



(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
31.07.2024 Bulletin 2024/31

(21) Application number: 23153791.1

(22) Date of filing: 27.01.2023

(51) International Patent Classification (IPC):
E05B 77/42^(2014.01) E05B 81/06^(2014.01)
E05B 81/50^(2014.01) E05B 81/58^(2014.01)
E05B 81/90^(2014.01) E05B 85/10^(2014.01)
E05B 81/76^(2014.01)

(52) Cooperative Patent Classification (CPC):
E05B 77/42; E05B 81/06; E05B 81/58;
E05B 81/76; E05B 81/90; E05B 85/103;
E05B 85/107; E05B 2015/0448

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(71) Applicant: MINEBEA ACCESSSOLUTIONS ITALIA
S.P.A.
10044 Pianezza (IT)

(72) Inventors:
• PEYNOT, Thomas
58000 Nevers (FR)
• BALZARINI, Luca
10044 Pianezza (IT)
• LABALESTRA, Antonio
10044 Pianezza (IT)

(74) Representative: Innovincia et al
11, avenue des Tilleuls
74200 Thonon-Les-Bains (FR)

(54) ELECTRIC VEHICLE DOOR HANDLE ASSEMBLY

(57) The present invention relates to a vehicle door handle assembly (1) with a handle (2) comprising a first extremity (22) and a second extremity (23), the first extremity (22) being connected to a first lever (3) designed to be connected to an opening lever to open a latch of the vehicle door, said first lever (3) being designed to rotate between a rest position, a deployed position where the first extremity (22) and an opening position, the second extremity (23) being connected to a second lever (4), designed to rotate between a rest position and a deployed position, the handle (2) also being configured to have an activation position where the han-

dle (2) is pushed into a bracket (10), the vehicle door handle assembly (1) also comprising a return lever (5) to the second lever (4), said return lever (5) being designed to rotate between a first position and a second position, the vehicle door handle assembly (1) also comprising an electrical actuating device (100) comprising an actuator (11) and configured to rotate the return lever (5) from its first to its second position, the passive rotation of the return lever (5) from its second to its first position actuates the rotation of the second lever (4) from its deployed position to its rest position.

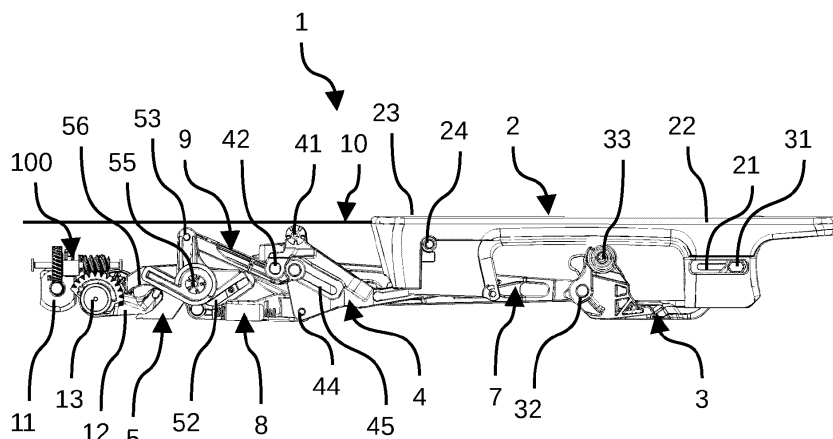


Fig 1a

Description

TECHNICAL FIELD:

[0001] The present invention relates to a vehicle door assembly, in particular of the type with a handle translating from a rest position where the handle is retracted and 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 is becoming more common and requested by manufacturers.

[0003] In order to translate between these two positions, such vehicle door handle assemblies are 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. Furthermore, these vehicle door handle assemblies may be blocked or unusable in case of electrical power supply failure.

[0004] One aim of the present invention is to find an economic and improved alternative for vehicle door handle assemblies having a translative movement.

[0005] To this end, the invention relates to a vehicle door handle assembly comprising a bracket and a handle, said handle comprising a first extremity and a second extremity opposed to the first extremity,

the first extremity being connected to a first lever, said first lever being designed to be connected to an opening lever to open a latch of the vehicle door, said first lever being designed to rotate between a rest position where the first extremity of the handle is in a rest position, a deployed position where the first extremity of the handle is in a deployed position outside the bracket and an opening position where the first lever actuates the opening lever,

the second extremity being connected to a second lever, said second lever being designed to rotate between a rest position where the second extremity of the handle is in a rest position, and a deployed position where the handle is in a deployed position outside the bracket,

the handle also being configured to have an activation position where the handle is pushed into the bracket, the vehicle door handle assembly also comprising a return lever having a first extremity connected to the second lever, said return lever being designed to rotate between a first position and a second position, the return lever comprising an elastic mean passively bringing back said return lever to its first position, the vehicle door handle assembly also comprising an electrical actuating device comprising an actuator and configured to rotate the return lever from its first

to its second position, and the passive rotation of the return lever from its second to its first position actuates the rotation of the second lever from its deployed position to its rest position.

[0006] The vehicle door handle assembly could comprise a switch activating the electrical actuating device, said switch being activated when the handle is pushed in its activation position.

[0007] The switch and the electrical actuating device could be electrically connected directly to each other.

[0008] The switch could be configured to be activated by the rotation of the second lever to its activation position.

[0009] The second lever could comprise a protruding portion configured to push and activate the switch when the second lever is in its activation position.

[0010] The extremity of the return lever could comprise an extended portion, and the electrical actuating device could comprise a rotating arm configured to push this extended portion and rotate the return lever.

[0011] The second rod could comprise a first part connected to the return lever and a second part connected to the first lever, the first and second parts being configured to slide relative to each other so that the second rod can contract itself, shortening its length.

[0012] The second rod could also comprise at least one stopper to avoid the extension of its length.

[0013] The second rod could comprise at least one elastic mean to bring said second rod back to its original length.

[0014] The return lever could be connected to a delay element which slows down the passive rotation of the return lever from its second to its first position.

[0015] The first lever could comprise an elastic mean passively bringing back said first lever from its deployed position to its rest position.

[0016] The second lever could comprise an elastic mean passively rotating said second lever toward its deployed position.

[0017] The actuator could be connected to an electronic timer stopping the rotation of the actuator when the return lever is in its second position.

[0018] The actuator could be configured to measure the current draw in function of the resistance to the rotation.

[0019] Further features and advantages of the invention will become apparent from the following description, given by way of non-limiting example, with reference to the appended drawings, in which:

- Figure 1a and 1b are a bottom view of a schematic representation of a first side of a vehicle door assembly in a rest position,
- Figure 2a and 2b are a top view of a schematic representation of a second side of a vehicle door assembly in a rest position,
- Figure 3 is a rear view of a schematic representation

- of the vehicle door assembly of figures 1a to 2b,
- Figure 4 is a schematic representation in perspective of the second lever and the second rod of the vehicle door assembly of figures 1a to 2b
- Figure 5a and 5b are a bottom view of a schematic representation of a first side of a vehicle door assembly in an activation position,
- Figure 6a and 6b are a top view of a schematic representation of a second side of a vehicle door assembly in an activation position,
- Figure 7a and 7b are a bottom view of a schematic representation of a first side of a vehicle door assembly in a deployed position,
- Figure 8a and 8b are a top view of a schematic representation of a second side of a vehicle door assembly in a deployed position,
- Figure 9 is a bottom view of a schematic representation of a first side of a vehicle door assembly in an opening position,
- Figure 10 is a top view of a schematic representation of a second side of a vehicle door assembly in an opening position.

[0020] In these 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

[0021] Figures 1a to 2b show a vehicle door handle assembly 1 in a rest position. The vehicle door handle assembly 1 comprises a bracket 10 and a handle 2. The bracket 10 is designed to be fixed on the vehicle door (not represented). In this rest position, the handle 2 is retracted into the bracket 10 in order to be at the same level of the door body when installed.

[0022] 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 lever 3 and the second extremity 23 of the handle 2 is connected to a second lever 4.

[0023] The first lever 3 is also designed to be connected to an opening lever (not represented) to open a latch of the vehicle door. The first lever 3 is designed to rotate between a rest position (represented in figures 1a and 2a) where the first extremity 22 of the handle 2 is in a rest position, a deployed position (represented in figures 7a and 8a) where the first extremity 22 of the handle 2 is in a deployed position outside the bracket 10 and an opening position (represented on figures 9 and 10) where the first lever 3 actuates the opening lever.

[0024] More precisely, the first lever 3 comprises a pivot connection 33 with the bracket 10 around which the

first lever 3 rotates between its different positions. A first extremity of the first lever 3 is connected to the first extremity 22 of the handle 2 and a second extremity of the first lever 3, is connected to the opening lever, in particular, thanks to a pivot connection 31 and the shape of the first lever 3, the first lever 3 can touch the opening lever during the movement.

[0025] The connection between the first lever 3 and the first extremity 22 of the handle is preferably a pivot-slide connection. In the examples represented figures 1, 3, 5, and 7, the first extremity 22 of the handle 2 comprises a slide opening 21 and the first lever 3 comprises a recess 31 for example to receive a pin (not represented). The first lever 3 may also comprises an elastic mean (not represented) passively bringing back said first lever 3 from its deployed position to its rest position. This elastic mean may be a spring positioned for example on the pivot connection 33 between the first lever 3 and the bracket 10.

[0026] The second extremity 23 of the handle 2 is connected to a second lever 4. The second lever 4 is designed to rotate between a rest position (represented in figures 1a and 2a) where the second extremity 23 of the handle 2 is in a rest position and a deployed position (represented in figures 7a and 8a) where the second extremity 23 of the handle 2 is in a deployed position outside the bracket 10.

[0027] More precisely, the second lever 4 comprises a pivot connection 41 with the bracket 10 around which the second lever 4 rotates between its different positions. A first extremity of the second lever 4 is connected to the second extremity 23 of the handle 2. This connection is preferably a pivot connection 24. The second lever 4 may also comprises an elastic mean (not represented) passively rotating said second lever 4 to its deployed position. This elastic mean may be a spring positioned for example on the pivot connection 41 between the second lever 4 and the bracket 10.

[0028] The first 3 and second 4 levers may be connected together with at least one first rod 7 in order to synchronize the movements of the two levers 3, 4. More exactly, the first rod 7 transmits the rotation of the second lever 4 from its activation position to its deployed position to the first lever 3, rotating said first lever 3 from its rest position to its deployed position. The first rod 7 may comprises a pivot-slide connection with anyone of the first 3 or second lever 4 so that the first 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 lever 4. In the example illustrated in figures 1a to 10, the first rod 7 comprises a first extremity connected to a second extremity of the first lever 3 by a pivot connection 32. The first rod 7 comprises a second extremity connected to the second lever 4 by pivot-slide connection. The second extremity of the first rod 7 comprises a slide 71 and the second extremity of the second lever 4 comprises a pin 42 inserted into said slide 71. The handle 2, the first lever 3, the second 4 lever and

the first rod 7 are designed and connected like a parallelogram and move together synchronously. The other connection of the first rod 7 with any of the first 3 or second lever 4 is preferably a pivot connection.

[0029] The handle 2 is configured to have an activation position (illustrated in figures 5a to 6b) where the handle 2 is pushed inside the bracket 10. The handle 2 may be pushed inside the bracket 10 in a short distance, for example inferior to 5mm, preferably 2mm or 3mm. To enable the handle 2 to go inside the bracket 10, the first 3 and second 4 levers rotate around their pivot connection 33 and 41 in a direction of rotation opposed to their deployed position, where the handle 2 is deployed, to an activation position of these two levers 3, 4. The handle 2 may be pushed in its activation position by a pression applied by a user.

[0030] The vehicle door handle assembly 1 also comprises a return lever 5 having a first extremity connected to a second extremity of the second lever 4, said return lever 5 being designed to rotate between a first position (represented in figures 1a to 2b) and a second position (represented in figures 7a to 8b). More precisely, the return lever 5 comprises a pivot connection 55 with the bracket 10 around which the return lever 5 rotates between its different positions. The return lever 5 also comprises an elastic mean (not represented) passively bringing back said return lever 5 to its first position. This elastic mean may be a spring positioned for example on the pivot connection 55 between the return lever 5 and the bracket 10.

[0031] When the return lever 5 is in its first position, it blocks the rotation of the second lever 4 in its rest position. When the return lever 5 is in its first position, the second lever 4 is free to rotate to its deployed position. The rotation of the return lever 5 from its second position to its first position actuates the rotation of the second lever 4 from its deployed position to its rest position.

[0032] The second lever 4 and the return lever 5 are connected together by a second 8 and a third 9 rods. The second rod 8 transmits the rotation of the second lever 4 from its rest position to its activation position to the return lever 5, rotating said return lever 5 from its first position to its second position. The third rod 9 transmits the rotation of the return lever 5 from its second position to its first position to the second lever 4, rotating said second lever 4 from its deployed position to its rest position. The second 8 and the third 9 rods are placed on the return lever 5 on either side of the pivot connection 55 of the return lever 5 with the bracket 10. The second 8 and the third 9 rods are placed on the second extremity of second lever 5 on the same side of the pivot connection 41 of the second lever 4 with the bracket 10.

[0033] As illustrated more precisely in figures 3 and 4, the second rod 8 may comprise a first part 81 connected to the return lever 5 and a second part 82 connected to the first lever 4. The first 81 and second 82 parts are configured to slide relative to each other so that the second rod 8 can contract itself, shortening its length. The

second rod 8 also comprise at least one stopper 84 (visible in figure 4) to avoid the extension of its length. The second rod 8 may also comprise at least one elastic mean 83 to bring it back to its original length.

[0034] The second rod 8 may comprise a pivot-slide connection 52 with anyone of the second lever 4 or return lever 5. In the example illustrated in figures 1a to 10, the pivot-slide connection 52 is placed between the return lever 5 and the second rod 8. The return lever 5 comprises the slide of said pivot-slide connection 52 and the second rod 8 comprises a pin inserted in the slide. Still according to the example illustrated in figures 1a to 10, the connection between the second rod 8 and the second lever 4 is a pivot connection 44. The other connection of the second rod 8 with any of the second lever 4 or return lever 5 is preferably a pivot connection.

[0035] The third rod 9 may comprises a pivot-slide connection 45 with any of the second lever 4 or return lever 5. In the example illustrated in figures 1a to 10, the pivot-slide connection 45 is placed between the second lever 4 and the third rod 9. The second lever 4 comprises the slide of said pivot-slide connection 45 and the third rod 9 comprises a pin inserted in the slide. Still according to the example illustrated in figures 1a to 10, the connection between the third rod 9 and the return lever 5 is a pivot connection 53. The other connection of the third rod 9 with any of the second lever 4 or return lever 5 is preferably a pivot connection.

[0036] The return lever 5, more exactly its second extremity, could be connected to a delay element 6 which slows down the passive rotation of the return lever 5 from its second to its first position. This delay element 6 may comprises at least one damper as illustrated in figures 1a to 10. The at least one damper 6 may comprises a gearwheel 61 (visible in figure 3) and the extremity of the return lever 5, connected to the at least one damper 6, comprises an arc portion with teeth 54 engaged with said gearwheel 61.

[0037] The vehicle door handle assembly 1 also comprises an electrical actuating device 100. This electrical actuating device 100 comprises an actuator 11 linked to the return lever 5 in order to move said return lever 5 from its first position to its second position. The return lever 5 may comprise an extended portion 56, for example on the same extremity of its arc portion with teeth 54, and the electrical actuating device 100 may comprise a rotating arm 12 configured to push this extended portion 56 to rotate the second lever 5. This extended portion 56 may also have a curved shape. The electrical actuating device 100 may also comprise some gears 13 for the connection between the actuator 11 and its rotating arm 12.

[0038] The arm 12 may be only in contact with the extended portion 56 of the return lever 5 in order to push said return lever 5 to its second position. The electrical actuating device 100 may then rotate back to its initial position, freeing the contact with the return lever 5 and leaving it in its second position maintained by the damper

6. This single contact between the electrical actuating device 100 and the return lever 5 allows the second lever 5 rotating to its second position without the help of the electrical actuating device 100, for example by a push of the second extremity 23 of the handle 2 beyond its activation position.

[0039] The vehicle door handle assembly 1 also comprises a switch 47 configured to activate the electrical actuating device 100. This switch 47 is activated when the handle 2 is pushed in its activation position. More precisely, the switch 47 may be configured to be activated by the rotation of the second lever 4 to its activation position. As represented in figures 1a to 10, the second lever 4 may comprise a protruding portion 46 configured to push and activate the switch 47 when the second lever 4 is in its activation position.

[0040] The switch 47 and the electrical actuating device 100 may be electrically connected directly to each other in order to avoid a connection with an electronic central unit of the vehicle and allows an autonomous functioning of the electrical actuating device 100.

[0041] The actuator 11 could stop rotating according to different means. The actuator 11 may for example be connected to an electronic timer stopping the rotation of the actuator 11 when the return lever 5 is in its second position. The actuator 11 may also be configured to measure the current draw in function of the resistance to the rotation. When the return lever 5 is in its second position it stops and the resistance increases due to the second 8 and third 9 levers and its link with the second lever 4. This increase of the resistance of rotation may lead to an increase of the electrical current of the actuator 11 and may generate a signal to stop its rotation in order to avoid stalling of the electric motor. The actuating system may comprise one or both of these two means to determine when the second lever 5 is in its second position.

[0042] The figures 1a to 10 represent different positions and cinematic steps of the deployment, opening and retraction of the handle 2.

[0043] As described above, figures 1a to 2b are a representation of a rest position where the handle 2 is retracted into the bracket 10 in order to be at the same level of the door body when installed. The first lever 3 is in its rest position and maintained in this rest position by its elastic mean. The second lever 4 is in its rest position and the return lever 5 is in its first position. The return lever 5 is maintained in its first position by its elastic mean. The elastic mean of the return lever 5 is stronger than the elastic mean of the second lever 4 in order that the return lever 5 in its first position maintained the second lever 4 in its rest position. The elastic mean of the return lever 5 is also stronger than the delay element 6 in order to maintain the return lever 5 in its first position.

[0044] Figures 5a to 6b represent an activation position of the handle 2 where the user activates the handle 2 by pushing the handle 2 into the bracket 10 through a short distance, for example inferior to 5mm, preferably 2mm

or 3mm. Due to this push, the first 3 and second 4 levers rotate around their pivot connection 33 and 41 in a direction of rotation opposed to their deployed position. The push of the handle 2 is transmitted on both the first 3 and the second 4 levers due to the parallelogram configuration with the first rod 7. The rotation of the second lever 4 is not transmitted to the return lever 5 due to the contraction of the second rod 8 and the slide of the third rod 9 on its pivot-slide connection 45 between the second lever 4 and the third rod 9. The rotation of the second lever 5 activates the switch 47.

[0045] The activation of the switch 47 commands the rotation of the electrical actuating device 100. The rotation of the electrical actuating device 100 causes the rotation of the return lever 5 around its pivot connection 55 with the bracket 10 from its first to its second position. The rotation of the first 3 and second 4 levers is made against the torque of their elastic means and the rotation of the return lever 5 is made against the torque of its elastic mean. When the return lever 5 is in its second position, the electrical actuating device 100 rotates back to its initial position (not represented in figures 5a to 6b).

[0046] Figures 7a to 8b represent a deployed position of the handle 2 where the first lever 3 and the second lever 4 have rotated from their activation position to their deployed position, bringing the handle 2 in its deployed position outside the bracket 10. When the electrical actuating device 100 has pushed the return lever 5 in its second position, the elastic mean of the second lever 4 allows the passive rotation of the second lever 4 to its deployed position. The rotation of the second lever 4 is transmitted to the first lever 3 by the first rod 7, rotating the first lever 3 to its deployed position. The rotation of the second lever 4 is not transmitted to the return lever 5 by any of the second 8 or third rod 9 which slide with their pivot-slide connections 52, 45. The first lever 3 is maintained in its deployed position due to the first rod 7 which is in abutment with its pivot-slide connection. The return lever 5 is still on its second position due to the delay element 6 or to the resistive torque of the electrical actuating device 100, especially the actuator 11. The third rod 9 is in abutment in order to stop the rotation of the second lever 4 in its deployed position against the torque of its elastic mean.

[0047] In case of an electrical failure of the electrical actuating device 100, it is still possible to rotate the return lever 5 to its second position. To this purpose, the user can push further the second extremity 23 of the handle 2 into the bracket 10 in order to rotate furthermore the second lever 4. the transmission of the rotation of the second lever 4 to the return lever 5 is then made by the second rod 8 which pushes one side of the return lever 5 causing its rotation. Indeed, the rotation of the second lever 4 to its activation position makes the second rod 8 slid in its slide-pivot connection with anyone of the second 4 or return lever 5 bringing the second rod 8 to abutment pushing the return lever 5. The third rod 9 slides in its slide-pivot connection with anyone of the second lever 4

or return lever 5 without affecting the rotation of anyone of these levers 4, 5. (this example is not represented)

[0048] Figures 9 and 10 represent an opening position of the handle 2 where the user can grab the handle 2 and pull it or has taken the handle 2 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 lever 4. The first extremity 22 of the handle 2 is pulled in an opening position rotating the first lever 3 from its deployed position to its opening position. The rotation of the first lever 3 is not transmitted to the second lever 4 by the first rod 7 due to its pivot-slide connection. When the user releases the handle 2, the first lever 3 rotates back to its deployed position due to its elastic mean.

[0049] The delay element 6 or the resistive torque of the electrical actuating device 100, especially the actuator 11, slows down the passive return rotation of the return lever 5 from its second position to its first position. When the return lever 5 rotates from its second to its first position, it also transmits its rotation to the second lever 4 in order to rotate the second lever 4 from its deployed position to its rest position. In the example illustrated in figures 9 and 10, when the return lever 5 rotates to its first position, the third rod 9 is in abutment in order to pull back the second lever 4 in its rest position against the torque of the elastic mean of the second lever 4. The rotation of the second lever 4 and the first lever 3 to their rest position are synchronous due to the first rod 7. Thus, the handle 2 translates from its deployed position (figures 7a to 8b) to its rest position (figures 1a to 2b). This translation is slowed down and progressive thanks to the delay element 6.

LIST OF REFERENCES

[0050]

1: vehicle door handle
 10: bracket
 2: 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 lever
 31: recess at the first extremity of the first lever
 32: pivot connection of the first lever with first rod
 33: pivot connection of the first lever with bracket
 4: second lever
 41: pivot connection of the second lever with the bracket
 42: pivot connection of the second lever with first rod
 44: pivot connection of the of the second lever with the second rod
 45: slide-pivot connection of the second lever with the third rod
 46: protruding portion of the second lever

47: switch
 5: return lever
 52: slide-pivot connection of the return lever with the second rod
 53: pivot connection of the return lever with the third rod
 54: teeth of the return lever
 55: pivot connection of the return lever with the bracket
 6: damper
 61: gear
 62: fixing mean
 7: first rod
 71: extremity slide of the first rod
 8: second rod
 81: first part of the second rod
 82: second part of the second rod
 83: elastic mean of the second rod
 84: stopper of the second rod
 9: third rod
 100: electrical actuating device
 11: actuator
 12: arm of the electrical actuating device
 13: gears

Claims

1. Vehicle door handle assembly (1) comprising a bracket (10) and a handle (2), said handle (2) comprising a first extremity (22) and a second extremity (23) opposed to the first extremity (22),

the first extremity (22) being connected to a first lever (3), said first lever (3) being designed to be connected to an opening lever to open a latch of the vehicle door, said first lever (3) being designed to rotate between a rest position where the first extremity (22) of the handle (2) is in a rest position, a deployed 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 lever (3) actuates the opening lever,
 the second extremity (23) being connected to a second lever (4), said second lever (4) being designed to rotate between a rest position where the second extremity (23) of the handle (2) is in a rest position, and a deployed position where the handle (2) is in a deployed position outside the bracket (10),
 the handle (2) also being configured to have an activation position where the handle (2) is pushed into the bracket (10),
 the vehicle door handle assembly (1) also comprising a return lever (5) having a first extremity connected to the second lever (4), said return lever (5) being designed to rotate between a first

- position and a second position, the return lever (5) comprising an elastic mean passively bringing back said return lever (5) to its first position, the vehicle door handle assembly (1) also comprising an electrical actuating device (100) comprising an actuator (11) and configured to rotate the return lever (5) from its first to its second position, and the passive rotation of the return lever (5) from its second to its first position actuates the rotation of the second lever (4) from its deployed position to its rest position.
2. Vehicle door handle assembly (1) according to the previous claim, wherein it comprises a switch (47) activating the electrical actuating device (100), said switch (47) being activated when the handle (2) is pushed in its activation position.
 3. Vehicle door handle assembly (1) according to the previous claim, wherein the switch (47) and the electrical actuating device (100) are electrically connected directly to each other.
 4. Vehicle door handle assembly (1) according to any one of claims 2 or 3, wherein the switch (47) is configured to be activated by the rotation of the second lever (4) to its activation position.
 5. Vehicle door handle assembly (1) according to the previous claim, wherein the second lever (4) comprises a protruding portion (46) configured to push and activate the switch (47) when the second lever (4) is in its activation position.
 6. Vehicle door handle assembly (1) according to any one of the previous claims, wherein the extremity of the return lever (5) comprises an extended portion (56), and wherein the electrical actuating device (100) comprises a rotating arm (12) configured to push this extended portion 56 and rotate the return lever (5).
 7. Vehicle door handle assembly (1) according to any one of the previous claims, wherein the second rod (8) comprises a first part (81) connected to the return lever (5) and a second part (82) connected to the first lever (4), the first (81) and second (82) parts being configured to slide relative to each other so that the second rod (8) can contract itself, shortening its length.
 8. Vehicle door handle assembly (1) according to the previous claim, wherein the second rod (8) also comprises at least one stopper (84) to avoid the extension of its length.
 9. Vehicle door handle assembly (1) according to any one of claims 7 or 8, wherein the second rod (8) comprises at least one elastic mean (83) to bring said second rod (8) back to its original length.
 10. Vehicle door handle assembly (1) according to any one of the previous claims, wherein the return lever (5) is connected to a delay element (6) which slows down the passive rotation of the return lever (5) from its second to its first position.
 11. Vehicle door handle assembly (1) according to any one of the previous claims, wherein the first lever (3) comprises an elastic mean (34) passively bringing back said first lever (3) from its deployed position to its rest position.
 12. Vehicle door handle assembly (1) according to any one of the previous claims, wherein the second lever (4) comprises an elastic mean passively rotating said second lever (4) toward its deployed position.
 13. Vehicle door handle assembly (1) according to any one of the previous claims, wherein the actuator (11) is connected to an electronic timer stopping the rotation of the actuator (11) when the return lever (5) is in its second position.
 14. Vehicle door handle assembly (1) according to any one of the previous claims, wherein the actuator (11) is configured to measure the current draw in function of the resistance to the rotation.

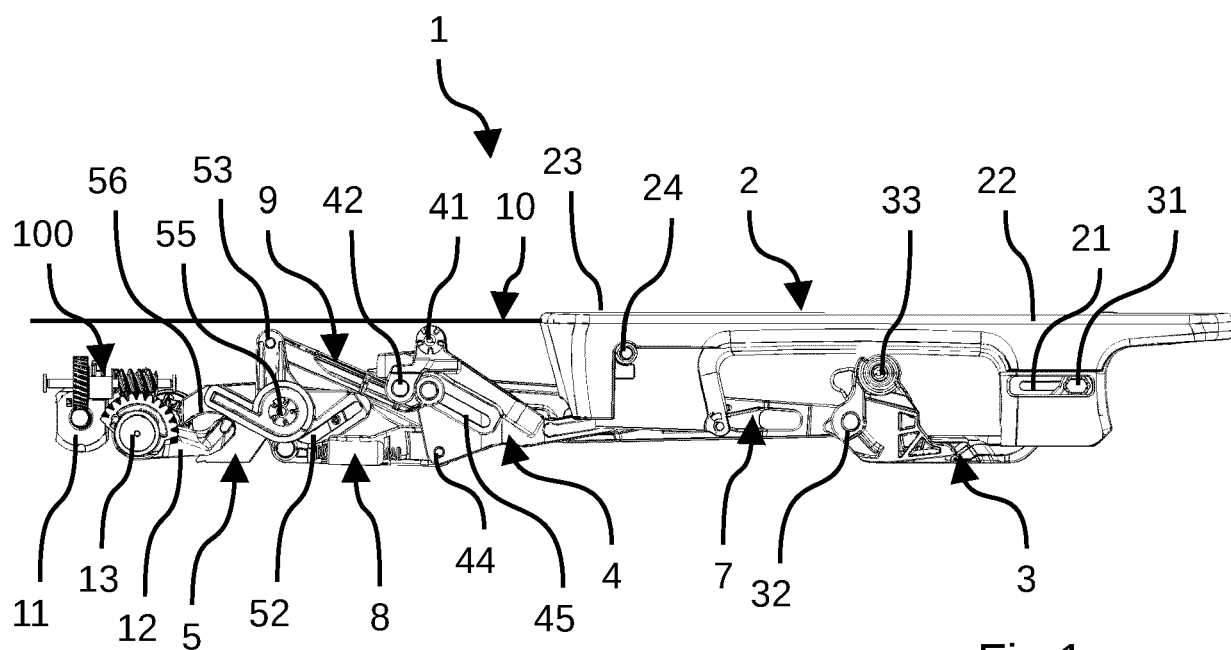


Fig 1a

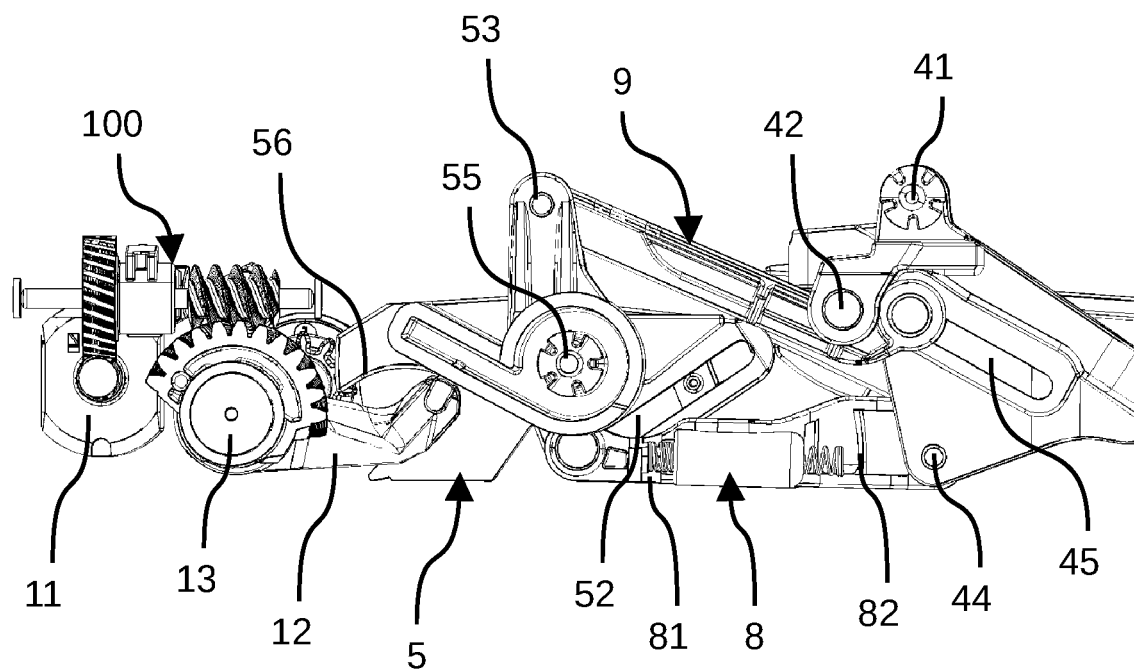


Fig 1b

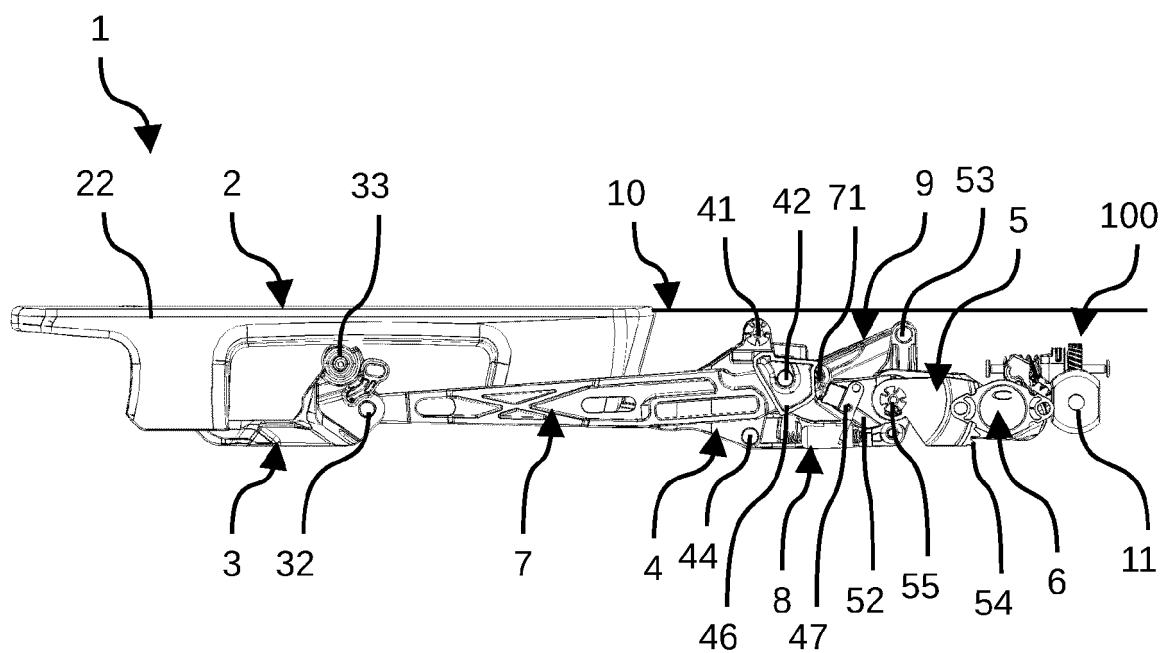


Fig 2a

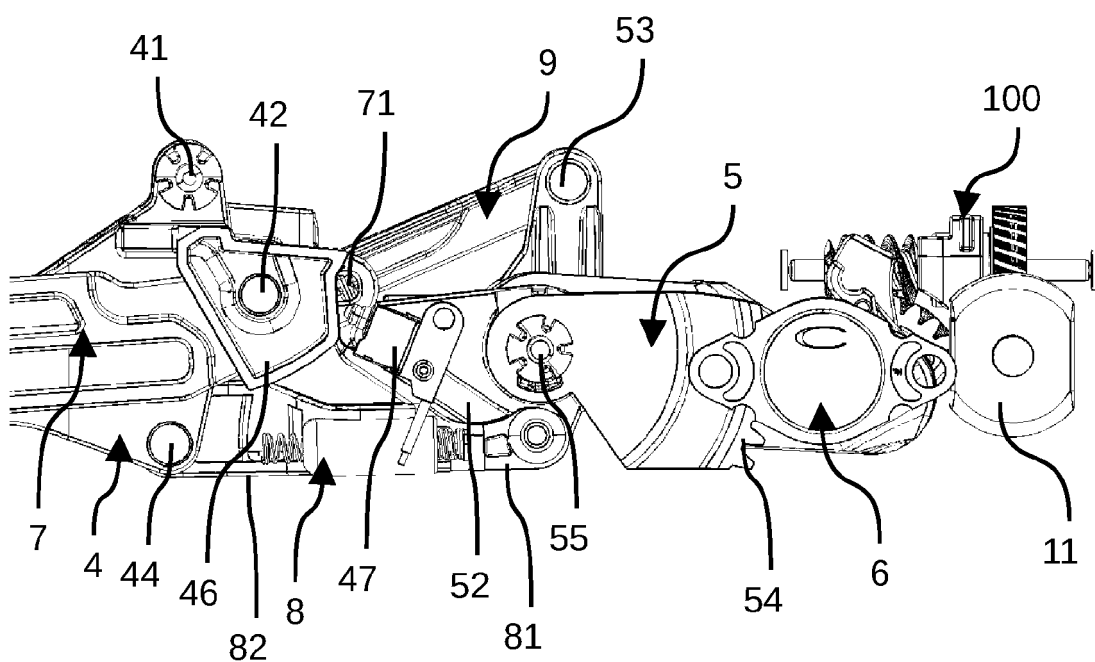


Fig 2b

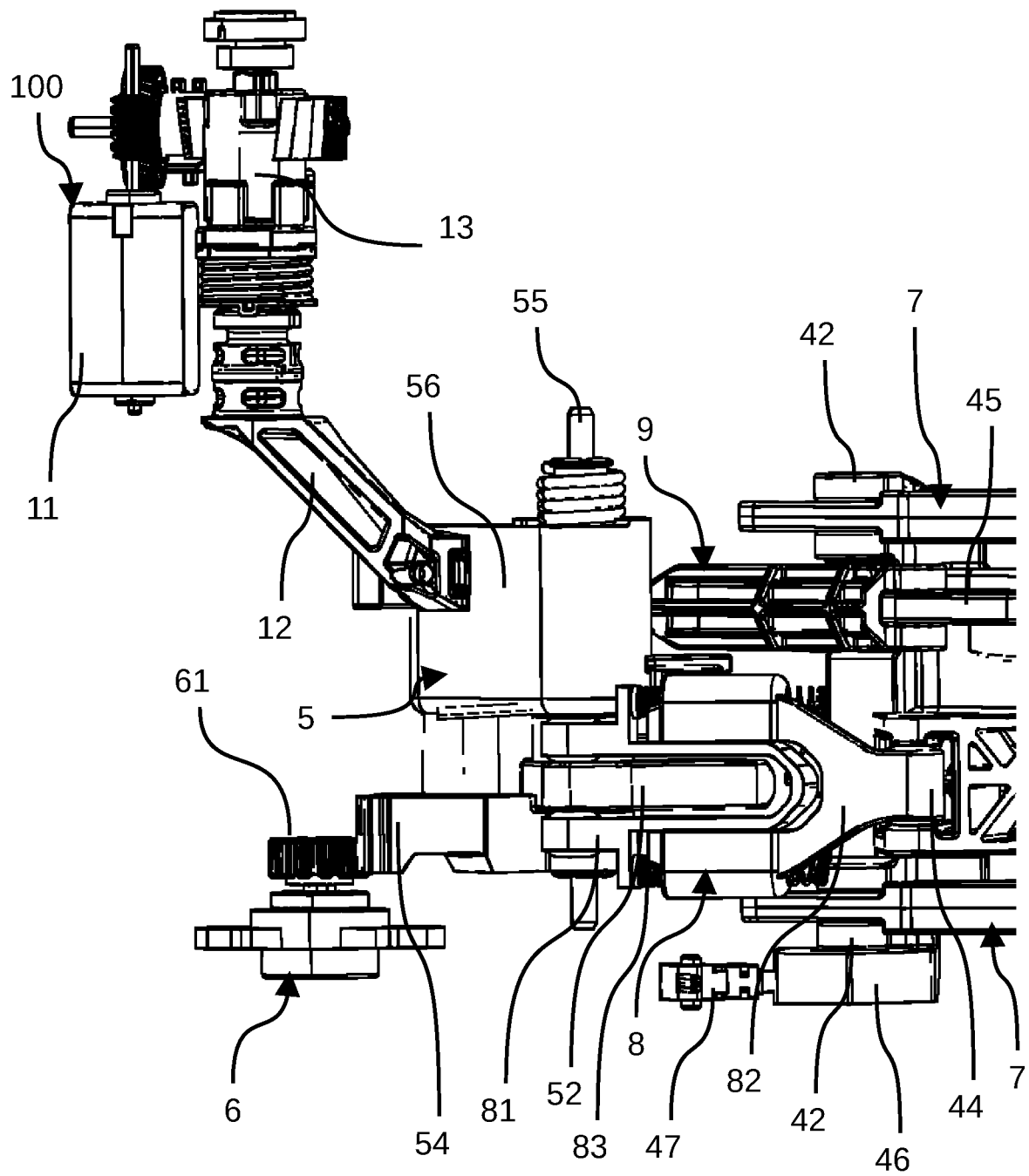


Fig 3

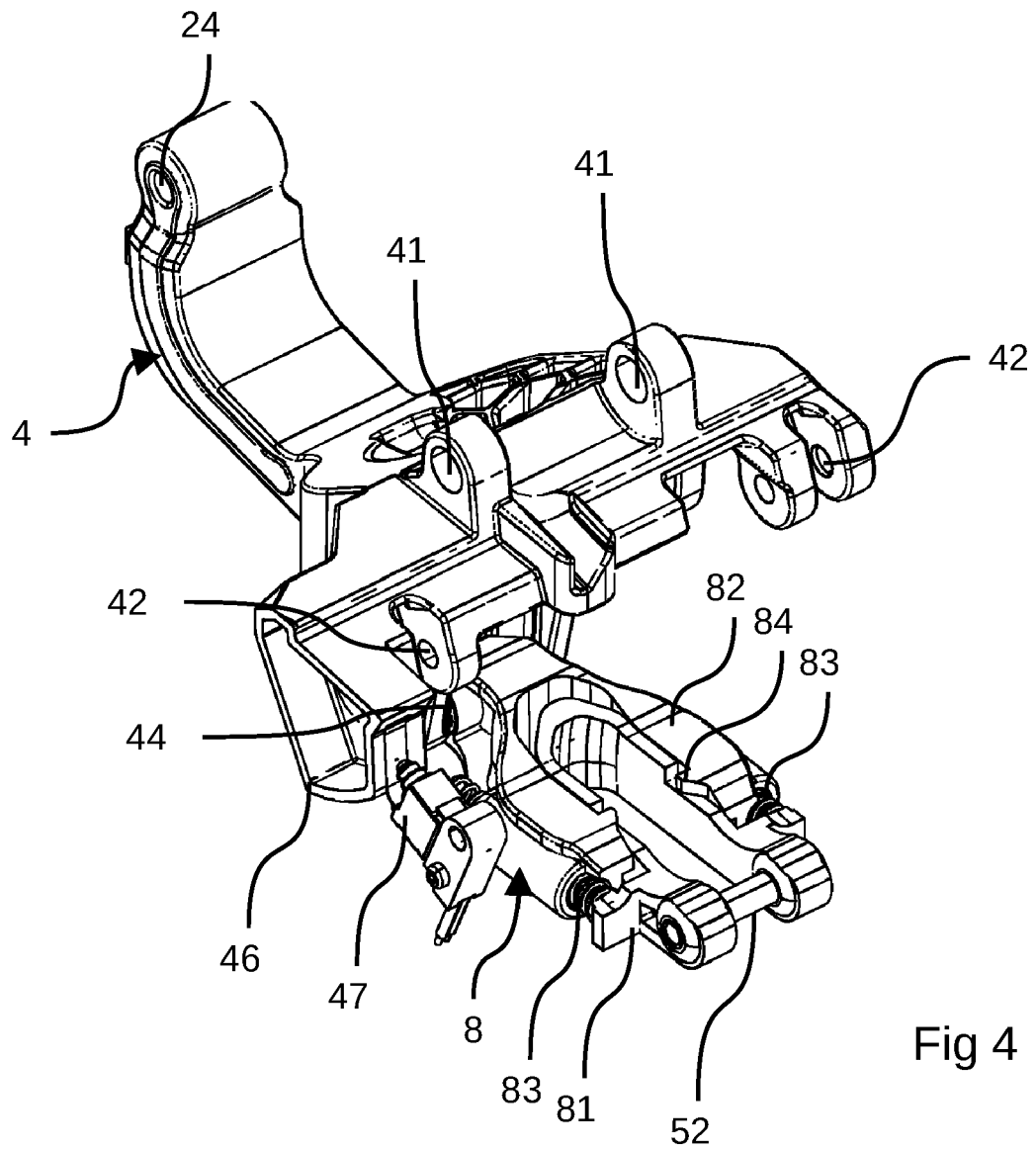


Fig 4

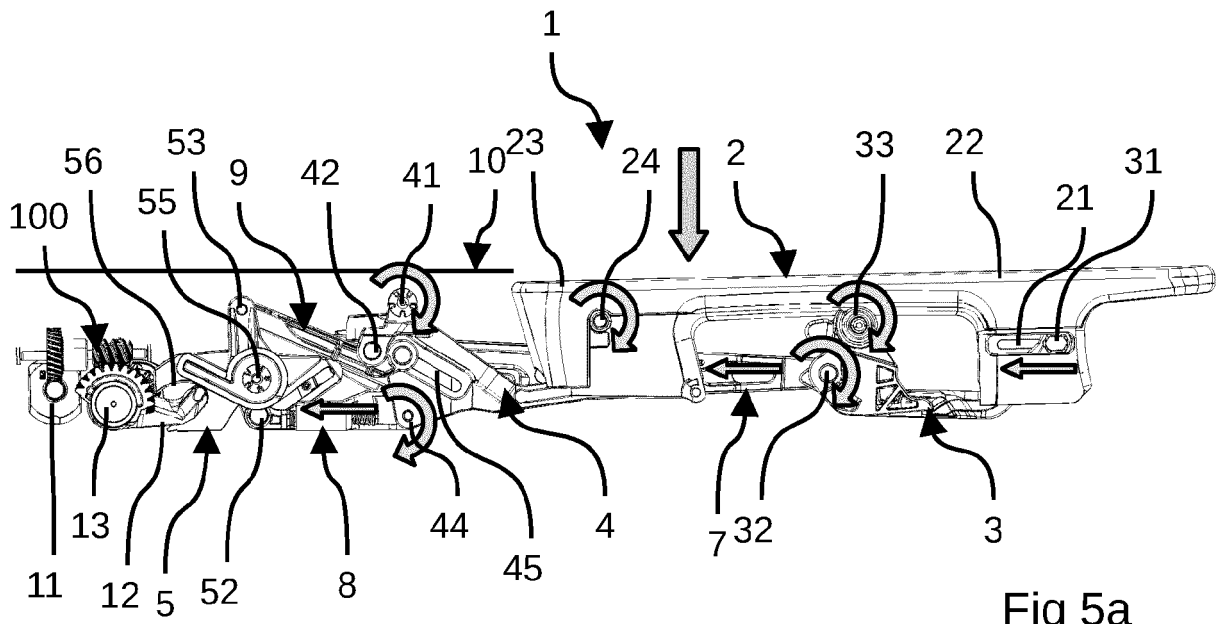


Fig 5a

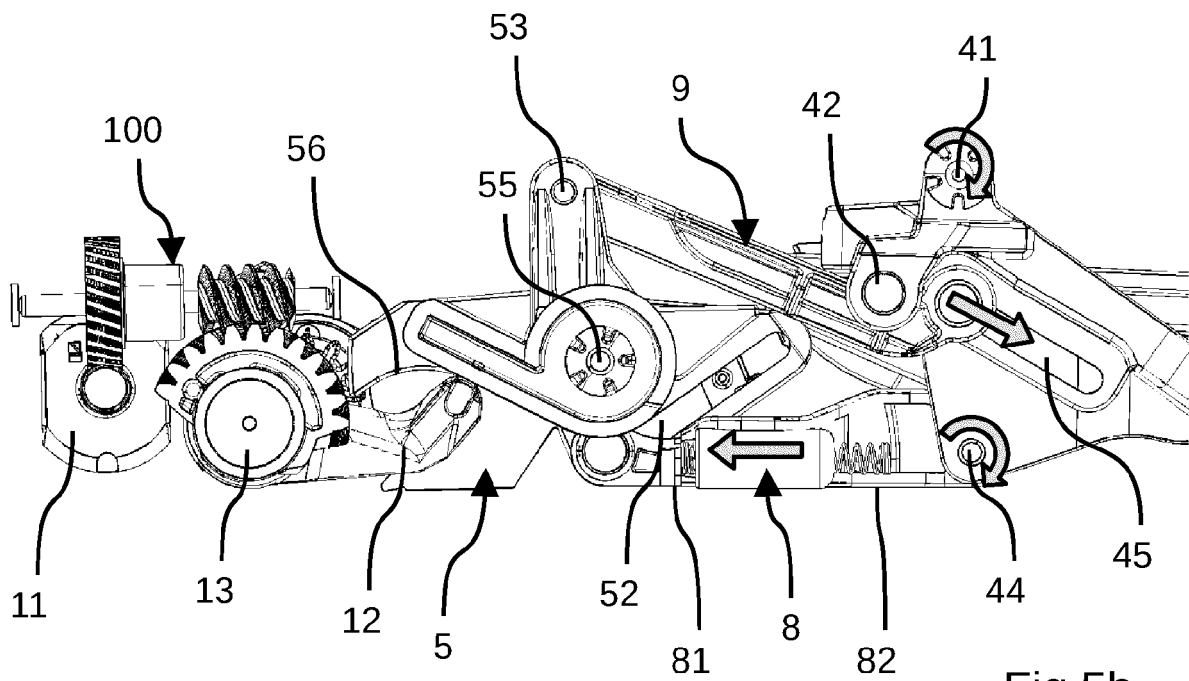
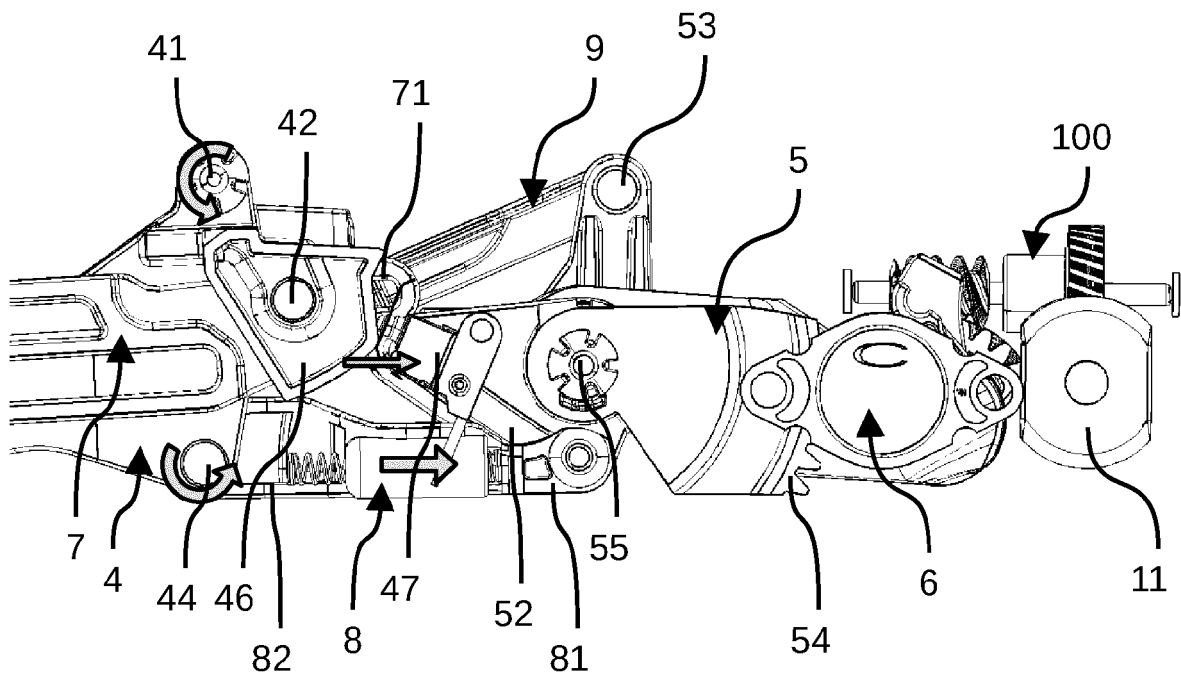
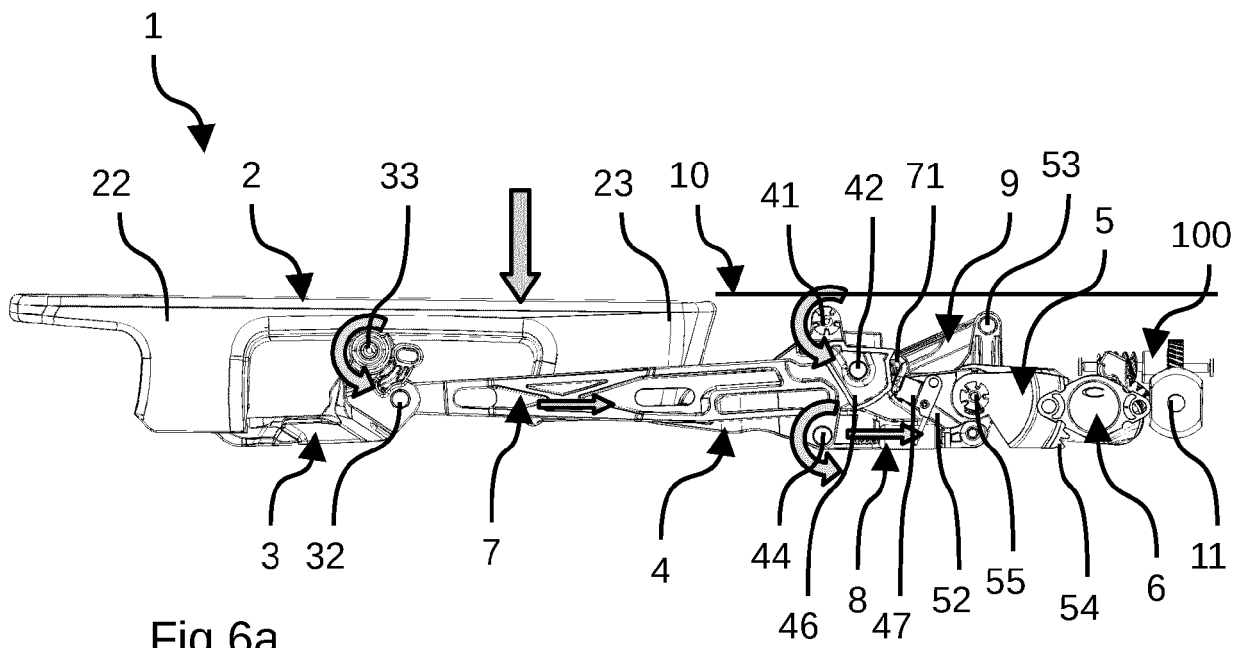
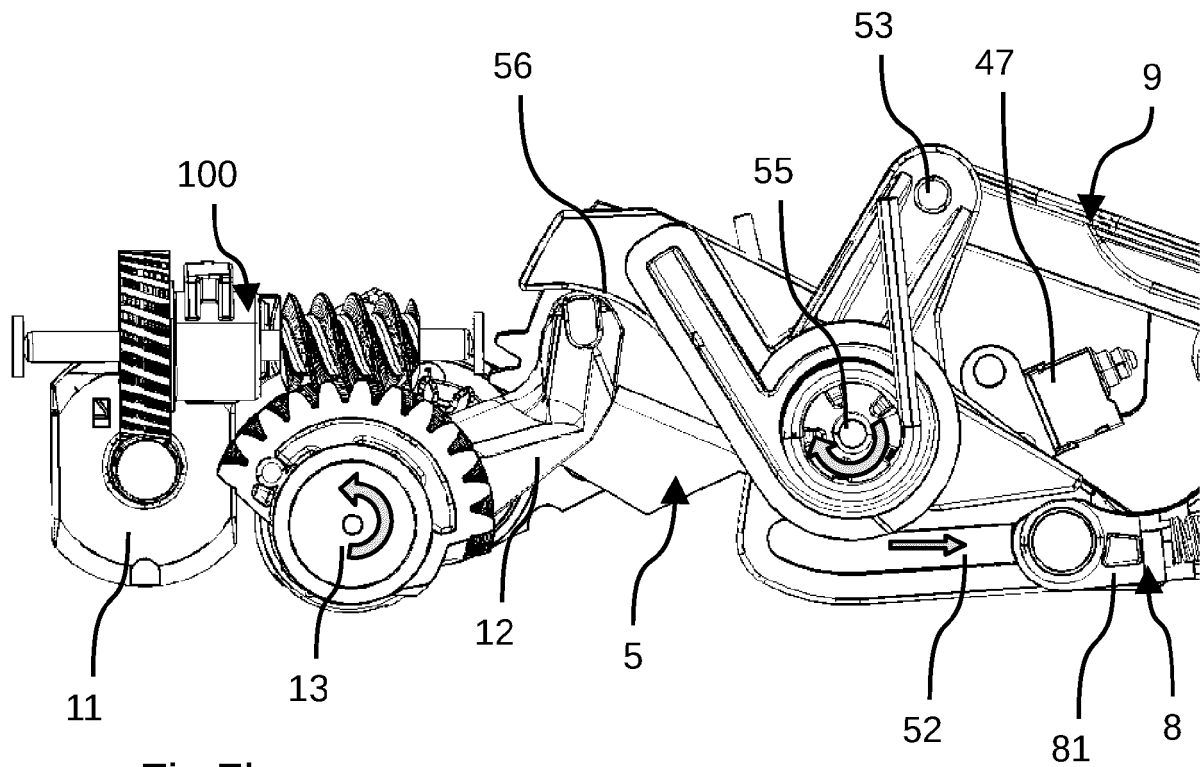
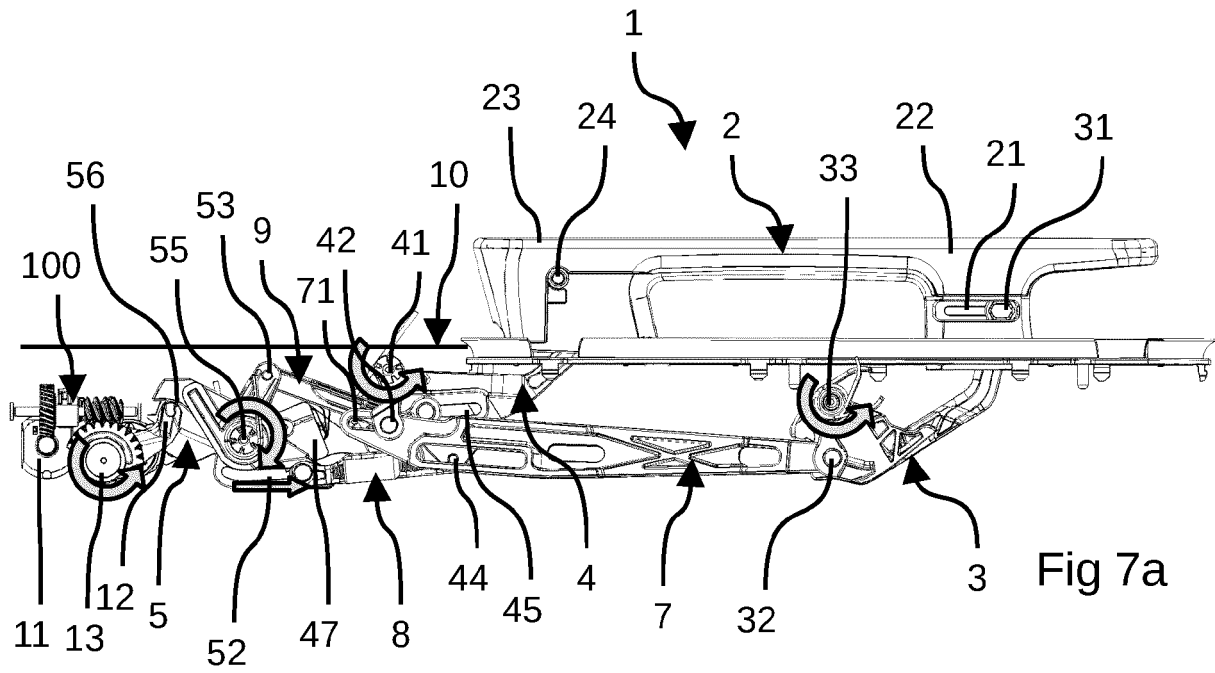
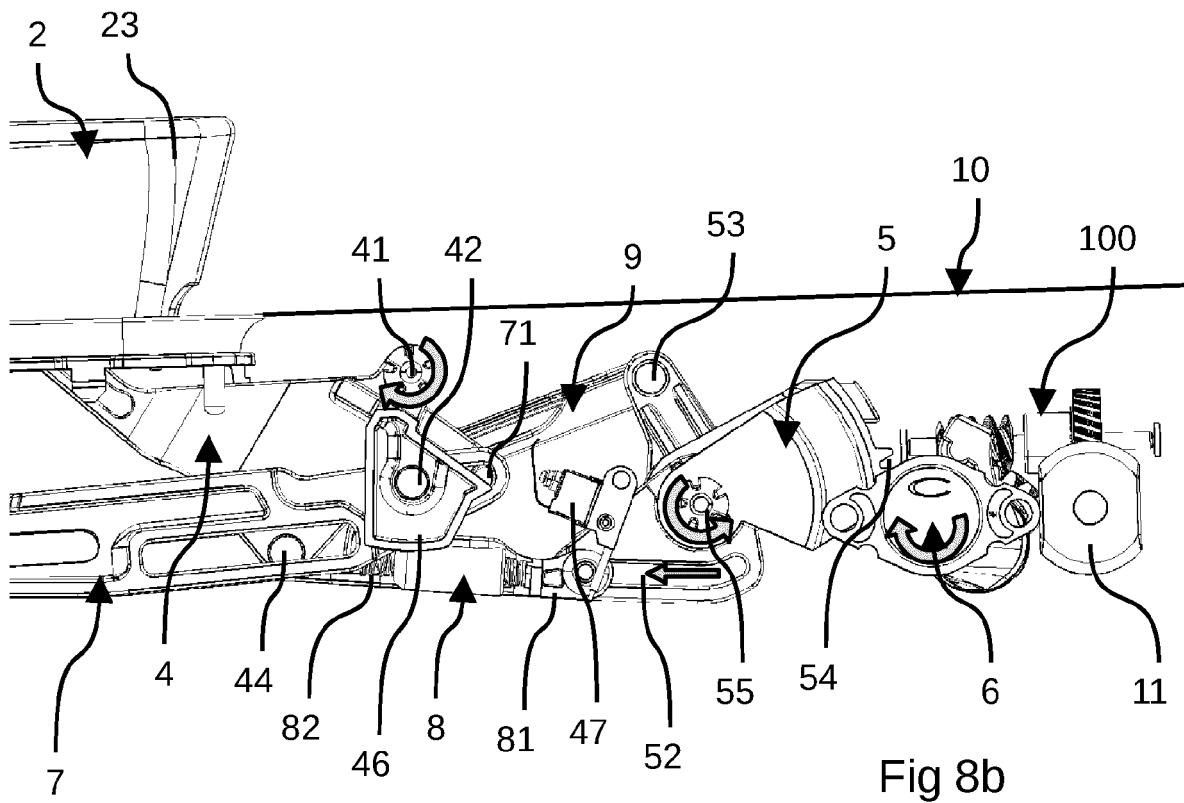
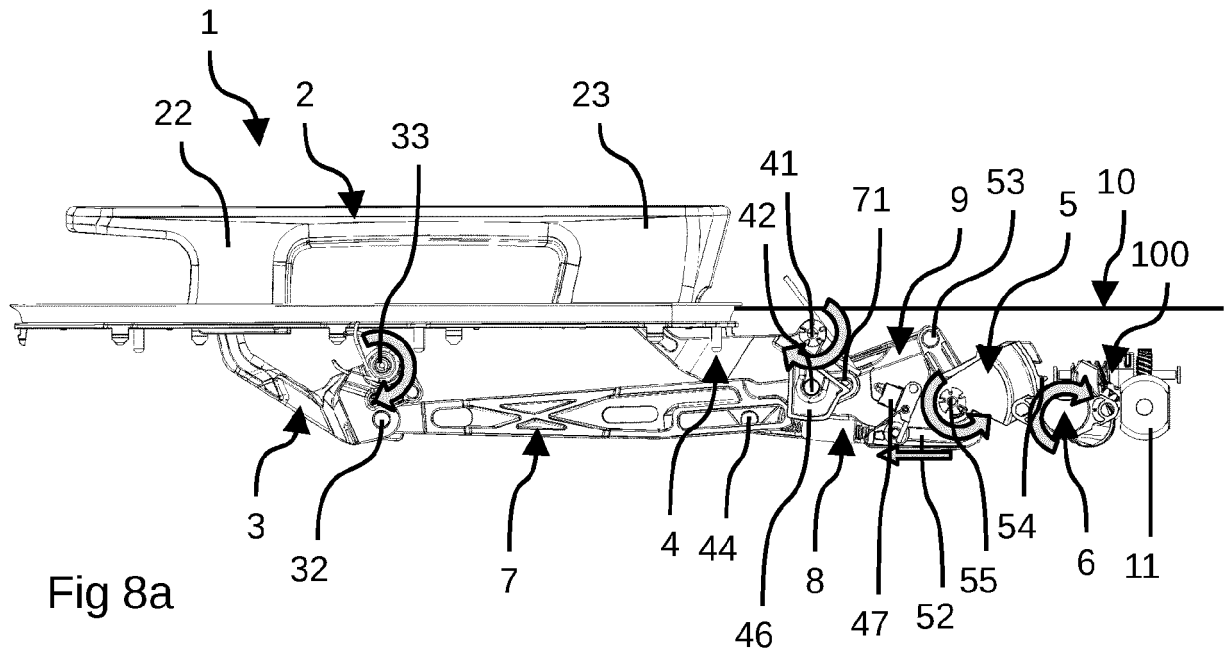
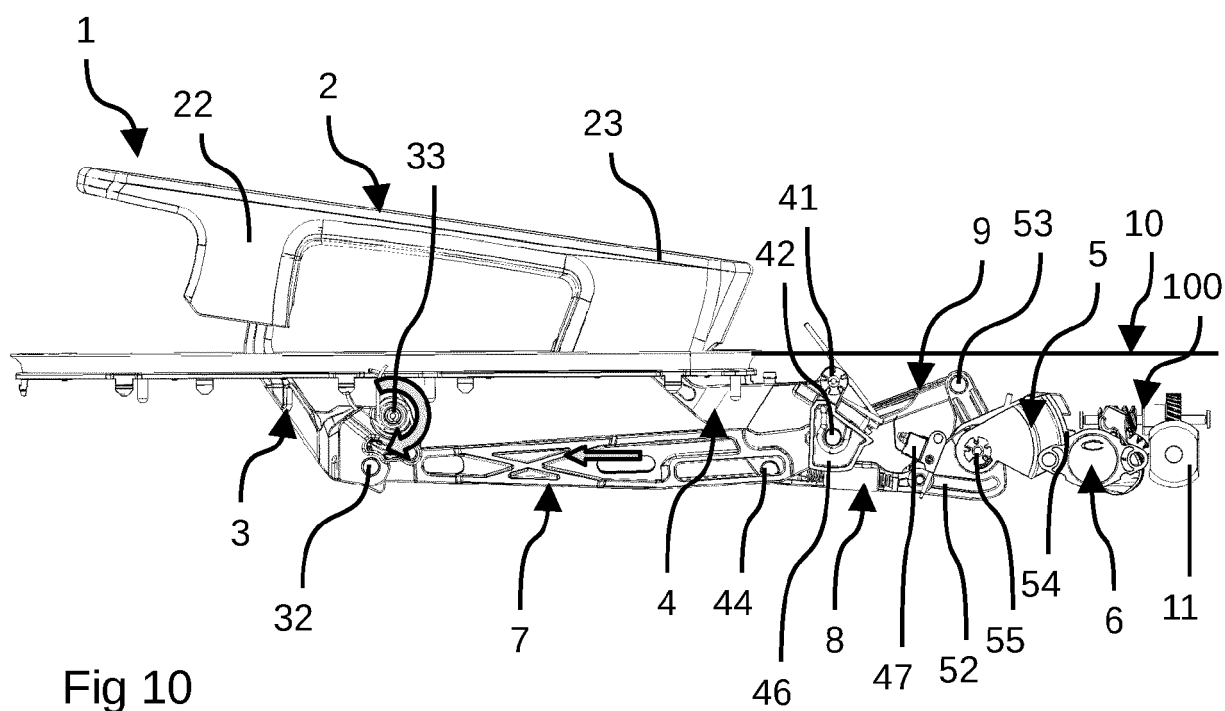
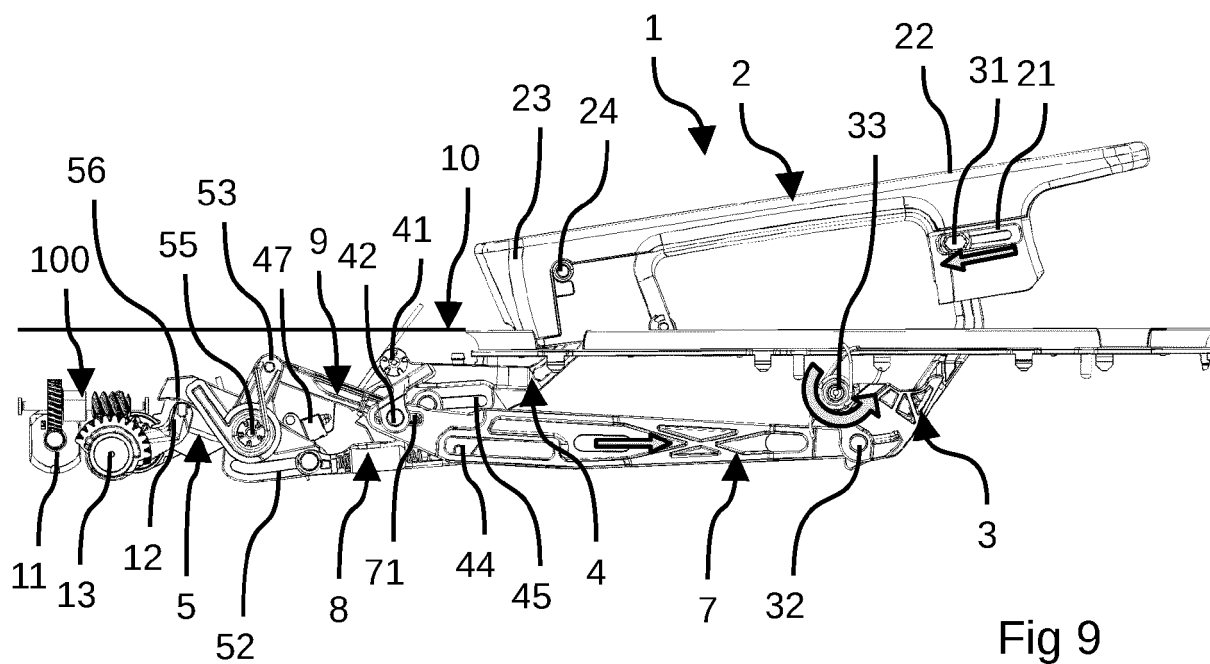


Fig 5b











EUROPEAN SEARCH REPORT

Application Number

EP 23 15 3791

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 11 214 994 B2 (HYUNDAI MOTOR CO LTD [KR]; KIA MOTORS CORP [KR]) 4 January 2022 (2022-01-04)	1, 6, 11-14	INV. E05B77/42 E05B81/06
Y	* column 4, line 30 - column 7, line 11; figures 1-13 *	2, 10	E05B81/50 E05B81/58 E05B81/90
X	US 2021/332620 A1 (RHEIN MICHAEL [DE] ET AL) 28 October 2021 (2021-10-28)	1-6, 10-14	E05B85/10 E05B81/76
A	* paragraphs [0067] - [0077]; figures 1-43 *	7-9	
A	US 2020/392771 A1 (TOYAMA TAKAO [JP]) 17 December 2020 (2020-12-17) * paragraphs [0033] - [0050]; figures 1-8 *	1-14	
A	KR 2021 0055107 A (SEHWA AUTOMOTIVE CO LTD [KR]) 17 May 2021 (2021-05-17) * figures 1- 14 *	1	
Y	FR 3 051 501 A1 (PEUGEOT CITROEN AUTOMOBILES SA [FR]) 24 November 2017 (2017-11-24) * page 6, lines 15, 16; figures 1-3 *	2	TECHNICAL FIELDS SEARCHED (IPC) E05B
Y	DE 10 2021 209082 A1 (WITTE AUTOMOTIVE GMBH [DE]) 17 November 2022 (2022-11-17) * paragraphs [0134] - [0139] *	10	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 5 July 2023	Examiner Boufidou, Maria
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 23 15 3791

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-07-2023

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 11214994	B2	04-01-2022	CN	110872922 A	10-03-2020
			EP	3617433 A1	04-03-2020
			JP	7224881 B2	20-02-2023
			JP	2020037846 A	12-03-2020
			KR	20200025707 A	10-03-2020
			US	2020071973 A1	05-03-2020

US 2021332620	A1	28-10-2021	CN	110023574 A	16-07-2019
			DE	102017101421 A1	26-07-2018
			US	2021332620 A1	28-10-2021
			WO	2018137817 A1	02-08-2018

US 2020392771	A1	17-12-2020	CN	111836941 A	27-10-2020
			EP	3763904 A1	13-01-2021
			JP	6957390 B2	02-11-2021
			JP	7216787 B2	01-02-2023
			JP	2019157424 A	19-09-2019
			JP	2022003214 A	11-01-2022
			US	2020392771 A1	17-12-2020
			WO	2019172057 A1	12-09-2019

KR 20210055107	A	17-05-2021	NONE		

FR 3051501	A1	24-11-2017	CN	109312582 A	05-02-2019
			EP	3458661 A1	27-03-2019
			FR	3051501 A1	24-11-2017
			WO	2017198921 A1	23-11-2017

DE 102021209082	A1	17-11-2022	NONE		
