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(72) Inventors:

- **Perrin, Christophe
94000 Creteil (FR)**
- **Lanno, Thomas
94000 Creteil (FR)**

(74) Representative: **Croonenbroek, Thomas Jakob et
al**

Innovincia

11, avenue des Tilleuls

74200 Thonon-les-Bains (FR)

(71) Applicant: **U-Shin France
94000 Créteil (FR)**

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

- a metallic reinforcing plate (17) fixed to the bracket (7) and covering at least in part the switch module (15) in order to prevent the deformation of the switch module (15).

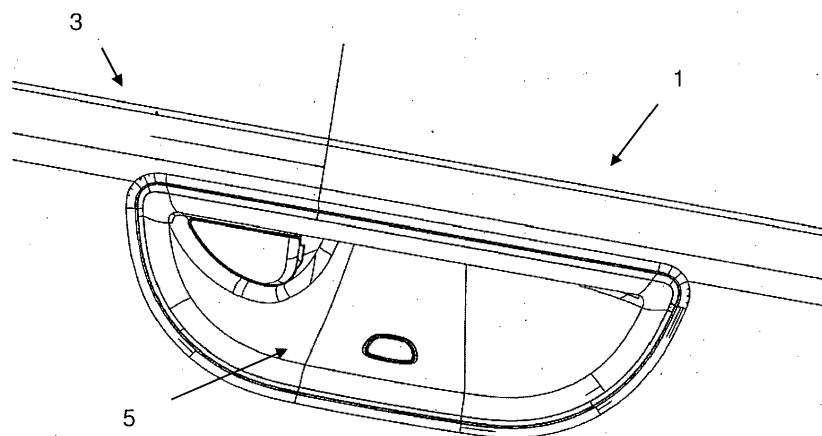


FIG. 1

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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. In usual designs, the plastic material coming from the bracket is used to protect the printed circuit board from deformation. However, in order to make it easier for the user to reach the switch, the handle design may require positioning the switch closer to the door panel. Therefore, a small space remains between the switch and the door panel so that it is no longer possible to insert an enough robust plastic bracket reinforcements in between.

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 metallic reinforcing plate fixed to the bracket and covering at least in part the switch module in order to prevent the deformation of the switch module.

[0006] The metallic reinforcing plate allows reinforcing the switch module while limiting the footprint because of the mechanical characteristics of the metal enabling it to be thin. Typically, the metallic reinforcing plate thickness is lower than 2mm. In this manner, this switch module can withstand a high activation force of the user, up to 400N for example, without any damage on the PCB. Moreover, the metallic reinforcing plate can be a standard piece and is not expensive.

[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] In order to well position the metallic reinforcing plate onto the switch module and in order to withstand the forces in the middle of the metallic reinforcing plate that might be a quite long, the metallic reinforcing plate may comprises a central leg cooperating with a notch of the bracket.

[0009] According to a first embodiment, the metallic reinforcing plate is screwed to the bracket on each side of the switch module.

[0010] The vehicle door handle may comprises two screws going through two holes of the metallic reinforcing plate and in two holes of the bracket, the said holes of the metallic reinforcing plate being made in each ends of the metallic reinforcing plate and the said holes of the bracket being made in each side of the switch module.

[0011] According to a second embodiment, the metallic reinforcing plate is mounted on the bracket by a translation of the metallic reinforcing plate along the switch module, two ends of the metallic reinforcing plate being translated into two recesses of the bracket on each side of the switch module.

[0012] The metallic reinforcing plate may have bent ends configured to slid into complementary recesses of the bracket.

[0013] According to a third embodiment, the metallic reinforcing plate is mounted on the bracket by translation of a first end of the metallic reinforcing plate in a housing of the bracket on a first side of the switch module, the second end of the metallic reinforcing plate being screwed in the bracket on the other side of the switch module.

[0014] The bracket may comprise a clip configured to retain the metallic reinforcing plate by clipping after the slide of the metallic reinforcing plate in the bracket housing.

[0015] The switch module may comprise at least two pins and a frame surrounding the face facing the metallic reinforcing plate which are in contact with the metallic reinforcing plate. Pins and frame are in contact with the metallic reinforcing plate. They allow facilitating the transfer of the forces applied on the switch module to the metallic reinforcing plate.

[0016] The metallic reinforcing plate may comprise at least one reinforcement longitudinal bulge. The reinforcement longitudinal bulge allow reinforcing the bending stiffness of the metallic reinforcing plate without increasing the thickness of it.

[0017] 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 according to a first embodiment of the invention.

Figure 2 is a perspective view of the vehicle door handle assembly of figure 1 without the door panel.

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

Figure 4 is an enlarged view of a detail of the vehicle door handle assembly of figure 2.

Figure 5 is the vehicle door handle assembly of figure 2 without metallic reinforcing plate.

Figure 6 is a perspective view of the metallic reinforcing plate of the vehicle door assembly of figure 2. Figure 7 is a perspective view of a second embodiment of the vehicle door handle assembly and the metallic reinforced plate been in the disassembled state.

Figure 8 is a perspective view of the second embodiment of the vehicle door handle assembly of figure 7 in the assembled state.

Figure 9 is a perspective view of a third embodiment of the vehicle door handle assembly.

Figure 10 is a perspective view of the metallic reinforcing plate of the vehicle door assembly of figure 9.

Figure 11 is an enlarged view of a detail of the vehicle door handle assembly of figure 9.

DETAILED DESCRIPTION OF THE INVENTION

[0018] 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.

[0019] 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.

[0020] Figure 1 represents a perspective view of a vehicle door handle 1 assembly according to a first embodiment of the present invention, the vehicle door handle assembly 1 being assembled on a vehicle door panel 3.

[0021] 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 may be made of metal. The bowl 5 and the bracket 7 may be made of plastic.

[0022] The vehicle door handle 1 may also comprise a strip (not represented) 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.

[0023] The vehicle door handle 1 also comprises a switch module 15.

[0024] 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.

[0025] 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.

[0026] The vehicle door handle 1 assembly further comprises a metallic reinforcing plate 17 fixed to the bracket 7 and covering at least in part the switch module 15 in order to prevent the deformation of the switch module 15. The metallic reinforcing plate 17 might be longer than the switch module 15 and might present a surface which is almost equal to the surface of the rear face of the switch module 15. The metallic reinforcing plate 17 allows reinforcing the switch module 15 while taking little space because of the mechanical characteristics of the metal enabling it to be thin. Typically, the metallic reinforcing plate 17 thickness is lower than 2mm. The metallic reinforcing plate may be made in steel. In this manner, this switch module 15 can withstand a high activation force of the user without any damage on the PCB. The activation force may be up to 400N for example. Moreover, the metallic reinforcing plate 17 can be a standard piece and is cheap.

[0027] In order to well position the metallic reinforcing plate 17 onto the switch module 15 and in order to withstand the forces in the middle of the metallic reinforcing plate 17 that might be quite long, the metallic reinforcing plate 17 may comprise a central leg 19 cooperating with a notch 21 of the bracket 7 (figure 4). This central leg 19 is made in a longitudinal edge of the metallic reinforcing plate 17, in the middle of it. The central leg 19 may be integrally formed with the metallic reinforcing plate 17 member. The notch 21 of the bracket 7 opens upwardly so that the central leg 19 can be introduced into the notch 21 from the top.

[0028] The switch module 15 may comprise at least two pins 23, four pins 23 for example as visible in figure

5, that might be aligned, on the rear face of the switch module 15 facing the metallic reinforcing plate 17. The switch module 15 may also comprise a frame 25 that surrounds the face facing the metallic reinforcing plate 17. Those pins 23 and the frame 25 are in contact with the metallic reinforcing plate 17. They allow facilitating to withstand the forces applied on the switch module 15 to the metallic reinforcing plate 17.

[0029] The metallic reinforcing plate 17 may comprise at least one reinforcement longitudinal bulge 27, such as two parallel longitudinal bulges 27, as it can be seen on figure 2 and 3. The two longitudinal bulges 27 can extend in almost all of the length of the metallic reinforcing plate 17. The reinforcement longitudinal bulges 27 allow reinforcing the stiffness of the metallic reinforcing plate 17 while limiting the thickness of it.

[0030] Figures 1 to 6 show a first embodiment of the vehicle door handle 1.

[0031] In this embodiment, the metallic reinforcing plate 17 is screwed to the bracket 7 on each side of the switch module 15.

[0032] More precisely, the vehicle door handle 1 comprises two screws (not shown) going through two holes 31 of the metallic reinforcing plate 17 and in two holes 33 of the bracket 7. The holes 31 of the metallic reinforcing plate being 17 are made in each ends of the metallic reinforcing plate 17 and the holes 33 of the brackets 7 are made in each side of the switch module 15.

[0033] Two holes can also be made in the switch module 15. Then, the screws go through the metallic reinforcing plate 17 holes 31, possibly through the switch module 15 holes and in the bracket 7 holes 33.

[0034] Figures 7 and 8 show a second embodiment of the vehicle door handle 1.

[0035] In this embodiment, the metallic reinforcing plate 17 is mounted on the bracket 7 by a translation of the metallic reinforcing plate 17 along the switch module 15, that is to say from the top and along a plane parallel to the rear face of the switch module 15. Two ends 35 of the metallic reinforcing plate being 17 translate into two recesses 37 of the bracket 7 on each side of the switch module 15. The recesses 37 open upwardly so that the metallic reinforcing plate 17 may be introduced into the recesses 37 from the top, along a direction parallel to a plane of the switch module 15.

[0036] The metallic reinforcing plate 17 may have bent ends 35, at least once inwardly, configured to slid into complementary recesses 37 of the bracket 7. More precisely, the two ends 35 of the metallic reinforcing plate 17 might be bent a first time inwardly and a second time outwardly in a "L-shape".

[0037] As in the first example, the metallic reinforcing plate 17 may comprise a central leg 19 cooperating with a notch 21 of the bracket 7. The switch module 15 may comprise at least two pins 23 and a frame 25 surrounding the face facing the metallic reinforcing plate 17 (figure 7). In this illustration, when assembled, the metallic reinforcing plate 17 wraps all the surface of the rear face

of the switch module 15 (figure 8).

[0038] The other features of this second embodiment of the vehicle door handle 1 may be similar to the first embodiment.

5 **[0039]** Figures 9, 10 and 11 show a third embodiment of the vehicle door handle 1.

[0040] In this embodiment, the metallic reinforcing plate 17 is mounted on the bracket 7 by translation of a first end 39 of the metallic reinforcing plate 17 in a housing 41 of the bracket 7 on a first side of the switch module 15. The housing 41 open upwardly so that the metallic reinforcing plate 17 can be introduced into the housing 41 from the top.

10 **[0041]** The first end 39 of the metallic reinforcing plate 17 is for example flat, in the continuity of the rest of the metallic reinforcing plate 17 member (figure 10).

[0042] The bracket 7 may comprise a clip 44 configured to retain the metallic reinforcing plate 17 by clipping after the slide of the first end 39 of the metallic reinforcing plate 17 in the bracket 7 housing 41 (figure 11).

15 **[0043]** The second end 43 of the metallic reinforcing plate 17 is screwed in the bracket 7 on the other side of the switch module 15. More precisely, the vehicle door handle 1 comprises one screw (not shown) going through a hole 31 formed in the second end 43 of the metallic reinforcing plate 17 and in a hole of the bracket 7.

20 **[0044]** Thus, during the assembly, the metallic reinforcing plate 17 first slides in the housing 41, then is clipped in the housing 41 by the clip 44 and then, is screwed to the bracket 7. This solution is less expensive than the first embodiment because it requires only one screw instead of two.

25 **[0045]** As in the first example, the metallic reinforcing plate 17 may comprise a central leg 19 cooperating with a notch 21 of the bracket 7. The metallic reinforcing plate 17 may comprise at least one reinforcement longitudinal bulge 27, such as two parallel longitudinal bulges 27 (figure 10).

30 **[0046]** The other features of this second embodiment of the vehicle door handle 1 may be similar to the first embodiment.

Claims

45 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 metallic reinforcing plate (17) fixed to the bracket (7) and covering at least in part the switch module (15) in order to prevent the deformation of the switch module (15).

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- 2. Vehicle door handle (1) assembly according to claim 1, wherein the metallic reinforcing plate (17) comprises a central leg (19) cooperating with a notch (21) of the bracket (7) in order to resume the applied forces in the middle of the metallic reinforcing plate (17).

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- 3. Vehicle door handle (1) assembly according to claims 1 or 2, wherein the metallic reinforcing plate (17) is screwed to the bracket (7) on each side of the switch module (15).

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- 4. Vehicle door handle (1) assembly according to claim 3, wherein the vehicle door handle (1) comprises two screws going through two holes (31) of the metallic reinforcing plate (17) and in two holes (33) of bracket (7), holes (31) of the metallic reinforcing plate (17) being made in each ends of the metallic reinforcing plate (17) and holes (33) of the bracket (7) being made in each side of the switch module (15).

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- 5. Vehicle door handle (1) assembly according to claim 1 or 2, wherein the metallic reinforcing plate (17) is mounted on the bracket (7) by a translation of the metallic reinforcing plate (17) along the switch module (15), two ends (35) of the metallic reinforcing plate (17) being translated into two recesses (37) of the bracket (7) on each side of the switch module (15).

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- 6. Vehicle door handle (1) assembly according to claim 5, wherein the metallic reinforcing plate (17) has bent ends (35) configured to slid into complementary recesses (37) of the bracket (7).

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- 7. Vehicle door handle (1) assembly according to claim 1 or 2, wherein the metallic reinforcing plate (17) is mounted on the bracket (7) by translation of a first end (39) of the metallic reinforcing plate (17) in a housing (41) of the bracket (7) on a first side of the switch module (15), the second end (43) of the metallic reinforcing plate (17) being screwed in the bracket (7) on the other side of the switch module (15).

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- 8. Vehicle door handle (1) assembly according to claim 7, wherein the bracket (11) comprises a clip (44) configured to retain the metallic reinforcing plate (17) by clipping after the slide of the metallic reinforcing plate (17) in the bracket (7) housing (41).

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- 9. Vehicle door handle (1) assembly according to one of the previous claims, wherein the switch module (15) comprises at least two pins (23) and a frame (25) surrounding the face facing the metallic reinforcing plate (17), pins (23) and frame being in contact with the metallic reinforcing plate (17).
- 10. Vehicle door handle (1) assembly according to one of the previous claims, wherein the metallic reinforcing plate (17) comprises at least one reinforcement longitudinal bulge (24).

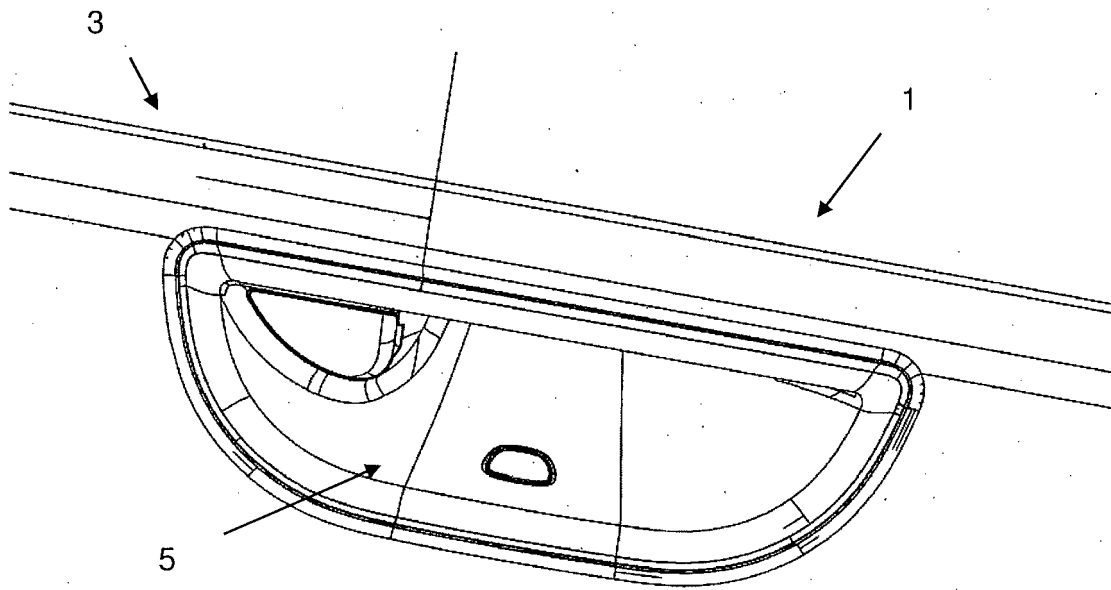


FIG. 1

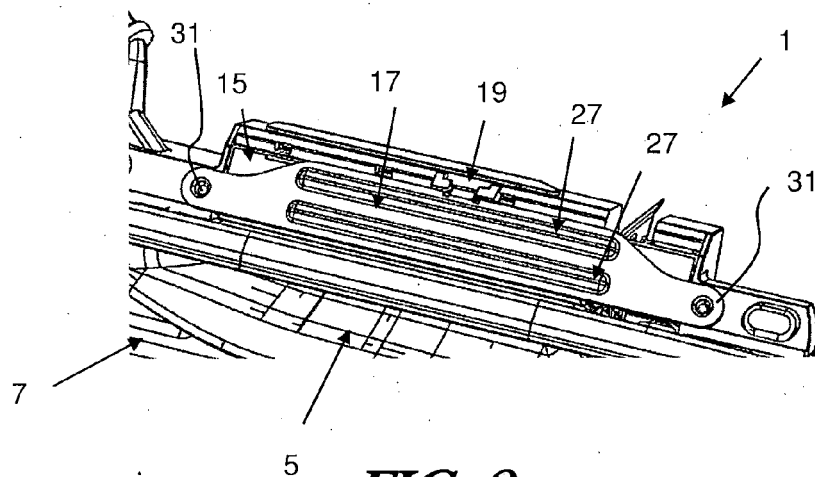


FIG. 2

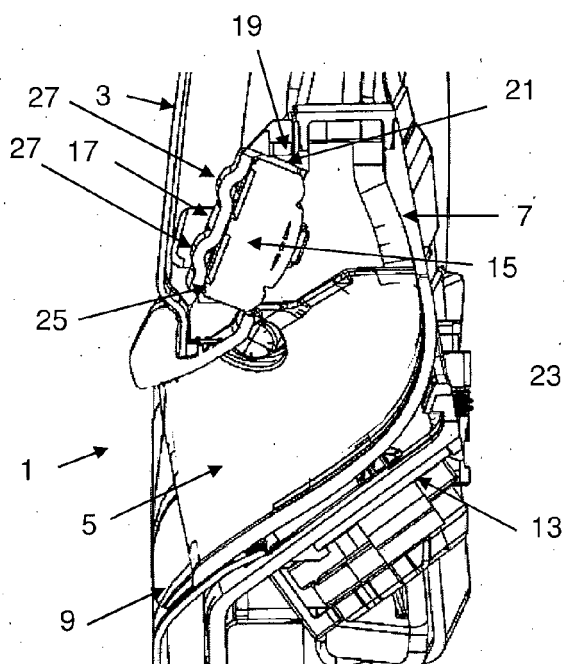


FIG. 3

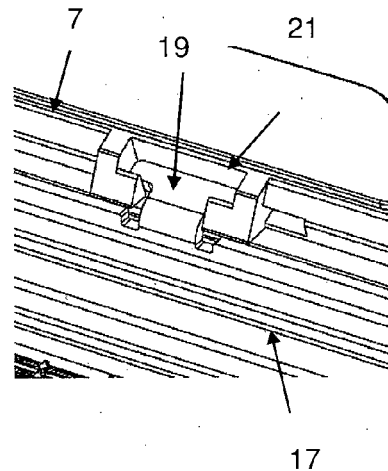


FIG. 4

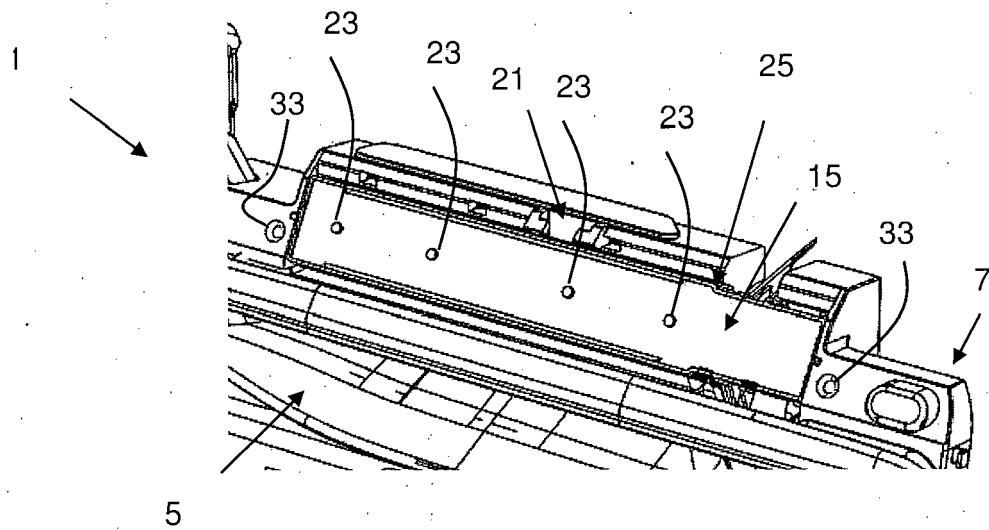


FIG. 5

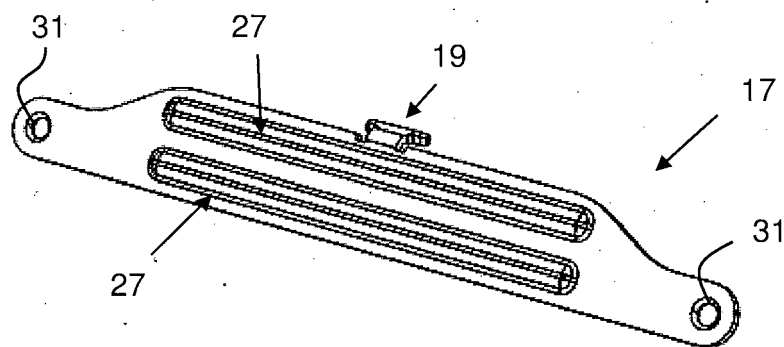


FIG. 6

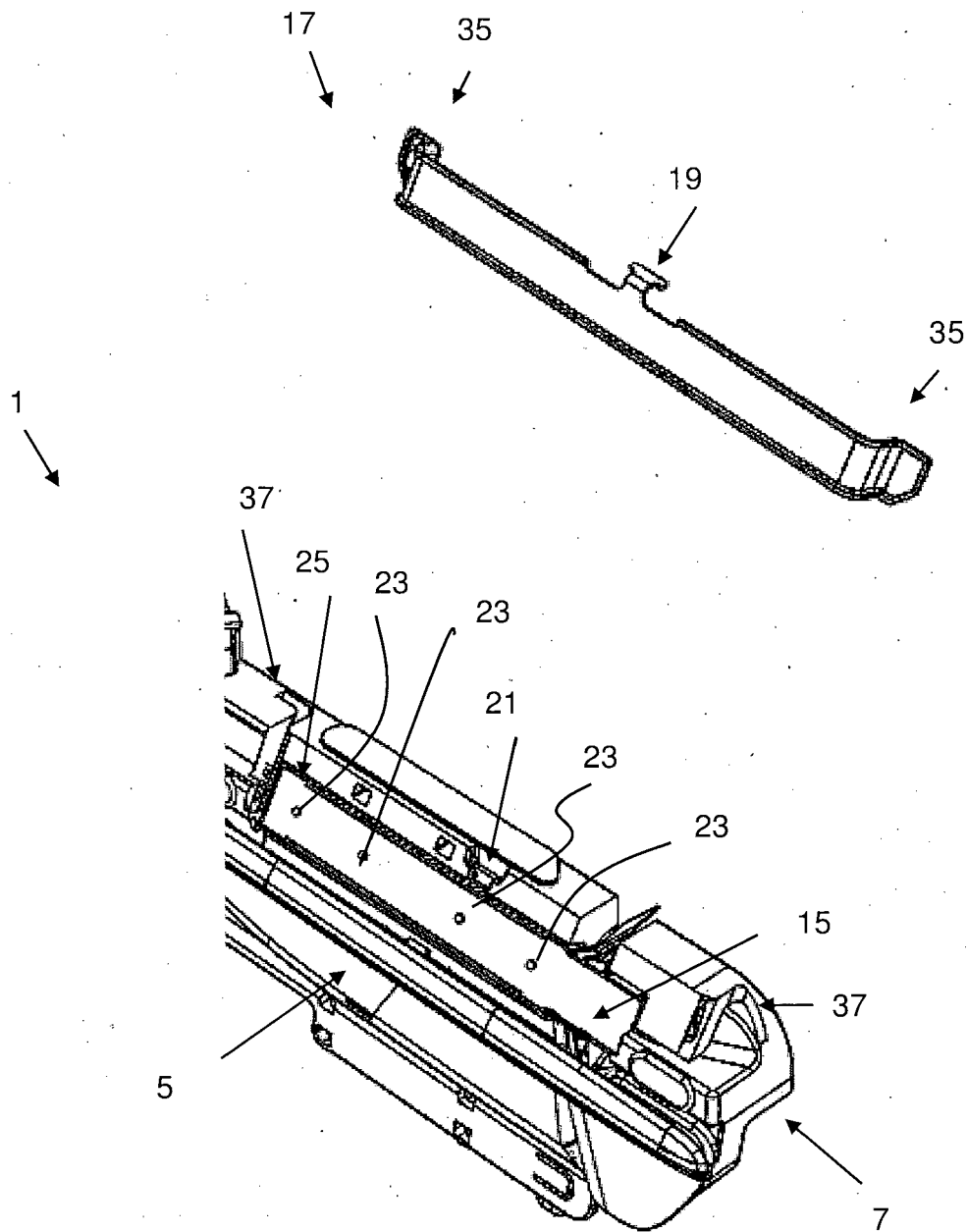


FIG. 7

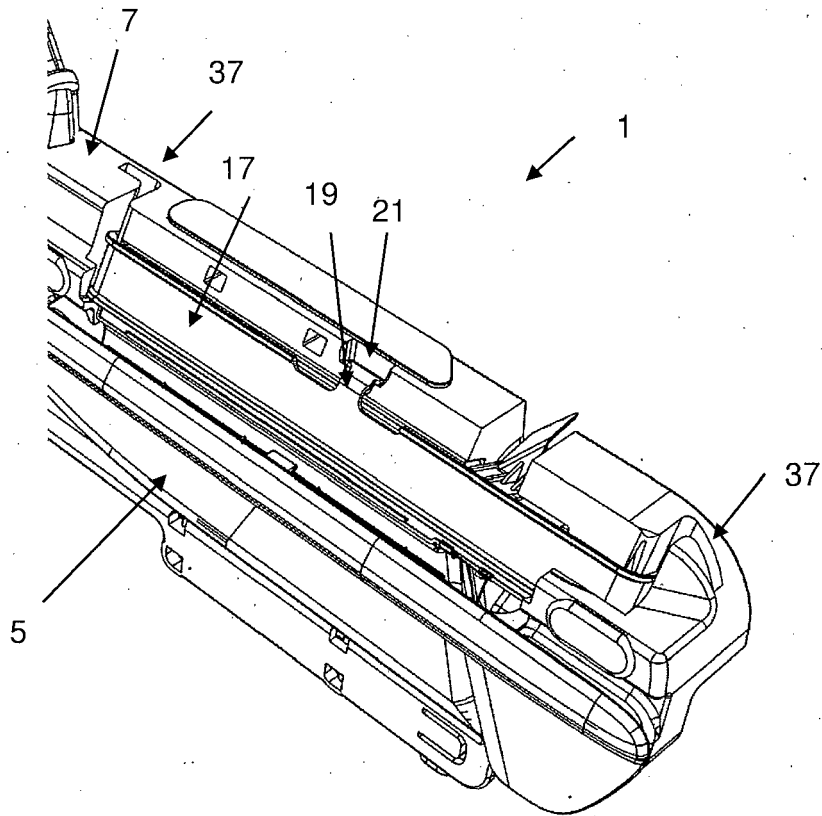


FIG. 8

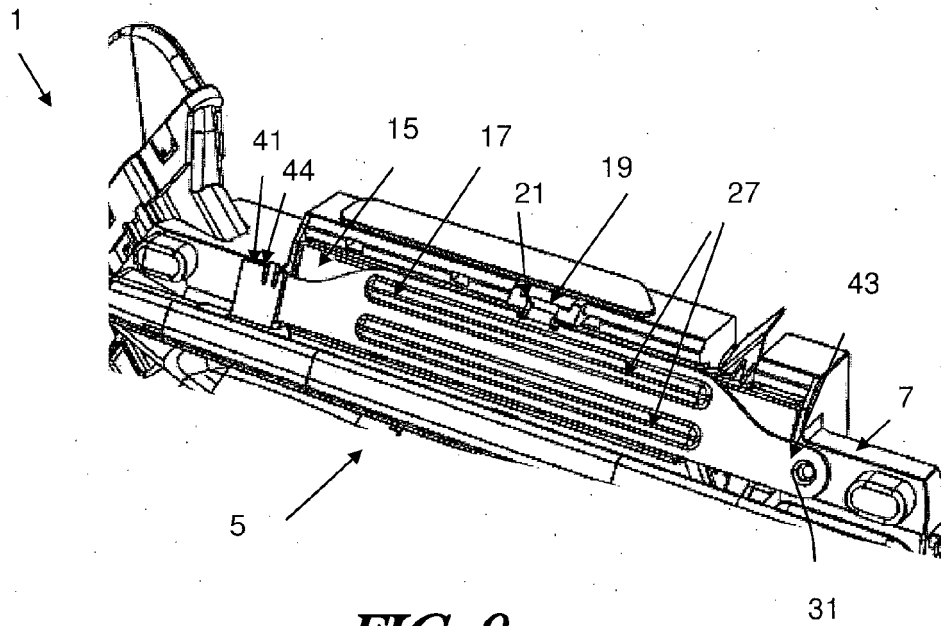


FIG. 9

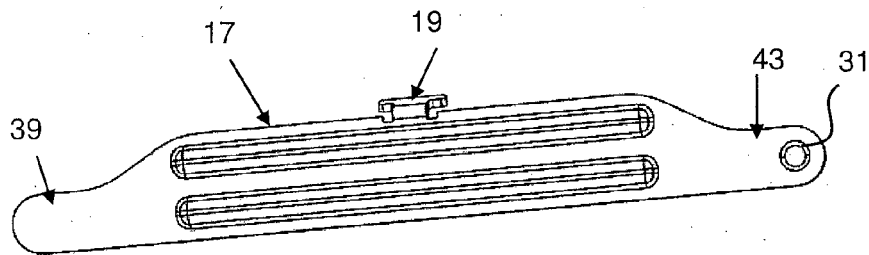


FIG. 10

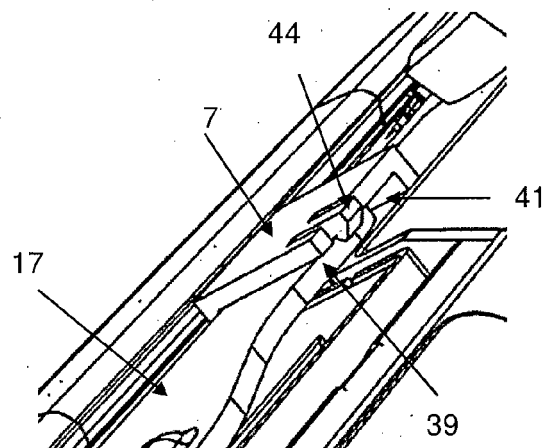


FIG. 11



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Application Number

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EPO FORM 1503 03.82 (P04C01)

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