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(54) Vehicle door handle

(57) A handle (1) for a vehicle door (2) has a connecting structure (5) fitted to the door (2); a control lever (13) hinged to the connecting structure (5) and operated, in use, by a user to control a lock on the door (2); and an aerial (23) for detecting the presence of the user about to open the door (2); the aerial (23) is housed inside the lever (13) and has an output cable (25) and an electric connector (27), which is connected to the lever (13) and to the connecting structure (5) and connects the output cable (25) to a cable (29) on the door (2) for transmitting an alert signal emitted by the aerial (23).

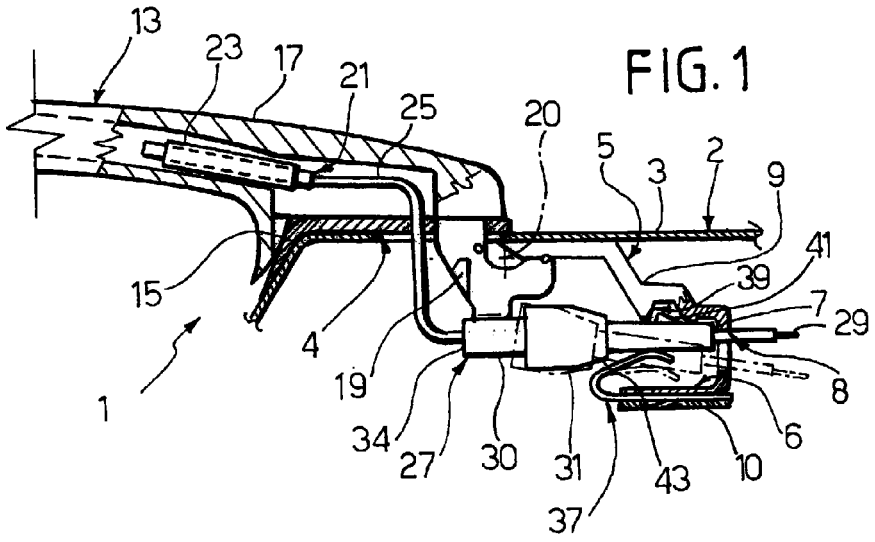

FIG. 1

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Description

[0001] The present invention relates to a vehicle door handle.

[0002] In particular, the present invention relates to a handle of the type comprising a connecting structure fitted to the vehicle door; a lever hinged to the connecting structure and activated, in use, by a user to control a lock on the door; and a user presence detecting device comprising an aerial housed inside the lever to detect the presence of the user about to open the door, and to emit a relative alert signal.

[0003] The aerial has a cable extending through the lever and connected to a cable on the door by means of an electric connector comprising two connecting elements, which, once the handle is fitted to the door, are connected to each other manually by a fitter. Connecting and, if necessary, disconnecting the two elements are fairly expensive and, above all, awkward jobs on account of the fairly confined space in which the fitter is compelled to work. Moreover, once connected up, the connector is normally left loose inside the door cavity, which not only results in noise but also, in some cases, fails to ensure firm connection of the aerial. That is, if connected poorly, the two elements inevitably work loose eventually, thus isolating the aerial and preventing the user from opening the lock.

[0004] It is an object of the present invention to provide a vehicle door handle designed to provide a straightforward solution to the above problems, and which, in particular, can be fitted extremely quickly to the door, provides for a high degree of efficiency and reliability, and is also relatively cheap.

[0005] According to the present invention, there is provided a handle for a vehicle door, the handle comprising a connecting element which is fitted integrally to said door; a movable control element connected to said connecting element and activated manually by a user to control, in use, a lock on said door; and user presence detecting means carried by said movable control element and in turn comprising an output cable, a first electric connecting member connected to said output cable, and a second electric connecting member connected to said first connecting member and which is connected to a cable on said door; characterized in that at least one of said connecting members is connected to one of said elements.

[0006] A non-limiting embodiment of the invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a partially sectioned view, with parts removed for clarity, of a first preferred embodiment of the handle according to the present invention connected to a vehicle door shown only partly;
Figure 2 shows a side view, with parts removed for clarity, of the Figure 1 handle;
Figure 3 shows a larger-scale, partially sectioned view of a variation of a detail of the Figure 1 handle;
Figure 4 shows a section, with parts removed for clarity, along line IV-IV in Figure 3;
Figure 5 shows the same view as in Figure 1, with parts removed for clarity, of a second preferred embodiment of the handle according to the present invention;
Figure 6 shows a larger-scale section of a detail of the Figure 5 handle;
Figure 7 shows a section along line VII-VII in Figure 6;
Figure 8 shows a larger-scale view, similar to that in Figure 2 and with parts removed for clarity, of a third preferred embodiment of the handle according to the present invention;
Figure 9 shows a front view, with parts removed for clarity, of a detail of the Figure 8 handle;
Figure 10 shows a section of the Figure 8 handle along line X-X in Figure 9.

[0007] Number 1 in Figure 1 indicates a handle (shown partly) fitted to a vehicle door 2, which has an outer body 3 having an opening 4.

[0008] With reference to Figures 1 and 2, handle 1 comprises a connecting structure 5 connected integrally, in known manner not described in detail, to an inner frame (not shown) of door 2 and having a cavity 6.

[0009] Cavity 6 is defined by an end wall 7 having an opening 8; by two lateral portions 9 and 10, portion 9 being located adjacent to body 3, and portion 10 being located on the opposite side of portion 9 to body 3; and by two lateral walls 11 facing each other and extending between portions 9 and 10.

[0010] Handle 1 also comprises a movable control lever 13 extending in a longitudinal direction and facing body 3; and a seal 15 interposed between lever 13 and body 3 and closing opening 4.

[0011] Lever 13 comprises a hollow body 17, which is gripped, in use, by the user's hand to open a lock (not shown) on door 2; and an end arm 19, which extends integrally from body 17 through opening 4, is surrounded by seal 15, and is hinged, in known manner not described in detail, to structure 5 to permit rotation of lever 13 about a hinge axis 20 perpendicular to the longitudinal direction and parallel to body 3.

[0012] As shown, particularly in Figure 1, handle 1 also comprises a detecting device 21 for detecting the presence of the user about to open door 2. Device 21 comprises an aerial 23 housed inside body 17; an output cable 25 extending through opening 4; and an electric connector 27 for connecting cable 25 to a cable 29 on door 2, extending through opening 8 to transmit an alert signal emitted by aerial 23.

[0013] Electric connector 27 is located on the opposite side of arm 19 to body 3, and comprises a first and a second element 30 and 31 connected to each other in a longitudinal connection direction. Element 30 is connected to cable 25 and comprises an outer casing 34

formed in one piece with arm 19; and element 31 is connected to cable 29, is housed partially inside cavity 6, and is connected to structure 5 by means of a click-on connecting assembly 37 interposed between element 31 and structure 5.

[0014] As shown in Figures 1 and 2, assembly 37 comprises a retaining seat 39 formed in portion 9 inside cavity 6; an outer tooth 41 carried by element 31 and engaging seat 39 loosely to allow element 31 to move with respect to structure 5; and a metal leaf spring 43. Spring 43 is U-shaped, is connected integrally to portion 10, and extends inside cavity 6 to exert elastic action on element 31 towards seat 39, so as to retain tooth 41 inside seat 39 and enable element 31, guided by lateral walls 11, to move with respect to structure 5 in a plane perpendicular to axis 20.

[0015] In the variation shown in Figures 3 and 4, element 30 is connected integrally to lever 13 by means of a respective click-on connecting assembly 47 interposed between element 30 and arm 19, and comprising a dove-tail seat 53 formed longitudinally in casing 34 and defined by a transverse bottom surface 54, a guide portion 55 for guiding arm 19 and engaging seat 53, and a retaining device 56 for retaining portion 55 resting on bottom surface 54.

[0016] Device 56 comprises a hemispherical cavity formed in portion 55, positioned facing casing 34, and inside which clicks a hemispherical elastic appendix integral with casing 34. In a variation not shown, device 56 comprises an elastic tab integral with casing 34 and located on the opposite side with respect to bottom surface 54 to click past portion 55.

[0017] When assembling handle 1, once structure 5 is connected to door 2, lever 13 is connected to structure 5 by tilting lever 13 with respect to body 3 and inserting arm 19 and element 30, integral with each other, through opening 4. Elements 30 and 31 may be connected to each other before connecting arm 19 to structure 5, in which case, cable 29 is simply slid through opening 8, and lever 13 pushed to click electric connector 27 inside cavity 6. Alternatively, element 31 is clicked inside cavity 6, and elements 30 and 31 are connected to each other when hinging arm 19 to structure 5.

[0018] In actual use, electric connector 27 of handle 1 rotates, integrally with lever 13, between a rest position (shown by the continuous line in Figure 1) and a lock control position (shown by the dash line in Figure 1) tilted with respect to the rest position, and in which tooth 41 still engages seat 39. When disassembling the handle, lever 13 is used to rotate electric connector 27 past the control position to release tooth 41 from seat 39 and withdraw arm 19 from door 2.

[0019] The embodiment shown in Figures 5, 6 and 7 relates to a handle 58, portions 9 and 10 and walls 7 and 11 of which define a fixed body 59 for connecting and housing arm 19, which extends inside cavity 6 in a longitudinal direction and is hinged to lateral walls 11 to rotate about axis 20. Handle 58 also comprises a seal 60 surrounding arm 19 and closing cavity 6.

[0020] Unlike handle 1, electric connector 27 comprises a first and a second connecting element 61 and 62, which in turn comprise respective sets of three contacts 63 and 64 connected to each other in sliding manner, and respective supporting bases 65 and 66. Bases 65 and 66 are co-molded with respective contacts 63 and 64, and are connected integrally in fixed positions to arm 19 and portion 10 respectively by means of respective click-on connecting assemblies 47 and 37.

[0021] More specifically, as shown in Figures 6 and 7, assembly 37 comprises a seat 67 formed in portion 10, facing arm 19, and defined longitudinally by an end surface 69; an elastic tab 71 formed in one piece with portion 10 inside seat 67 and spaced apart from end surface 69 to click base 66 against end surface 69; and two longitudinal locating grooves 72 differing in size and formed opposite each other inside the seat.

[0022] Base 66 is defined by a hollow parallelepiped-shaped body, which is locked between tab 71 and end surface 69 and has two outer locating ribs 76 differing in size and extending longitudinally along opposite lateral faces to engage respective grooves 72.

[0023] As shown in Figure 6, base 66 partly houses contacts 64, each of which is connected to cable 29 and extends through base 66, perpendicularly to axis 20 and portion 10, towards a respective contact 63. Base 66 also houses a set of three springs 80, each of which pushes a respective contact 64 towards axis 20 to keep contacts 63 and 64 in contact with each other.

[0024] With reference to Figures 6 and 7, connecting assembly 47 comprises a seat 81 defined by two transverse shoulders 83 spaced apart from each other and between which platelike base 65 is interposed facing base 66. Assembly 47 also comprises a click-on retaining device defined by two longitudinal ribs 84 extending integrally from arm 19 towards respective walls 11, and by two elastic longitudinal appendixes 85 carried laterally by base 65 and extending towards axis 20 to engage ribs 84.

[0025] Base 65 houses three contacts 63 defined by respective elastically deformable blades, each of which is connected to cable 25 and is bridge-shaped so as to contact respective contact 64 at a point lying along a line perpendicular to axis 20 and portion 10.

[0026] When assembling handle 58, once element 61 is fitted between the two shoulders 83 by clicking appendixes 85 onto ribs 84, arm 19 is connected to structure 5 by inserting the arm inside cavity 6, which is assisted by portion 9 having a cavity 6 boundary surface sloping with respect to portion 10 and body 3. Element 62 is clicked inside seat 67 to connect contacts 63 and 64 preferably after connecting lever 13 to structure 5.

[0027] In actual use, as lever 13 rotates about axis 20, contacts 63 and 64 slide over each other continuously by virtue of the deformability of springs 80 and contacts 63.

[0028] The embodiment shown in Figures 8, 9 and 10 relates to a handle 90, the electric connector 27 of which, unlike handle 58, comprises three annular contacts 91 comolded into arm 19 housed inside cavity 6; and a connecting element 92.

[0029] Contacts 91 are connected to cable 25, have respective longitudinal axes 93 extending in a plane parallel to axis 20, and communicate with cavity 6. Element 92 is located on the opposite side of end wall 7 to arm 19, is detached from wall 7, and comprises three inner guides 95 coaxial with axes 93, and a front end collar 96. Collar 96 loosely houses part of body 59, and is hinged to walls 11 by means of click-on connecting assembly 37, which comprises two pins hinging body 59 and engaging respective seats formed in collar 96 to rotate about a respective hinge axis coincident with axis 20. Assembly 37 also comprises three longitudinal locating grooves 98 formed in collar 96, two facing portion 9 and one facing portion 10; and three locating pins 99, each integral with body 59 and loosely engaging a respective groove 98.

[0030] As shown in Figure 10, element 92 houses a set of three contacts 100, each of which is connected to cable 29, slides inside a respective guide 95 along a respective axis 93, and extends outside element 92 and loosely through a respective opening 8 in wall 7 to engage a respective contact 91.

[0031] With reference in particular to Figure 10, element 92 comprises a seal 103 interposed between element 92 and end wall 7 and about contacts 100; and a set of three springs 104, each of which is housed inside a respective guide 95 to axially push respective contact 100 towards arm 19 and prevent damage to electric connector 27 when connecting contacts 91 and 100.

[0032] When assembling handle 90, element 92 is first clicked onto body 59, and contacts 91 and 100 are then connected by pushing arm 19 inside cavity 6 to connect lever 13 to body 59. As shown in Figure 10, arm 19 is detached from end wall 7 to permit displacement of lever 13 with respect to body 59 and connection of lever 13 to the lock of door 2 in known manner not described in detail.

[0033] In actual use, when lever 13 is operated, element 92 rotates, together with arm 19 and hence with contacts 91, about axis 20 and with respect to body 59 by virtue of the clearance, in a plane perpendicular to axis 20, between body 59 and element 92.

[0034] Fitting at least one of the connecting elements of electric connector 27 to lever 13 or to structure 5 therefore provides the fitter with a fixed reference by which to connect the connecting elements quickly and easily, thus enabling handles 1, 58 and 90 to be fitted to door 2 relatively quickly and cheaply.

[0035] Moreover, being fitted respectively to lever 13 and structure 5, the two connecting elements can be connected when connecting lever 13 to structure 5, with no need to work directly on connector 27, thus further reducing assembly time and cost as compared with known solutions.

[0036] Simplifying assembly also greatly reduces the risk of the two connecting elements being connected improperly, thus reducing the risk of the elements working loose, and so improving, as compared with known solutions, the reliability and efficiency of handles 1, 58 and 90, and in particular of the electric connection of aerial 23 and, hence, electric control of the lock of door 2.

[0037] Finally, being fitted in a fixed position to lever 13 and/or structure 5, connector 27 generates very little noise.

[0038] Clearly, changes may be made to handles 1, 58 and 90 as described herein without, however, departing from the scope of the present invention.

[0039] In particular, aerial 23 and cable 25 may be comolded with lever 13; elements 61 and 62 of handle 58 may be co-molded with lever 13 and body 59 respectively; the type of electric connector and the assemblies connecting the connecting elements to lever 13 and to structure 5 may be other than as described by way of example; and/or the lever may be connected to structure 5 differently from the manner described.

Claims

1. A handle (1; 58; 90) for a vehicle door (2), the handle comprising a connecting element (5) which is fitted integrally to said door (2); a movable control element (13) connected to said connecting element (5) and activated manually by a user to control, in use, a lock on said door (2); and user presence detecting means (21) carried by said movable control element (13) and in turn comprising an output cable (25), a first electric connecting member (30; 61; 91) connected to said output cable (25), and a second electric connecting member (31; 62; 92) connected to said first connecting member (30; 61; 91) and which is connected to a cable (29) on said door (2); characterized in that at least one of said connecting members (30; 61; 91) (31; 62; 92) is connected to one of said elements (13) (5).

2. A handle as claimed in Claim 1, characterized in that said first (30; 61; 91) and said second (31; 62; 92) connecting member are connected to said movable control element (13) and said connecting element (5) respectively.

3. A handle as claimed in Claim 1 or 2, characterized in that at least one of said connecting members (30; 61; 91) (62) is connected integrally to the relative said element (14 ((5).

4. A handle as claimed in Claim 3, characterized in that said first connecting member (91) is co-molded with said movable control element (13).

5. A handle as claimed in Claim 3, characterized in that said first connecting member (30) comprises an outer casing (34) formed in one piece with said movable control element (13).

6. A handle as claimed in one of Claims 1 to 5, characterized by comprising click-on connecting means (47) (37) interposed between at least one of said connecting members (30; 61) (31; 62; 92) and the relative said element (13) (5).

7. A handle as claimed in Claim 6, characterized in that said click-on connecting means (37) comprise a seat (39) formed in said connecting element (5); and a tooth (41) carried by said second connecting member (31) and loosely engaging said seat (39); elastic means (43) being provided to keep said tooth (41) engaged inside said seat (39) to permit displacement of said second connecting member (31) with respect to said connecting element (5).

8. A handle as claimed in Claim 7, characterized in that said connecting element (5) defines a cavity (6) loosely housing at least part of said second connecting member (31) and said elastic means (43); said seat (39) being formed in said cavity (6).

9. A handle as claimed in one of Claims 1 to 6, characterized in that both said connecting members (61) (62) are connected to the respective said elements (13) (5) in fixed positions with respect to the respective elements (13) (5), and comprise respective contacts (63) (64) connected to one another in sliding manner.

10. A handle as claimed in Claim 9, characterized in that said contacts (63) of one of said connecting members (61) are defined by elastically deformable blades.

11. A handle as claimed in one of Claims 1 to 6, characterized in that said connecting element (5) comprises a connecting portion (59), and said second connecting member (92) is hinged to the connecting portion (59) to rotate, together with said first connecting member (91), about a respective hinge axis.

12. A handle as claimed in Claim 11, characterized in that said movable control element (13) is hinged to said connecting element (5) to rotate about an axis (20) coincident with said hinge axis.

13. A handle as claimed in Claim 11 or 12, characterized in that said connecting portion (59) comprises a further cavity (6) housing said first connecting member (91); and in that said second connecting member (92) comprises a tubular portion (96) loosely housing at least part of said connecting portion (59), and respective contacts (100) extending loosely through the connecting portion (59) and engaging said first connecting member (91).

FIG. 2

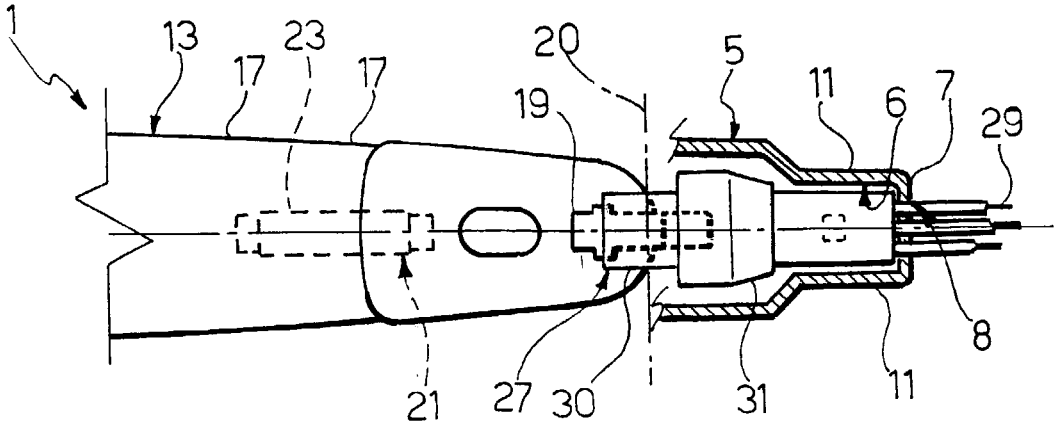


FIG. 1

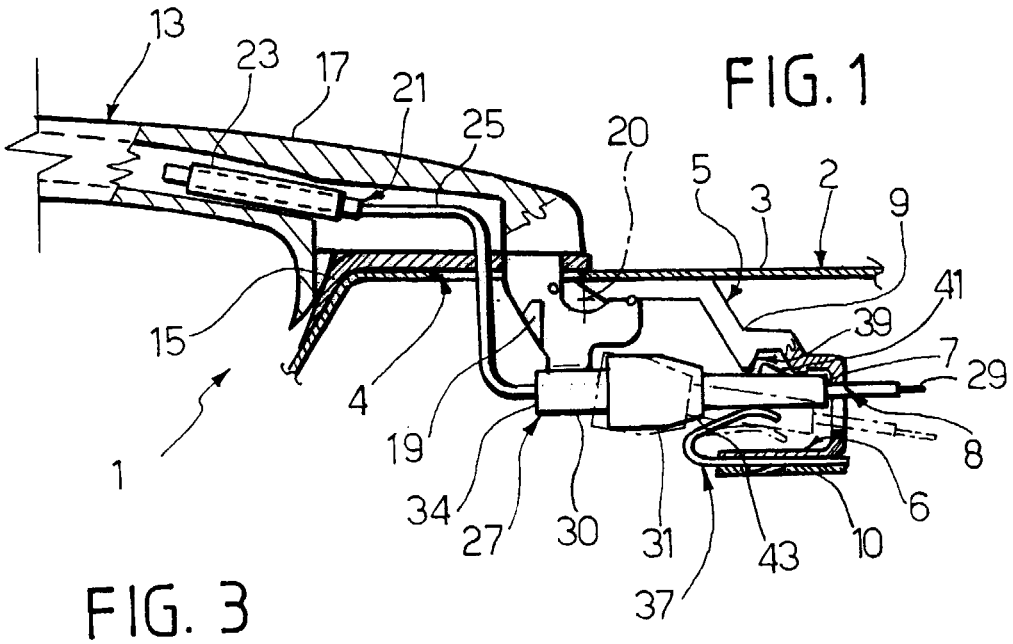


FIG. 3

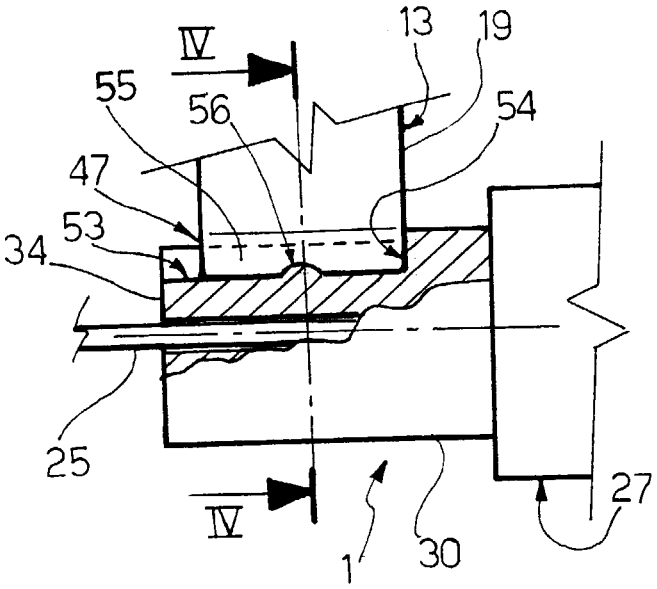


FIG. 4

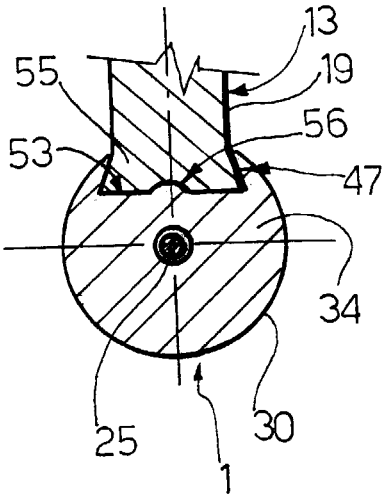


FIG. 5

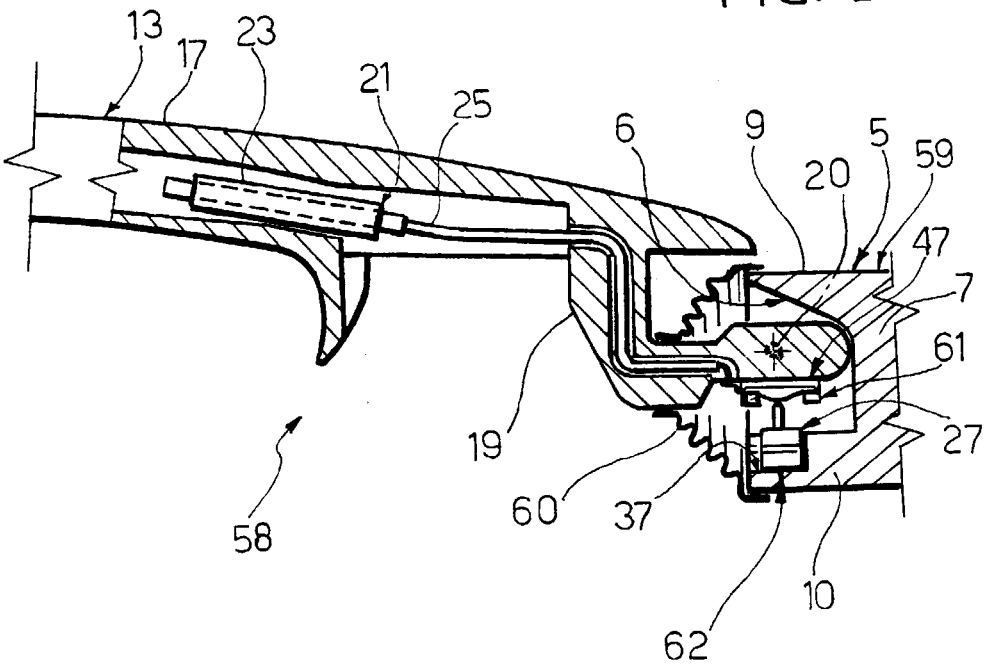


FIG. 6

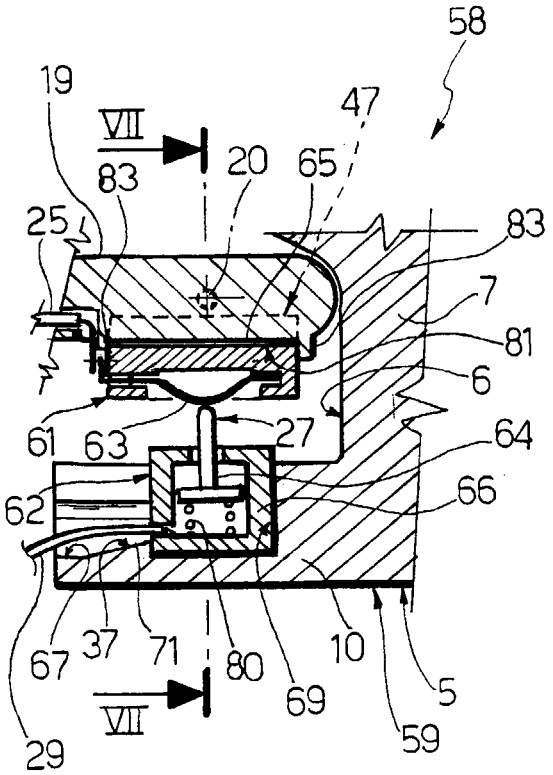


FIG. 7

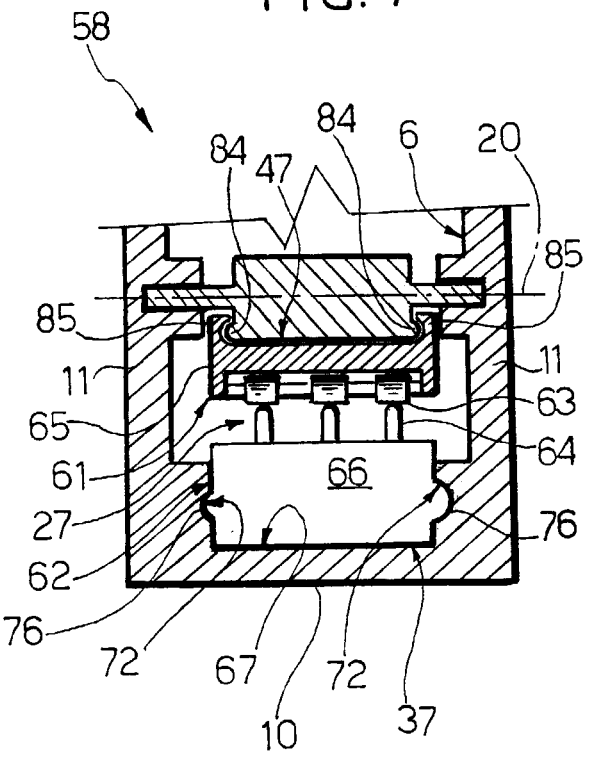


FIG. 8

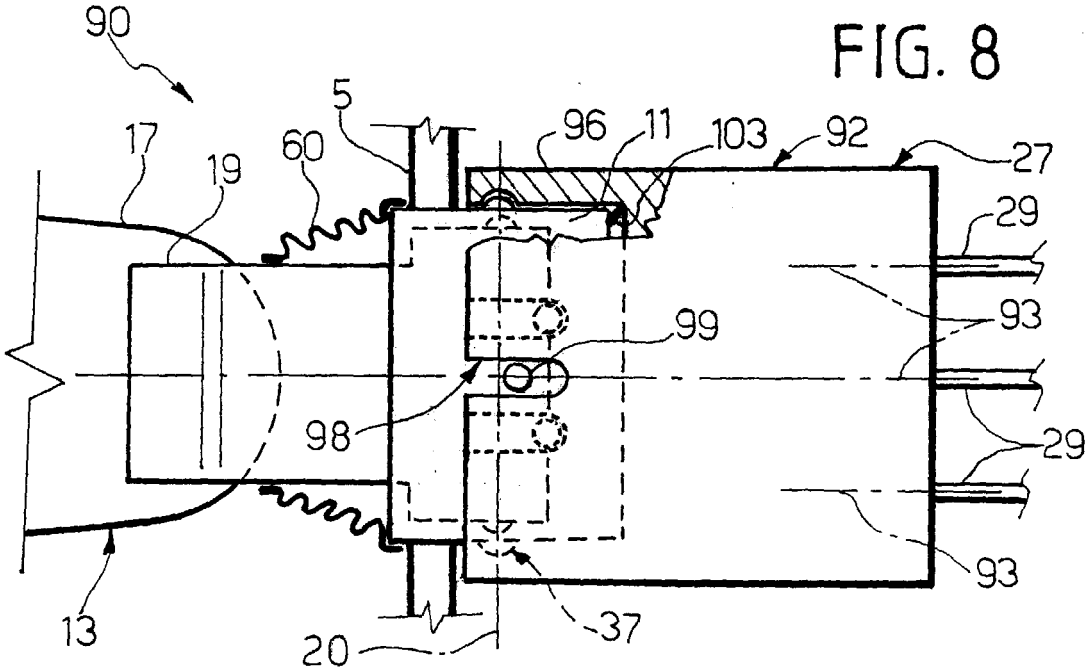


FIG. 10

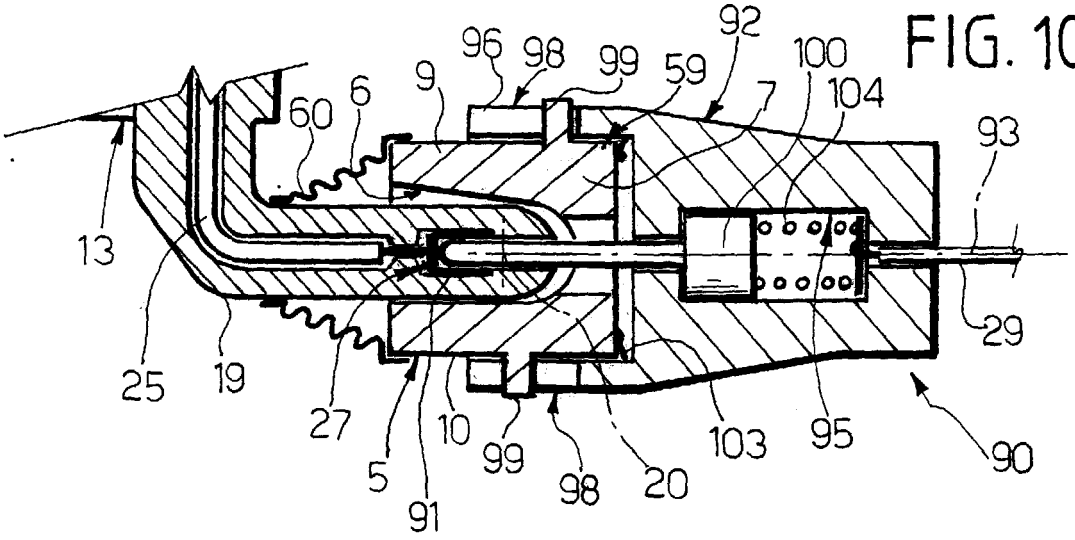
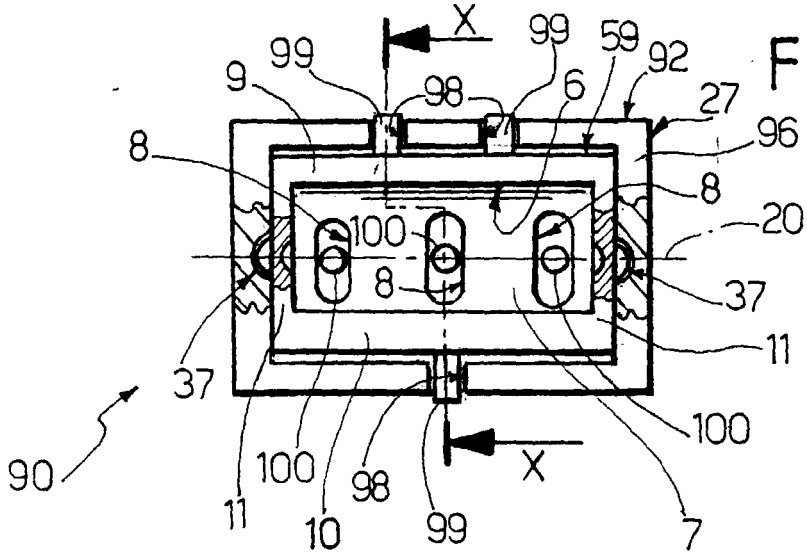


FIG. 9



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EUROPEAN SEARCH REPORT

Application Number
EP 00 10 3644

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X A	DE 196 33 894 A (HUF HÜLSBECK & FÜRST GMBH & CO. KG) 26 February 1998 (1998-02-26) * the whole document *	1-6,11,12 7,13	E05B7/00
A	DE 42 12 291 A (MERCEDES-BENZ AG) 14 October 1993 (1993-10-14) * column 2, line 67 - column 3, line 42; figures 1,2 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	30 May 2000	PEREZ MENDEZ, J

CATEGORY OF CITED DOCUMENTS

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 19633894 A	26-02-1998	NONE	
DE 4212291 A	14-10-1993	NONE	

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