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(54) VEHICLE DOOR HANDLE WITH SENSITIVE ACTUATOR

FAHRZEUGTÜRGRIFF MIT BERÜHRUNGSEMPFINDLICHER BETÄTIGER

POIGNÉE DE PORTE DE VÉHICULE AVEC ACTIONNEUR SENSITIF

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(73) Proprietors:
- **U-Shin Italia S.p.A.**
  10044 Pianezza (IT)
- **U-Shin Deutschland Zugangssysteme GmbH**
  85253 Erdweg (DE)

(72) Inventors:
- **BOBERSCHMIDT, Werner**
  85253 Erdweg (DE)
- **DESPREAUX, Guillaume**
  10044 Pianezza (IT)
- **PAVLOV, Konstantin**
  85253 Erdweg (DE)

(74) Representative: **Germain Maureau**
12, rue Boileau
69006 Lyon (FR)

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Description

Technical Field

[0001] The present invention concerns a vehicle door assembly, in particular of the type with a flushing door handle lever.

[0002] Such vehicle door handle assemblies comprise an electric motor which, when actuated, moves the handle lever between a flush position and a ready position. In the flush position, the handle lever is flush with the exterior surface of the door body. In the ready position, the handle lever is protruding from said exterior surface, so as to be graspable by a user.

[0003] Once the user grasps the handle lever in its ready position, he can unlatch the door by pulling the lever in a further protruding or extended unlocking position, in which the handle door lever interacts (via a Bowden cable, a rotating pin or a gear mechanism) with a latch mechanism thus unlatching the door.

[0004] The electric motor may also move the handle lever from the ready position to the flush position after opening or closing the door. A handle lever spring brings the handle lever back in its ready position when the user releases the handle lever.

[0005] Such door handle assemblies also comprise a back-up mechanism, to enable the opening of the door in case of, for example, electric motor or car battery failure i.e. when the electric motor cannot be actuated. This mechanism comprises for example a said push-push mechanism, in which the user pushes the handle lever deep inwards from its flushing position or ready position until reaching a clicking position in which a preloaded spring is released. Said preloaded spring, when released, pushes the handle lever from the inward clicking position in the protruding or extended ready position.

[0006] Once the user accesses the vehicle in back-up mode, the battery will generally be recharged, and/or the motor failure will be lifted and normal, electric, actuation can be resumed again.

[0007] In normal functioning, the electric motor sets the handle lever in motion via a reduction mechanism, for example a worm drive and gear mechanism, which reduces the rotational speed of the motor actuation while increasing torque value. When the user pushes the handle, associated with a lever from the flushing to the clicking position, said reduction mechanism is actuated in reverse.

Background Art

[0008] Patent application US 2013076047 regarding a door handle assembly that extends in parallel from an outer surface of a vehicle door and retracts the door handle until it is flush with the outer surface is known. This door handle assembly includes a door handle formed from a planar handle member and a handle base member. The planar handle member being coupled to the handle base member and a swing arm coupled to the backside of the handle base member extends and retracts the door handle. A first upper fork is rotably coupled to a backside of the handle base member near the distal portion of a first post portion and a second upper fork is rotably coupled to the backside of the handle base member near the distal portion of a second post portion. The lower dual fork portion of the swing arm pivots about a shaft mounted to an inner door surface. However, when a user's hand pushes inward on planar handle member so as to extend vehicle handle, the user does not know how deep he should push i.e. when to stop pushing.

[0009] Patent application EP 3106594 A is also known. It relates to a handle for a vehicle door, comprising: an activation member configured to activate a latch of a vehicle door so as to unlatch the door, a grip member configured to cooperate with the activation member so as to unlatch the door, wherein the grip member comprises a gripping part, the grip member being movable between a flushing position in which the gripping part extends flush to an external panel of the door, an active position in which the gripping part projects with respect to the external panel and becomes graspable, and the grip member cooperates with the activation member, and an opening position in which the grip member drives the activation member to activate the latch and unlatch the door, and a driving mechanism and an actuator lever cooperating with the grip member such that the grip member may be driven between the flushing position and the active position, the handle being configured such that when the grip member is pulled according to an opening direction, the grip member drives the activation member which in turn activates the latch to unlatch the door. However, in this disclosure, when a user's hand pushes inward on planar handle member so as to extend vehicle handle, he does not know how deep he should push i.e. when to stop pushing.

Summary of invention

[0010] So as to overcome the drawbacks identified in the prior art, the object of the invention is to provide a vehicle door handle comprising a coupling device having a handle lever movable between:

- a flush position in which said handle lever is flush with an exterior door panel surface
- a ready position in which said handle lever is extended and graspable by a user so as to open the door panel,
- and an inwards pushed position in which said handle lever is retracted at an angle α

said vehicle door handle comprising:

- a handle lever shaft, rotatively connected to a handle lever base,
- a positioning means able to detect the rotation angle

α of the handle lever shaft

- at least one coupling gear, driven in rotation by an electric motor and driving in rotation the handle lever shaft
- and an electronic control unit able to receive inputs from the positioning means and to send a signal to the motor

wherein the electronic control unit is able to create a motor short circuit so as to generate a torque resistance on the handle lever once an inwards pushed predetermined angle of rotation α of the handle lever is reached.

[0011] In a preferred embodiment, the predetermined angle of rotation α is so that:

$$-2.3 \leq \alpha \leq -0.4$$

Math. 1

[0012] Thus allowing an early detection of movement and triggering of motorized door handle extension.

[0013] In a further refinement, the predetermined angle of rotation α is so that:

$$-2 \leq \alpha \leq -0.5$$

Math. 2

[0014] Thus allowing a more precise and reproducible detection of movement and triggering of motorized door handle extension.

[0015] Preferably, the coupling gear comprises a first worm drive with a first worm screw and a first corresponding worm gear. This produces less noise for the coupling gear due to the helical teeth involved in the worm screw and the worm gear.

[0016] In an even preferred embodiment, the coupling gear further comprises a second worm drive with a second worm screw, a second corresponding gear wheel, and a transmission shaft which is able to transmit the rotational motion of the first worm gear to the second worm screw so as to increase the resistant torque informing the user that he has reached the desired angle.

[0017] According to the invention, it is preferable that the motor has a motor shaft which axis of rotation is perpendicular to the axis of rotation of the transmission shaft, so as to reduce the handle frame volume and save space in the door frame thickness.

[0018] According to the invention, it is also preferable that the motor has a motor shaft which axis of rotation is parallel to the axis of rotation of the handle lever shaft. so as to reduce the handle frame volume and save space in the door frame thickness.

[0019] According to a further refinement of the invention the positioning means is a magnetic sensor located at the opposite side of the lever base on the handle lever shaft so as to improve rotation angle accuracy.

[0020] The vehicle door handle according to the invention may further include a push-push lever cylinder, rotatively coupled with the handle lever shaft, interacting via a push-push lever with a push-push unit when the handle lever is pushed inwards in a clicking position so as to release a preloaded push-push unit and push the handle lever in the ready position in a non motorized fashion. This allows having a back-up totally mechanical mechanism in case of electrical energy failure rendering the motor inoperable.

[0021] It can further be provided that the clicking position so as to release a preloaded push-push unit and push the handle lever in the ready position in a non motorized fashion is reached at a rotation angle α strictly higher than -2.3°. Thus avoiding involuntary triggering of the back-up mechanism when there is no energy furniture failure.

[0022] It can further be provided that the electronic control unit is able to further instruct the motor to extend or retract the door handle lever at a predetermined time (t) after generation of torque resistance on the handle lever thus making the mechanism according to the invention usable in different starting position. A retraction instruction can be given after an inwards push from ready position for instance.

Technical Problem

[0023] The problem solved by the invention is to inform the user when to stop pushing the door handle so as to extend the door handle in a motorized and aesthetic fashion.

Solution to Problem

[0024] In the door handle according to the invention a counter-force is applied by the door handle transmitted by the door handle lever base. Such counter force informs the user that he has pushed the door handle deep enough to trigger the motorized door handle extension.

[0025] The user thus receives a message when the vehicle control unit and/ or door control unit has detected the signal from the positioning means that a pre defined angle α has been reached. Preferably, the positioning means is a sensor located on the handle lever shaft so as to improve angle precision.

[0026] The positioning means output, for example the sensor output, is received by the control unit of the handle and/or of the vehicle. A command of shortcut of the motor is sent by the control unit thus connecting the positive and negative terminals of the motor. The result is an increase of viscosity with an extra load during the movement driven by the handle lever being pushed inwards. The inversion creates a higher resistant torque on the motor axis, such torque is transmitted to the lever base by the worm drive mechanism or gear box of the door handle according to the invention and felt by the user who realizes he has reached the unlocking point. The additional torque obtained by the motor shortcut is am-

plified by more than 60 times when using the double stage reduction mechanism according to the invention.

Advantageous effect of invention

[0027] The user feels the extra load and stops the pushing movement at the right time instead of further pushing and potentially activating the back-up push-push mechanical system.

[0028] The user feels the extra load and stops the pushing movement at the right time instead of further pushing and potentially activating the back-up push-push mechanical system.

[0029] An advantage of the invention is that in case of low battery for the door handle, this motor short cut extra load will not be activated and will not disturb the safety (back-up) mechanism of extension of the door handle according to the invention.

Brief description of drawings

[0030] Characteristics and advantages of the invention will appear at the reading of the description, given in an illustrative and not limiting fashion, of the following figures, among which:

- figure 1 is a schematic cut away of a vehicle door with a handle comprising a handle lever represented in different positions,
- figure 2 is a schematic side view of a vehicle door handle according to the invention
- Figure 3 is side view of the door handle actuator showing the first transmission stage.
- Figure 4 is a front view of the door handle actuator showing the second transmission stage according to a plane perpendicular to axis A.
- Fig 5 is an illustration of the push mechanism to launch the unlock mechanical response
- Figure 6 is a schematic explanation of the push mechanism to launch the unlock mechanical response
- Figure 7 illustrates the links between the elements of the invention

[0031] In all figures, the same references apply to the same element.

[0032] Though the figures refer to precise embodiments of the invention, other embodiments may be obtained by combining or altering slightly the represented embodiments. The terms like "inwards", "outwards" and equivalents are defined with respect to the vehicle interior and exterior.

Description of embodiments

[0033] Figure 1 shows a series of schematic cutaways of a vehicle door panel 100 having a built-in door handle 1. The door panel 100 forms an exterior surface of the vehicle, the door handle 1 is essentially represented by its handle lever 102 i.e. the part meant to be grasped and set in motion by a user and a handle frame 101 i.e. the part that remains stationary during actuation.

[0034] In the first cutaway 1a of figure 1, the handle lever 102 is in a flushing position. In said flushing position, the outer surface of the handle lever 102 is flushing with the door panel 100. Said flushing position is adopted when the vehicle is driving or when it is parked for long times. In flushing position, the handle lever 102 is less likely, when parked, to be interacted by passers-by, accidentally or not, and air drag is reduced when driving. In the flushing position, the handle lever 3 also appears integrated in the door panel 100 in a pleasant and discrete way.

[0035] In the second cutaway 1b of figure 1, the handle lever 102 is in a ready position. In said ready position, the handle lever 102 has rotated outwards by a predefined angle of 20 to 45° for example around a handle axis *A,* so as to be graspable by the user. It is mentioned that the angle α is equal to 0° when the door handle lever (102) is flush with the door panel and the trigonometric reference is used to define positive and negative angles in figure 1. Said ready position is adopted when the user approaches the vehicle or causes unlocking of the doors, for example using a remote control integrated in a key or a RFID security token or just by pushing a button located on the door frame or close to such door frame. In said position the handle lever 102 is available and graspable for the user.

[0036] In the third cutaway 1c of figure 1, the handle lever 102 is in an open position. Compared to the ready position, the handle lever 102 has been rotated further outwards at an angle, for example, between 40° to 60° and more by the user, and the handle lever interacts with a latch mechanism to unlatch the door, which is consequently unlatched and ready to be opened by pulling further on the handle lever 102.

[0037] Figure 1d represents the situation when the handle lever 102 is pushed inwards at an angle α detected by a sensor so as to launch the actuator and extend the vehicle door handle. In figure 1d, the door handle is pushed inwards at an angle α between -0.4° and -2.3° using the trigonometric reference in figure 1d. Such angle is detected by a sensor placed on the door handle lever base 11; the control unit 9 then launches the motor driven actuator and extends the vehicle door handle.

[0038] In the event of a mechanical or electrical failure of the mechanism that drives the lever 102 from the flushing position to the ready position, the user can push the lever 102 deeply inwards with respect to the door panel 100 at an angle α between -2.4° and -5° by applying inwards directed pressure *P* on the handle lever 102. In this case, the handle reaches a position called clicking position, where a mechanical interaction here called a "click" releases a spring 42 of a push-push unit 4 that drives the lever 102 in ready position without actuation of a motor via a push-push lever 31 connected in rota-

tionally fixed manner to the handle lever shaft 22 .

[0039] There are therefore two steps to launch door handle extension to ready position: a first one pushing at an angle α between-0.4° and -2.3° triggering door handle extension with the motorised actuator and a second back-up step used in case of electrical failure of the mechanism involving a push at an angle α between -2.4° and -5° triggering door handle extension with the back-up push-push non motorized mechanism.

[0040] In figure 2, the handle lever 102 is rotatively mobile with respect to the handle frame 101, which is to be attached to an interior surface of the vehicle door panel 100. The frame 101 comprises housings for most parts of the door handle 1.

[0041] In a housing of the frame 101 is an electric motor 6 with a reduction mechanism (70, 80) represented in figure 3. The electric motor 6 is activated by injection of electric current, in particular from a vehicle battery. The reduction mechanism (70, 80) adapts the rotary output motion of the electric motor 6 by reducing rotational speed and increasing the torque values. The reduction mechanism (70, 80) sets the handle lever 102 in motion, in particular from the flushing position to the ready position or from the ready position back to the flushing position.

[0042] The reduction mechanism (70, 80) comprises for example one or more reduction stages, with reduction wheel gears and/or worm and gear systems. In this embodiment, Figures 3 and 4 show the transmission or coupling device 200 stages 1 and 2. Stage 1 being referenced 70 and stage 2 being referenced 80.

[0043] In figures 3 and 4, the coupling device 200 comprises the handle lever shaft 22, which extends axially from the lever base 21, and the reduction mechanism (70,80).

[0044] The reduction mechanism comprises a first reduction stage 70 and a second reduction stage 80, having each a worm drive i.e. a gear arrangement in which a worm screw meshes with a worm gear that is here a gear wheel with helical teeth matching the worm screw. Therefore, the worm drive of the first reduction stage 70 comprises a first worm screw 72 visible at figure 4 and a first wormgear 73, and the worm drive of the second reduction stage 80 comprises a second worm screw 82 and a second worm gear 83.

[0045] The first worm screw 72 of the first reduction stage 70 visible at figure 4 is set in motion by the torque applied by the electric motor 6. Said first worm of said first reduction stage 70 sets in turn the first worm gear 73 in rotational motion around a second axis C, orthogonal to the first axis A. The rotational motion of the first worm gear 73 is transmitted by a transmission shaft 81 (cf. Fig. 3) to the second worm screw 82 of the second reduction stage 80. The axis of rotation A of the handle lever shaft and the axis of rotation B of the Motor shaft 71 are parallel and both axis (A,B) are perpendicular to the axis C of the transmission shaft 81 so as to reduce the volume of the door handle assembly.

[0046] The second worm screw 82 of the second reduction stage 80 sets the second worm gear 83 in motion. The second worm gear 83 is rotationally coupled to the handle lever shaft 22. In particular, in this embodiment, the second worm gear 83 forms the portion of the lever shaft opposite the lever base 21.

[0047] The second worm gear 83 comprises a tubular body, forming the lower axial portion of the lever shaft 22 in figure 3, its lower extremity carrying helical teeth which mesh with the second worm 83 to form the worm drive. The push-push lever 31 is radially protruding from the tubular body of the second worm gear 83.

[0048] The two stage reduction mechanism (70,80) sets the coupling device 200 in motion. The coupling device 200 comprises a lever base 21, to which a handle lever body (not represented) is coupled to so as to obtain the assembled handle lever 102.

[0049] The frame 101 also houses a push-push unit 4, comprising two push-push springs 41, placed around two guiding rods 44. The push-push springs 41 push, when released, a slider 43 carrying a push-push finger 46 which is able to push against a push-push lever 31 (see figure 2) of the coupling device 200. The push-push finger 46 is in particular made of rubber, soft plastic or any shock absorbing material.

[0050] The springs 41 and guiding rods 44 are placed on each side of a release mechanism 42, which, when being compressed up to a clicking position, releases the slider 43 which is then pushed by the springs 41 along the guiding rods 44, pushing against the push push lever 31 and therefore driving the handle lever 102 in rotation up to the ready position.

[0051] The rotational position of the handle lever 102 is detected by positioning means 5, that can be on the lower side of the coupling device 200. Said positioning means 5 comprise a magnetic index and a magnetic sensor (e.g. a Hall effect sensor). The magnetic index rotates with the handle lever 102, the magnetic sensor then determinates the exact rotational position of the magnetic index, and thus the exact position of the handle lever 102.

[0052] It is to be noted that the sensor can be mechanical, electromechanical, magnetic, piezo-electric as long as it is capable of detecting a force, a change in force, a distance or a stroke, an electrical resistance or a change of electrical resistance, or even a deformation. The important point is that the information received bu the electronic control unit can be detected and processed to be turned into a signal.

[0053] In a preferred embodiment, the positioning means is a magnetic sensor unit that is directly positioned on the handle lever. The effect of such positioning is that the magnetic sensor is directly sensing the position of the handle since it is de-correlated from the actuator positioning. Sensing will be better due to reduced kinematic chain i.e. less cumulated clearance.

[0054] The second worm gear 83 and push-push lever cylinder 3 correspond to two axial portions of the handle lever shaft 22, and they surround said handle lever shaft

22 while being axially spaced.

[0055] Said handle lever shaft 22 is bound in rotation with the handle lever base 21 , second worm wheel 83 and the push-push lever cylinder 3, in particular, they may be solidly linked.

[0056] The second worm gear 83 comprises a tubular body, covered partially on its axial side by helical meshing teeth 831 to cooperate directly or indirectly with the electric motor 6, for example via a worm and gear link as a first optional stage. In figure 5 showing the door handle according to the invention, the different positions of the handle lever 102 are represented when being pushed. In the flush position, the angle α is considered to be null.

[0057] In the door handle according to the invention a counter-force is applied by the door handle transmitted by the lever base 21. Such counter force informs the user that he has pushed the door handle deep enough to trigger the motorized door handle extension.

[0058] The user thus receives a message when the vehicle control unit 9 and/ or door control unit 9 has detected the signal from the positioning means 5 that an angle α between -0.4° and -2.3° has been reached. Preferably, the positioning means is a sensor located on the handle lever shaft so as to improve angle precision.

[0059] The positioning means 5 output, for example the sensor 5 output, is received by the control unit 9 of the handle 1 and/or of the vehicle. A command of shortcut of the motor is sent by the control unit 9 i.e. connecting the positive and negative terminals of the motor 6. The result is an increase of viscosity with an extra load during the movement driven by the handle lever being pushed inwards. The inversion creates a higher resistant torque on the motor axis, such torque is transmitted to the lever base by the worm drive mechanism or gear box of the door handle according to the invention and felt by the user who realizes he has reached the unlocking point. The additional torque obtained by the motor 6 shortcut is amplified by more than 60 times when using the double stage reduction mechanism (70,80) according to the invention.

Industrial applicability

[0060] The coupling device for door handle according to the invention can be used with any system for any application that uses positioning means, a motor and an action from user within a specific range of stroke so as to launch an action.

References

[0061]

- US 2013076047
- EP 3106594 A

Claims

1. Vehicle door handle (1) comprising a coupling device (200) having a handle lever (102) movable between:

   - a flush position in which said handle lever (102) is flush with an exterior door panel surface (100)
   - a ready position in which said handle lever (102) is extended and graspable by a user so as to open the door panel (100),
   - and an inwards pushed position in which said handle lever (102) is retracted at an angle α

   characterised in that said vehicle door handle (1) comprises:

   - a handle lever shaft (22), rotatively connected to a handle lever base (21),
   - a positioning means (5) able to detect a rotation angle α of the handle lever shaft (22)
   - at least one coupling gear (70,80), driven in rotation by an electric motor (6) and driving in rotation the handle lever shaft (22)
   - and an electronic control unit (9) able to receive inputs from the positioning means (5) and to send a signal to the motor (6)

   wherein the electronic control unit (9) is able to create a motor (6) short circuit so as to generate a torque resistance on the handle lever(102) once an inwards pushed predetermined angle of rotation α of the handle lever (102) is reached.

2. Vehicle door handle (1) according to claim 1 wherein the predetermined angle of rotation α is so that:

$$-2.3 \leq \alpha \leq -0.4$$

Math. 3

3. Vehicle door handle (1) according to anyone of the preceding claims wherein the predetermined angle of rotation α is so that:

$$-2 \leq \alpha \leq -0.5$$

Math. 4

4. Vehicle door handle (1) according to anyone of the preceding claims wherein the coupling gear (70,80) comprises a first worm drive (70) with a first worm screw (72) and a first corresponding worm gear (73).

5. Vehicle door handle (1) according to claim 4 wherein the coupling gear (70,80) further comprises a second worm drive (80) with a second worm screw (82), a second corresponding gear wheel (83), and a transmission shaft (81) which is able to transmit the rota-

tional motion of the first worm gear (73) to the second worm screw (82).

6. Vehicle door handle (1) according to claim 5 wherein the motor(6) has a motor shaft (71) which axis of rotation (B) is perpendicular to the axis of rotation (C) of the transmission shaft (81),

7. Vehicle door handle (1) according to anyone of claims 5 or 6 wherein the motor(6) has a motor shaft (71) which axis of rotation (B) is parallel to the axis of rotation (A) of the handle lever shaft(22).

8. Vehicle door handle (1) according to anyone of preceding claims wherein the positioning means (5) is a magnetic sensor located at the opposite side of the lever base (21) on the handle lever shaft(22).

9. Vehicle door handle (1) according to anyone of preceding claims further comprising a push-push lever cylinder (3), rotatively coupled with the handle lever shaft (22), interacting via a push-push lever (31) with a push-push unit (4) when the handle lever (102) is pushed inwards in a clicking position so as to release a preloaded push-push unit (4) and push the handle lever (102) in the ready position in a non motorized fashion.

10. Vehicle door handle (1) according to claim 9 wherein the clicking position so as to release a preloaded push-push unit (4) and push the handle lever (102) in the ready position in a non motorized fashion is reached at a rotation angle α strictly higher than -2.3°.

11. Vehicle door handle (1) according to anyone of preceding claims wherein the electronic control unit (9), is able to further instruct the motor (6) to extend or retract the door handle lever (102) at a predetermined time (t) after generation of torque resistance on the handle lever(102).

Patentansprüche

1. Fahrzeugtürgriff (1), umfassend eine Koppelvorrichtung (200), die einen Griffhebel (102) aufweist, der beweglich ist zwischen:

- einer bündigen Stellung, in der der Griffhebel (102) mit einer äußeren Türblattfläche (100) bündig ist,
- einer bereiten Stellung, in der der Griffhebel (102) ausgefahren ist und von einem Benutzer gegriffen werden kann, um das Türblatt (100) zu öffnen,
- und einer einwärts gedrückten Stellung, in der der Griffhebel (102) um einen Winkel α versenkt ist,

dadurch gekennzeichnet, dass der Fahrzeugtürgriff (1) umfasst:

- eine Griffhebelwelle (22), die drehend mit einer Griffhebelbasis (21) verbunden ist,
- ein Stellmittel (5), das einen Drehwinkel α der Griffhebelwelle (22) erkennen kann,
- mindestens ein Koppelgetriebe (70, 80), das von einem Elektromotor (6) drehend angetrieben wird und die Griffhebelwelle (22) drehend antreibt,
- und eine elektronische Steuereinheit (9), die Eingänge vom Stellmittel (5) empfangen und ein Signal an den Motor (6) senden kann,

wobei die elektronische Steuereinheit (9) einen Motor- (6) Kurzschluss herstellen kann, um einen Drehmomentwiderstand am Griffhebel (102) zu erzeugen, sobald ein einwärts gedrückter vorbestimmter Drehwinkel α des Griffhebels (102) erreicht wird.

2. Fahrzeugtürgriff (1) nach Anspruch 1, wobei der vorbestimmte Drehwinkel α so ist, dass:

$$-2{,}3 \leq \alpha \leq -0{,}4$$

Gleichung 3

3. Fahrzeugtürgriff (1) nach einem der vorstehenden Ansprüche, wobei der vorbestimmte Drehwinkel α so ist, dass:

$$-2 \leq \alpha \leq -0{,}5$$

Gleichung 4

4. Fahrzeugtürgriff (1) nach einem der vorstehenden Ansprüche, wobei das Koppelgetriebe (70, 80) einen ersten Schneckenantrieb (70) mit einer ersten Schneckenschraube (72) und einem ersten entsprechenden Schneckengetriebe (73) umfasst.

5. Fahrzeugtürgriff (1) nach Anspruch 4, wobei das Koppelgetriebe (70, 80) weiter einen zweiten Schneckenantrieb (80) mit einer zweiten Schneckenschraube (82), einem zweiten entsprechenden Getrieberad (83) und einer Übertragungswelle (81) umfasst, die die Drehbewegung des ersten Schneckengetriebes (73) auf die zweite Schneckenschraube (82) übertragen kann.

6. Fahrzeugtürgriff (1) nach Anspruch 5, wobei der Motor (6) eine Motorwelle (71) aufweist, deren Drehachse (B) zur Drehachse (C) der Übertragungswelle

(81) senkrecht ist.

7. Fahrzeugtürgriff (1) nach einem der Ansprüche 5 oder 6, wobei der Motor (6) eine Motorwelle (71) aufweist, deren Drehachse (B) zur Drehachse (A) der Griffhebelwelle (22) parallel ist.

8. Fahrzeugtürgriff (1) nach einem der vorstehenden Ansprüche, wobei das Stellmittel (5) ein Magnetsensor ist, der sich auf der gegenüberliegenden Seite der Hebelbasis (21) an der Griffhebelwelle (22) befindet.

9. Fahrzeugtürgriff (1) nach einem der vorstehenden Ansprüche, weiter einen drehend mit der Griffhebelwelle (22) gekoppelten Drück-Drück-Hebelzylinder (3) umfassend, der über einen Drück-Drück-Hebel (31) mit einer Drück-Drück-Einheit (4) wechselwirkt, wenn der Griffhebel (102) einwärts in eine Klickstellung gedrückt wird, um eine vorbelastete Drück-Drück-Einheit (4) freizugeben und den Griffhebel (102) in einer nicht motorisierten Weise in die bereite Stellung zu drücken.

10. Fahrzeugtürgriff (1) nach Anspruch 9, wobei die Klickstellung, um eine vorbelastete Drück-Drück-Einheit (4) freizugeben und den Griffhebel (102) in einer nicht motorisierten Weise in die bereite Stellung zu drücken, bei einem Drehwinkel α von strikt größer als -2,3° erreicht wird.

11. Fahrzeugtürgriff (1) nach einem der vorstehenden Ansprüche, wobei die elektronische Steuereinheit (9) weiter den Motor (6) dazu anweisen kann, den Türgriffhebel (102) zu einer vorbestimmten Zeit (t) nach Erzeugen von Drehmomentwiderstand am Griffhebel (102) auszufahren oder zu versenken.

Revendications

1. Poignée de porte de véhicule (1) comprenant un dispositif de couplage (200) ayant un levier de poignée (102) mobile entre :

- une position d'affleurement dans laquelle ledit levier de poignée (102) est affleurant avec une surface de panneau de porte externe (100)
- une position de disponibilité dans laquelle ledit levier de poignée (102) est déployé et peut être saisi par un utilisateur de manière à ouvrir le panneau de porte (100),
- et une position de poussée vers l'intérieur dans laquelle ledit levier de poignée (102) est rétracté selon un angle α

caractérisé en ce que ladite poignée de porte de véhicule (1) comprend :

- un arbre de levier de poignée (22), relié en rotation à une base de levier de poignée (21),
- un moyen de positionnement (5) capable de détecter un angle de rotation α de l'arbre de levier de poignée (22)
- au moins un engrenage de couplage (70, 80), entraîné en rotation par un moteur électrique (6) et entraînant en rotation l'arbre de levier de poignée (22)
- et une unité de commande électronique (9) capable de recevoir des entrées à partir du moyen de positionnement (5) et d'envoyer un signal au moteur (6)

dans laquelle l'unité de commande électronique (9) est capable de créer un court-circuit de moteur (6) de manière à générer une résistance de couple sur le levier de poignée (102) une fois qu'un angle de rotation α prédéterminé de poussée vers l'intérieur du levier de poignée (102) est atteint.

2. Poignée de porte de véhicule (1) selon la revendication 1, dans laquelle l'angle de rotation prédéterminé α est tel que :

$$-2{,}3 \leq \alpha \leq -0{,}4$$

Math.3

3. Poignée de porte de véhicule (1) selon l'une quelconque des revendications précédentes, dans laquelle l'angle de rotation prédéterminé α est tel que :

$$-2 \leq \alpha \leq -0{,}5$$

Math.4

4. Poignée de porte de véhicule (1) selon l'une quelconque des revendications précédentes, dans laquelle l'engrenage de couplage (70, 80) comprend un premier entraînement à vis sans fin (70) avec une première vis sans fin (72) et un premier engrenage de vis sans fin correspondant (73).

5. Poignée de porte de véhicule (1) selon la revendication 4, dans laquelle l'engrenage de couplage (70, 80) comprend en outre un deuxième entraînement à vis sans fin (80) avec une deuxième vis sans fin (82), une deuxième roue d'engrenage correspondante (83), et un arbre de transmission (81) qui est capable de transmettre le mouvement de rotation du premier engrenage de vis sans fin (73) à la deuxième vis sans fin (82).

6. Poignée de porte de véhicule (1) selon la revendication 5, dans laquelle le moteur (6) a un arbre de moteur (71) dont l'axe de rotation (B) est perpendiculaire à l'axe de rotation (C) de l'arbre de transmis-

sion (81).

7. Poignée de porte de véhicule (1) selon l'une des revendications 5 et 6 dans laquelle le moteur (6) a un arbre de moteur (71) dont l'axe de rotation (B) est parallèle à l'axe de rotation (A) de l'arbre de levier de poignée (22).

8. Poignée de porte de véhicule (1) selon l'une quelconque des revendications précédentes, dans laquelle le moyen de positionnement (5) est un capteur magnétique situé au niveau du côté opposé de la base de levier (21) sur l'arbre de levier de poignée (22).

9. Poignée de porte de véhicule (1) selon l'une quelconque des revendications précédentes, comprenant en outre un cylindre de levier de type poussée-poussée (3), couplé en rotation avec l'arbre de levier de poignée (22), interagissant par l'intermédiaire d'un levier de type poussée-poussée (31) avec une unité de type poussée-poussée (4) lorsque le levier de poignée (102) est poussé vers l'intérieur dans une position de clic de manière à libérer une unité de type poussée-poussée préchargée (4) et à pousser le levier de poignée (102) dans la position prête de manière non motorisée.

10. Poignée de porte de véhicule (1) selon la revendication 9, dans laquelle la position de clic permettant de libérer une unité de type poussée-poussée préchargée (4) et de pousser le levier de poignée (102) dans la position prête de manière non motorisée est atteinte à un angle de rotation α strictement supérieur à -2,3°.

11. Poignée de porte de véhicule (1) selon l'une quelconque des revendications précédentes, dans laquelle l'unité de commande électronique (9), est capable de donner en outre une instruction au moteur (6) pour étendre ou rétracter le levier de poignée de porte (102) à un instant prédéterminé (t) après génération de la résistance de couple sur le levier de poignée (102).

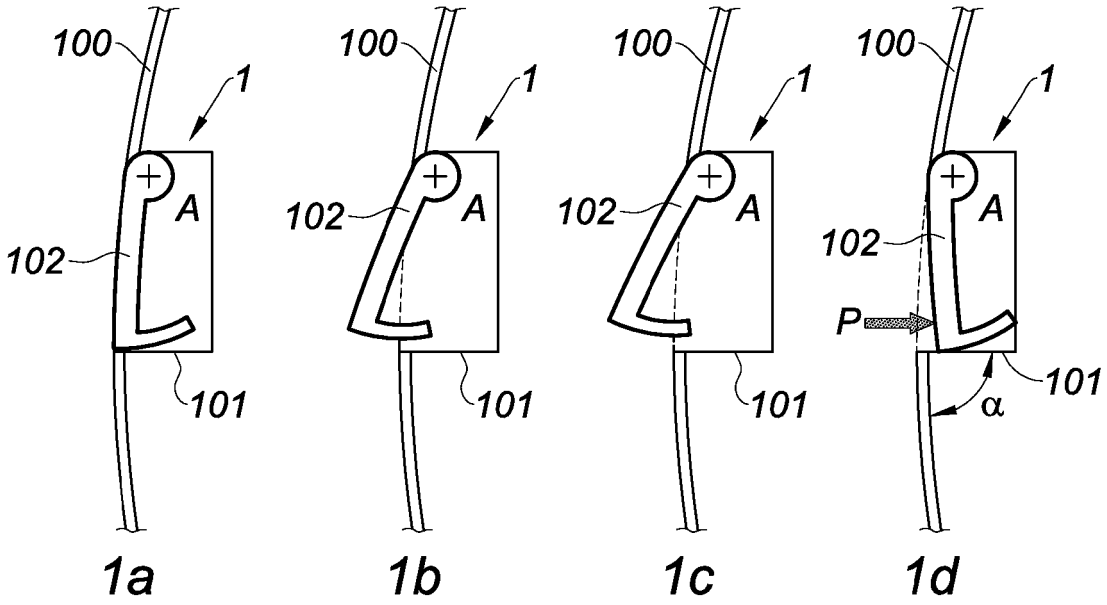
100
1
A
102
101
P
α
1a
1b
1c
1d

Fig. 1

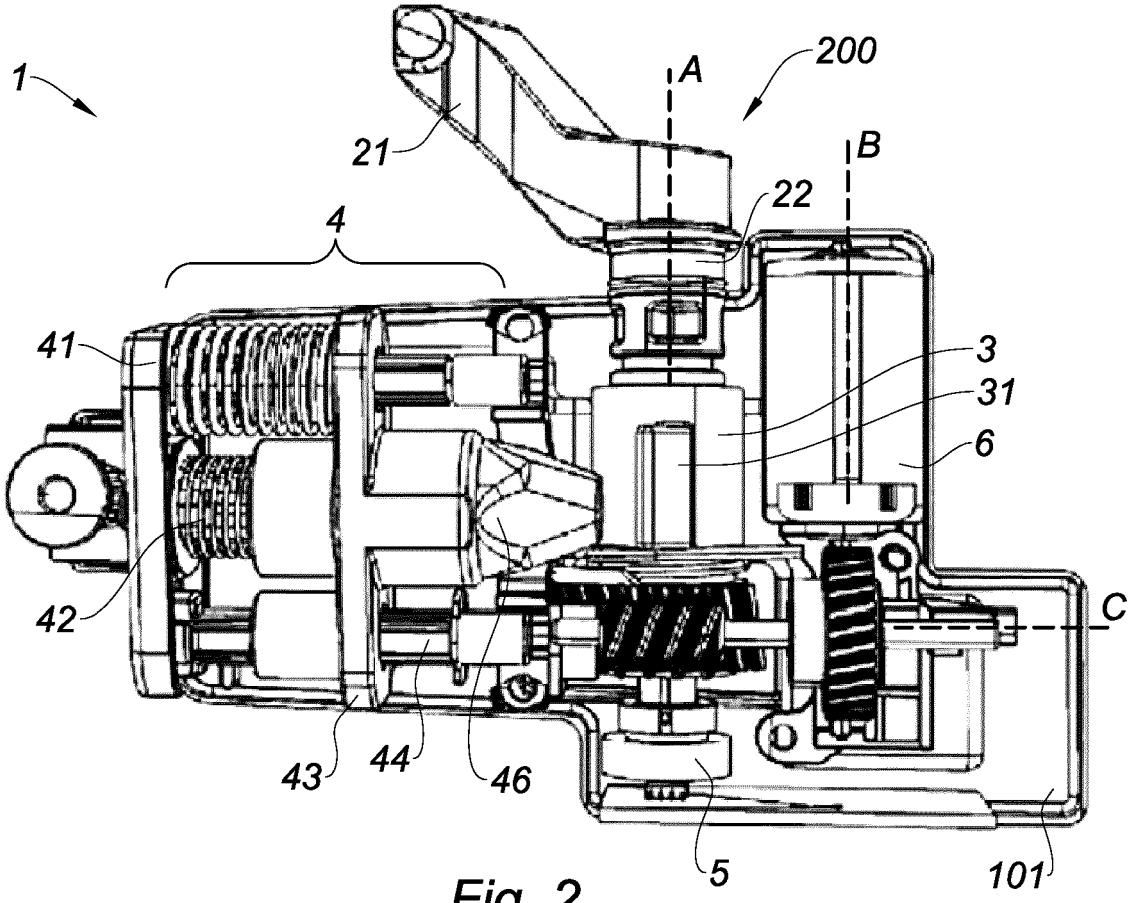
1
200
A
B
21
22
4
41
3
31
6
42
C
43
44
46
5
101

Fig. 2

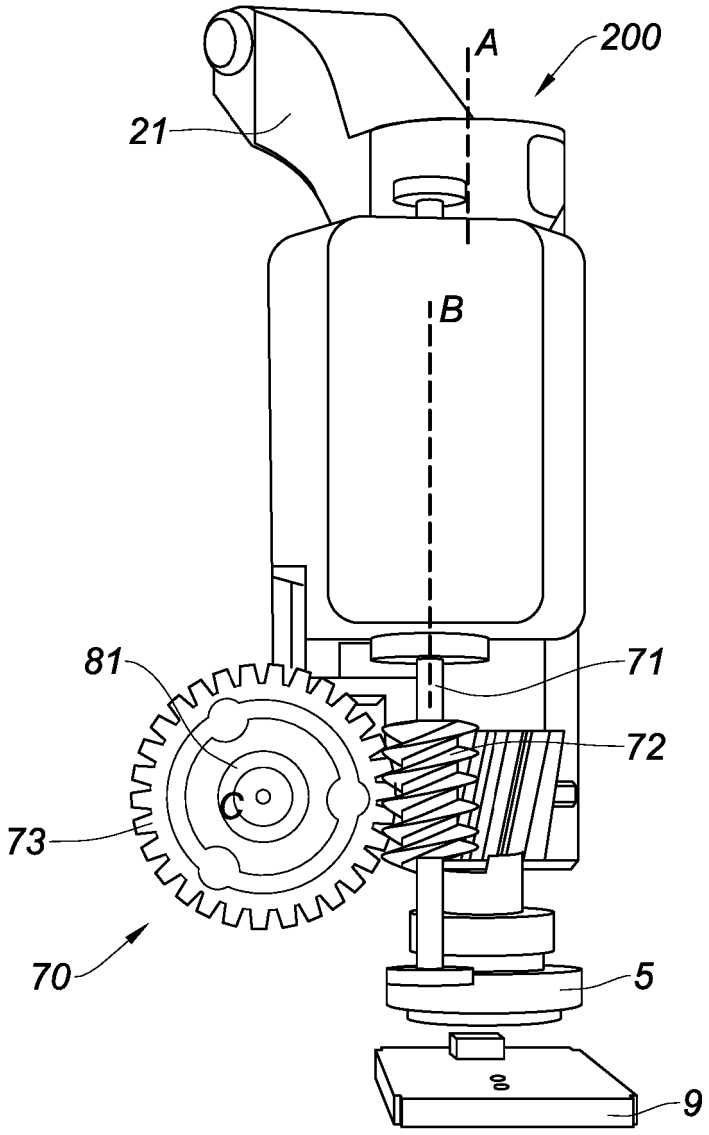

Fig. 3

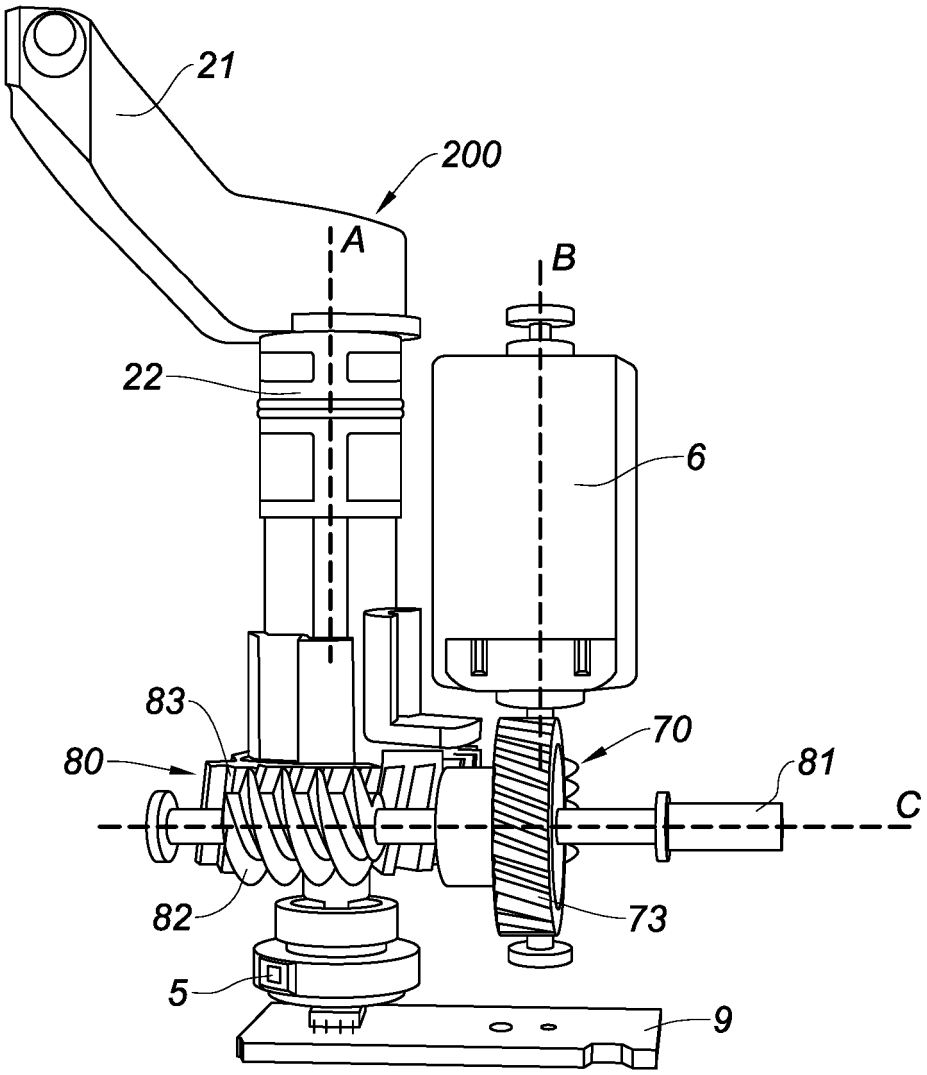

Fig. 4

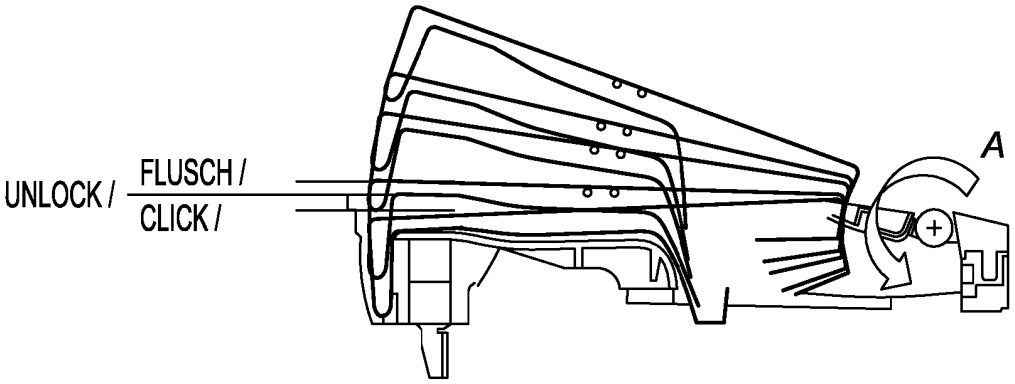

Fig. 5

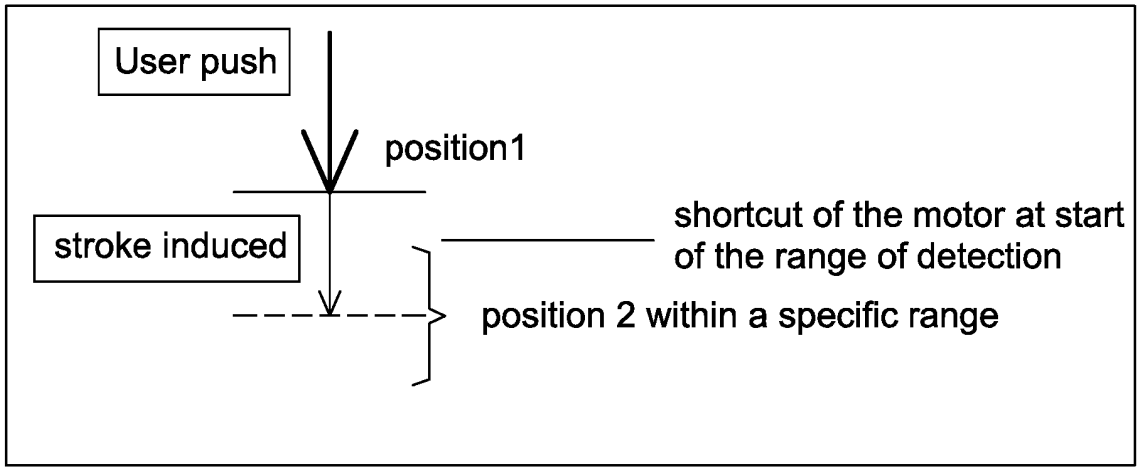

Fig. 6

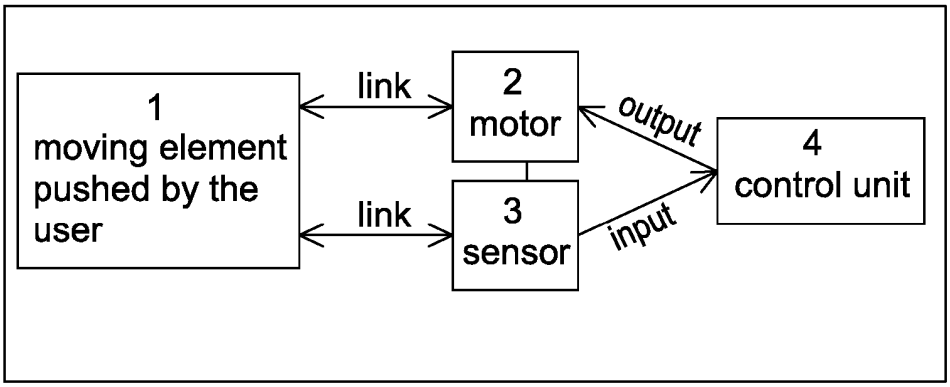

Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- EP 3106594 A **[0009] [0061]**