be placed against a first face (9) of the bracket (8) opposite to the housing (6), the attachment unit (10) comprising two curved ends (14a, 14b) relative to the main body, at least one first curved end (14a) comprising at least two hooks (16, 18, 20), at least a first hook (16) or a second hook (18) extending in a second plan distant from the first plan, the first hook (16) or the second

- hook (18) being configured to slide on the first face (9) of the bracket (8), and at least one third hook (20) in a third plan more distant from the first plan than the second plan, the third hook (20) being configured to be inserted into a first hole (22) of a first retention member (21) carried by the housing (6). 5
2. Vehicle door handle assembly (2) according to claim 1, wherein at least one curved end (14a, 14b) forms an angle with the main body (12) substantially equal to 90°. 10
3. Vehicle door handle assembly (2) according to any of the previous claims, wherein at least one stiffening recess (24) extends between the main body (12) and each curved end (14a, 14b). 15
4. Vehicle door handle assembly (2) according to any of the previous claims, wherein the attachment unit (10) is made of metal. 20
5. Vehicle door handle assembly (2) according to any of the previous claims, wherein the bracket (8) comprises two sliding guides (26), each curved end (14a, 14b) extending into one sliding guide (26). 25
6. Vehicle door handle assembly (2) according claim 5, wherein each sliding guide (26) comprises a flat base (28) and a through opening (30) arranged in the flat base (28), the first hook (16) or the second hook (18) resting on the flat base (28), the retention member (21) crossing the through opening (30). 30
7. Vehicle door handle assembly (2) according to any of the previous claims, wherein the sliding guides (26) are scaled to allow a translation of the hooks (16, 18, 20) along the sliding guides (26). 35
8. Vehicle door handle assembly (2) according to any of the previous claims, wherein the third hook (20) rests on the sliding guide (26) when it is inserted into the first hole (22) of the first retention member (21). 40
9. Vehicle door handle assembly (2) according to any of the previous claims, wherein the hooks (16, 18, 20) are formed at the end of the first curved end (14a). 45
10. Vehicle door handle assembly (2) according to any of the previous claims, wherein one second curved end (14b) comprises two curved portions (32a, 32b) and at least one fourth hook (34) configured to be inserted into a second hole (22') of a retention member (21) carried by the housing (6). 50
11. Vehicle door handle assembly (2) according to any of the previous claims, wherein the bracket (8) comprises several guiding hooks (38) configured to guide the attachment unit (10) in translation. 55
12. Vehicle door handle assembly (2) according to any of the previous claims, wherein the retention member (21) is a buckle shaped retention member.

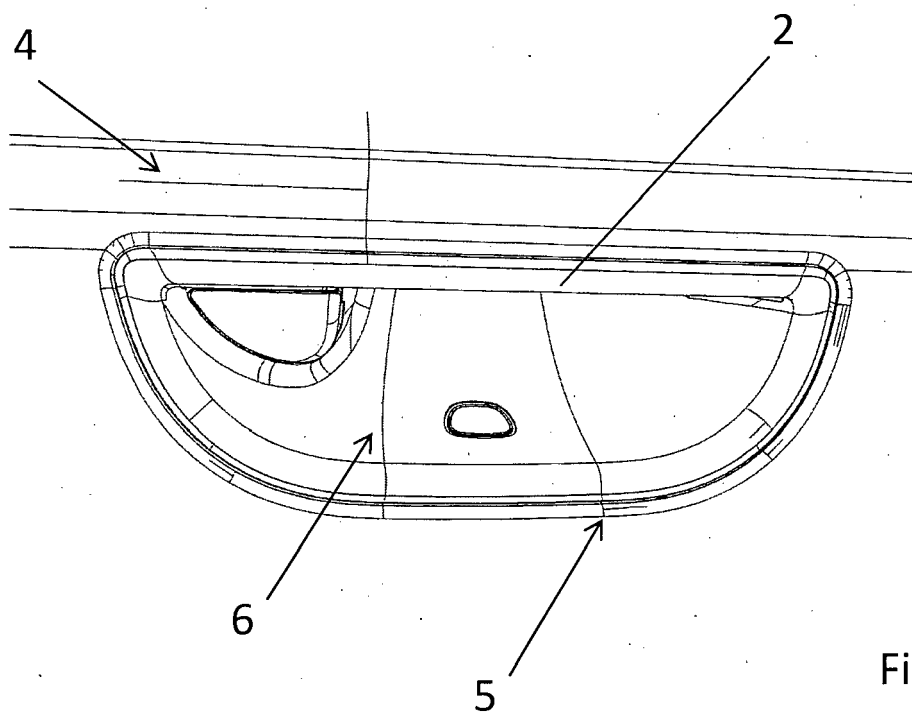


Fig. 1

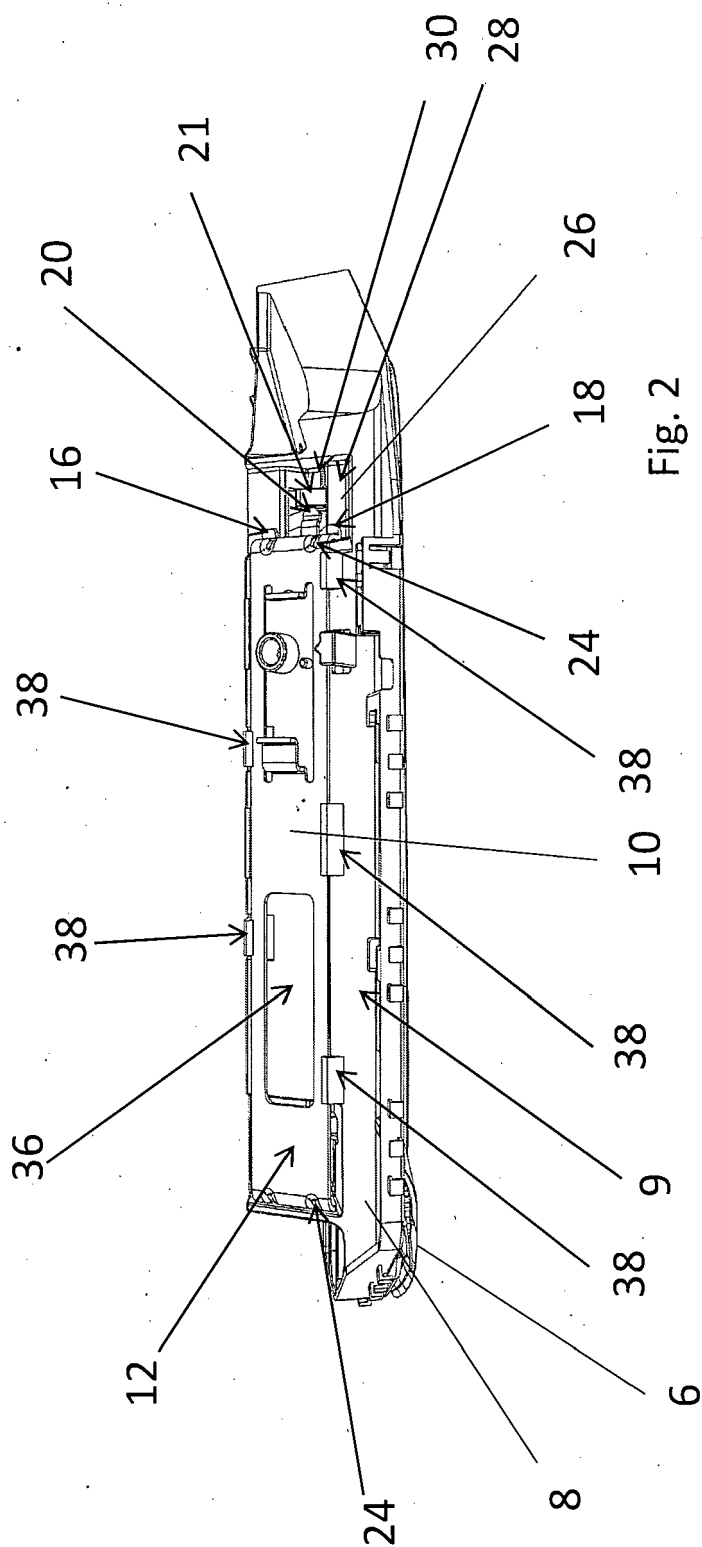


Fig. 2

Fig. 2

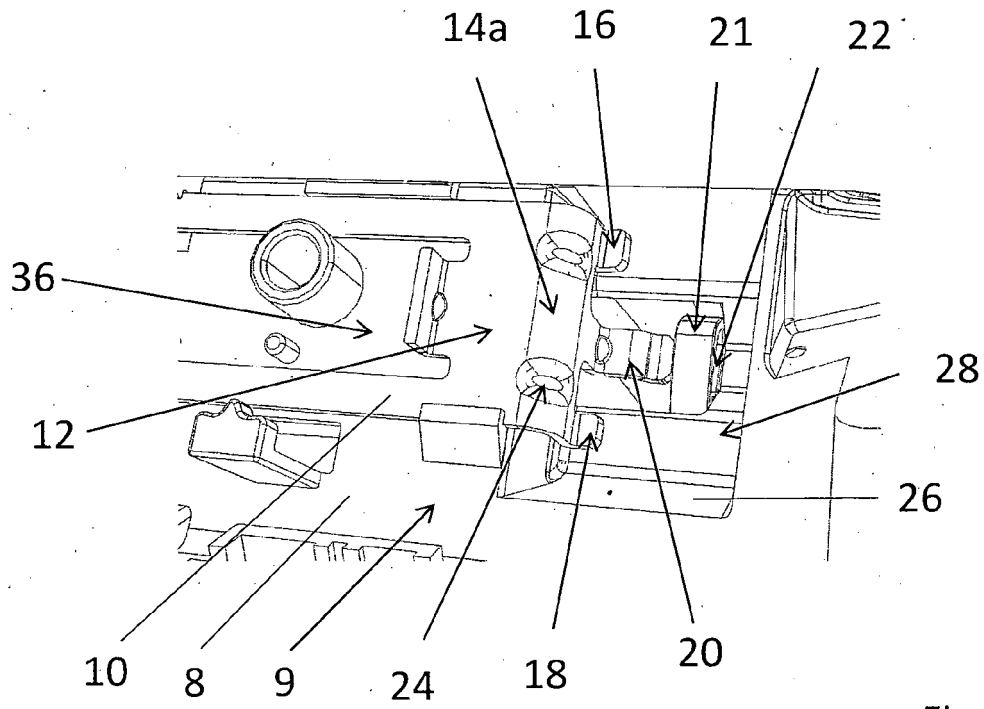


Fig. 3

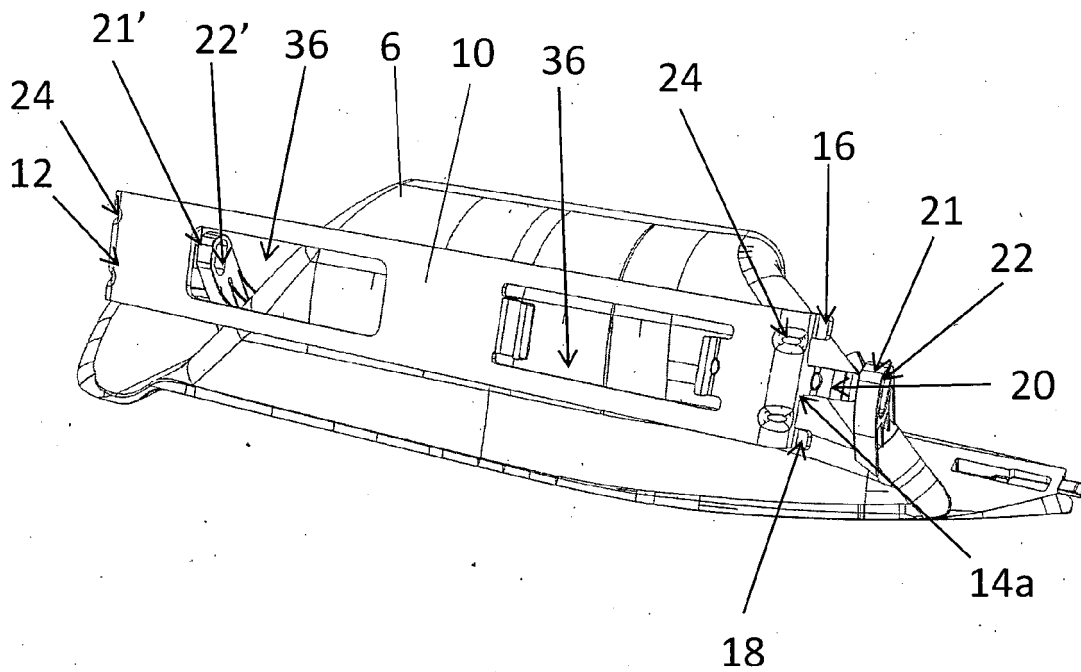


Fig. 4

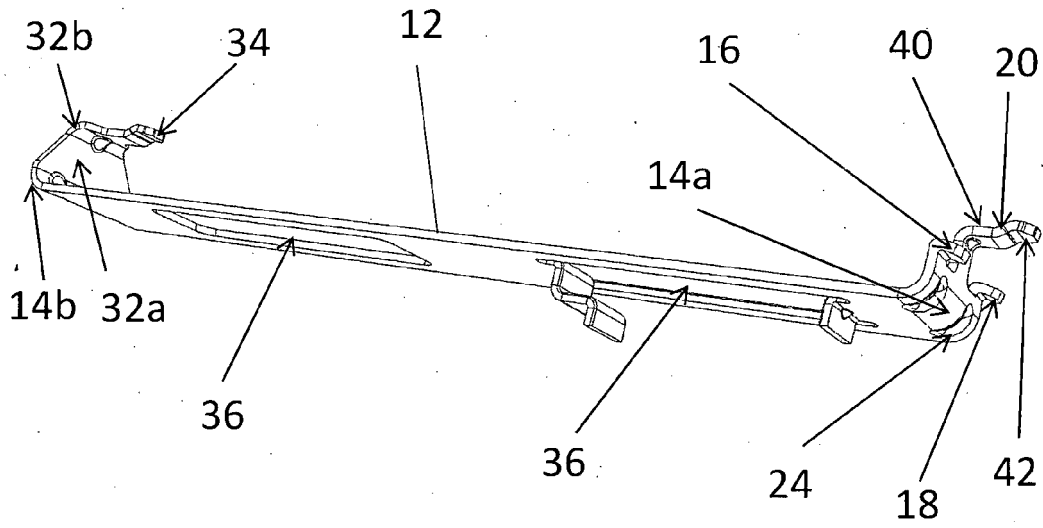


Fig. 5

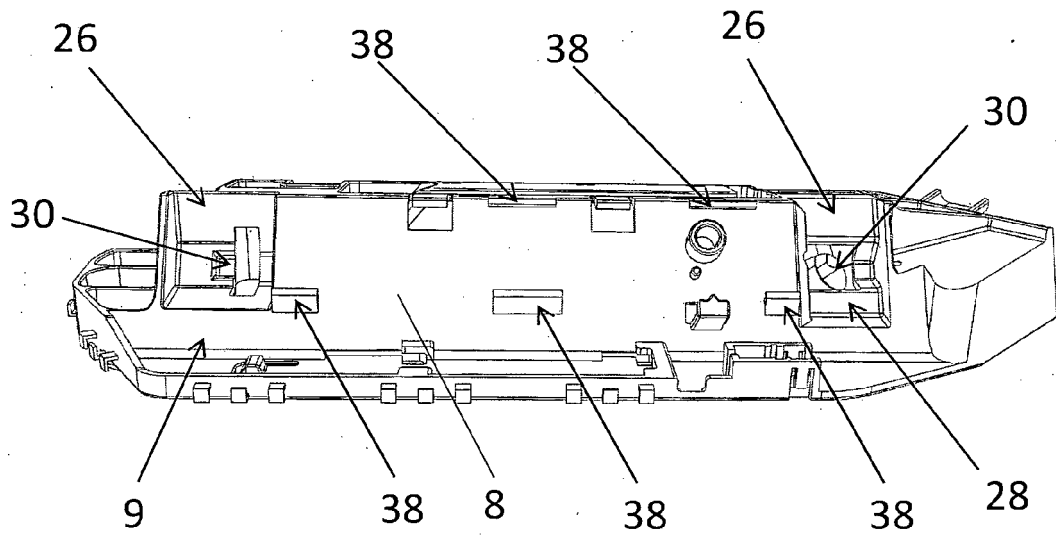


Fig. 6



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