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(54) **VEHICLE DOOR INSIDE OPENING HANDLE ASSEMBLY, VEHICLE DOOR STRUCTURE AND VEHICLE**

FAHRZEUGTÜR-INNENÖFFNUNGSGRIFFANORDNUNG, FAHRZEUGTÜRSTRUKTUR UND FAHRZEUG

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Description**FIELD**

[0001] The present invention relates to the technical field of vehicle door handles, and in particular, to an internally openable handle assembly for a vehicle door, a vehicle door structure, and a vehicle.

BACKGROUND

[0002] With refinements of the automotive industry, consumers are demanding higher and higher for perceived quality of automotive parts and have the need for increasing refinements of components.

[0003] The commercially available internally openable handles for a vehicle door are various in shape, but all use a center shaft type. After the internally openable handle is opened, an internal structure, such as internal springs, buffer pads, and other uneven structures, can be visible.

[0004] In addition, most internally openable handles for the vehicle door on the market have a damping feeling when the handle is opened and closed, which may generate abnormal sound during the closing of the handle.

[0005] The existing internally openable handle is required to be further improved in terms of both visual and auditory perception. Therefore, there is an urgent need to provide an internally openable handle for the vehicle door that is good-looking and user-friendly and has good auditory perception.

[0006] From document CN 207 392 956 U an internally openable handle assembly for a vehicle door according to the preamble of claim 1 is known.

SUMMARY

[0007] In order to solve the above technical problems, the present invention provides an internally openable handle assembly for a vehicle door. The resistance is small when the internally openable handle assembly for the vehicle door is opened, and an extendable member is provided to prevent the internally openable handle from being closed quickly when the internally openable handle assembly for the vehicle door is closed, to avoid impact noise during the closing. Therefore, the resistance is small when the internally openable handle assembly for the vehicle door is opened, and user's experience feeling is improved because of no noise during the closing.

[0008] In order to achieve the above purpose of the present invention, the present invention provides an internally openable handle assembly for a vehicle door. The internally openable handle assembly for the vehicle door includes a first rotary shaft, a handle structure rotating around the first rotary shaft, a first locking member fixed at the handle structure, a second rotary shaft, a second locking member rotating around the second rotary shaft, and an extendable member. The handle struc-

ture is configured to enable opening or closing of the internally openable handle assembly by rotating around the first rotary shaft. The second locking member is cooperatively locked with the first locking member to lock the handle structure. The extendable member has an end fixedly connected to the second rotary shaft and another end configured to be fixedly connected to the vehicle door. The extendable member is extendable or retractable in a direction perpendicular to the second rotary shaft.

[0009] In an embodiment, when the handle structure rotates around the first rotary shaft, the second locking member is driven to be rotatable between an initial position and an open position. The second locking member is positioned at the open position when the handle structure is in an open state.

[0010] In an embodiment, the internally openable handle assembly for the vehicle door further includes an elastic member configured to drive the handle structure in the open state to rotate around the first rotary shaft in a reversed direction until the handle structure returns into a close state.

[0011] In an embodiment, during the rotation of the handle structure around the first rotary shaft in the reversed direction, the second rotary shaft is driven by the handle structure to move away from the extendable member, or is driven by the extendable member to move toward the extendable member.

[0012] In an embodiment, during the rotation of the handle structure around the first rotary shaft in the reversed direction, when an elastic force of the elastic member is greater than a pulling force at which the extendable member is extended, the second rotary shaft is driven by the handle structure to move away from the extendable member until the elastic force of the elastic member is equal to a restoring force at which the extendable member is retracted. The extendable member is pulled by the second rotary shaft synchronously to be extended toward the second rotary shaft.

[0013] In an embodiment, during the rotation of the handle structure around the first rotary shaft in the reversed direction, when an elastic force of the elastic member is smaller than a restoring force at which the extendable member is retracted, the second rotary shaft is driven by the extendable member to move toward the extendable member until the second locking member returns to the initial position.

[0014] In an embodiment, the internally openable handle assembly for the vehicle door further includes a limit member configured to limit a position of the second locking member.

[0015] In an embodiment, the limit member is an elastic sheet.

[0016] In an embodiment, the second locking member is a ratchet mechanism.

[0017] In an embodiment, the extendable member is a damper, and the damper has an end fixedly connected to the second rotary shaft and another end configured to be

fixed to the vehicle door. The damper is extendable or retractable in the direction perpendicular to the second rotary shaft.

[0018] In an embodiment, the handle structure includes a handle and a handle base fixedly connected to each other. The handle base is arranged around the first rotary shaft and rotatable around the first rotary shaft. A first arc surface is formed by engaging the handle with the handle base, and is located on an inner side surface of the handle base engaged with the handle and formed into a goose-neck-like structure with an inner notch at the handle base. The first rotary shaft is located on a perpendicular bisector of a connecting line between two points on the first arc surface.

[0019] In an embodiment, the handle base has a second arc surface formed on an outer side surface of the handle base, and the second arc surface is formed with the first rotary shaft as a center of circle.

[0020] In an embodiment, the first locking member is fixedly connected to the handle base and has a gear structure.

[0021] The specific advantages are described below. The internally openable handle assembly for the vehicle door of the present invention has a small resistance when the internally openable handle assembly for the vehicle door is opened. The extendable member is provided to prevent the internally openable handle from being closed quickly when the internally openable handle assembly for the vehicle door is closed, to avoid impact noise during the closing. Accordingly, the internally openable handle assembly for the vehicle door has the small resistance during the opening, and the user's experience feeling is provided because of no noise during the closing.

[0022] The present invention further provides a vehicle door structure. The vehicle door structure includes a vehicle door sheet metal; a vehicle door interior trim panel fixed on the vehicle door sheet metal and having an opening; and the internally openable handle assembly for the vehicle door as described above. The handle structure includes a handle base that is movable in the opening.

[0023] In an embodiment, the handle structure is engaged with a second arc surface by a goose-neck-like structure that is formed by a first arc surface of the handle structure, in such a manner that the first arc surface and the second arc surface are in close fit with the opening when the handle base moves in the opening.

[0024] The specific advantages of the vehicle door of the present disclosure are described below. When the vehicle door is opened by the internally openable handle assembly for the vehicle door, the internally openable handle assembly for the vehicle door is opened with a small resistance and closed without noise, which improves the user's experience feeling. Moreover, during the opening and closing, a structure of a visible region of the internally openable handle assembly has no change, and thus has a concise shape and a better visual effect.

[0025] The present invention further provides a vehi-

cle. The vehicle includes a body and the vehicle door structure described above. The vehicle door structure is disposed on the body.

5 BRIEF DESCRIPTION OF THE DRAWINGS

[0026] In order to clearly explain technical solutions of embodiments of the present invention or in the related art, accompanying drawings used in the description of the embodiments or the related art are briefly described below. Obviously, the accompanying drawings as described below are merely some embodiments of the present disclosure. Based on these drawings, other accompanying drawings may be obtained by those skilled in the art without involving creative effort.

FIG. 1 is a perspective structural diagram of an internally openable handle assembly for a vehicle door.

FIG. 2 is a schematic structural diagram of an internally openable handle assembly for a vehicle door.

FIG. 3 is a schematic structural diagram of an internally openable handle assembly for a vehicle door that is assembled on the vehicle door when a handle structure is opened.

FIG. 4 is a schematic structural diagram of an internally openable handle assembly for a vehicle door that is assembled on the vehicle door when a handle structure is closed.

[0027] Reference signs in the drawings are described below:

1 first rotary shaft; 2 handle structure; 201 handle; 202 handle base; 203 first arc surface; 204 second arc surface; 3 second rotary shaft; 4 second locking member; 5 extendable member; 6 limit member; 7 first locking member; 8 vehicle door interior trim panel; 801 opening.

DETAILED DESCRIPTION

[0028] In order to make the objects, technical solutions and advantages of the present invention more apparent, the present invention will be further described in detail below in combination with accompanying drawings.

[0029] It should be noted that in the specification and claims of the present invention and the accompanying drawings, terms such as "first" and "second" are used to distinguish similar objects, rather than to describe a specific sequence or order. In addition, terms "include", "have" and any variation thereof are intended to cover non-exclusive inclusions. In different embodiment modifications, the same components have the same reference signs.

[0030] FIG. 1 is a perspective structural diagram of an internally openable handle assembly for a vehicle door of the present invention. The internally openable handle assembly for the vehicle door includes a first rotary shaft 1, a handle structure 2 rotating around the first rotary

shaft 1, a first locking member 7 fixed at the handle structure 2, a second rotary shaft 3, a second locking member 4 rotating around the second rotary shaft 3, and an extendable member 5. The handle structure 2 is configured to enable opening or closing of the internally openable handle assembly by rotating around the first rotary shaft 1.

[0031] In some embodiments, the handle structure 2 may rotate clockwise and counterclockwise around the first rotary shaft 1.

[0032] In some embodiments, the present invention may be, but is not limited to that, when the handle structure 2 rotates clockwise around the first rotary shaft 1, the handle structure 2 is configured to open the internally openable handle assembly.

[0033] When the handle structure 2 rotates counterclockwise around the first rotary shaft 1, the handle structure 2 is configured to close the internally openable handle assembly.

[0034] The second locking member 4 is engaged and locked with the first locking member 7 to lock the handle structure 2.

[0035] In some embodiments, when the handle structure 2 rotates clockwise around the first rotary shaft 1, the first locking member 7 synchronously rotates with the handle structure 2 and pushes the second locking member 4 to move, causing the second locking member 4 to rotate counterclockwise around the second rotary shaft 3, during which the first locking member 7 is in sliding fit with the second locking member 4.

[0036] In some embodiments, the second locking member 4 may be a ratchet mechanism, and the first locking member 7 may be a gear structure. The ratchet mechanism is engaged with the gear structure to lock the handle structure 2.

[0037] In some embodiments, in this embodiment of the description, when the handle structure 2 rotates around the first rotary shaft 1, the first locking member 7 synchronously rotates with the handle structure 2.

[0038] The extendable member 5 has an end fixedly connected to the second rotary shaft 3 and another end fixedly connected to the vehicle door.

[0039] In an embodiment, the extendable member 5 may include a fixed portion and an extendable portion.

[0040] The extendable portion has an end connected to the fixed portion and another end fixedly connected to the second rotary shaft 3.

[0041] An end of the fixed portion away from the extendable portion is configured to be fixed to the vehicle door.

[0042] The extendable member 5 is extendable or retractable in a direction perpendicular to the second rotary shaft 3.

[0043] In an embodiment, the extendable portion of the extendable member 5 may be perpendicular to the second rotary shaft 3, enabling the extendable member 5 to be extendable or retractable in a direction perpendicular to the second rotary shaft 3. During extending or retract-

ing of the extendable portion, the extendable portion is slidable relative to the fixed portion in the direction of the extendable portion perpendicular to the second rotary shaft 3. In the internally openable handle assembly for the vehicle door of the present disclosure, the resistance is small when the internally openable handle assembly for the vehicle door is opened, and the extendable member is provided to prevent an internally openable handle from closing quickly when the internally openable handle assembly for the vehicle door is closed, to avoid impact noise during the closing. Therefore, the internally openable handle assembly for the vehicle door is opened with a small resistance and close without noise, which improves user's experience feeling.

[0044] In an embodiment, as illustrated in FIG. 1 and FIG. 2, the extendable member 5 is a damper having an end fixedly connected to the second rotary shaft 3 and another end configured to be fixed to the vehicle door. The damper is configured to be extendable or retractable in the direction perpendicular to the second rotary shaft 3.

[0045] In other embodiments of the present invention, the extendable member 5 may be a spring, an air cylinder, or other structures.

[0046] As illustrated in FIG. 1 and FIG. 2, when the handle structure 2 rotates around the first rotary shaft 1, the second locking member 4 is driven by the handle structure 2 to be rotatable between an initial position and an open position. The second locking member 4 is positioned at the open position when the handle structure 2 is in an open state.

[0047] In some embodiments, during the clockwise rotation of the handle structure 2 around the first rotary shaft, the second locking member 4 is driven by the handle structure 2 to rotate counterclockwise from the initial position to the open position. During the counterclockwise rotation of the handle structure 2 around the first rotary shaft, the second locking member 4 is driven by the handle structure 2 to return to the initial position from the open position.

[0048] In some embodiments, the internally openable handle assembly for the vehicle door further includes an elastic member (not shown in the figures). The elastic member is configured to drive the handle structure 2 in the open state to rotate around the first rotary shaft 1 in a reversed direction until the handle structure 2 returns into a close state.

[0049] In an embodiment, the elastic member is arranged around the first rotary shaft 1. When the handle structure 2 is opened, the elastic member has a reaction force. With this arrangement, the handle structure is driven to automatically return after the handle structure 2 is opened.

[0050] In an embodiment, the elastic member may be a torsion spring.

[0051] In some embodiments, as illustrated in FIG. 1 and FIG. 2, during the rotation of the handle structure 2 around the first rotary shaft 1 in the reversed direction, the second rotary shaft 3 is driven by the handle structure 2 to

move away from the extendable member 5, or the extendable member 5 is capable of driving the second rotary shaft 3 to move toward the extendable member 5.

[0052] In some embodiments, when an elastic force of the elastic member is greater than a pulling force at which the extendable member 5 is extended, and the second rotary shaft 3 is driven by the handle structure 2 to move away from the extendable member 5 until the elastic force of the elastic member is equal to a restoring force at which the extendable member 5 is retracted. The extendable member 5 is pulled by the second rotary shaft 3 synchronously to extend toward the second rotary shaft 3.

[0053] In an embodiment, the extendable portion of the extendable member 5 is pulled to extend toward the second rotary shaft 3.

[0054] In some embodiments, when the elastic force of the elastic member is smaller than the restoring force at which the extendable member 5 is retracted, the second rotary shaft 3 is driven by the extendable member 5 to move toward the extendable member 5 until the second locking member 4 returns to the initial position. The second locking member 4 synchronously moves with the second rotary shaft 3 when the second rotary shaft 3 moves.

[0055] As illustrated in FIG. 1 and FIG. 2, the internally openable handle assembly for the vehicle door further includes a limit member 6 configured to limit a position of the second locking member 4.

[0056] In some embodiments, after the second locking member 4 is engaged and locked with the first locking member 7, the limit member 6 is configured to limit and fix the second locking member 4 again, to prevent the second locking member 4 from sliding.

[0057] In an embodiment, the limit member 6 is an elastic sheet.

[0058] In other embodiments of the present invention, the limit member 6 is another elastic pressure device, such as a tension spring.

[0059] As illustrated in FIG. 1 and FIG. 2, the handle structure 2 includes a handle 201 and a handle base 202 that are fixedly connected to each other. The handle base 202 is arranged around the first rotary shaft 1 and rotatable around the first rotary shaft 1. A first arc surface 203 is formed by engaging the handle 201 with the handle base 202. The first arc surface 203 is located on an inner side surface of the handle base 202 engaged with the handle 201 and forms a goose-neck-like structure with an inner notch at the handle base 202. The first rotary shaft 1 is located on a perpendicular bisector of a connecting line between two points on the first arc surface 203.

[0060] In some embodiments, a point A and a point B are selected on the first arc surface 203. The point A is connected to the point B, and a perpendicular bisector of a connecting line between the point A and the point B is made.

[0061] During the assembly, a Y-direction position where a center of circle is located may be determined based on information, such as a shape-limiting surface, a

component material thickness, a minimum gap, and a minimum structural strength of a vehicle door interior trim panel. Further, a position of the first rotary shaft 1 is determined. The first arc surface 203 is formed with the first rotary shaft 1 as a center of circle.

[0062] In some embodiments, as illustrated in FIG. 1 and FIG. 2, an outer side surface of the handle base 202 has a second arc surface 204. The second arc surface 204 is formed with the first rotary shaft 1 as a center of circle. That is, the first arc surface 203 and the second arc surface 204 are arc surfaces of concentric circles. With this configuration, when the handle structure 2 rotates around the first rotary shaft 1, a distance between the first arc surface and the handle structure 2 and a distance between the second arc surface and the handle structure 2 both remain constant. Therefore, when the internally openable handle assembly is subsequently assembled to the vehicle door, convenient assembly and a more aesthetically pleasing profile are facilitated to be achieved.

[0063] In some embodiments, as illustrated in FIG. 1 and FIG. 2, the first locking member 7 is fixedly connected to the handle base 202. When the handle structure 2 rotates around the first rotary shaft 1, the first locking member 7 and the handle structure 2 rotate synchronously.

[0064] The operation principle of the internally openable handle assembly for the vehicle door is described below.

1) Opening process of the internally openable handle assembly

[0065] During the opening of the internally openable handle, the handle structure 2 rotates clockwise around the first rotary shaft 1. Meanwhile, the first locking member 7 is driven by the handle structure 2 to move synchronously, and the second locking member 4 is pushed by the first locking member 7 to rotate counterclockwise around the second rotary shaft 3 until the handle structure 2 rotates to the internally openable handle assembly to be opened. During the synchronous movement of the second locking member 4 pushed by the first locking member 7, the first locking member 7 is in sliding fit with the second locking member 4. During the opening of the internally openable handle of the present invention, the handle structure 2 has the small resistance and is opened smoothly.

[0066] In some embodiments, when the first locking member 7 is the gear structure and the second locking member 4 is the ratchet mechanism, the gear structure pushes the ratchet mechanism, enabling the ratchet mechanism to rotate counterclockwise around the second rotary shaft 3. After the handle structure 2 continues to rotate to open one of teeth, the ratchet mechanism continues to be tightly attached to the teeth of the gear structure under the action of the elastic sheet and this cycle is to be performed on the next tooth until the handle

structure 2 rotates to the internally openable handle assembly to be opened.

2) Closing process of the internally openable handle assembly

[0067] When the internally openable handle assembly is fully opened or needs to be closed at any angle, i.e., when the handle structure 2 needs to be closed after rotating to any angle, the elastic member has the elastic force greater than the pulling force at which the extendable member 5 is extended and drives the handle structure 2 to rotate counterclockwise around the first rotary shaft 1, and the handle structure drives the first locking member 7 to move synchronously. Currently, the first locking member 7 applies an acting force to the second locking member 4, enabling the second locking member 4 to drive the second rotary shaft 3 to move simultaneously in a force direction. Moreover, the second rotary shaft 3 pulls the extendable member 5 to move synchronously in the direction perpendicular to the second rotary shaft 3 until the elastic force of the elastic member is equal to the restoring force at which the extendable member 5 is retracted. In this case, the handle structure 2 continues to rotate counterclockwise. When the elastic force of the elastic member is smaller than the restoring force at which the extendable member 5 is retracted, the second rotary shaft 3 is driven by the extendable member 5 to move toward the extendable member 5 until the handle structure 2 is slowly closed. At this time, the second locking member 4 continues to rotate counterclockwise under the action of the second rotary shaft 3 until the second locking member 4 returns to the initial position to prepare for the next cycle. In this process, the handle structure 2 can be slowly closed due to the force of the extendable member 5, thereby avoiding impact noise during the closing.

[0068] With the internally openable handle assembly for the vehicle door according to the present invention, when the internally openable handle assembly for the vehicle door is opened, the resistance is small. Moreover, when the internally openable handle assembly for the vehicle door is closed, the internally openable handle is prevented from being quickly closed by providing the extendable member, to avoid the impact noise during the closing. That is, the handle structure 2 of the present invention is only subjected to the force of the extendable member 5 during the closing, and is not subjected to an external force of the extendable member during the opening. In this way, with this unidirectional force configuration, the resistance is small when the internally openable handle assembly is opened, and no abnormal sound is generated when the internally openable handle assembly is closed, thereby improving the user's experience feeling.

[0069] The present invention further discloses a vehicle door structure. FIG. 3 and FIG. 4 are both perspective partial structural diagrams of an internally openable han-

dle assembly for a vehicle door assembled on the vehicle door. The vehicle door structure includes a vehicle door sheet metal, a vehicle door interior trim panel 8 fixed on the vehicle door sheet metal and having an opening 801, and the internally openable handle assembly for the vehicle door as described above. The handle structure 2 includes the handle base 202 that is movable in the opening 801.

[0070] As illustrated in FIG. 3, the handle structure 2 is engaged with the second arc surface 204 by a goose-neck-like structure that is formed by the first arc surface 203 of the handle structure 2, such that the first arc surface 203 and the second arc surface 204 are in close fit with the opening 801 when the handle base 202 moves in the opening 801.

[0071] In some embodiments, as illustrated in FIG. 3, during the opening or closing of the internally openable handle assembly, i.e., during the rotation of the handle structure 2, the second arc surface 204 is always in close fit with an inner wall of the opening 801 of the vehicle door interior trim panel 8, ensuring that the user only see the second arc surface 204 of the handle structure 2. However, the user is unable to see any other internal structures of the vehicle door sheet metal or any other internal structures of the internally openable handle assembly such as springs, cache pads, and other uneven structures. Therefore, the overall structure is more attractive and more in line with user's aesthetic requirements.

[0072] According to the vehicle door structure of the present invention, when the vehicle door is opened by using the internally openable handle assembly for the vehicle door, the internally openable handle assembly for the vehicle door is opened with a small resistance and close without noise, which improves the user's experience feeling. Moreover, during the opening and closing, the structure of the visible region of the internally openable handle assembly has no change, is in a cleaner shape, and has a better visual effect.

[0073] The present invention further provides a vehicle. The vehicle includes a body and the vehicle door structure as described above. The vehicle door structure is disposed on the body.

[0074] The above disclosures are only preferred embodiments of the present invention, and the scope of the present invention is not be limited thereto. The scope of the present invention is defined by the appended claims.

Claims

1. An internally openable handle assembly for a vehicle door, comprising:

a first rotary shaft (1);

a handle structure (2) rotating around the first rotary shaft (1), the handle structure (2) being configured to enable an opening or a closing of the internally openable handle assembly by ro-

- tating around the first rotary shaft (1);
a first locking member (7) fixed on the handle structure (2);
a second rotary shaft (3);
a second locking member (4) rotating around the second rotary shaft (3), the second locking member (4) being engaged and locked with the first locking member (7) to lock the handle structure (2);
- characterized in that**
an extendable member (5) having an end fixedly connected to the second rotary shaft (3) and another end configured to be fixedly connected to the vehicle door, the extendable member (5) being extendable or retractable in a direction perpendicular to the second rotary shaft (3).
2. The internally openable handle assembly according to claim 1, wherein when the handle structure (2) rotates around the first rotary shaft (1), the second locking member (4) is driven by the handle structure (2) to be rotatable between an initial position and an open position, the second locking member (4) is positioned at the open position when the handle structure (2) is in an open state.
 3. The internally openable handle assembly according to claim 2, further comprising an elastic member configured to drive the handle structure (2) in the open state to rotate around the first rotary shaft (1) in a reversed direction until the handle structure (2) returns into a closed state.
 4. The internally openable handle assembly according to claim 3, wherein during the rotation of the handle structure (2) around the first rotary shaft (1) in the reversed direction, the second rotary shaft (3) is driven by the handle structure (2) to move away from the extendable member (5), or the extendable member (5) is capable of driving the second rotary shaft (3) to move towards the extendable member (5).
 5. The internally openable handle assembly according to claim 4, wherein:

during the rotation of the handle structure (2) around the first rotary shaft (1) in the reversed direction, when an elastic force of the elastic member is greater than an extending force at which the extendable member (5) is extended, the second rotary shaft (3) is driven by the handle structure (2) to move away from the extendable member (5) until the elastic force of the elastic member is equal to a retracting force at which the extendable member (5) is retracted; and
the extendable member (5) is pulled by the second rotary shaft (3) synchronously to extend
- towards the second rotary shaft (3).
6. The internally openable handle assembly according to claim 4, wherein:

during the rotation of the handle structure (2) around the first rotary shaft (1) in the reversed direction, when an elastic force of the elastic member is smaller than a retracting force at which the extendable member (5) is retracted, the second rotary shaft (3) is driven by the extendable member (5) to move towards the extendable member (5) until the second locking member (4) returns to the initial position; and
the second locking member (4) synchronously moves with the second rotary shaft (3).
 7. The internally openable handle assembly according to claim 1, further comprising a limiting member (6) configured to limit a position of the second locking member (4), preferably, the limiting member (6) is an elastic sheet.
 8. The internally openable handle assembly according to claim 1, wherein the second locking member (4) is a ratchet mechanism.
 9. The internally openable handle assembly according to claim 1, wherein the extendable member (5) is a damper having an end fixedly connected to the second rotary shaft (3) and another end configured to be fixed to the vehicle door, the damper being configured to be extendable or retractable in the direction perpendicular to the second rotary shaft (3).
 10. The internally openable handle assembly according to claim 1, wherein:

the handle structure (2) comprises a handle (201) and a handle base (202) that are fixedly connected to each other;
the handle base (202) is sleeved on the first rotary shaft (1) and rotatable around the first rotary shaft (1);
a first arc surface (203) is formed by engaging the handle (201) with the handle base (202), the first arc surface (203) being located on an inner side surface of handle base (202) engaged with the handle (201) and forming a goose-neck-like structure together with an inner notch on the handle base (202); and
the first rotary shaft (1) is located on a perpendicular bisector of a connecting line between any two points on the first circular arc surface (203).
 11. The internally openable handle assembly according to claim 10, wherein an outer side surface of the

handle base (202) has a second arc surface (204), the second arc surface (204) being formed with the first rotary shaft (1) as a center of circle.

12. The internally openable handle assembly according to claim 10, wherein the first locking member (7) is fixedly connected to the handle base (202) and is a gear structure. 5
13. A vehicle door structure, comprising: 10
- a vehicle door sheet metal;
 - a vehicle door interior trim panel (8) fixed on the door sheet metal and having an opening (801); and
 - the internally openable handle assembly according to any one of claims 1 to 12, wherein a handle base (202) on a handle structure (2) is movable in the opening (801). 15
14. The vehicle door structure according to claim 13, wherein the handle structure (2) is engaged with a second arc surface (204) with a goose-neck-like structure formed by a first arc surface (203) on the handle structure (2), to brought the first arc surface (203) and the second arc surface (204) into close fit with the opening (801) when the handle base (202) moves in the opening (801). 20 25
15. A vehicle, comprising: 30
- a body; and
 - the vehicle door structure according to claim 13 or 14, the vehicle door structure being disposed on the body. 35

Patentansprüche

1. Griffbaugruppe, die von innen zu öffnen ist, für eine Fahrzeugtür, umfassend: 40
- eine erste Drehwelle (1);
 - eine Griffstruktur (2), die um die erste Drehwelle (1) dreht, wobei die Griffstruktur (2) konfiguriert ist, ein Öffnen oder ein Schließen der von innen zu öffnenden Griffbaugruppe durch Drehen um die erste Drehwelle (1) ermöglicht;
 - ein erstes Verriegelungselement (7), das an der Griffstruktur (2) befestigt ist; 45
 - eine zweite Drehwelle (3);
 - ein zweites Verriegelungselement (4), das um die zweite Drehwelle (3) dreht, wobei das zweite Verriegelungselement (4) mit dem ersten Verriegelungselement (7) in Eingriff gebracht wird und verriegelt wird, um die Griffstruktur (2) zu verriegeln; 50
- dadurch gekennzeichnet, dass** 55

ein ausfahrbares Element (5) aufweisend ein fest mit der zweiten Drehwelle (3) verbundenes Ende und ein anderes Ende, das konfiguriert ist, fest mit der Fahrzeugtür verbunden zu werden, wobei das ausfahrbare Element (5) in einer Richtung senkrecht zu der zweiten Drehwelle (3) ausfahrbar oder einfahrbar ist.

2. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 1, wobei, wenn die Griffstruktur (2) um die erste Drehwelle (1) dreht, das zweite Verriegelungselement (4) durch die Griffstruktur (2) angetrieben wird, um zwischen einer Ausgangsposition und einer offenen Position drehbar zu sein, wobei das zweite Verriegelungselement (4) in der offenen Position positioniert ist, wenn sich die Griffstruktur (2) in einem offenen Zustand befindet. 10 15
3. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 2, ferner umfassend ein elastisches Element, das konfiguriert ist, die Griffstruktur (2) in dem geöffneten Zustand anzutreiben, so dass sie um die erste Drehwelle (1) in einer umgekehrten Richtung dreht, bis die Griffstruktur (2) in einen geschlossenen Zustand zurückkehrt. 20 25
4. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 3, wobei während der Drehung der Griffstruktur (2) um die erste Drehwelle (1) in der umgekehrten Richtung die zweite Drehwelle (3) durch die Griffstruktur (2) angetrieben wird, um sich von dem ausfahrbaren Element (5) weg zu bewegen, oder das ausfahrbare Element (5) in der Lage ist, die zweite Drehwelle (3) anzutreiben, um sich zu dem ausfahrbaren Element (5) hin zu bewegen. 30 35
5. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 4, wobei: 40
- während der Drehung der Griffstruktur (2) um die erste Drehwelle (1) in der umgekehrten Richtung, wenn eine elastische Kraft des elastischen Elements größer ist als eine Ausfahrkraft, bei der das ausfahrbare Element (5) ausgefahren wird, die zweite Drehwelle (3) durch die Griffstruktur (2) angetrieben wird, um sich von dem ausfahrbaren Element (5) weg zu bewegen, bis die elastische Kraft des elastischen Elements einer Einfahrkraft, bei der das ausfahrbare Element (5) eingefahren wird, gleich ist, und das ausfahrbare Element (5) von der zweiten Drehwelle (3) synchron gezogen wird, um sich zu der zweiten Drehwelle (3) auszufahren. 45 50
6. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 4, wobei: 55
- während der Drehung der Griffstruktur (2) um

- die erste Drehwelle (1) in der umgekehrten Richtung, wenn eine elastische Kraft des elastischen Elements kleiner als eine Einfahrkraft, bei der das ausfahrbare Element (5) eingefahren wird, ist, die zweite Drehwelle (3) durch das ausfahrbare Element (5) angetrieben wird, um sich zu dem ausfahrbaren Element (5) zu bewegen, bis das zweite Verriegelungselement (4) in die Ausgangsposition zurückkehrt; und das zweite Verriegelungselement (4) sich synchron mit der zweiten Drehwelle (3) bewegt.
7. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 1, ferner umfassend ein Begrenzungselement (6), das konfiguriert ist, eine Position des zweiten Verriegelungselements (4) zu begrenzen, vorzugsweise ist das Begrenzungselement (6) eine elastische Platte.
8. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 1, wobei das zweite Verriegelungselement (4) ein Klinkemechanismus ist.
9. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 1, wobei das ausfahrbare Element (5) ein Dämpfer ist, der ein fest mit der zweiten Drehwelle (3) verbundenes Ende und ein anderes Ende aufweist, das konfiguriert ist, an der Fahrzeugtür befestigt zu werden, wobei der Dämpfer konfiguriert ist, in der Richtung senkrecht zu der zweiten Drehwelle (3) ausfahrbar oder einfahrbar zu sein.
10. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 1, wobei:
- die Griffstruktur (2) einen Griff (201) und eine Griffbasis (202) umfasst, die fest miteinander verbunden sind;
- die Griffbasis (202) auf die erste Drehwelle (1) aufgeschoben wird und um die erste Drehwelle (1) drehbar ist;
- eine erste Bogenfläche (203) durch Ineingreifen des Griffs (201) mit der Griffbasis (202) gebildet wird, wobei die erste Bogenfläche (203) auf einer inneren Seitenfläche der Griffbasis (202), die mit dem Griff (201) in Eingriff steht, angeordnet ist und zusammen mit einer inneren Kerbe auf der Griffbasis (202) eine schwanenhalsartige Struktur bildet; und
- die erste Drehwelle (1) auf einer senkrechten Halbierenden einer Verbindungslinie zwischen zwei beliebigen Punkten auf der ersten Kreisbogenfläche (203) liegt.
11. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 10, wobei eine äußere Seitenfläche der Griffbasis (202) eine zweite Bogenfläche (204) aufweist, wobei die zweite Bogenfläche (204) mit der
- ersten Drehwelle (1) als Kreismittelpunkt gebildet ist.
12. Griffbaugruppe, die von innen zu öffnen ist, nach Anspruch 10, wobei das erste Verriegelungselement (7) fest mit der Griffbasis (202) verbunden ist und eine Zahnradstruktur ist.
13. Fahrzeugtürstruktur, umfassend:
- ein Fahrzeugtürblech;
- eine Fahrzeugtür-Innenverkleidung (8), die an dem Türblech befestigt ist und eine Öffnung (801) aufweist; und
- die Griffbaugruppe, die von innen zu öffnen ist, nach einem der Ansprüche 1 bis 12, wobei eine Griffbasis (202) an einer Griffstruktur (2) in der Öffnung (801) beweglich ist.
14. Fahrzeugtürstruktur nach Anspruch 13, wobei die Griffstruktur (2) mit einer zweiten Bogenfläche (204) in Eingriff steht, die eine schwanenhalsartige Struktur aufweist, die durch eine erste Bogenfläche (203) an der Griffstruktur (2) gebildet wird, um die erste Bogenfläche (203) und die zweite Bogenfläche (204) in engem Kontakt mit der Öffnung (801) zu bringen, wenn sich die Griffbasis (202) in der Öffnung (801) bewegt.
15. Fahrzeug, umfassend:
- eine Karosserie; und
- die Fahrzeugtürstruktur nach Anspruch 13 oder 14, wobei die Fahrzeugtürstruktur an der Karosserie angeordnet ist.

Revendications

1. Ensemble poignée à ouverture interne pour une porte de véhicule, comprenant :
- un premier arbre rotatif (1) ;
- une structure de poignée (2) entrant en rotation autour du premier arbre rotatif (1), la structure de poignée (2) étant configurée pour permettre une ouverture ou une fermeture de l'ensemble poignée à ouverture interne en entrant en rotation autour du premier arbre rotatif (1) ;
- un premier élément de verrouillage (7) fixé sur la structure de poignée (2) ;
- un deuxième arbre rotatif (3) ;
- un deuxième élément de verrouillage (4) entrant en rotation autour du deuxième arbre rotatif (3), le deuxième élément de verrouillage (4) étant engagé et verrouillé avec le premier élément de verrouillage (7) pour verrouiller la structure de poignée (2) ;
- caractérisé en ce que**

- un élément extensible (5) ayant une extrémité reliée de manière fixe au deuxième arbre rotatif (3) et une autre extrémité configurée pour être reliée de manière fixe à la porte du véhicule, l'élément extensible (5) étant extensible ou rétractable dans une direction perpendiculaire au deuxième arbre rotatif (3).
2. Ensemble poignée à ouverture interne selon la revendication 1, dans lequel, lorsque la structure de poignée (2) entre en rotation autour du premier arbre rotatif (1), le deuxième élément de verrouillage (4) est entraîné par la structure de poignée (2) pour pouvoir entrer en rotation entre une position initiale et une position ouverte, le deuxième élément de verrouillage (4) étant positionné en position ouverte lorsque la structure de poignée (2) est à l'état ouvert.
 3. Ensemble poignée à ouverture interne selon la revendication 2, comprenant en outre un élément élastique configuré pour entraîner la structure de poignée (2) à l'état ouvert pour entrer en rotation autour du premier arbre rotatif (1) dans une direction inversée jusqu'à ce que la structure de poignée (2) revienne à l'état fermé.
 4. Ensemble poignée à ouverture interne selon la revendication 3, dans lequel pendant la rotation de la structure de poignée (2) autour du premier arbre rotatif (1) dans la direction inversée, le deuxième arbre rotatif (3) est entraîné par la structure de poignée (2) pour s'éloigner de l'élément extensible (5), ou l'élément extensible (5) est capable d'entraîner le deuxième arbre rotatif (3) pour se rapprocher de l'élément extensible (5).
 5. Ensemble poignée à ouverture interne selon la revendication 4, dans lequel :

pendant la rotation de la structure de la poignée (2) autour du premier arbre rotatif (1) dans le sens inverse, lorsqu'une force élastique de l'élément élastique est supérieure à une force d'extension à laquelle l'élément extensible (5) est étendu, le deuxième arbre rotatif (3) est entraîné par la structure de poignée (2) pour s'éloigner de l'élément extensible (5) jusqu'à ce que la force élastique de l'élément élastique soit égale à une force de rétraction à laquelle l'élément extensible (5) est rétracté ; et l'élément extensible (5) est tiré par le deuxième arbre rotatif (3) de manière synchronisée pour s'étendre vers le deuxième arbre rotatif (3).
 6. Ensemble poignée à ouverture interne selon la revendication 4, dans lequel :

pendant la rotation de la structure de poignée (2)
- autour du premier arbre rotatif (1) dans le sens inverse, lorsqu'une force élastique de l'élément élastique est inférieure à une force de rétraction à laquelle l'élément extensible (5) est rétracté, le deuxième arbre rotatif (3) est entraîné par l'élément extensible (5) pour se déplacer vers l'élément extensible (5) jusqu'à ce que le deuxième élément de verrouillage (4) revienne à la position initiale ; et le deuxième élément de verrouillage (4) se déplace de manière synchronisée avec le deuxième arbre rotatif (3).
7. Ensemble poignée à ouverture interne selon la revendication 1, comprenant en outre un élément de limitation (6) configuré pour limiter une position du deuxième élément de verrouillage (4), de préférence, l'élément de limitation (6) est une feuille élastique.
 8. Ensemble poignée à ouverture interne selon la revendication 1, dans lequel le deuxième élément de verrouillage (4) est un mécanisme à cliquet.
 9. Ensemble poignée à ouverture interne selon la revendication 1, dans lequel l'élément extensible (5) est un amortisseur ayant une extrémité reliée de manière fixe au deuxième arbre rotatif (3) et une autre extrémité configurée pour être fixée à la porte du véhicule, l'amortisseur étant configuré pour être extensible ou rétractable dans la direction perpendiculaire au deuxième arbre rotatif (3).
 10. Ensemble poignée à ouverture interne selon la revendication 1, dans lequel :

la structure de poignée (2) comprend une poignée (201) et une base de poignée (202) qui sont reliées de manière fixe l'une à l'autre ; la base de la poignée (202) est manchonnée sur le premier arbre rotatif (1) et peut tourner autour du premier arbre rotatif (1) ; une première surface en arc (203) est formée par l'engagement de la poignée (201) avec la base de la poignée (202), la première surface en arc (203) étant située sur une surface latérale intérieure de la base de la poignée (202) engagée avec la poignée (201) et formant une structure en forme de col de cygne avec une encoche intérieure sur la base de la poignée (202) ; et le premier arbre rotatif (1) est situé sur une bissectrice perpendiculaire d'une ligne de jonction entre deux points quelconques de la première surface d'arc de cercle (203).
 11. Ensemble poignée à ouverture interne selon la revendication 10, dans lequel une surface latérale extérieure de la base de la poignée (202) a une

deuxième surface d'arc (204), la deuxième surface d'arc (204) étant formée avec le premier arbre rotatif (1) comme centre de cercle.

- 12.** ensemble poignée à ouverture interne selon la revendication 10, dans lequel le premier élément de verrouillage (7) est relié de manière fixe à la base de la poignée (202) et est une structure d'engrenage. 5
- 13.** Structure de porte de véhicule, comprenant : 10
- une tôle de porte de véhicule ;
un panneau de garniture intérieure de porte de véhicule (8) fixé sur la tôle de la porte et ayant une ouverture (801) ; et 15
- l'ensemble poignée à ouverture interne selon l'une des revendications 1 à 12, dans lequel une base de poignée (202) sur une structure de poignée (2) est mobile dans l'ouverture (801). 20
- 14.** Structure de porte de véhicule selon la revendication 13, dans laquelle la structure de poignée (2) est engagée avec une deuxième surface d'arc (204) avec une structure en forme de col de cygne formée par une première surface d'arc (203) sur la structure de poignée (2), pour amener la première surface d'arc (203) et la deuxième surface d'arc (204) en ajustement étroit avec l'ouverture (801) lorsque la base de poignée (202) se déplace dans l'ouverture (801). 25 30
- 15.** Véhicule comprenant
- un corps ; et 35
- la structure de la porte du véhicule selon la revendication 13 ou 14, la structure de la porte du véhicule étant disposée sur la carrosserie. 40
- 45
- 50
- 55

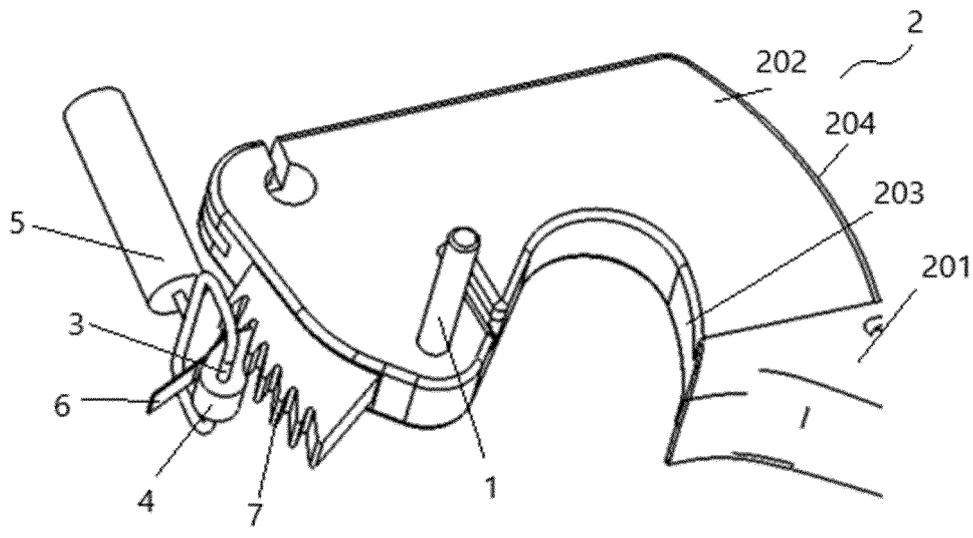


FIG. 1

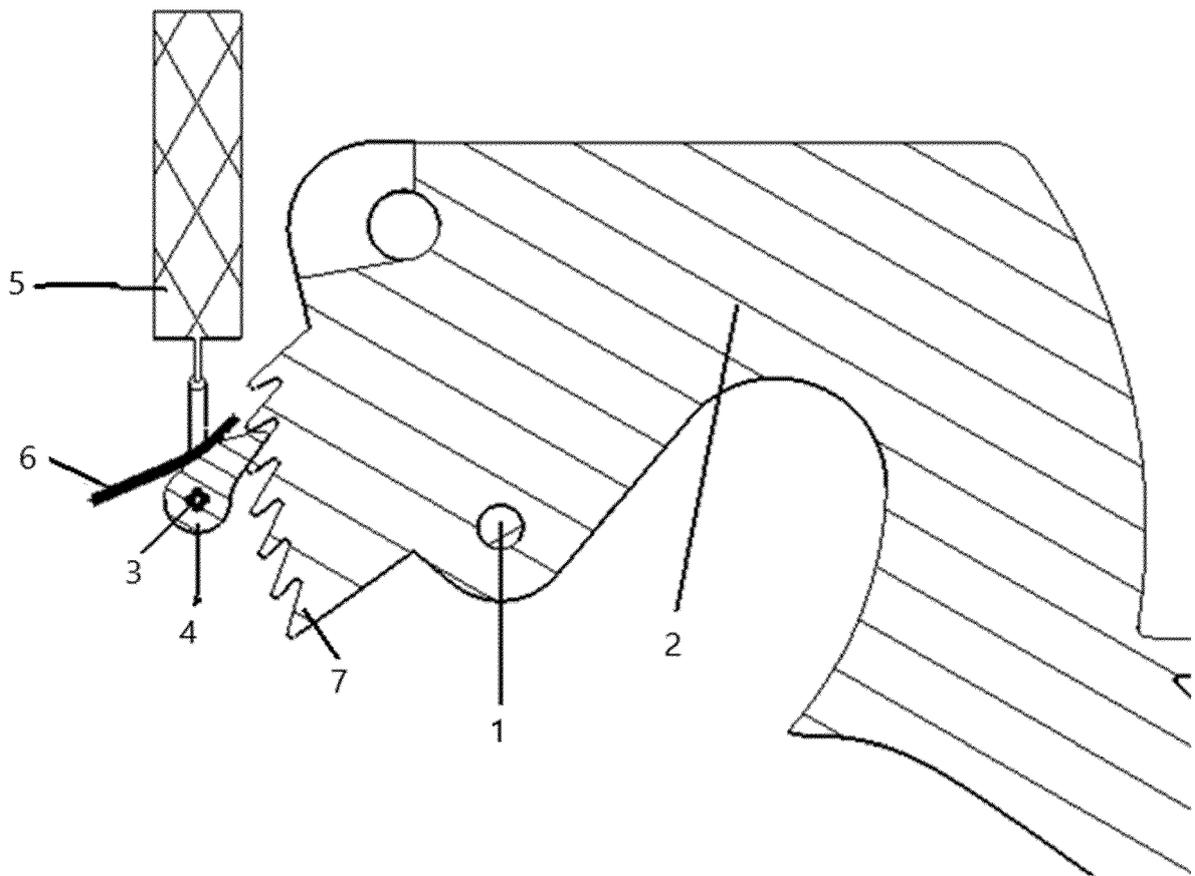


FIG. 2

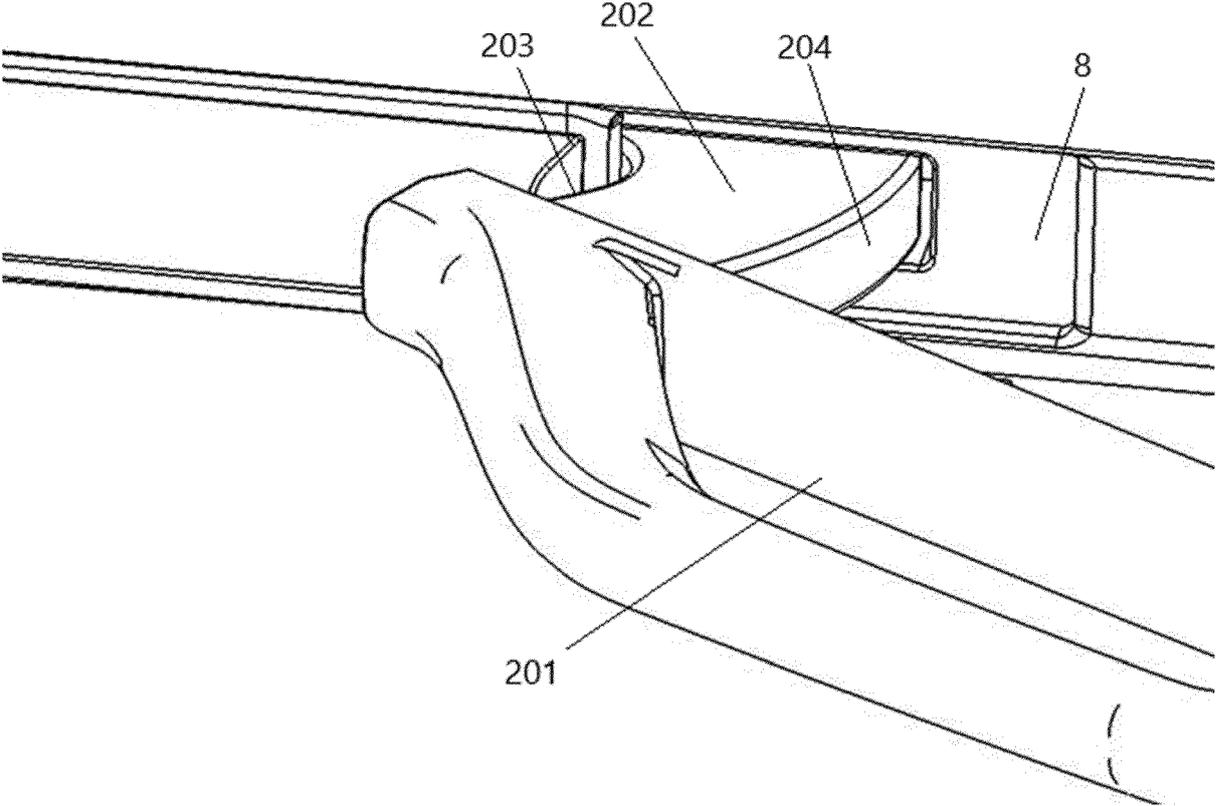


FIG. 3

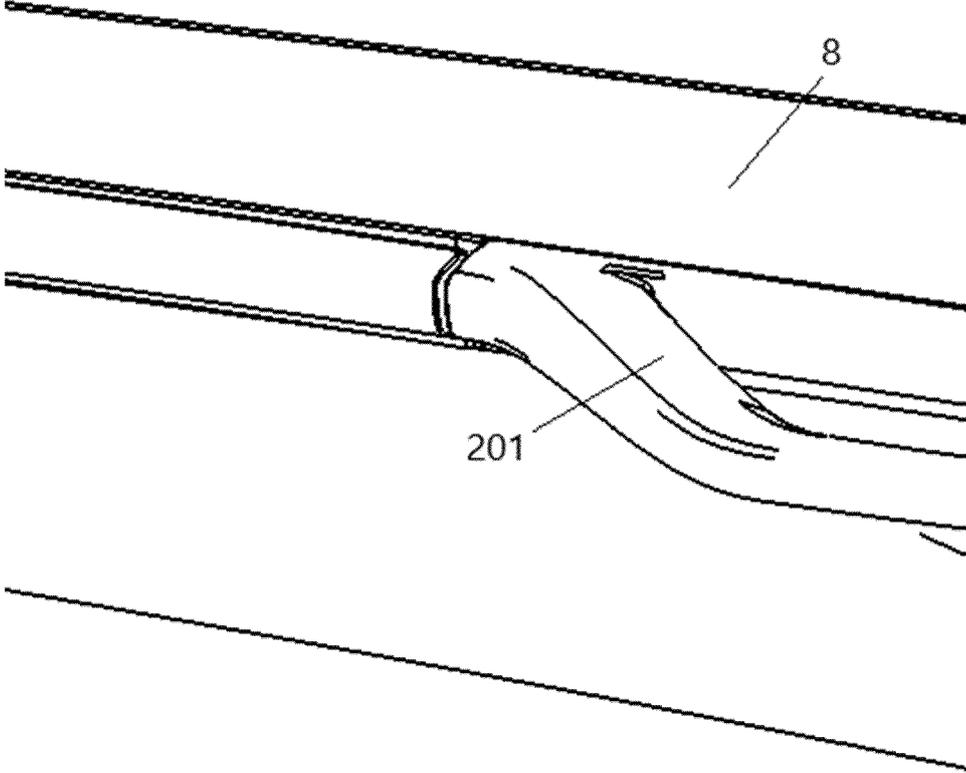


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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