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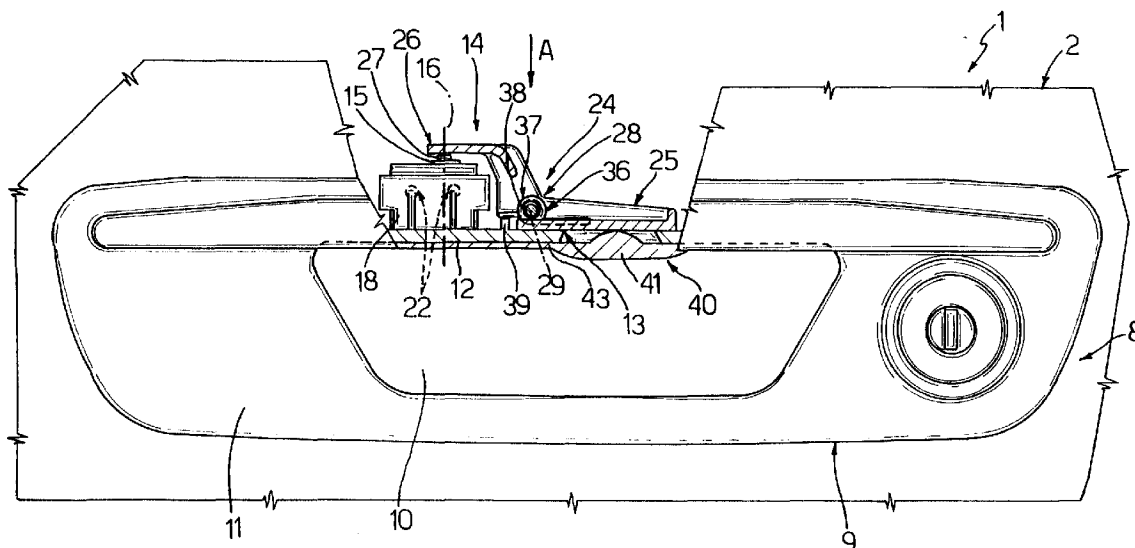
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(54) Vehicle door handle

(57) A handle (8) for a vehicle door (1), having a structure (9) which is fitted to the door (1) and supports at least one device (14) for manually controlling a respective electric lock of the door (1); the device (14) having a pushbutton switch (15), and a single rocker-arm body (24) in turn having a respective end portion (26)

acting directly on the pushbutton switch (15), and a respective intermediate portion (28) hinged to the structure (9) to rotate, under pressure applied by the user, to and from a rest position in which the body (24) is maintained by an elastic spring (36) carried by the body (24) itself.

**Fig. 1****EP 0 903 454 A2**

Description

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

[0002] More specifically, the present invention relates in particular, but not exclusively, to a handle for a vehicle luggage compartment door, and of the type comprising a rigid structure fitted to the vehicle door and supporting a device for controlling an electric door lock.

[0003] Known control devices normally comprise a pushbutton switch; and a push element fitted in sliding manner to the rigid structure, and which is moved manually by the user into a forward switching position to activate the pushbutton switch, and is maintained in a withdrawn rest position detached from the pushbutton switch by one or more elastic reaction elements compressed between the push element and the structure.

[0004] Some of the component parts of known handles of the above type are fairly complicated to manufacture and assemble, thus increasing overall production cost.

[0005] It is an object of the present invention to provide a vehicle door handle designed to eliminate the aforementioned drawbacks, and which, in particular, is straightforward and cheap to produce and provides for a high degree of reliability and efficiency.

[0006] According to the present invention, there is provided a handle for a vehicle door having at least one electric lock; the handle comprising a structure fitted to the door, and at least one device, carried by said structure, for manually controlling said electric lock; the device comprising a pushbutton switch, and manual operating means for manually operating the pushbutton switch; characterized in that said manual operating means comprise a single rocker-arm switching body having a first portion acting directly on said pushbutton switch, and hinge-connecting means for connecting an intermediate second portion of said switching body to said structure in rotary manner about a hinge axis; elastic means being provided to maintain said switching body in a rotated rest position in which said first portion is detached from said pushbutton switch.

[0007] 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 front view, with parts removed for clarity, of a preferred embodiment of the handle according to the present invention, as fitted to a partially illustrated vehicle door;

Figure 2 shows a view, with parts removed for clarity, in the direction of arrow A in Figure 1;

Figure 3 shows a larger-scale section along line III-III in Figure 2;

Figure 4 shows a larger-scale section along line IV-IV in Figure 2.

[0008] Number 1 in Figures 1 and 3 indicates as a

whole a vehicle door, the body 2 of which comprises a hollow portion 3 defining a cavity 4 (Figure 3), which communicates externally through a first opening 5, and with the inside of door 1 through an elongated second opening 6.

[0009] Door 1 is fitted in known manner (not described in detail) with a handle 8 comprising a structure 9, a flared hollow portion 10 of which extends inside cavity 4 through opening 5, and a peripheral flange portion 11 of which extends outside body 2 to close the gap defined by portions 3 and 10.

[0010] Portion 10 comprises a flat lateral wall 12, which faces the portion of body 2 having opening 6, in turn comprises an elongated opening 13, and forms part of a device 14 for controlling a known electric lock (not shown) of door 1.

[0011] As shown in the accompanying drawings, device 14 comprises a known pushbutton switch 15, which, in use, is located inside door 1 and has a respective axis 16 perpendicular to wall 12. Switch 15 is fitted to a bracket 18, which is integral with wall 12, extends inside door 1 through opening 6, and defines a click-in seat 19 for switch 15, which is clicked into seat 19 through a lateral opening 20 in seat 19. Inside seat 19, switch 15 is maintained in a fixed position by a pair of parallel pins 22 (Figures 1 and 2), which extend inside seat 19 perpendicularly to axis 16, and each engage a respective through hole 23 in switch 15.

[0012] With reference to Figures 1 and 2, switch 15 is activated manually from outside structure 9 by means of an elongated rocker-arm body 24, which is formed in one piece, preferably molded from plastic material, and comprises two opposite end portions 25 and 26: portion 25 extends to substantially close opening 13, while portion 26 directly contacts a movable element 27 of switch 15. Elongated body 24 also comprises an intermediate portion 28, which is hinged to a portion of wall 12 extending between bracket 18 and opening 13 to rotate about a hinge axis 29 parallel to wall 12 and perpendicular to axis 16. More specifically, wall 12 carries, integrally, a pair of platelike elastic appendixes 31, which extend, perpendicularly to wall 12, inside door 1 through opening 6, are positioned facing each other to define a fork 32, and have respective through holes 33 (Figure 2) coaxial with axis 29. Intermediate portion 28 extends inside fork 32, and carries, integrally, a pair of opposite outer pins 35 coaxial with axis 29 and defined by respective axial surfaces 36 converging with each other and with wall 12 (Figure 3). When fitting intermediate portion 28 to fork 32, surfaces 36 cooperate in sliding manner with respective inclined lead-in surfaces internally defining the free ends of appendixes 31 to slightly flex appendixes 31 and permit each pin 35 to click inside respective hole 33.

[0013] With reference to Figures 2 and 3, body 24 is maintained in a rest position - in which, portion 26 is detached from movable element 27 of switch 15 - by a pin-type wire torsion spring 36 inside intermediate portion

28. Spring 36 comprises a central portion 37 wound about a pair of pins 38 extending coaxially with axis 29 inside intermediate portion 28; and two opposite end arms, one of which contacts portion 25, and the other of which contacts a fixed stop 39 integral with wall 12. Stop 39 also defines an angular stop for limiting rotation of body 24 about axis 29 when body 24 is rotated by pressure applied by the user.

[0014] As shown in Figures 1, 3, 4, opening 14 is closed externally by a seal 40 made of elastomeric material, extending on the opposite side of wall 12 to body 24, and comprising two opposite projections 41 and 42 (Figures 3 and 4): projection 41 projects outwards; while projection 42 loosely engages opening 13 and rests against portion 25 of body 24.

[0015] As shown in Figures 1, 3, 4, seal 40 also comprises a substantially flat portion 43 extending in contact with an outer surface of wall 12, and is maintained contacting said surface by a number of appendixes 44 integral with seal 40, and which engage respective slots 45 formed in wall 12 to click onto the other side of wall 12.

[0016] In actual use, as of the condition in which body 24 is maintained in the rest position by spring 36, pressure is applied on projection 41 to elastically deform seal 40 in opposition to the action of spring 36, so that body 24 is rotated gradually about axis 29 into the forward switching position to activate switch 15.

[0017] As compared with known solutions, handle 8 as described is therefore extremely straightforward in design, quick to assemble, and cheap to produce. This is mainly due to the straightforward design of the lock components, and to the lock being assembled by simply fitting portion 37 of spring 36 onto pins 38 of body 24, and clicking the resulting body-spring assembly onto structure 9 by pushing portion 28 of the body between the arms of fork 32, after first clicking switch 15 onto bracket 18 and seal 40 onto structure 9.

[0018] The particular connection of seal 40 to structure 9 provides for fluidtight sealing opening 13 in structure 9, through which the inside of door 1 communicates externally, and so forming a control device unaffected by external agents.

[0019] The particular geometric design of seal 40 - in particular the provision of projection 41 - enables rapid location by the user of the portion to be pressed to activate the lock.

[0020] Clearly, changes may be made to handle 8 as described herein without, however, departing from the scope of the present invention. In particular, wall 12 may be fitted with two devices 14, each for controlling a respective lock. This solution is particularly advantageous in the event door 1 comprises two electric locks: one interposed between body 2 of door 1 and the vehicle frame, and the other between body 2 and the window of door 1.

[0021] Moreover, body 24 may be formed differently from the one described and illustrated herein by way of

example, and may be maintained in the rest position by elastic elements other than the one shown and, for example, by elastic appendixes integral with or fitted to body 24.

Claims

1. A handle (8) for a vehicle door (1) having at least one electric lock; the handle (8) comprising a structure (9) fitted to the door (1), and at least one device (14), carried by said structure (9), for manually controlling said electric lock; the device (14) comprising a pushbutton switch (15), and manual operating means (24, 40) for manually operating the pushbutton switch (15); characterized in that said manual operating means (24, 40) comprise a single rocker-arm switching body (24) having a first portion (26) acting directly on said pushbutton switch (15), and hinge-connecting means (31, 35) for connecting an intermediate second portion (28) of said switching body (24) to said structure (9) in rotary manner about a hinge axis (29); elastic means (36) being provided to maintain said switching body (24) in a rotated rest position in which said first portion (26) is detached from said pushbutton switch (15).
2. A handle as claimed in Claim 1, characterized in that said switching body (24) is formed in one piece from plastic material.
3. A handle as claimed in Claim 1 or 2, characterized in that said elastic means (36) are separate from said switching body (24), and are carried by the switching body (24).
4. A handle as claimed in Claim 3, characterized in that said elastic means comprise a wire torsion spring (36).
5. A handle as claimed in any one of the foregoing Claims, characterized in that said hinge-connecting means (31, 35) are click-on connecting means.
6. A handle as claimed in Claim 5, characterized in that said hinge-connecting means (31, 35) comprise at least one pin (35) coaxial with said hinge axis (29) and carried by either one of said structure (9) or said intermediate second portion (28); and a cylindrical retaining seat (33) carried by the other of said structure (9) or said intermediate second portion (28); lead-in means (36) being provided to permit the pin (35) to click inside said cylindrical retaining seat (33).
7. A handle as claimed in Claim 6, characterized in that said lead-in means comprise at least one substantially flat surface (36) carried by said pin (35) or

by said structure (9) and forming an angle of other than 90° with said hinge axis (29).

8. A handle as claimed in any one of the foregoing Claims, characterized by comprising connecting means (22, 23) for connecting said pushbutton switch (15) to said structure (9); said connecting means (22, 23) comprising at least one seat (23) carried by either one of said structure (9) or said pushbutton switch (15), and at least one projection (22) carried by the other of said structure (9) or said pushbutton switch (15) and positively engaging said seat (23) to prevent said pushbutton switch (15) from moving with respect to said structure (9) in at least one direction (16) perpendicular to said hinge axis (29); click-on retaining means (18) being provided to retain said projection (22) inside said seat (23). 5 10 15
9. A handle as claimed in any one of the foregoing Claims, characterized in that said structure (9) comprises at least one opening (13) formed at a third portion (25) of said switching body (24); said manual operating means also comprising an elastically deformable seal (40) closing said opening (13) and at least partly contacting said third portion (25) of said switching body (24). 20 25
10. A handle as claimed in Claim 9, characterized in that said seal (40) comprises at least one portion (43) contacting an outer surface of said structure (9); and retaining means (44) being provided for retaining said portion (43) contacting said outer surface. 30 35
11. A handle as claimed in Claim 10, characterized in that said retaining means comprise a number of elastically deformable projections (44) integral with said seal (40) and inserted inside respective openings (45) in the structure (9) to click onto the other side of the structure (9). 40 45 50 55

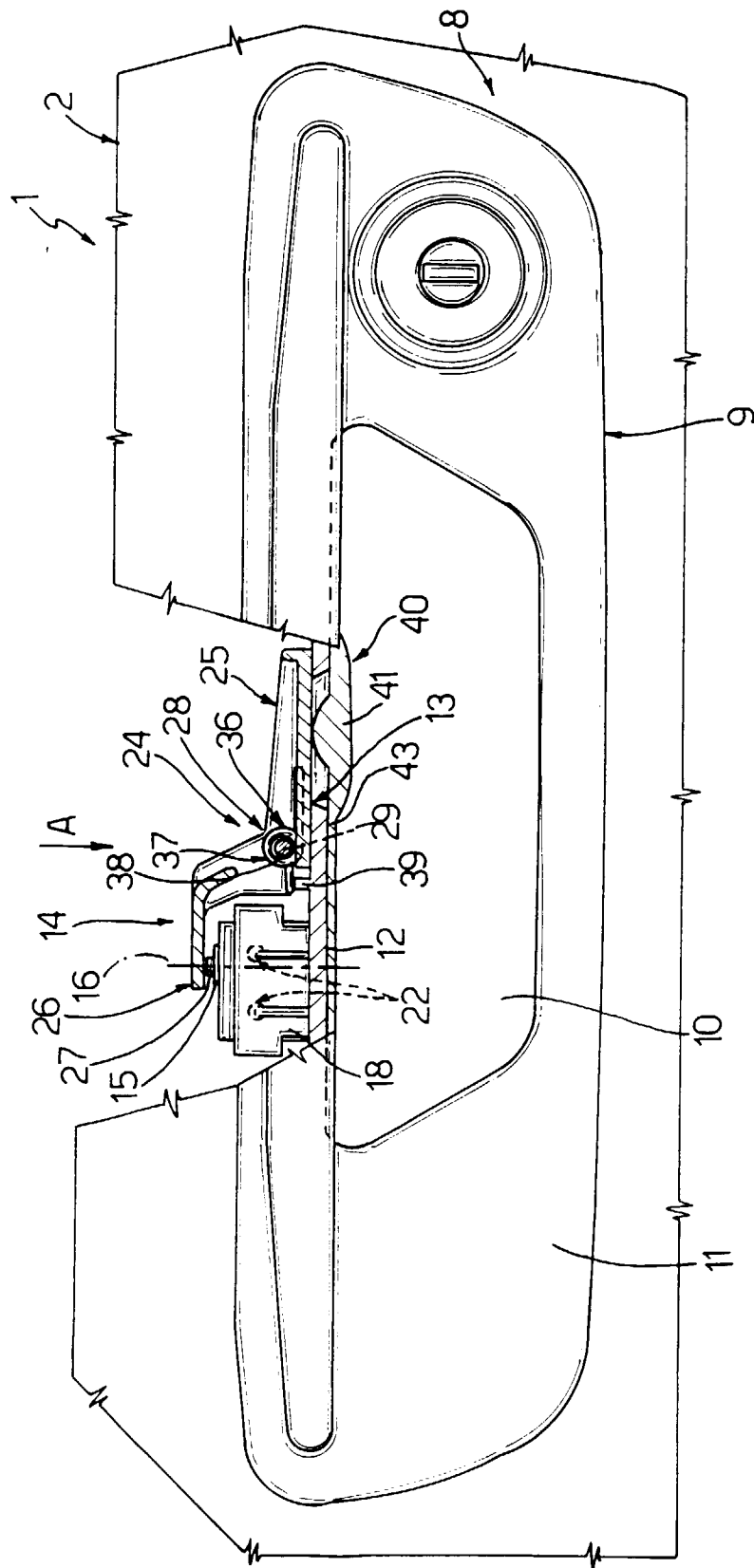


Fig. 1

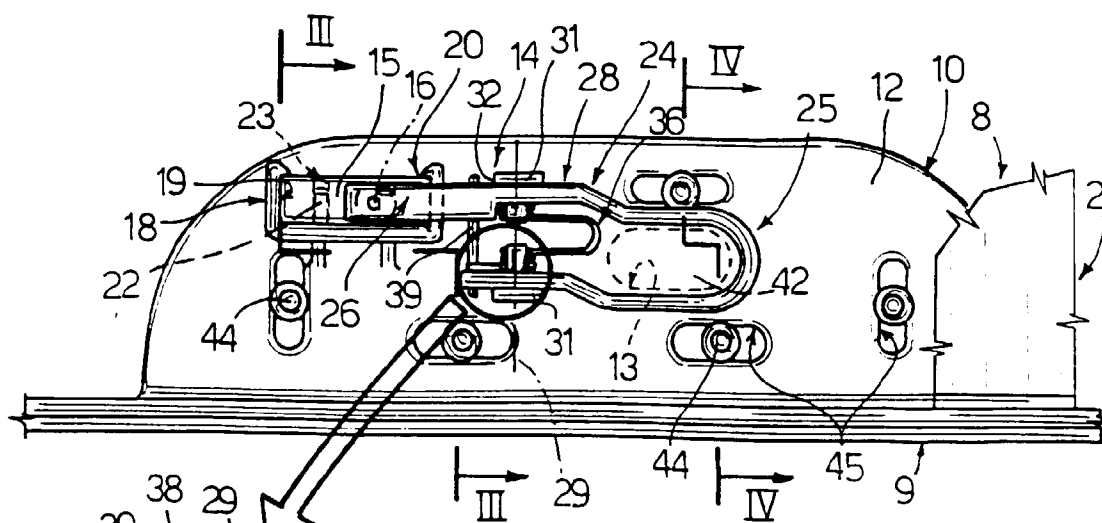


Fig. 2

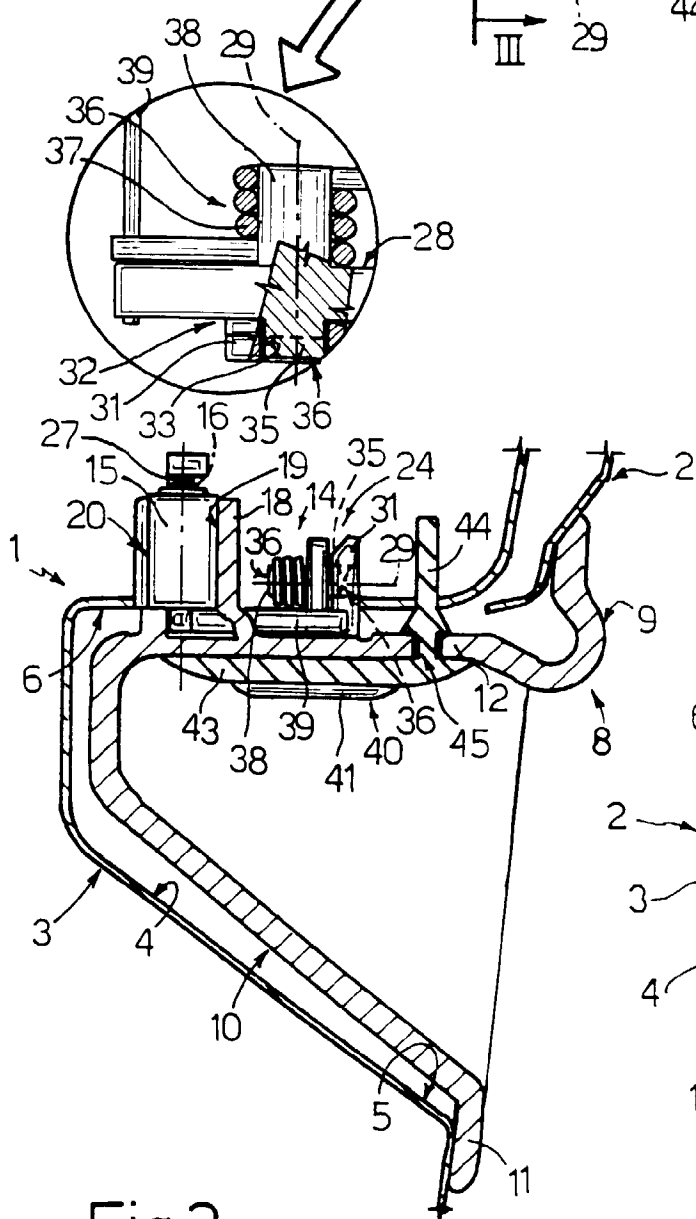


Fig. 3

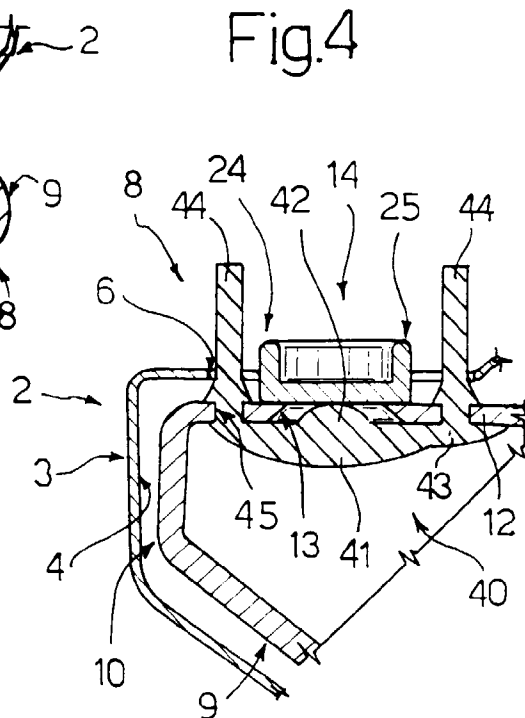


Fig. 4