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(54) **VEHICLE DOOR HANDLE ASSEMBLY**

(57) The present invention relates to a vehicle door handle assembly comprising a handle (2), a bracket (10) for accommodating said handle (2), a mechanism (3, 4, 7) enabling the handle (2) to assume an extended position outside the bracket (10) where a user can grab it, and a retracted position in which the handle (2) is mainly contained by said bracket (10), the vehicle door handle assembly comprising:
-resilient return means (5, 8, 9) able to apply a driving force to the mechanism (3, 4, 7) to ensure the return of the handle (2) from the extended position to the retracted position when not subjected to any further action,
-a damper (6) engaged with the resilient return means (5, 8, 9), capable of resisting the driving force by reducing the speed of the handle (2) when it leaves the extended position. The damper (6) comprises a movable cam (61) and is engageable with the resilient return means (5, 8, 9) via said movable cam (61), said movable cam (61) being configured so that while the handle (2) is between its extended position and an intermediate position, it engages the damper (6) resilient return means (5, 8, 9), and when the handle (2) is between the intermediate position and its retracted position, it disengages the damper (6) from the resilient return means (5, 8, 9).

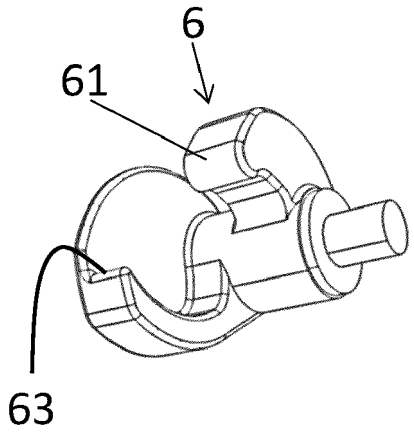


Fig. 10

EP 4 414 526 A1

Description

TECHNICAL FIELD:

[0001] The present invention relates to a vehicle door assembly, of the type with a handle translating from a rest position where the handle is retracted to a deployed position where the handle is deployed and can be taken in hand and opened.

BACKGROUND:

[0002] Such vehicle door handle assemblies with a handle translating between a rest position and a deployed position are becoming more common and requested by car manufacturers.

[0003] To translate between these two positions, such vehicle door handle assemblies are often motorized by an electric actuator. Such electric vehicle door handle assemblies are expensive and are not suitable for entry-level vehicles due to their costs.

[0004] A mechanical alternative for vehicle door handle assemblies having a translative movement has been suggested. Such assemblies are less expensive and never suffer from electric power failure. However, their operation relies on spring means which could trigger motions of excessive speed. This drawback is overcome thanks to damping means integrated into the assembly, for slowing down the motion speed during part of the operation.

[0005] Known damping means make use of teeth gears which engage and disengage with each other at the right time of the movement.

[0006] It has been observed that the teeth of the gears tend to wear out and may interlock undesirably, leading to the blocking of the handle assembly.

[0007] One aim of the present invention is a handle door assembly which would not stay locked by its damping means.

[0008] To this purpose, the invention relates to a vehicle door handle assembly comprising a handle, a bracket for accommodating said handle, a mechanism enabling the handle to assume an extended position outside the bracket where a user can grab it, and a retracted position in which the handle is mainly contained by said bracket. The vehicle door handle assembly comprises:

- resilient return means able to apply a driving force to the mechanism to ensure the return of the handle from the extended position to the retracted position when not subjected to any further action,

- a damper engaged with the resilient return means, capable of resisting the driving force by reducing the speed of the handle when it leaves the extended position,

characterized by the damper comprising a movable cam and being engageable with the mechanism via said movable cam, said movable cam being configured so that while the handle is between its extended position and an intermediate position, it engages the damper with the resilient return means, and when the handle is between the intermediate position and its retracted position, it disengages the damper from the resilient return means.

[0009] In the present invention, a damper is any kind of delay element able to slow down a motion by resisting a force that is imparted to it.

[0010] In one embodiment, the damper is directly engaged with the resilient return means. In an alternative embodiment, the damper is indirectly engaged with the resilient return means, though the mechanism.

[0011] In one embodiment, the damper comprises a camwheel provided with the movable cam and the extremity of the push lever comprises an arc portion forming a cam able to engage with the damper's movable cam.

[0012] Preferably, in this embodiment, the damper has an index, and the push lever also has an index, said indexes being designed to meet during the rotation of the push lever, so that the push lever can set the angular position of the damper.

[0013] According to one embodiment, the handle comprises a first extremity and a second extremity opposed to the first extremity, and the mechanism comprises a first front lever and a second front lever, the first extremity being connected to the first front lever, said first front lever being designed to be connected to an opening lever to open a latch of the vehicle door, said first front lever being designed to rotate with respect to the bracket between a rest position where the first extremity of the handle is in a rest position, the extended position where the first extremity of the handle is in a deployed position outside the bracket and an opening position where the first front lever actuates the opening lever, the second extremity being connected to the second front lever, said second front lever being designed to rotate with respect to the bracket between a rest position where the second extremity of the handle is in a rest position, an activation position where the second extremity of the handle is pushed into the bracket, and a deployed position where the second extremity of the handle is in a deployed position outside the bracket, and the resilient return means comprise a push lever, said push lever having a first extremity connected to the second front lever, said push lever being designed to rotate between a first position and a second position, the push lever comprising an elastic means passively bringing back said push lever to its first position, the rotation of the second front lever to its activation position actuates the rotation of the push lever from its first to its second position, and the passive rotation of the push lever from its second to its first position actuates the rotation of the second front lever from its deployed position to its rest position.

[0014] The second extremity of the handle may be provided with guiding means configured so as to reduce the degrees of freedom of the handle with respect to the

bracket when moving from the rest position to the activation position, the remaining degrees of freedom being translation and rotation about an axis parallel to the fixed direction.

[0015] The guiding means may comprise a rotating slider mounted rotational on the handle and a back wall of the bracket against which the rotating slider rests in a stable way when the handle moves from its rest position to its activation position.

[0016] The bracket may comprise side walls with slots for guiding the rotating slider when the handle moves.

[0017] The first front lever may comprise an elastic means passively bringing back said first front lever from its deployed position to its rest position.

[0018] The second front lever may comprise an elastic means passively rotating said second front lever toward its deployed position.

[0019] The connection between the first front lever and the first extremity of the handle may be a pivot-slide connection.

[0020] The first and second front levers may be connected together with at least one linking rod, said linking rod transmitting the rotation of the second front lever from its activation position to its deployed position to the first front lever, rotating said first front lever from its rest position to its deployed position.

[0021] The linking rod may comprise a pivot-slide connection with anyone of the first or second front lever so that the first front lever can rotate from its rest position to its deployed position or from its deployed position to its opening position without rotating the second front lever.

[0022] The second and the push levers may be connected together by a pushing rod and a pulling rod,

said pushing rod transmitting the rotation of the second front lever from its rest position to its activation position to the push lever, rotating said push lever from its first position to its second position,

said pulling rod transmitting the rotation of the push lever from its second position to its first position to the second front lever, rotating said second front lever from its deployed position to its rest position.

[0023] The pushing rod may comprise a pivot-slide connection with anyone of the second or push lever.

[0024] The pulling rod comprises a pivot-slide connection with anyone of the second or push lever.

[0025] Further features and advantages of the invention will become apparent from the following description, given by way of non-limiting examples, with reference to the appended drawings, in which:

- Figure 1 is a perspective view of a handle on a vehicle door panel, the handle being flush with the panel,
- Figure 2 is a view similar to the previous one, the handle being pushed,
- Figure 3 is a view similar to the previous one, the handle being extracted,
- Figure 4 is a view similar to the previous one, the handle being pulled,
- Figure 5 is a view similar to the previous one, the handle being extracted
- Figure 6 is a view identical to the one of figure 1,
- Figure 7 is a back view of the door handle assembly,
- Figure 8 is a close-up view of part VIII of figure 7,
- Figure 9 is a perspective view of a push lever,
- Figure 10 is perspective view of a damper,
- Figure 11 is a top view of the vehicle door handle assembly of figure 1,
- Figure 12 is a close-up view of part XII of figure 11,
- Figure 13 is a top view of the vehicle door handle assembly of figure 2,
- Figure 14 is a close-up view of part XIV of figure 13,
- Figure 15 is a top view of the vehicle door handle assembly of figure 3,
- Figure 16 is a close-up view of part XVI of figure 15,
- Figure 17 is a perspective view of the push lever and damper in cooperation,
- Figure 18 is a top view of the vehicle door handle assembly of figure 4,
- Figure 19 is a close-up view of part XIX of figure 18,
- Figure 20 is a perspective view of the push lever and damper in cooperation.

[0026] In the figures, identical elements bear the same reference numbers. The following implementations are examples. Although the description refers to one or more embodiments, this does not necessarily mean that each reference relates to the same embodiment or that the features apply only to a single embodiment. Individual features of different embodiments can also be combined or interchanged to provide other embodiments.

SUMMARY OF INVENTION

[0027] Figures 1, 6, 7, 11 show a vehicle door handle assembly in a rest position. This position is also called retracted position. The vehicle door handle assembly comprises a bracket 10 and a handle 2. The handle has a gripping face 20 oriented towards the bracket 10. The bracket 10 is designed to be fixed on the vehicle door 1. In this rest position, the handle 2 is retracted into the bracket 10 in order to be flush with the door body when installed.

[0028] The handle 2 comprises a first extremity 22 and a second extremity 23 opposed to the first extremity 22. The first extremity 22 of the handle 2 is connected to a first front lever 3 and the second extremity 23 of the handle 2 is connected to a second front lever 4.

[0029] The first front lever 3 is also designed to be connected to an opening lever (not represented) to open a latch of the vehicle door. The first front lever 3 is designed to rotate with respect to the bracket about an axis of rotation which is parallel to a predetermined fixed direction,

between a rest position (represented in figures 1, 6 and 11) where the first extremity 22 of the handle 2 is in a rest position, a deployed position (represented in figures 3 and 5) where the first extremity 22 of the handle 2 is in a deployed position outside the bracket 10 and an opening position (represented in figure 4) where the first front lever 3 actuates the opening lever.

[0030] More precisely, the first front lever 3 comprises a pivot connection 33 with the bracket 10. Said pivot connection 33 is parallel to the predetermined fixed direction. When the vehicle door handle assembly 1 is mounted on a car, said predetermined direction is vertical or almost vertical. Said fixed direction is perpendicular to the view on Figs. 11-16 and 18-19. The first front lever 3 rotates around the pivot connection between its different positions. A first extremity of the first front lever 3 is connected to the first extremity 22 of the handle 2 and a second extremity of the first front lever 3, is connected to the opening lever, in particular, thanks to a pivot connection 31 and the shape of the first front lever 3, the first front lever 3 can touch the opening lever during the movement.

[0031] The connection between the first front lever 3 and the first extremity 22 of the handle is preferably a pivot-slide connection. In the examples represented the figures, the first extremity 22 of the handle 2 comprises a slide opening 21 and the first front lever 3 comprises a recess 31 for example to receive a pin (not represented). The first front lever 3 may also comprise an elastic means 34 passively bringing back said first front lever 3 from its deployed position to its rest position. This elastic means 34 may be a spring positioned for example on the pivot connection 33 between the first front lever 3 and the bracket 10.

[0032] The second extremity 23 of the handle 2 is connected to a second front lever 4. The second front lever 4 is designed to rotate between a rest position (represented in figures 1, 6 and 11) where the second extremity 23 of the handle 2 is in a rest position, an activation position (represented in figures 2 and 13) where the second extremity 23 of the handle 2 is pushed into the bracket 10, and a deployed position (represented in figures 3, 5 and 15) where the second extremity 23 of the handle 2 is in a deployed position outside the bracket 10.

[0033] More precisely, the second front lever 4 comprises a pivot connection 41 with the bracket 10 around which the second front lever 4 rotates between its different positions. A first extremity of the second front lever 4 is connected to the second extremity 23 of the handle 2. This connection is preferably a pivot connection 24. The second front lever 4 may also comprise an elastic means (not represented) passively rotating said second front lever 4 to its deployed position. This elastic means may be a spring positioned for example on the pivot connection 41 between the second front lever 4 and the bracket 10.

[0034] The first 3 and second 4 levers may be connected together with at least one linking rod 7 in order to synchronize the movements of the two levers 3, 4. More precisely, the linking rod 7 transmits the rotation of the second front lever 4 from its activation position to its deployed position to the first front lever 3, rotating said first front lever 3 from its rest position to its deployed position. The linking rod 7 may comprise a pivot-slide connection with anyone of the first 3 or second front lever 4 so that the first front lever 3 can rotate from its rest position to its deployed position or from its deployed position to its opening position without rotating the second front lever 4. In the example illustrated in the figures, the linking rod 7 comprises a first extremity connected to a second extremity of the first front lever 3 by a pivot connection 32. The linking rod 7 comprises a second extremity connected to the second front lever 4 by pivot-slide connection. The second extremity of the linking rod 7 comprises a slide 71 (figure 15) and the second extremity of the second front lever 4 comprises a pin (not shown) inserted into said slide 71. The handle 2, the first front lever 3, the second 4 lever and the linking rod 7 are designed and connected like a parallelogram and move together synchronously. The other connection of the linking rod 7 with anyone of the first 3 or second front lever 4 is preferably a pivot connection.

[0035] The front levers 3, 4 and linking rod 7 altogether form a mechanism enabling the handle 2 to assume different positions, namely the extended position outside the bracket, where a user can grab it, and the rest or retracted position, in which the handle 2 is mainly contained by said bracket 10.

[0036] The vehicle door handle assembly 1 also comprises a push lever 5 having a first extremity connected to a second extremity of the second front lever 4, said push lever 5 being designed to rotate between a first position (represented in figures 1 and 2) and a second position (represented in figures 3 to 8). More precisely, the push lever 5 comprises a pivot connection 55 with the bracket 10 around which the push lever 5 rotates between its different positions. The push lever 5 also comprises an elastic means 56 passively bringing back said push lever 5 to its first position. This elastic means 56 may be a spring positioned for example on the pivot connection 55 between the push lever 5 and the bracket 10.

[0037] The pushing rod 8, pulling rod 9 and push lever 5 form a resilient return means able to apply a driving force to the mechanism to ensure the return of the handle 2 from the extended or deployed. position to the retracted or rest position when not subjected to any further action.

[0038] The rotation of the second front lever 4 to its activation position actuates the rotation of the push lever 5 from its first to its second position. The passive rotation of the push lever 5 from its second to its first position actuates the rotation of the second front lever 4 from its deployed position to its rest position.

[0039] The second front lever 4 and the push lever 5 are connected by a pushing rod 8 and a pulling rod 9. The pushing rod 8 transmits the rotation of the second front lever 4 from its rest position to its activation position

to the push lever 5, rotating said push lever 5 from its first position to its second position. The pulling rod 9 transmits the rotation of the push lever 5 from its second position to its first position to the second front lever 4, rotating said second front lever 4 from its deployed position to its rest position. The pushing 8 and the pulling 9 rods are placed on the push lever 5 on either side of the pivot connection 55 of the push lever 5 with the bracket 10. The pushing 8 and the pulling 9 rods are placed on the second extremity of second front lever 5 on the same side of the pivot connection 41 of the second front lever 4 with the bracket 10.

[0040] The pushing rod 8 may comprise a pivot-slide connection 52 with anyone of the second front lever 4 or push lever 5. In the example illustrated in the figures, the pivot-slide connection 52 is placed between the push lever 5 and the pushing rod 8. The push lever 5 comprises the slide of said pivot-slide connection 52 and the pushing rod 8 comprises a pin inserted in the slide. Still according to the example illustrated in the figures, the connection between the pushing rod 8 and the second front lever 4 is a pivot connection 44. The other connection of the pushing rod 8 with any of the second front lever 4 or push lever 5 is preferably a pivot connection.

[0041] The pulling rod 9 may comprise a pivot-slide connection 45 with any of the second front lever 4 or push lever 5. In the example illustrated in figures 1 to 8, the pivot-slide connection 45 is placed between the second front lever 4 and the pulling rod 9. The second front lever 4 comprises the slide of said pivot-slide connection 45 and the pulling rod 9 comprises a pin inserted in the slide. Still according to the example illustrated in the figures, the connection between the pulling rod 9 and the push lever 5 is a pivot connection 53. The other connection of the pulling rod 9 with any of the second front lever 4 or push lever 5 is preferably a pivot connection.

[0042] The push lever 5, more exactly its second extremity, cooperates with a damper 6 which slows down the passive rotation of the push lever 5 from its second to its first position. The damper 6, thus engaged with the resilient return means, is capable of resisting the driving force of said resilient return means by reducing the speed of the handle 2 when it leaves the extended position. The damper 6 comprises a camwheel provided with a movable cam 61 and the extremity of the push lever 5, connected to the at least one damper 6, comprises an arc portion forming a cam 54 able to engage with the damper's movable cam 61. The damper 6 has an index 63 and the push lever 5 also has an index 57. Indexes 63 and 57 are designed to meet during the rotation of the push lever 5, so that the push lever 5 can set the angular position of the damper 6, as will be explained hereafter. Accordingly, the damper 6 comprises a movable cam 61 and can be engaged (i.e. is engageable) with the mechanism via said movable cam 61.

[0043] As described above, figures 1 and 11 are a representation of a rest or retracted position where the handle 2 is retracted into the bracket 10 in order to be at the same level as the door body when installed. The first front lever 3 is in its rest position and maintained in this rest position by the elastic means 34. The second front lever 4 is in its rest position and the push lever 5 is in its first position. The push lever 5 is maintained in its first position by the elastic means 56. The elastic means 56 of the push lever 5 is stronger than the elastic means of the second front lever 4 in order that the push lever 5 in its first position maintained the second front lever 4 in its rest position. The elastic means 56 of the push lever 5 is also stronger than the damper 6 in order to maintain the push lever 5 in its first position. The position of the damper 6 is such that movable cam 61 remains out of the trajectory of the cam 54. Accordingly, the cam 54 of the push lever 5 cannot engage the movable cam 61 of the damper 6.

[0044] In this rest position, the inside of the handle 2 may also rests on a rest portion 11 of the bracket 10, placed between the first 22 and second 23 extremities of the handle 2, and on a rotating slider 12 rotatably connected to the second extremity 23 of the handle and resting against a back wall (not represented) of the bracket 10.

[0045] Figures 2 and 13 represent an activation position of the handle 2 where the user activates the handle 2 by pushing the second extremity 23 of the handle 2 into the bracket 10. Due to this push, the handle 2 rotates taking support on the rest portion 11 of the bracket 10 and on the rotating slider 12. The first extremity 22 of the handle 2 protrudes from the bracket 10 and rotates the first front lever 3 around its pivot connection 33 with the bracket 10 from its rest position to an intermediate. The rotation of the first front lever 3 is not transmitted to the second front lever 4 by the linking rod 7 due to the pivot-slide connection of the linking rod 7 with anyone of the first 3 or second front lever 4.

[0046] The push of the second extremity 23 of the handle 2 rotates the second front lever 4 around its pivot connection 41 with the bracket 10 from its rest position to its activation position. The rotation of the second front lever 4 causes the rotation of the push lever 5 around its pivot connection 55 with the bracket 10 from its first to its second position. The transmission of the rotation of the second front lever 4 to the push lever 5 is made by the pushing rod 8 which pushes one side of the push lever 5 causing its rotation. Indeed, the rotation of the second front lever 4 to its activation position makes the pushing rod 8 slid in its slide-pivot connection with anyone of the second 4 or push lever 5 bringing the pushing rod 8 to abutment pushing the push lever 5. The pulling rod 9 slides in its slide-pivot connection with anyone of the second front lever 4 or push lever 5 without affecting the rotation of anyone of these levers 4, 5. The rotation of the second front lever 4 is made against the torque of its elastic means and the rotation of the push lever 5 is made against the torque of its elastic means 56.

[0047] The activation position can also be reached by a parallel movement in a different embodiment. In such

a case, the push takes place on the surface of the handle 2, not necessarily at the second extremity 23.

[0048] The rotation of the push lever 5 around the pivot connection 55, as indicated by the curved arrow in figure 14, rotates its index 57 towards the index 63 of the damper 6. The cams 54 and 61 cannot engage and do not interfere with one another. When the two indexes 57 and 63 come into contact, the damper 6 rotates in the direction indicated by the curved arrow in figure 14, thus moving the movable cam 61 on the trajectory of the cam 54 in case of reverse rotation of the push lever 5.

[0049] Figures 3, 5 and 15 represent a deployed position, also called extended position, of the handle 2 where the first front lever 3 is still in its deployed position and where the second front lever 4 has rotated from its activation position to its deployed position, bringing the second extremity 23 of the handle 2 in its deployed position outside the bracket 10. When the user removes his push on the second extremity 23 of the handle 2, the elastic means of the second front lever 4 allows the passive rotation of the second front lever 4 to its deployed position. The rotation of the second front lever 4 is not transmitted to the push lever 5 by any of the pushing 8 or pulling rod 9 which slide with their pivot-slide connections. The first front lever 3 is maintained in its deployed position due to the linking rod 7 which is in abutment with its pivot-slide connection. The push lever 5 turns back slowly to its second position due to the damper 6 because the cam of the camwheel 61 abuts against the cam portion 54 of the push lever 5, as one can see in figure 16. The pulling rod 9 is in abutment in order to stop the rotation of the second front lever 4 in its deployed position against the torque of its elastic means 34.

[0050] Figure 4 represents an opening position of the handle where a user can grab the handle and pull it or has taken the handle and pulled it in order to open the vehicle door. When the user pulls the handle 2, it rotates around the pivot connection 24 between the second extremity 23 of the handle 2 and the second front lever 4. The first extremity 22 of the handle 2 is pulled in an opening position rotating the first front lever 3 from its deployed position to its opening position. The rotation of the first front lever 3 is not transmitted to the second front lever 4 by the linking rod 7 due to its pivot-slide connection.

[0051] When the user releases the handle 2, the first front lever 3 rotates back to its deployed position due to its elastic means 34, as illustrated by figures 4 and 15.

[0052] Thanks to the abutment of cams 61 and 54, as shown in figures 16 and 17, the damper 6 slows down the passive return rotation of the push lever 5 from its second position to its first position. When the push lever 5 rotates from its second to its first position, it also transmits its rotation to the second front lever 4 to rotate the second front lever 4 from its deployed position to its rest position.

[0053] When the push lever 5 rotates to its first position, the pulling rod 9 is in abutment in order to pull back the second front lever 4 in its rest position against the torque of the elastic means of the second front lever4. The rotation of the second 4 and the first 3 levers to their rest position are synchronous due to the linking rod 7. Thus, the handle 2 translates from its deployed position (figure 5) to its rest position (figure 6). This translation is slowed down and progressive thanks to the abutment of the cam 54 of the push lever 5 with the movable cam 61 of the damper 6.

[0054] As long as the cams 61 and 54 stay engaged, as shown in figure 16, the push lever 5 is prevented from accelerating. The handle 2 moves slowly from its deployed position towards its retracted position.

[0055] After the push lever 5 and damper 6 have rotated until the position represented in figures 19 and 20, the cams 61 and 54 disengage and the damper 6 stops preventing the push lever 5 from rotating faster under the torque of its elastic means 56. The index 63 is back on the path of index 57 in case of reverse rotation. The push lever 5 accelerates its motion and the handle 2 moves quickly to its retracted position.

[0056] The moment of disengagement of the cams 61 and 54 is predetermined by the shape of the cams 61 and 54, so that the disengagement takes place when the handle has reached an intermediary position where it is partially inserted into the bracket and leaves no room for human fingers on its gripping face 20. The exact adjustment of this position is left to the skilled person, depending on the exact shape of the handle 2 and bracket 10.

[0057] As a result, the movable cam 61 is configured so that while the handle 2 is between its extended position and the intermediate position, said movable cam 61 engages the damper 6 with the mechanism, and when the handle 2 is between the intermediate position and its retracted position, it disengages the damper 6 from the mechanism.

[0058] The damper 6 is back in its initial position shown in figure 12, ready for another opening cycle starting from the rest position of the handle 2.

LIST OF REFERENCES

[0059]

1: vehicle door
10: bracket
11: rest bracket
12: rotating slider
2: handle
20: gripping face of the handle
21: slide of the first extremity of the handle
22: first extremity of the handle
23: second extremity of the handle
24: second extremity pivot connection
3: first front lever
31: recess at the first extremity of the first front lever
32: pivot connection of the first front lever with linking rod
33: pivot connection of the first front lever with brack-

et
34: elastic means
4: second front lever
41: pivot connection of the second front lever with the bracket
42: pivot connection of the second front lever with linking rod
44: pivot connection of the of the second front lever with the pushing rod
45: slide-pivot connection of the second front lever with the pulling rod
5: push lever
52: slide-pivot connection of the push lever with the pushing rod
53: pivot connection of the push lever with the pulling rod
54: cam of the push lever
55: pivot connection of the push lever with the bracket
56: elastic means
57: index of the push lever
6: damper
61: movable cam of the damper
62: fixing mean
63: index of the damper
7: linking rod
71: extremity slide of the linking rod
8: pushing rod
9: pulling rod

Claims

1. **Vehicle door handle assembly** comprising a handle (2), a bracket (10) for accommodating said handle (2), a mechanism (3, 4, 7) enabling the handle (2) to assume an extended position outside the bracket (10) where a user can grab it, and a retracted position in which the handle (2) is mainly contained by said bracket (10), the vehicle door handle assembly comprising:

    - resilient return means (5, 8, 9) able to apply a driving force to the mechanism (3, 4, 7) to ensure the return of the handle (2) from the extended position to the retracted position when not subjected to any further action,
    - a damper (6) engaged with the resilient return means (5, 8, 9), capable of resisting the driving force by reducing the speed of the handle (2) when it leaves the extended position,

    characterized by the damper (6) comprising a movable cam (61) and being engageable with the resilient return means (5, 8, 9) via said movable cam (61), said movable cam (61) being configured so that while the handle (2) is between its extended position and an intermediate position, it engages the damper (6) resilient return means (5, 8, 9), and when the handle (2) is between the intermediate position and its retracted position, it disengages the damper (6) from the resilient return means (5, 8, 9).

2. Vehicle door assembly according to claim 1, wherein the damper (6) is directly engaged with the resilient return means (5, 8, 9).

3. Vehicle door assembly according to claim 2, wherein the damper (6) comprises a camwheel provided with the movable cam (61) and the extremity of the push lever (5) comprises an arc portion forming a cam (54) able to engage with the damper's movable cam (61).

4. Vehicle door assembly according to claim 3, wherein the damper (6) has an index (63) and the push lever (5) also has an index (57), said indexes (63, 57) being designed to meet during the rotation of the push lever (5), so that the push lever (5) can set the angular position of the damper (6).

5. Vehicle door assembly according to claim 1, wherein the damper is indirectly engaged with the resilient return means, though the mechanism.

6. Vehicle door handle assembly according to any one of the preceding claims, said handle (2) comprising a first extremity (22) and a second extremity (23) opposed to the first extremity (22),

    the mechanism comprising a first front lever (3) and a second front lever (4), the first extremity (22) being connected to the first front lever (3), said first front lever (3) being designed to be connected to an opening lever to open a latch of the vehicle door, said first front lever (3) being designed to rotate with respect to the bracket (10) between a rest position where the first extremity (22) of the handle (2) is in a rest position, the extended position where the first extremity (22) of the handle (2) is in a deployed position outside the bracket (10) and an opening position where the first front lever (3) actuates the opening lever,
    the second extremity (23) being connected to the second front lever (4), said second front lever (4) being designed to rotate with respect to the bracket (10) between a rest position where the second extremity (23) of the handle (2) is in a rest position, an activation position where the second extremity (23) of the handle (2) is pushed into the bracket (10), and a deployed position where the second extremity (23) of the handle (2) is in a deployed position outside the bracket (10),
    the resilient return means comprising a push lever (5), said push lever (5) having a first extrem-

ity connected to the second front lever (4), said push lever (5) being designed to rotate between a first position and a second position, the push lever (5) comprising an elastic means (56) passively bringing back said push lever (5) to its first position,
the rotation of the second front lever (4) to its activation position actuates the rotation of the push lever (5) from its first to its second position, and the passive rotation of the push lever (5) from its second to its first position actuates the rotation of the second front lever (4) from its deployed position to its rest position.

7. Vehicle door handle assembly according to any one of the preceding claims, wherein the second extremity (23) of the handle (2) is provided with guiding means (25, 104) configured so as to reduce the degrees of freedom of the handle (2) with respect to the bracket (10) when moving from the rest position to the activation position, the remaining degrees of freedom being translation and rotation about an axis parallel to a fixed direction.

8. Vehicle door assembly according to claim 7, wherein the guiding means comprise a rotating slider (25) mounted rotational on the handle (2) and a back wall of the bracket (10) against which the rotating slider (25) rests in a stable way when the handle (2) moves from its rest position to its activation position.

9. Vehicle door assembly (1) according to claim 2, wherein the bracket (10) comprises side walls with slots for guiding the rotating slider (25) when the handle (2) moves.

Fig. 1

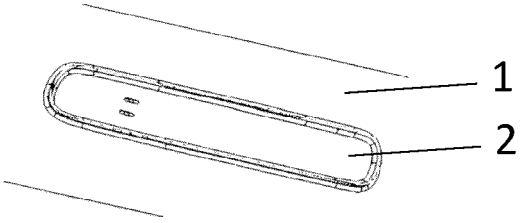
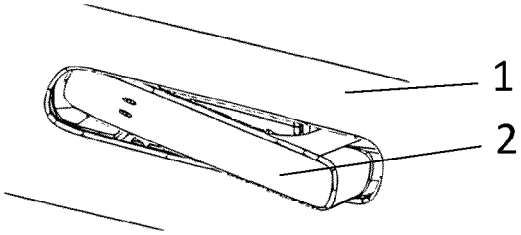


Fig. 2



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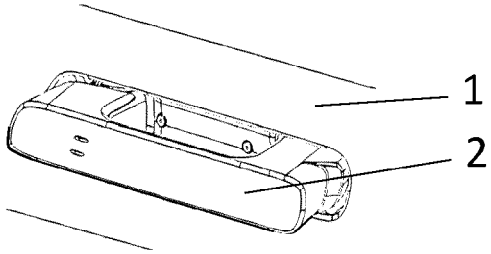


Fig. 4

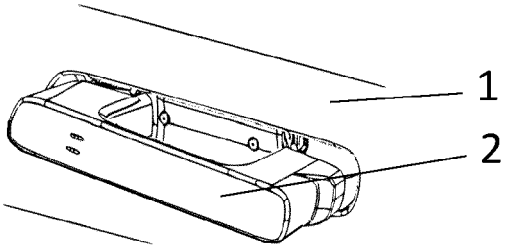
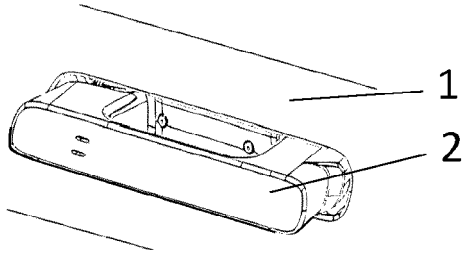


Fig. 5



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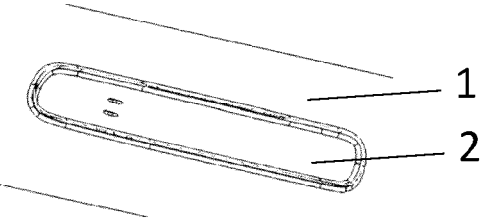

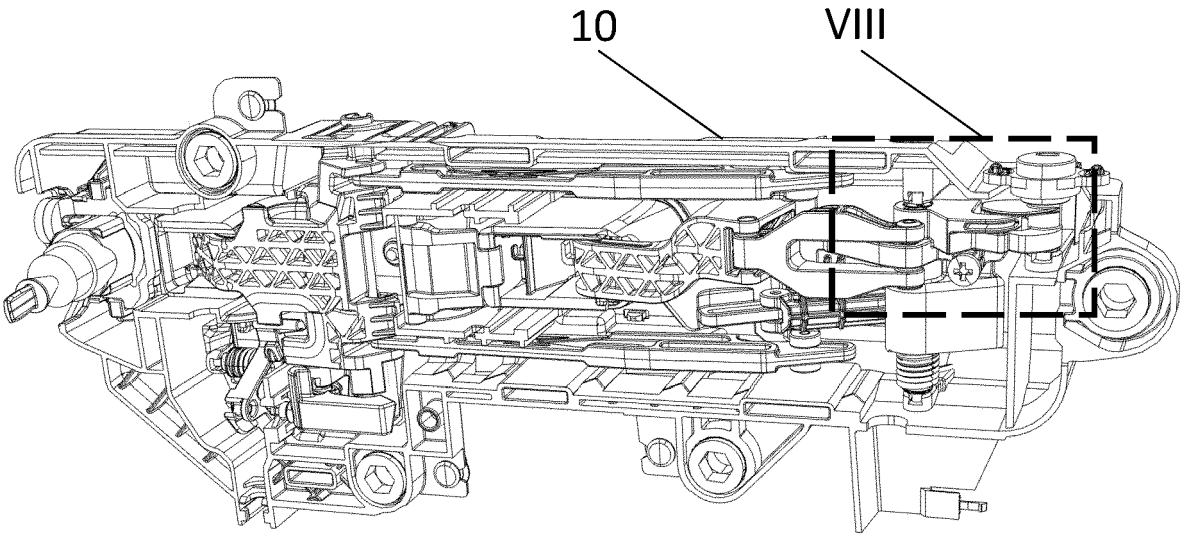

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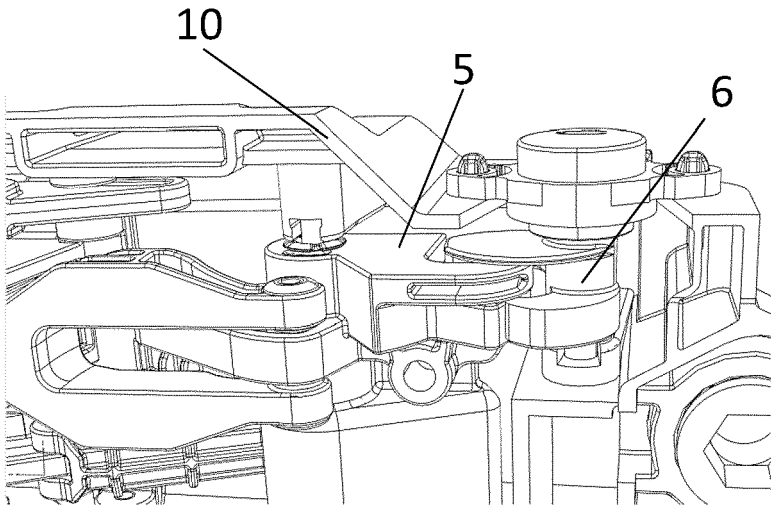

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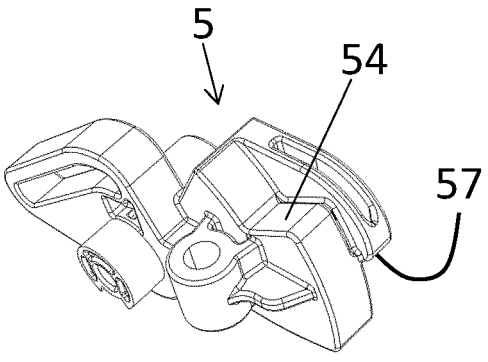

Fig. 9

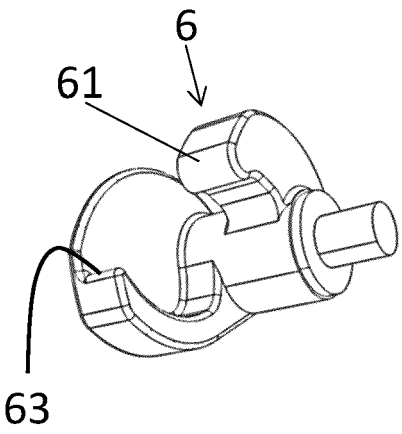

Fig. 10

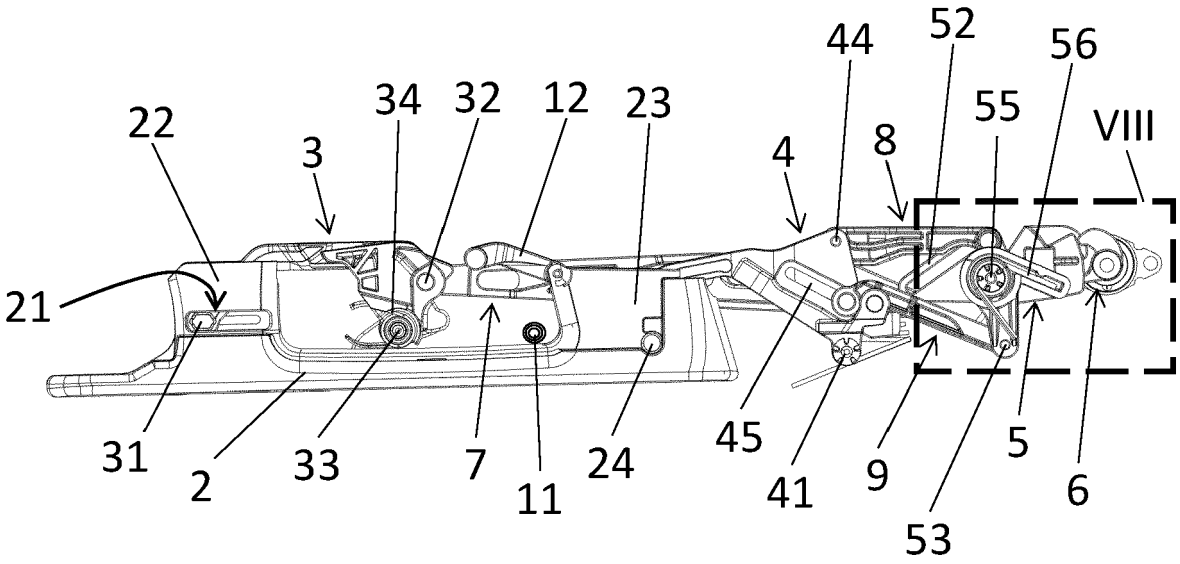
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Fig. 11

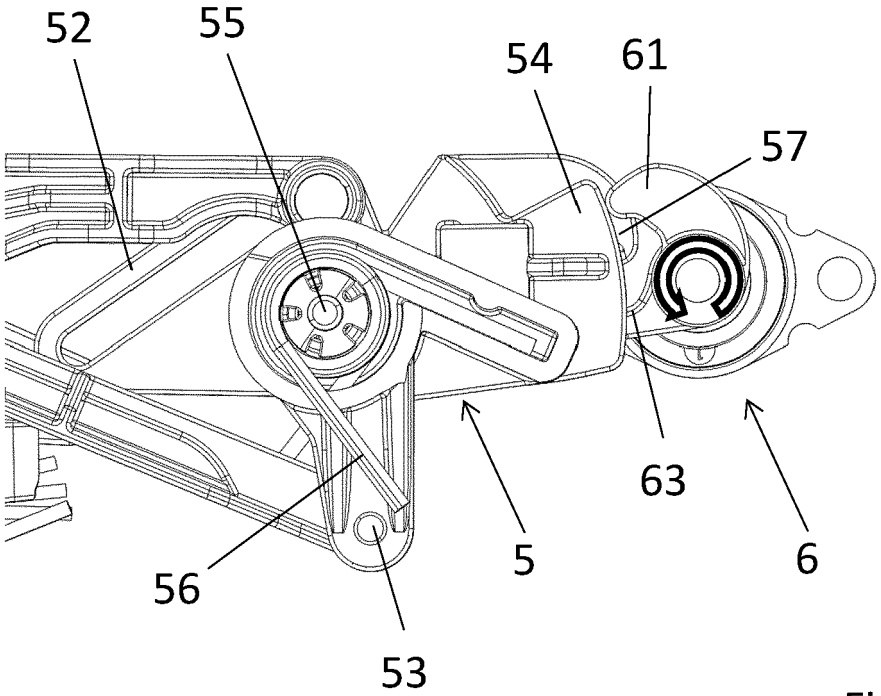
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Fig. 12

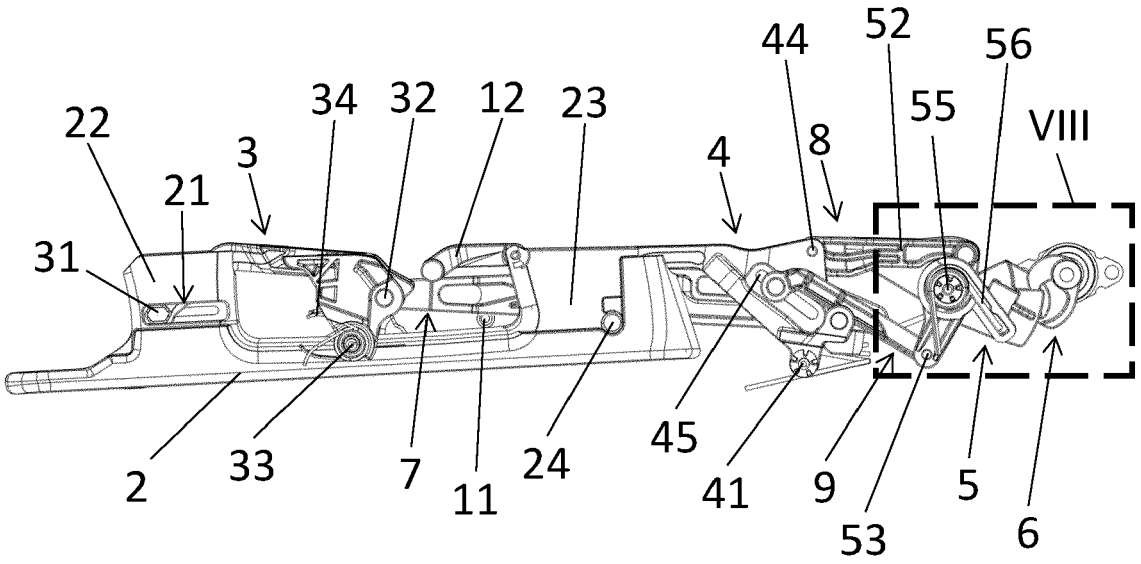
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Fig. 13

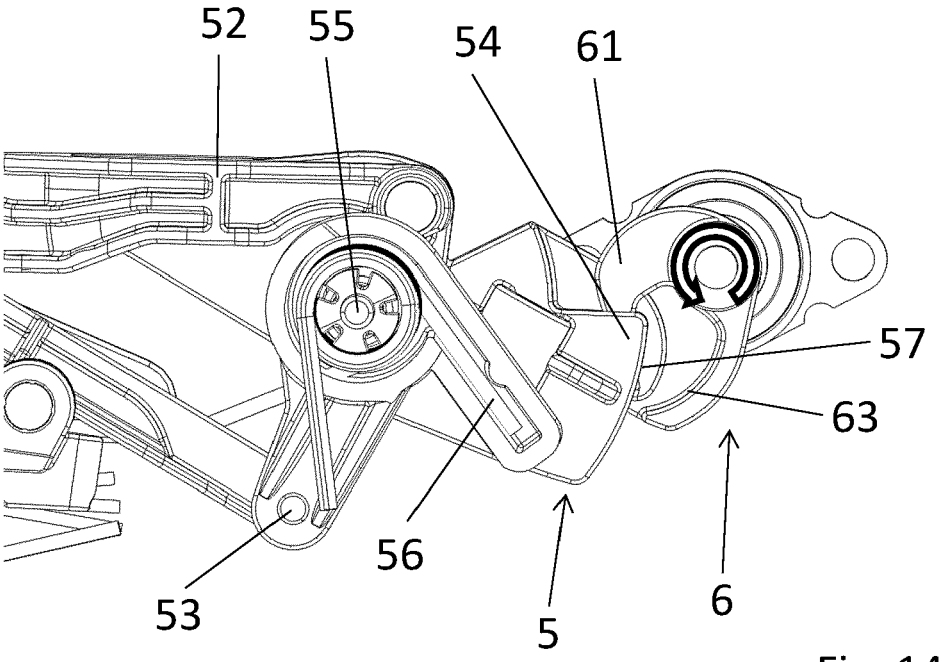
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Fig. 14

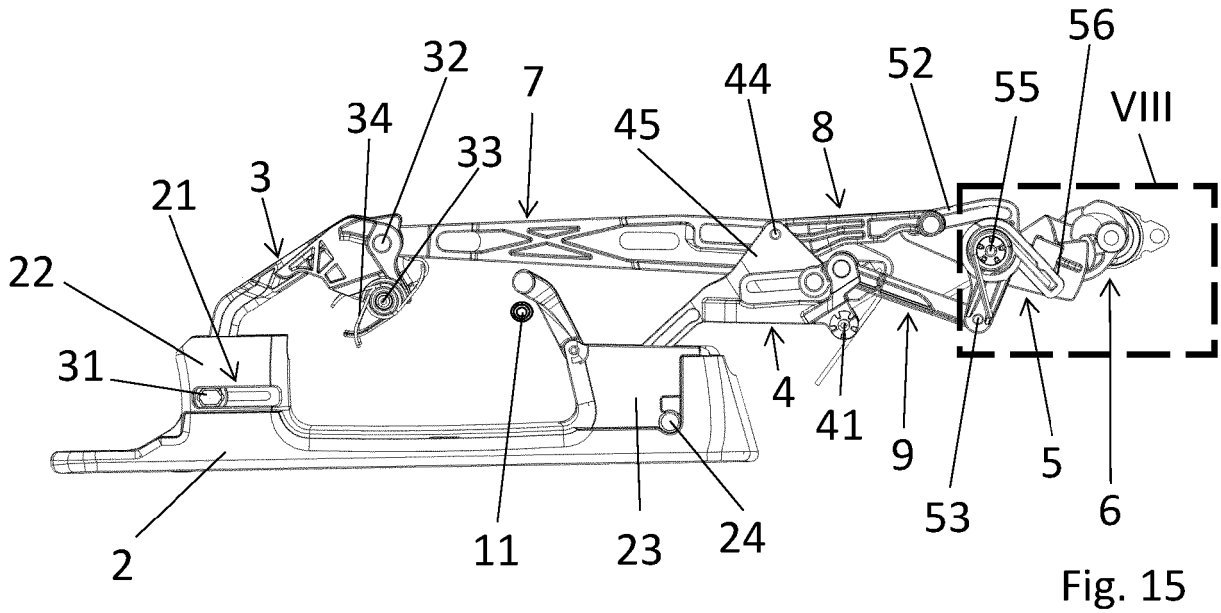

Fig. 15

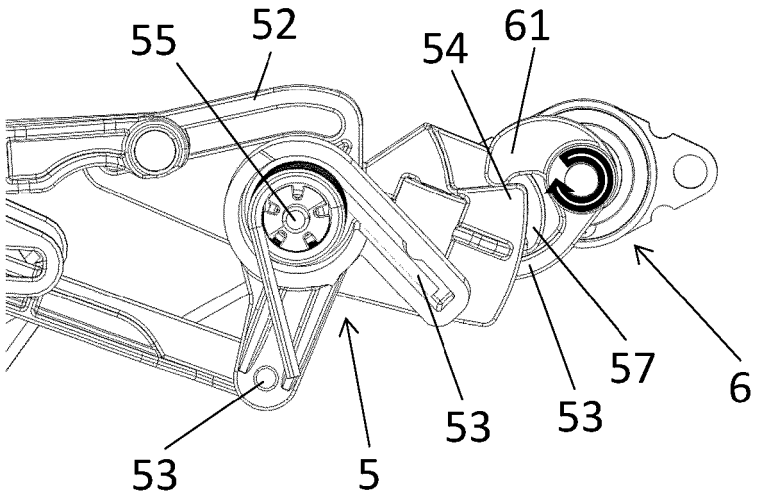

Fig. 16

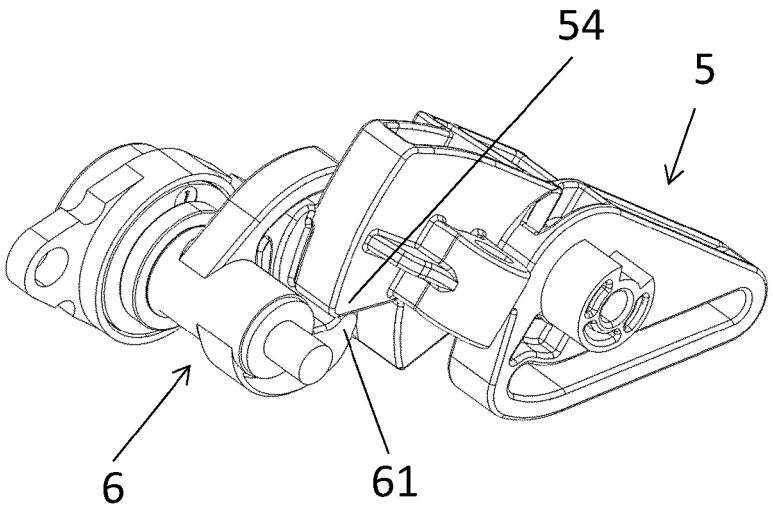

Fig. 17

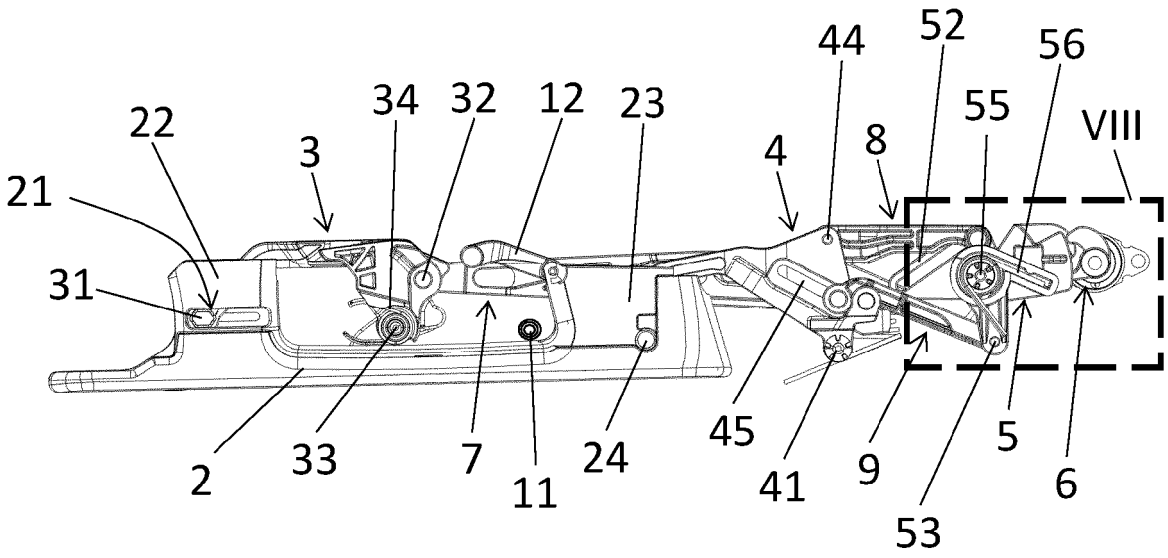

Fig. 18

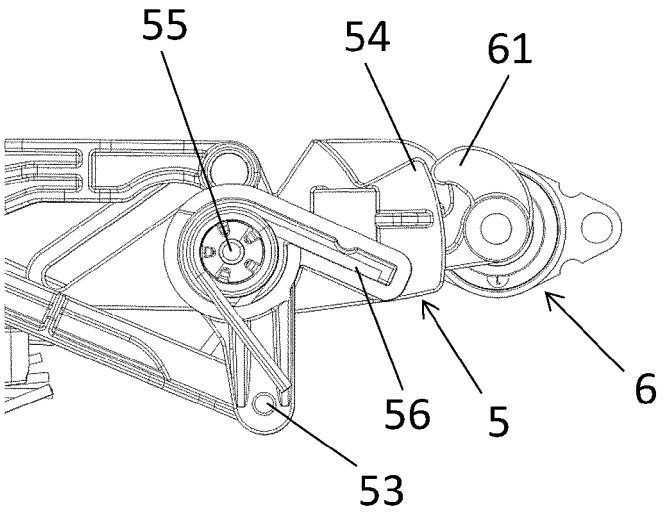

Fig. 19

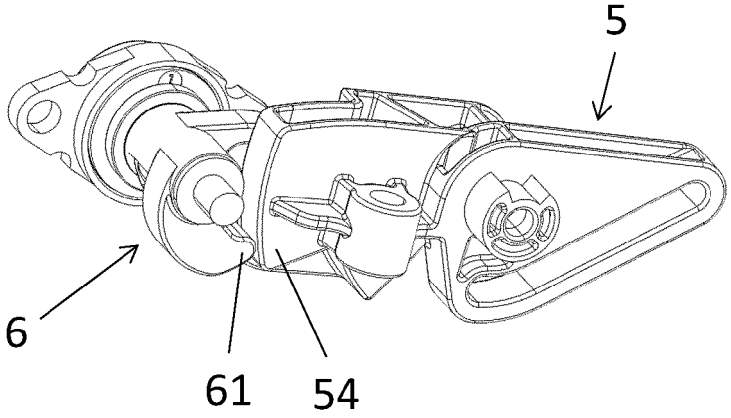

Fig. 20

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EUROPEAN SEARCH REPORT

Application Number
EP 23 15 5709

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2016/290018 A1 (HAMACHER KAI [DE] ET AL) 6 October 2016 (2016-10-06) * the whole document *	1-9	INV. E05B85/10 E05B77/42
A	CN 115 354 927 A (FORYOU MULTIMEDIA ELECTRONICS) 18 November 2022 (2022-11-18) * figures 1,2 *	1-9	
A	US 10 072 447 B2 (HONDA LOCK KK [JP]) 11 September 2018 (2018-09-11) * figures 3, 4 *	1-9	
A	EP 3 584 395 A1 (AKWEL VIGO SPAIN SL [ES]) 25 December 2019 (2019-12-25) * the whole document *	1-9	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 July 2023	Cruyplant, Lieve

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