



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.05.2001 Bulletin 2001/20

(51) Int Cl.7: **E05B 17/22**, E05B 7/00,
E05B 65/12, E05B 65/20

(21) Application number: **00124654.5**

(22) Date of filing: **10.11.2000**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **12.11.1999 IT TO990977**

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(54) **Vehicle door handle**

(57) A handle (1) for a vehicle door (2) extends in a mid-plane (P) and has a connecting structure (10) fittable to the door (2), and a control lever (15) gripped manually by a user and movable between a rest position and a control position to control a lock on the door; the control lever (15) has a first end portion (17) connected to

the connecting structure (10) by a substantially spherical articulated coupling (31), and a second end portion (18) connected to the connecting structure (10) by a flexible guide and slide coupling (37) to enable the second end portion (18) to travel along any path between the rest position and the control position and crosswise to a longitudinal direction (A).

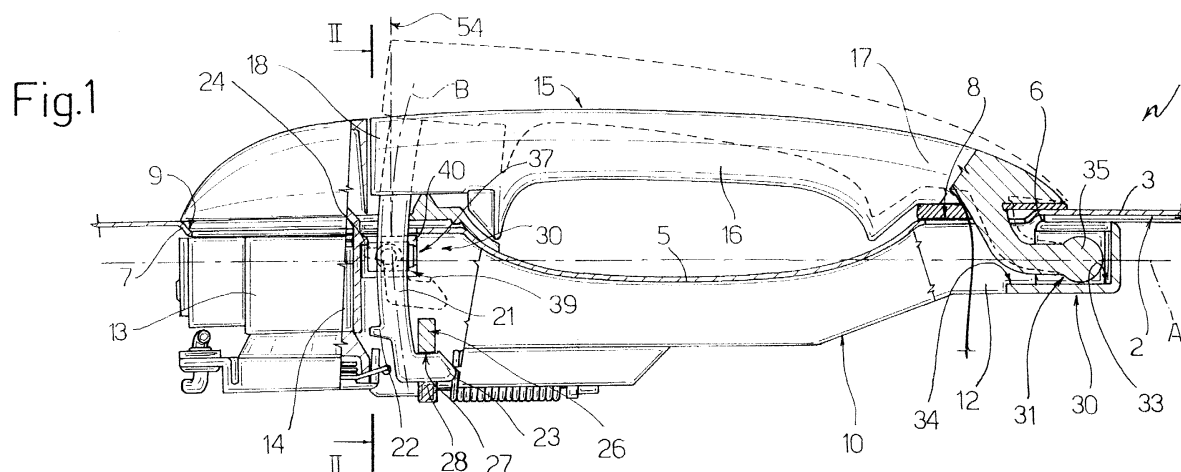
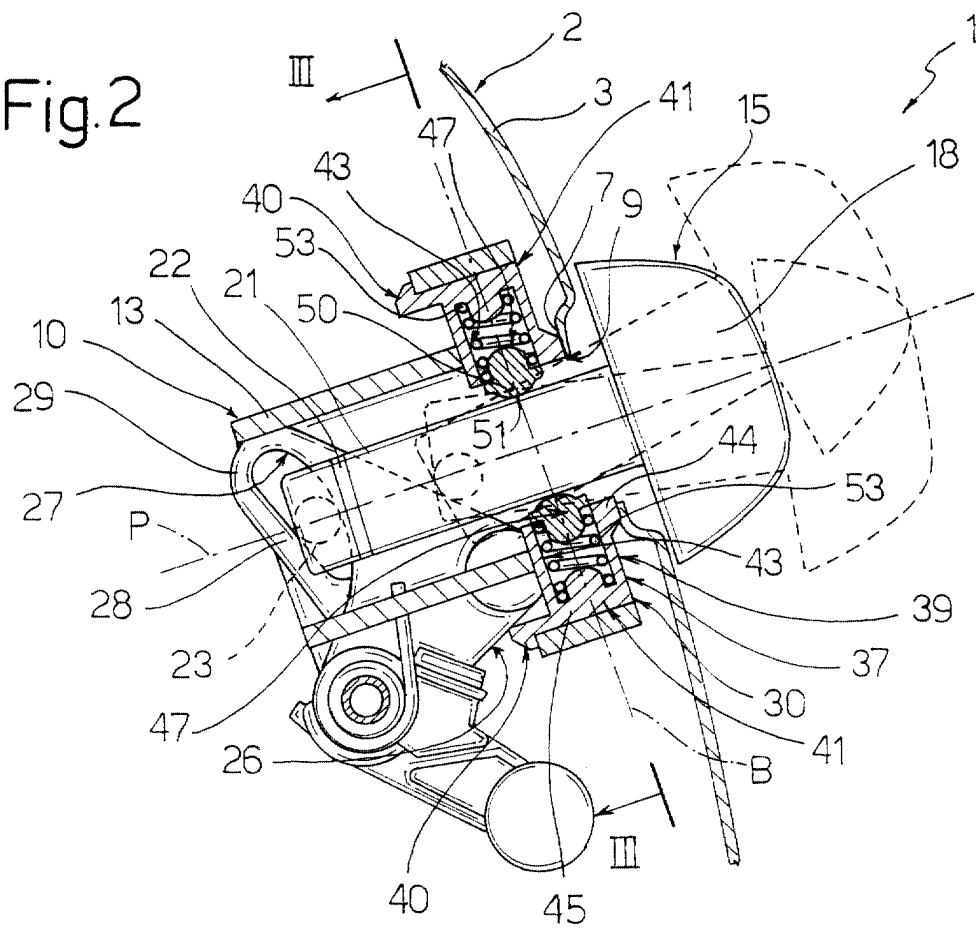


Fig.2



Description

[0001] The present invention relates to a vehicle door handle, and in particular to a handle of the type comprising a structure fittable integrally to a door of the vehicle, and a control lever in turn comprising an elongated intermediate outer grip portion facing the body of the door. The control lever also comprises an end portion hinged to the structure to enable the control lever to rotate, about a normally vertical hinge axis, between a rest position and a release position to release a lock on the door.

[0002] Though widely used, known handles of the type described above are far from satisfactory by failing to enable the door to be opened easily regardless of the physical characteristics of the user and the location of the handle with respect to the door.

[0003] Both the height of the user and the height at which the handle is fitted to the door affect the posture of the user and the ease with which the handle is operated when activating the control lever and opening the door. That is, to release the lock, the user must grip the grip portion and exert such force as to rotate the control lever in a substantially horizontal plane. Once the lock is released, the user, to open the door, must continue to exert a force whose useful component is that in the horizontal plane, while the components perpendicular to the horizontal plane are transmitted to the hinges.

[0004] Depending on the height at which the handle is fitted to the door, particularly tall or short users may be forced to operate in awkward or unnatural, e.g. bent, positions, or by contracting the arm operating the grip portion, so that considerable difficulty is encountered in exerting a force comprising a straightforward horizontal component to operate the control lever and open the door.

[0005] It is an object of the present invention to provide a vehicle door handle designed to eliminate the aforementioned drawbacks.

[0006] According to the present invention, there is provided a handle for a vehicle door; the handle being elongated in a longitudinal direction, and comprising a connecting structure fittable to said door; and a control lever gripped manually, in use, by a user and movable, with respect to said connecting structure, between a rest position and a control position to release a lock on said door; characterized in that said control lever comprises a first end portion connected to said connecting structure by a substantially spherical articulated coupling; and a second end portion connected to said connecting structure by a flexible guide and slide coupling to enable the second end portion to travel along any path between said rest position and said control position and cross-wise to said longitudinal direction.

[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 partly sectioned view, with parts removed for clarity, of a preferred embodiment of the handle according to the present invention and fitted to a vehicle door;

Figure 2 shows a larger-scale section along line II-II in Figure 1;

Figure 3 shows a section, with parts removed for clarity, along line III-III in Figure;

Figure 4 shows an exploded view of a detail in Figures 2 and 3;

Figure 5 shows the same view as in Figure 3, of a variation of the Figure 3 handle.

[0008] Number 1 in Figure 1 indicates a handle for a door 2 (shown partly) of a vehicle, in particular a motor vehicle. Door 2 comprises an outer body 3 in turn comprising a concave intermediate portion 5, and two portions 6 and 7 having respective openings 8 and 9 and located on opposite sides of portion 5 in a direction parallel, in use, to a horizontal longitudinal direction of the vehicle.

[0009] With reference to the accompanying drawings, handle 1 extends in a mid-plane P, is elongated in a direction A lying in plane P, and comprises a connecting structure 10, which is fitted to body 3, inside door 2, is connected integrally to door 2 in known manner not described in detail, and comprises two hollow end portions 12 and 13 adjacent to portions 6 and 7 respectively, and of which portion 13 houses a tubular member 14 in turn housing a key-operated lock (not shown) of handle 1.

[0010] Handle 1 also comprises a movable lever 15 outside door 2 and in turn comprising an elongated intermediate grip portion 16, which extends facing portion 5 and parallel to direction A when in a rest position (shown by the continuous line in Figures 1 and 2), and is gripped by a user to release a lock (not shown) on door 2.

[0011] With particular reference to Figure 1, lever 15 also comprises two end portions 17 and 18 located on opposite sides of grip portion 16. Portion 17 extends through portions 6 and 12, and portion 18 terminates with an arm 21 engaging portions 7 and 13.

[0012] With reference to Figures 1, 2 and 3, arm 21 carries, integrally, two opposite appendixes 22 and 23, of which appendix 22 faces away from portion 12 towards member 14 and comes to rest against a stop member 24 carried by member 14 to define a stop for lever 15, and appendix 23 extends from the end of arm 21 and is connected to a transmission lever 26.

[0013] As shown in Figure 2, transmission lever 26 is hinged to structure 10 about an axis parallel to direction A, provides for releasing the lock on door 2, and comprises a slot 27, which extends perpendicularly to appendix 23, is engaged in sliding manner by appendix 23, and is defined by an annular connecting portion 28 comprising a C-shaped end portion 29 for keeping appendix 23 connected to transmission lever 26 during the movements of control lever 15.

[0014] Lever 15 is connected to structure 10 by means of a connecting assembly 30 for enabling end portion 18 to move with respect to structure 10, along any path and crosswise to direction A, between a rest position and a lock control position (two possible control positions are shown by the dash lines in Figure 2).

[0015] With reference to Figure 1, assembly 30 comprises a spherical joint device 31 in turn comprising a dead retaining seat 33 formed in portion 12, parallel to direction A, and having an inlet 34 facing portion 13; and a spherical head 35 integral with the end of portion 17 of lever 15, and which engages seat 33 to enable lever 15 to rotate with respect to structure 10 about a center of rotation lying in plane P.

[0016] As shown in Figures 2 and 3, connecting assembly 30 also comprises a guide and slide assembly 37 in turn comprising a slide defined by arm 21, and a guide 39 in turn comprising two members 40 carried by structure 10 on opposite sides of arm 21 in a direction B perpendicular to plane P and therefore to direction A.

[0017] With particular reference to Figure 4, each member 40 comprises a parallelepiped-shaped supporting frame 41 having a dead cavity 43 defined by a lateral wall 44 and by a bottom wall 45 which clicks inside a relative seat 46 formed in portion 13 in a direction substantially parallel to arm 21 (Figures 2 and 3).

[0018] Each member 40 also comprises a guide body 47, which in turn comprises two end appendixes 48 engaging relative cavity 43 and which slide in direction B to engage relative lateral wall 44; and an end wall 50 having a hemispherical portion 51 on the opposite side to appendixes 48.

[0019] Cavities 43 house respective springs 53, which push end walls 50 in direction B to keep hemispherical portions 51 in contact with arm 21, which may thus move in any direction crosswise to direction A and substantially in a plane 54 perpendicular to direction A, so as to enable lever 15 to travel along any path.

[0020] In the Figure 5 variation, guide 39 is defined by a single member 55 comprising a U-shaped supporting frame 56 having a cavity 57 defined by two opposite lateral end walls 58, which are located on opposite sides of arm 21 in direction B and are fitted releasably inside respective seats 59 formed in portion 13 in directions substantially parallel to arm 21. Cavity 57 houses a U-shaped guide body 60 having an intermediate guide seat 62 facing member 14 and engaged in sliding manner by arm 21 with substantially no slack in direction B; and two springs 53, each interposed between a relative wall 58 and guide body 60 to enable guide body 60 to oscillate, inside cavity 57, crosswise to direction A and substantially in plane 54, and therefore to enable lever 15 to travel along any path.

[0021] To assemble the handle, guide 39 is connected to portion 13 of structure 10, which is then positioned in substantially horizontal direction A and fitted inside door 2. Control lever 15 is then connected to structure 10 from outside door 2 by connecting arm 21 to guide bodies 47,

60 and inserting spherical head 35 inside seat 33, and, finally, member 14 is inserted inside portion 13 and locked to keep stop member 24 facing appendix 22.

[0022] In actual use, to release the lock on door 2 and open door 2 itself, the user grips and pulls grip portion 16 outwards by exerting any force comprising a horizontal component parallel to plane P and a component perpendicular to plane P.

[0023] The flexibility of guide 39 enables grip portion 16 to move, not only in plane P to release the lock, but also perpendicularly to plane P, thus deforming springs 53 so that arm 21 slides against guide bodies 47, 60, and lever 15 can rotate about the center of rotation of joint device 31 to travel along any path substantially determined by the force exerted by the user.

[0024] Handle 1 therefore provides for releasing the lock and opening door 2 more easily by adapting to the physical characteristics of the user and to the height of the handle on door 2, and by grip portion 16 traveling along a path determined, not by rigid constraints, but substantially by the force exerted by the user when operating lever 15. The flexibility of guide 39, in fact, enables end portion 18 to travel along any path about the center of rotation and crosswise to direction A on opposite sides of plane P, depending on the position of the user with respect to handle 1, and on the force exerted by the user.

[0025] After releasing the lock by moving lever 15 to the control position, the user, to open door 2, continues the same movement performed to rotate lever 15, thus performing one continuous, extremely smooth movement.

[0026] Moreover, when lever 15 is pulled towards the user, the user exerts a force whole vertical component, as opposed to being transmitted to rigid constraints as in known solutions, is transmitted to springs 53 and from there to structure 10, thus safeguarding against damage to assembly 30.

[0027] Clearly, changes may be made to handle 1 as described herein without, however, departing from the scope of the present invention.

[0028] In particular, spherical head 35 may engage retaining seat 33 with sufficient clearance parallel to direction A to eliminate any jamming and reduce the effort required to operate handle 1, and so, for example, make up for any errors in the manufacture or assembly of handle 1, or any deformation caused by variations in temperature.

[0029] Device 31 and guide and slide assembly 37 may differ from those described and illustrated in the accompanying drawings. For example, the slide may be defined by a member other than arm 21, and/or guide 39 need not have supporting frames 41, 56. Finally, springs 53 may be replaced with elastic members other than those indicated, and/or portion 28 of transmission lever 26 connected to appendix 23 could be open and still comprise C-shaped end portion 29.

Claims

1. A handle (1) for a vehicle door (2); the handle (1) being elongated in a longitudinal direction (A), and comprising a connecting structure (10) fittable to said door (2); and a control lever (15) gripped manually, in use, by a user and movable, with respect to said connecting structure (10), between a rest position and a control position to release a lock on said door (2); characterized in that said control lever (15) comprises a first end portion (17) connected to said connecting structure (10) by a substantially spherical articulated coupling (31); and a second end portion (18) connected to said connecting structure (10) by a flexible guide and slide coupling (37) to enable the second end portion (18) to travel along any path between said rest position and said control position and crosswise to said longitudinal direction (A).
5 10 15 20 25
2. A handle as claimed in any one of the foregoing Claims, characterized in that said guide and slide coupling (37) comprises a slide (21) carried by said control lever (15); and a flexible guide (39) interposed between said connecting structure (10) and said slide (21).
30
3. A handle as claimed in Claim 2, characterized in that said guide (39; 50) comprises elastic means (53) located in a direction (B) perpendicular to said longitudinal direction (A) and on opposite sides of said slide (21).
35
4. A handle as claimed in Claim 2 or 3, characterized in that said guide (39; 50) comprises at least one supporting frame (41; 56) connected releasably to said connecting structure (10).
40 45
5. A handle as claimed in Claim 4, characterized in that said supporting frame (41; 56) houses a guide body (47; 60) movable with respect to the supporting frame (41; 56); said elastic means (53) being interposed between said guide body (47; 60) and said supporting frame (41; 56).
50
6. A handle as claimed in Claim 5, characterized in that said guide body (60) has a guide seat (62); said slide (21) engaging said guide seat (62) with substantially no clearance in said perpendicular direction (B).
55
7. A handle as claimed in Claim 5, characterized in that said guide body (47) comprises a hemispherical portion (51) which slides against said slide (21).
8. A handle as claimed in any one of Claims 2 to 7, characterized in that said control lever (15) comprises an arm (21) extending through said connecting structure (10) to release said lock; said slide (21) being defined by said arm (21).
9. A handle as claimed in Claim 8, characterized by comprising a transmission lever (26) for releasing said lock, and which is carried by said connecting structure (10) and in turn comprises a connecting portion (28) connected to said arm (21) and in turn comprising a C-shaped end portion (29) for keeping the arm (21) connected to said transmission lever (26) during the movements of said control lever (15).
10. A handle as claimed in Claim 9, characterized in that said connecting portion (28) is an annular portion defining a slot (27).
11. A handle as claimed in any one of the foregoing Claims, characterized in that said articulated coupling (31) comprises a retaining seat (33) formed in said connecting structure (10); and a spherical head (35) carried by said first end portion (17) and engaging said retaining seat (33).

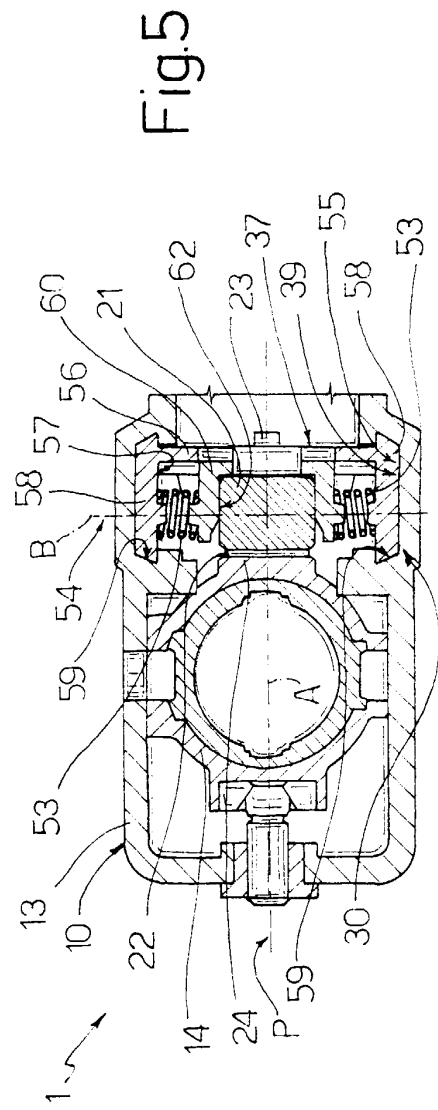
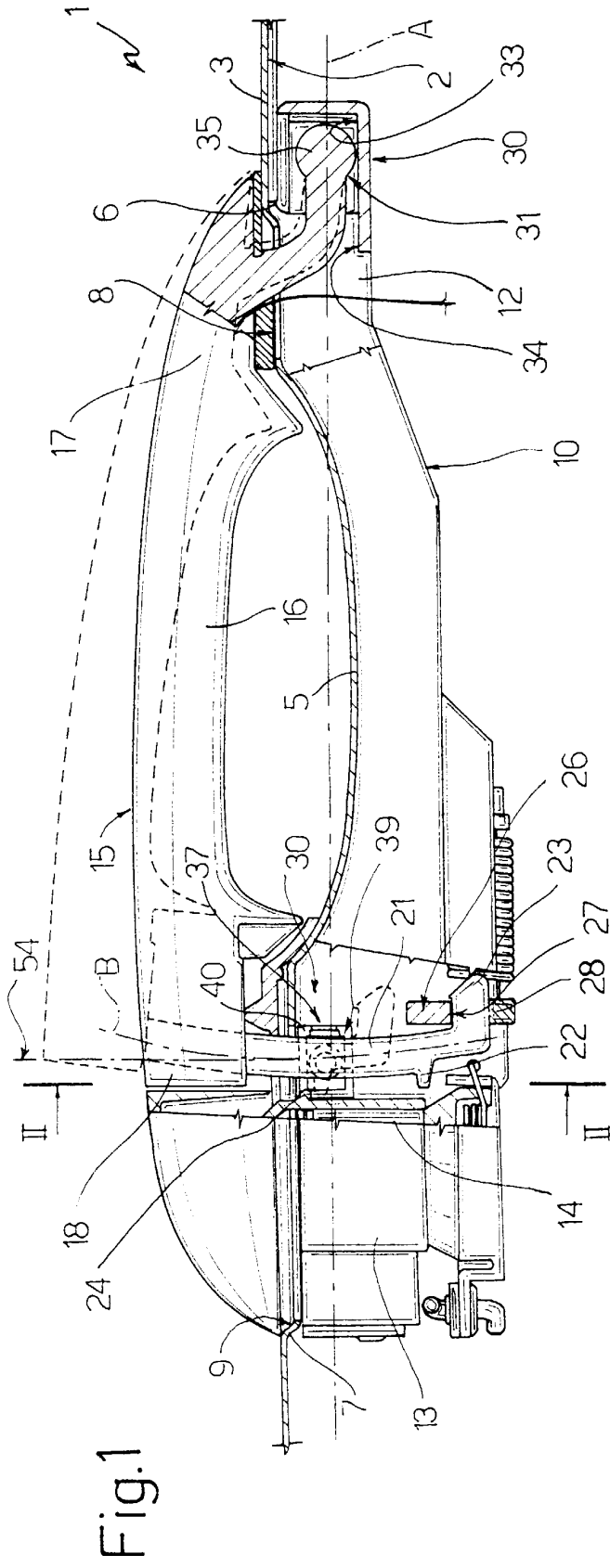


Fig.2

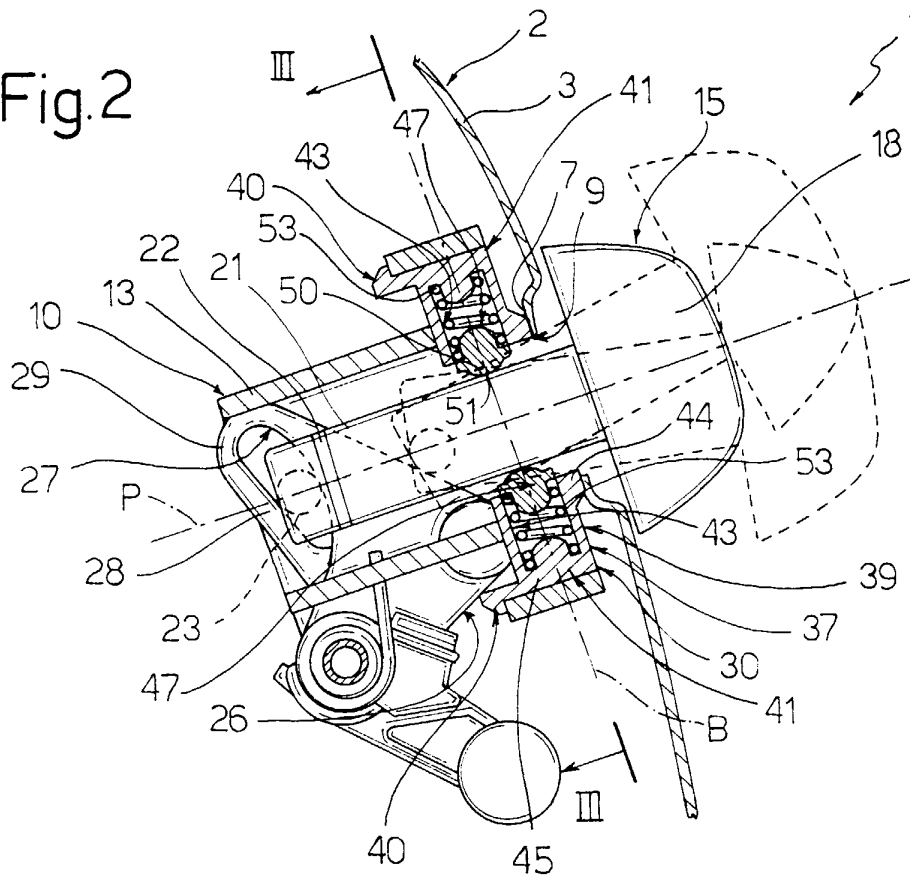


Fig.3

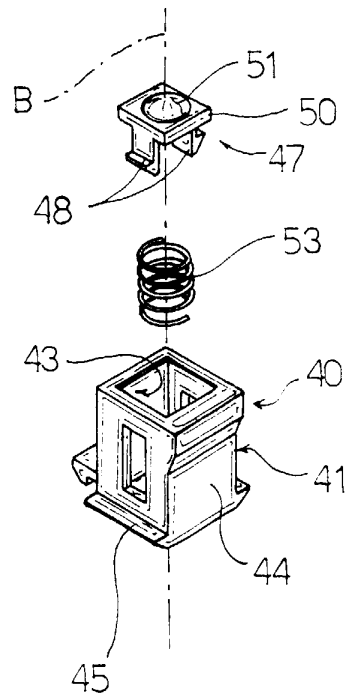
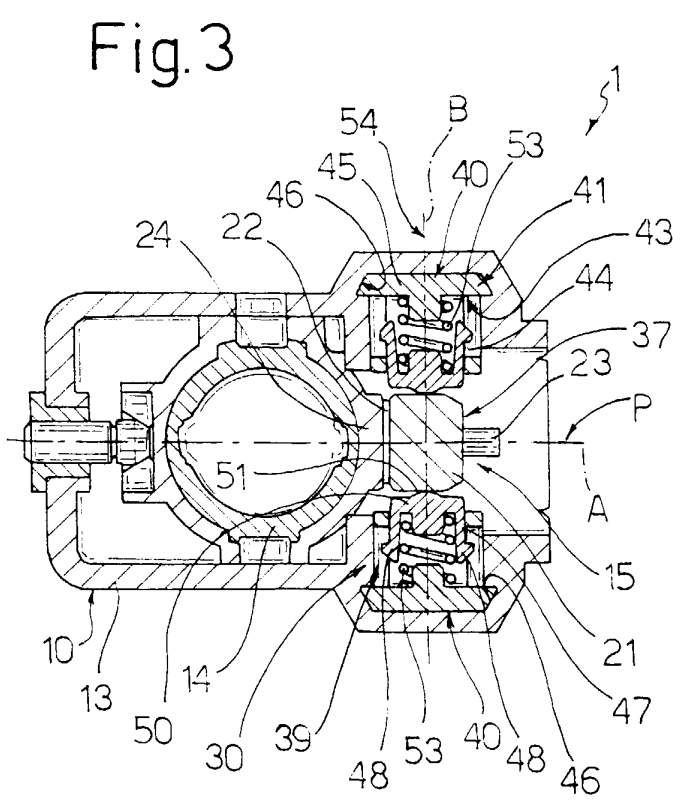


Fig.4



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 4654

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Place of search MUNICH		Date of completion of the search 16 March 2001	Examiner Friedrich, A
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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