



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.09.2023 Bulletin 2023/37

(51) International Patent Classification (IPC):
E05B 85/10^(2014.01) E05B 85/16^(2014.01)

(21) Application number: **22215889.1**

(52) Cooperative Patent Classification (CPC):
E05B 85/103; E05B 85/107; E05B 85/16

(22) Date of filing: **22.12.2022**

(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: **TOYOTA JIDOSHA KABUSHIKI KAISHA**
Toyota-shi, Aichi-ken 471-8571 (JP)

(72) Inventors:
• **YOKOI, Satoru**
Toyota-shi, Aichi-ken 471-8571 (JP)
• **TANEDA, Satoshi**
Toyota-shi, Aichi-ken 471-8571 (JP)

(30) Priority: **08.03.2022 JP 2022035503**

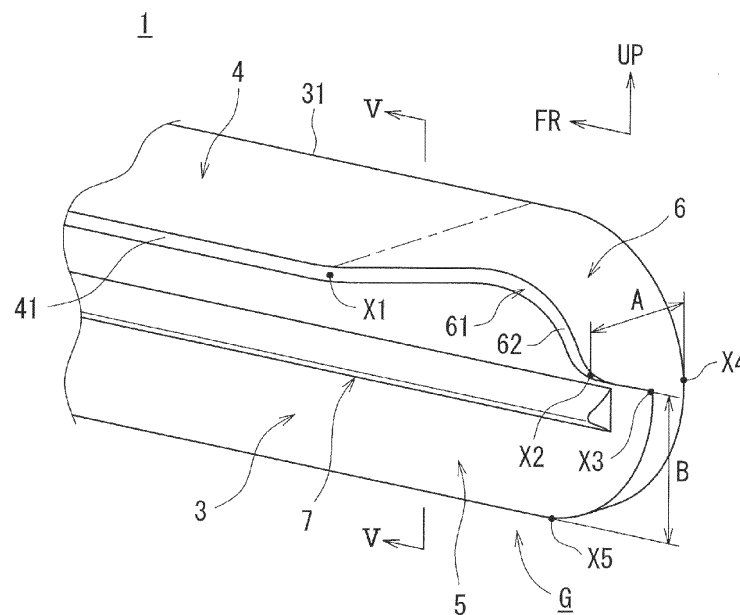
(74) Representative: **Cabinet Beau de Loménie**
158, rue de l'Université
75340 Paris Cedex 07 (FR)

(54) **DOOR HANDLE FOR VEHICLE**

(57) A door handle (1) includes: a vertical wall portion (3) configured to be generally flush with an outer surface of a side door (2) in a storage posture; an extending portion (4) extending toward an inner side of the side door (2) from an upper edge of the vertical wall portion (3); and a cover portion (6) continuous with the extending portion (4) and the vertical wall portion (3) and disposed at a position closer to a rear end of the door handle (1)

in a handle longitudinal direction, the cover portion (6) extending in a direction intersecting with the handle longitudinal direction. An inner edge part (61) of the cover portion (6) that is placed closer to the inner side of the side door (2) recedes toward the vertical wall portion (3) from an inner edge part (41) of the extending portion (4) that is placed closer to the inner side of the side door (2).

FIG. 4



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a door handle for a vehicle. Particularly, the present invention relates to improvement of a door handle that is storable such that the door handle is generally flush with the outer surface of a door.

2. Description of Related Art

[0002] In the related art, as a door handle for a vehicle, a door handle that is storable in a side door (hereinafter just referred to as a door) has been known. Generally, the door handle of this type is called a flush-surface door handle or a pop-up door handle.

[0003] As the door handle of this type, there is a door handle configured such that a first end side of the door handle in its longitudinal direction is rotatably supported by a hinge rotatable around the vertical axis, as described in Japanese Unexamined Patent Application Publication No. 2019-49188 (JP 2019-49188 A). That is, at the time of traveling or the like of a vehicle, the door handle takes a posture (hereinafter referred to as a storage posture) in which the door handle is stored in a door by rotating toward the door side around the vertical axis, and the outer surface of the door handle becomes generally flush with the outer surface of the door (the outer surface of a door outer panel), so that the design property or the aerodynamic characteristic of the vehicle is improved. When it is necessary to open the door so that a person gets in the vehicle, the door handle takes a posture (hereinafter referred to as a pop-up posture) in which the door handle projects from the door by rotating outwardly from the door around the vertical axis. Thus, the door handle can be gripped.

SUMMARY OF THE INVENTION

[0004] However, in the door handle of this type, the length dimension (the dimension in a direction along the vehicle-body front-rear direction in a door closed state and in the storage posture of the door handle) is determined in view of the design property, and the projecting dimension in the pop-up posture (the projection dimension toward the outer side in the vehicle width direction) is restricted by the law (for example, there is such a restriction that the projecting dimension shall fall within a range of around 40 mm).

[0005] Accordingly, this might cause an uncomfortable feeling when a person puts his or her fingers on the door handle in the pop-up posture, or the operationability in a door opening operation might be insufficient. As the uncomfortable feeling, there is such a case where the person feels narrow (tight) for the space inside the door han-

dle when the person inserts the fingers into the space. Further, as the situation where the operationability is insufficient, there is such a case where, when the person is to open the door by gripping the door handle, the fingers slip in the longitudinal direction of the door handle (a direction opposite from the position where the hinge is disposed). In order to prevent the slip, it is necessary to grip the door handle with large force. Accordingly, it is hard to say that the operationability is sufficient.

[0006] JP 2019-49188 A describes a configuration that can restrain the fingers from slipping in the longitudinal direction of the door handle by providing a cover portion (a vertical wall) in an end portion of the door handle that is opposite from the position where the hinge is disposed. However, in terms of the shape of the cover portion, JP 2019-49188 A does not describe anything about a configuration that restrains the uncomfortable feeling (narrowness when the fingers are inserted). Accordingly, there is such a concern that the presence of the cover portion promotes the uncomfortable feeling. Thus, in the door handle, the restraint of the uncomfortable feeling and the securing of the operationability are contradictory to each other, and a proposal effective for a configuration that balances them has not been made yet.

[0007] The present invention is accomplished in view of such a problem, and an object of the present invention is to provide a door handle for a door which can restrain an uncomfortable feeling from being caused when the door handle is gripped and which can improve the operationability in a door opening operation.

[0008] A means for solving the problem in the present invention to achieve the above object is on the premise of a door handle for a vehicle, the door handle being supported by a hinge disposed at a position closer to a first side of the door handle in a handle longitudinal direction such that the door handle is rotatable between a storage posture where the door handle is stored in a door and a projecting posture where the door handle projects from the door. The door handle includes a vertical wall portion, an extending portion, an opened portion, and a cover portion. The vertical wall portion is configured to be generally flush with an outer surface of the door in the storage posture. The extending portion extends toward an inner side of the door from either one of an upper edge and a bottom edge of the vertical wall portion. The opened portion is provided in the other one of the upper edge and the bottom edge of the vertical wall portion, the opened portion being a part into which a finger is insertable in the projecting posture. The cover portion is continuous with the extending portion and the vertical wall portion and disposed at a position closer to a second side of the door handle in the handle longitudinal direction, the cover portion extending in a direction intersecting with the handle longitudinal direction. The inner edge part of the cover portion, the inner edge part being placed closer to the inner side of the door, recedes toward the vertical wall portion from an inner edge part of the extending portion, the inner edge part being placed closer to the inner

side of the door.

[0009] In this specific matter, when a person who is to get in the vehicle grips the door handle in the posture where the door handle projects from the door, the person inserts his or her fingers into the opened portion of the door handle. Since the inner edge part of the cover portion disposed continuously from the extending portion and the vertical wall portion recedes toward the vertical wall portion from the inner edge part of the extending portion, a sufficient space is formed around the cover portion (a sufficient space is formed in comparison with a case where the position of the inner edge part of the cover portion is placed at the same position as the position of the inner edge part of the extending portion (a case where the inner edge part of the cover portion does not recede toward the vertical wall)). This makes it possible to restrain the person from feeling narrow (tight) for the space when the person inserts the fingers into the opened portion of the door handle (it is possible to restrain an uncomfortable feeling). Further, even in a case where the fingers slip in a direction where the fingers slip out of the door handle (a direction opposite from the position where the hinge is disposed) at the time when the person is to open the door by gripping the door handle, the fingers abut with the cover portion, thereby making it possible to restrain the slip of the fingers. Accordingly, it is not necessary to grip the door handle with large force to prevent the slip, thereby making it possible to improve the operationability in a door opening operation. As such, with the means for solving the problem, it is possible to restrain an uncomfortable feeling from being caused at the time when a person grips the door handle and to improve the operationability in the door opening operation.

[0010] Further, a projection extending in the handle longitudinal direction and projecting toward the inner side of the door may be provided on an inner surface of the vertical wall portion, the inner surface facing the inner side of the door. In the up-down direction, a position of an edge of the projection on a side closer to the opened portion may be set between a position of a distal end of the cover portion on the side closer to the opened portion and a position of an edge of the vertical wall portion on the side closer to the opened portion.

[0011] In this configuration, when the person inserts the fingers into the opened portion of the door handle to grip the door handle, the fingers can be caught on the projection, thereby making it possible to restrain the fingers from slipping out of the door handle in the up-down direction. Since the position of the edge of the projection on the side closer to the opened portion is set between the position of the distal end of the cover portion on the side closer to the opened portion and the position of the edge of the vertical wall portion on the side close to the opened portion, the projection is not present in the open end of the opened portion at the time when the fingers are inserted into the opened portion of the door handle. This configuration also makes it possible to restrain the person from feeling narrow (tight) for the space when the

person inserts the fingers into the opened portion of the door handle. That is, while it is possible to restrain an uncomfortable feeling from being caused when the person inserts the fingers into the opened portion of the door handle, it is possible to stably maintain a gripped state of the door handle at the time when the person grips the door handle.

[0012] As respective specific configurations of the extending portion, the opened portion, and the cover portion, the extending portion may extend toward the inner side of the door from the upper edge of the vertical wall portion, the opened portion may be provided on the bottom edge side of the vertical wall portion, and the cover portion may be continuous with the extending portion and the vertical wall portion and extend downward along an outer edge shape of the vertical wall portion at a position closer to the second side of the door handle in the handle longitudinal direction.

[0013] In this configuration, the fingers are inserted into the opened portion of the door handle from the lower side. That is, in a door handle configured to be gripped from the lower side, it is possible to restrain an uncomfortable feeling from being caused when the person inserts the fingers into the opened portion, thereby making it possible to improve the operationability in the door opening operation.

[0014] Specific examples of the dimensions of those portions are as follows.

[0015] First, an inner edge part of the cover portion may include a reference inner edge part extending along the handle longitudinal direction. A dimension in the horizontal direction between an outer surface of the vertical wall portion and the reference inner edge part may be set by being selected from a range from 5 mm to 15 mm.

[0016] Further, in the up-down direction, a dimension between a position of a distal end of the cover portion on a side closer to the opened portion and a position of an edge of the vertical wall portion on the side closer to the opened portion may be set by being selected from a range from 10 mm to 20 mm.

[0017] Further, a projecting dimension of the projection from the inner surface of the vertical wall portion may be set by being selected from a range from 1 mm to 4 mm.

[0018] Further, in the up-down direction, a dimension between the position of the edge of the vertical wall portion on the side closer to the opened portion and a position of a distal end part of the projection at which the projection dimension of the projection is maximum may be set by being selected from a range from 10 mm to 15 mm.

[0019] By defining the dimensions as such, it is possible to specify a specific shape of the door handle. Note that the dimensions of those portions to achieve the effects described above are not limited to those described above.

[0020] In the present invention, the door handle includes the cover portion having a function to restrain fingers of a person from slipping in a direction where the fingers slip out of the door handle at the time when the

person grips the door handle to open the door. The inner edge part of the cover portion that is placed closer to the inner side of the door recedes toward the vertical wall portion (the vertical wall portion generally flush with the outer surface of the door in the storage posture) from the inner edge part of the extending portion extending toward the inner side of the door, the inner edge part being placed closer to the inner side of the door. Accordingly, a sufficient space is formed around the cover portion, thereby making it possible to restrain the person from feeling narrow (tight) for the space when the person inserts the fingers into the opened portion of the door handle. That is, it is possible to balance the improvement of the operability in the door opening operation with the restraint of the uncomfortable feeling to be caused when the person grips the door handle.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Features, advantages, and technical and industrial significance of exemplary embodiments of the invention will be described below with reference to the accompanying drawings, in which like signs denote like elements, and wherein:

FIG. 1 is a side view of part of a vehicle including a door handle according to an embodiment;
 FIG. 2A is a perspective view illustrating a storage posture of the door handle;
 FIG. 2B is a perspective view illustrating a pop-up posture of the door handle;
 FIG. 3 is a sectional view taken along a line III-III in FIG. 1 and illustrates the storage posture and the pop-up posture of the door handle;
 FIG. 4 is a perspective view of the vicinity of a gripped area of the door handle that is viewed from its inner side;
 FIG. 5 is a sectional view taken along a line V-V in FIG. 4;
 FIG. 6 is a view corresponding to FIG. 4 and illustrates one example of a door handle according to a comparative example;
 FIG. 7 is a plan view illustrating the position of each finger at the time of opening a door when the door handle illustrated in FIG. 6 takes the pop-up posture;
 FIG. 8 is a plan view illustrating the position of each finger at the time of opening a door when the door handle according to embodiment takes the pop-up posture;
 FIG. 9 is a view corresponding to FIG. 5 and illustrates one example of the door handle according to the comparative example; and
 FIG. 10 is a perspective view of the vicinity of a gripped area of a door handle according to a modification that is viewed from its inner side.

DETAILED DESCRIPTION OF EMBODIMENTS

[0022] An embodiment of the present invention will be described below with reference to the drawings. The present embodiment describes a case where the present invention is applied to a door handle (a flush-surface door handle) provided in a side door (door) of a vehicle and rotatably supported by a hinge disposed at a position closer to a front end of the door handle in a handle longitudinal direction (in the vehicle-body front-rear direction in a door closed state and in a storage posture of the door handle).

[0023] FIG. 1 is a sideview of part of a vehicle V including a door handle 1 according to the present embodiment. An arrow FR in FIG. 1 indicates the front side in the vehicle-body front-rear direction, and an arrow UP indicates the upper side in the up-down direction. Similarly, in other drawings (described later), an arrow FR indicates the front side in the vehicle-body front-rear direction, and an arrow UP indicates the upper side in the up-down direction.

[0024] As illustrated in FIG. 1, a side door 2 of the vehicle V is provided with a door handle 1 to be gripped when the side door 2 is opened. Note that, in FIG. 1, the side door 2 on the right side is illustrated, but a side door on the left side also has a similar configuration (symmetric configuration).

[0025] The door handle 1 is made of resin or metal and is rotatably supported by a hinge (not illustrated) at a position closer to a front end of the door handle 1 in its longitudinal direction. The hinge rotates around its vertical axis. That is, at the time of traveling or the like of the vehicle V, the door handle 1 rotates toward the side door 2 side around the vertical axis such that the door handle 1 takes a storage posture in which the door handle 1 is stored in the side door 2. FIG. 2A is a perspective view illustrating the storage posture of the door handle 1. Further, in FIG. 3 (a sectional view along a line III-III in FIG. 1), the door handle 1 indicated by a virtual line shows the storage posture. As illustrated in these figures, in the storage posture of the door handle 1, an outer surface 31 of the door handle 1 is generally flush with an outer surface (an outer surface of a door outer panel 22) 21 of the side door 2, so that the design property or the aerodynamic characteristic of the vehicle V is improved.

[0026] When it is necessary to open the side door 2 at the time when a person gets in the vehicle V, the door handle 1 rotates outwardly from the side door 2 side around the vertical axis, so that the door handle 1 takes a pop-up posture in which the door handle 1 projects from the side door 2. FIG. 2B is a perspective view illustrating the pop-up posture of the door handle 1. Further, in FIG. 3, the door handle 1 indicated by a continuous line shows the pop-up posture. As illustrated in these figures, in the pop-up posture of the door handle 1, the person inserts his or her fingers into a space inside the door handle 1 from the lower side, so that the person can grip the door handle 1 (see a hand H indicated by a virtual line in FIG.

2B). At the time when the person opens the side door 2 by gripping the door handle 1 in the pop-up posture, the person pulls the door handle 1 toward his or her side (an open side of the side door 2) to further rotate the door handle 1 from the pop-up posture only by a predetermined angle. In this case, when the person takes the hand off from the door handle 1, the door handle 1 returns to the pop-up posture by a biasing force from a spring (not illustrated).

[0027] The rotation of the door handle 1 between the storage posture and the pop-up posture is performed by the operation of an actuator (not illustrated). The operation of the actuator can be performed by various operations such as the operation of a smart key, for example. A mechanism to rotate the door handle 1 along with the operation of the actuator is well known, and therefore, the description thereof is omitted herein.

[0028] Next will be described a configuration of a gripped area (an area around the space into which the fingers are inserted) in the door handle 1 as the feature of the present embodiment.

[0029] FIG. 4 is a perspective view of the vicinity of a gripped area G of the door handle 1 that is viewed from its inner side. Further, FIG. 5 is a sectional view taken along a line V-V in FIG. 4. As illustrated in these figures, the door handle 1 includes a vertical wall portion 3, an extending portion 4, an opened portion 5, and a cover portion 6. The following describes each of those portions.

[0030] The vertical wall portion 3 is a part extending in the vertical direction such that the outer surface 31 is generally flush with the outer surface 21 of the side door 2 in the storage posture, as illustrated in FIG. 2A. Further, the shape of the vertical wall portion 3 in a side view (a shape viewed from a lateral side from the vehicle body in a door closed state) is generally elliptical. The door outer panel 22 of the side door 2 is provided with a recessed portion 23 (see FIG. 2B) that generally fits the shape of the vertical wall portion 3. When the door handle 1 takes the storage posture, the outer edge of the vertical wall portion 3 comes close to the inner edge of the recessed portion 23 of the door outer panel 22, so that the outer surface 31 of the vertical wall portion 3 is generally flush with the outer surface 21 of the side door 2 (see FIG. 2A). Note that the dimension of the vertical wall portion 3 in the up-down direction is 30 mm, for example. The dimension is not limited to this.

[0031] The extending portion 4 extends in the horizontal direction toward the inner side of the side door 2 from the upper edge of the vertical wall portion 3. That is, at the time when a person grips the door handle 1, the person inserts, from the lower side, his or her fingers into the opened portion 5 opened downward toward an inside space inside the door handle 1 (see a finger F indicated by a virtual line in FIG. 5). The outer side (the outer side in the vehicle width direction) of the inside space is defined by the vertical wall portion 3, and the upper side of the inside space is defined by the extending portion 4. Note that the dimension of the extending portion 4 in the

horizontal direction (a direction along the vehicle width direction) is 25 mm, for example. The dimension is not limited to this.

[0032] The cover portion 6 is a feature of the present embodiment. As illustrated in FIG. 4, the cover portion 6 is continuous with the rear side of the extending portion 4 in the vehicle-body front-rear direction and is also continuous with the side door 2 side of the vertical wall portion 3 (the inner side of the vertical wall portion 3 in the vehicle width direction), and the cover portion 6 curves along the outer edge of a rear end part of the vertical wall portion 3. Hereby, the cover portion 6 extends in a direction intersecting with the handle longitudinal direction (the horizontal direction). Note that, in FIG. 4, a boundary between the extending portion 4 and the cover portion 6 is indicated by an alternate long and short dash line.

[0033] An inner edge part 61 of the cover portion 6 that is placed closer to the inner side of the side door 2 recedes toward the vertical wall portion 3 (outwardly in the vehicle width direction) from an inner edge part 41 of the extending portion 4 that is placed closer to the inner side of the side door 2. That is, as the shape of the inner edge part 61 of the cover portion 6, while the inner edge part 61 curves with a predetermined curvature from a rear end position (a position X1 in FIG. 4) of the inner edge part 41 of the extending portion 4 toward the vertical wall portion 3 (the inner edge part 61 curves outwardly in the vehicle width direction), the inner edge part 61 curves downward along the outer edge of the rear end part of the vertical wall portion 3 and extends generally horizontally toward the vertical wall portion 3 from a bottom end position (a position X2 in FIG. 4) of the inner edge part 61. More specifically, the inner edge part 61 extends to be slightly inclined downward toward the vertical wall portion 3 from the bottom end position (the position X2 in FIG. 4) such that the inner edge part 61 reaches a position X3 in FIG. 4. Further, the inner edge part 61 of the cover portion 6 includes a reference inner edge part 62 extending along the handle longitudinal direction and also extending downward. The reference inner edge part 62 is a part extending along the vehicle-body front-rear direction in a plan view in the closed state of the side door 2 and in the storage posture of the door handle 1.

[0034] The dimension of each part of the cover portion 6 is set such that, in the horizontal direction (the vehicle width direction in the closed state of the side door 2 and in the storage posture of the door handle 1), a dimension A between the outer surface 31 of the vertical wall portion 3 (a position X4 in FIG. 4) and the position of the reference inner edge part 62 (more specifically, the bottom end position of the reference inner edge part 62; the position X2 in FIG. 4) is set by being selected from a range from 5 mm to 15 mm.

[0035] Further, in the up-down direction, a dimension B between a position (the position X3 in FIG. 4) of a distal end (a bottom end) of the cover portion 6 on a side closer to the opened portion 5 and a position (a position X5 in FIG. 4) of an edge (a bottom end) of the vertical wall

portion 3 on the side closer to the opened portion 5 is set by being selected from a range from 10 mm to 20 mm.

[0036] Particularly, in the present embodiment, the dimension A is set to 10 mm, and the dimension B is set to 15 mm. These dimensions are not limited to them. Further, in the present embodiment, the dimension B is set to be larger than the dimension A. However, the present invention is not limited to this. The dimension A and the dimension B may be set to the same dimension, or the dimension A may be set to be larger than the dimension B.

[0037] Further, the settable range of the dimension A is not limited to the above range, and the dimension A may be selected from a range from 6 mm to 14 mm, may be selected from a range from 7 mm to 13 mm, may be selected from a range from 8 mm to 12 mm, or may be selected from a range from 9 mm to 11 mm. Further, the settable range of the dimension B is also not limited to the above range, and the dimension B may be selected from a range from 11 mm to 19 mm, may be selected from a range from 12 mm to 18 mm, may be selected from a range from 13 mm to 17 mm, or may be selected from a range from 14 mm to 16 mm.

[0038] When it is necessary to open the side door 2 at the time when the person gets in the vehicle V, the door handle 1 rotates around the vertical axis to take the pop-up posture, and in the pop-up posture, the finger F is inserted into the opened portion 5 of the door handle 1 from the lower side. As described above, since the inner edge part 61 of the cover portion 6 recedes toward the vertical wall portion 3 from the inner edge part 41 of the extending portion 4, a sufficient space is formed around the cover portion 6, thereby making it possible to restrain the person from feeling narrow (tight) for the space when the person inserts the finger F into the opened portion 5 of the door handle 1 (it is possible to restrain an uncomfortable feeling).

[0039] FIG. 6 is a view corresponding to FIG. 4 and illustrates one example of a door handle a according to a comparative example. The door handle a illustrated in this FIG. 6 is configured such that the position of an inner edge part c of a cover portion b is placed at the same position as the position of an inner edge part e of an extending portion d (the inner edge part c does not recede toward a vertical wall portion g). FIG. 7 is a plan view illustrating respective positions of fingers f1 to f4 at the time of opening a door when the door handle a according to the comparative example takes the pop-up posture. As illustrated in FIG. 7, in the door handle a according to the comparative example, the inner edge part c of the cover portion b does not recede toward the vertical wall portion g. Accordingly, due to the narrowness of the space due to the presence of the cover portion b, at the time when the fingers f1 to f4 are inserted into an opened portion h, the little finger (the little finger in a case where the door handle of the side door on the right side is gripped by the right hand) f4 cannot be inserted into the opened portion h. That is, since the door handle a has a

restriction on its length dimension and its projecting dimension in the pop-up posture as described above, there is a restriction on the length of the opened portion h (the length in the handle longitudinal direction). In a case where the inner edge part c of the cover portion b does not recede toward the vertical wall portion g, the little finger f4 cannot be inserted into the opened portion h.

[0040] In contrast, as illustrated in FIG. 8, in the door handle 1 according to the present embodiment, the inner edge part 61 of the cover portion 6 recedes toward the vertical wall portion 3, so that a sufficient space is formed around the cover portion 6. Consequently, the cover portion 6 can hardly interfere with fingers F1 to F4, and the fingers F1 to F4 can be inserted into the opened portion 5, thereby making it possible to restrain the person from feeling narrow (tight) for the space. Accordingly, it is possible to restrain an uncomfortable feeling from being caused when the person grips the door handle 1.

[0041] Further, even when the fingers F1 to F4 slip in a direction where the fingers F1 to F4 slip out of the door handle 1 (toward the rear side that is a direction opposite from the position where the hinge is disposed) at the time when the person opens the side door 2 by gripping the door handle 1, the fingers F1 to F4 (particularly, the fingers F1 to F3) abut with the cover portion 6, thereby making it possible to restrain the slip. Accordingly, it is not necessary to grip the door handle 1 with large force to prevent the slip, thereby making it possible to improve the operationability in the door opening operation.

[0042] Thus, in the present embodiment, it is possible to restrain an uncomfortable feeling from being caused when a person grips the door handle 1 and to improve the operationability in the door opening operation.

[0043] Further, as another feature of the door handle 1 according to the present embodiment, an inner surface of the vertical wall portion 3 that faces the inner side of the side door 2 (the inner side in the vehicle width direction) is provided with a projection (a projection having a bell-shaped section) 7, as illustrated in FIGS. 4, 5. The projection 7 extends along the handle longitudinal direction and projects toward the inner side of the side door 2.

[0044] Further, in the up-down direction, a position (a position X6 in FIG. 5) of an edge (a bottom end) of the projection 7 on the side closer to the opened portion 5 is set between the position (the position X3 in FIG. 4) of the distal end (the bottom end) of the cover portion 6 on the side closer to the opened portion 5 and the position (the position X5 in FIGS. 4, 5) of the edge (the bottom end) of the vertical wall portion 3 on the side closer to the opened portion 5.

[0045] Further, the dimension of each part of the projection 7 is set as follows. That is, the projecting dimension from the inner surface of the vertical wall portion 3 (the projecting dimension in the horizontal direction; a dimension C in FIG. 5) is set by being selected from a range from 1 mm to 4 mm. Further, in the up-down direction, the dimension (a dimension D in FIG. 5) between the position (the position X5 in FIGS. 4, 5) of the edge

(the bottom end) of the vertical wall portion 3 on the side closer to the opened portion 5 and a position (a position X7 in FIG. 5) of a distal end part of the projection 7 at which the projection dimension is maximum is set by being selected from a range from 10 mm to 15 mm.

[0046] Particularly, in the present embodiment, the dimension C is set to 2 mm, and the dimension D is set to 13 mm. These dimensions are not limited to them. In the present embodiment, the dimension D is set to be larger than the dimension C.

[0047] Further, the settable range of the dimension C is not limited to the above range, and the dimension C may be selected from a range from 1 mm to 3 mm, may be selected from a range from 1 mm to 2 mm, may be selected from a range from 2 mm to 4 mm, or may be selected from a range from 2 mm to 3 mm. Further, the settable range of the dimension D is also not limited to the above range, and the dimension D may be selected from a range from 11 mm to 14 mm or may be selected from a range from 12 mm to 13 mm.

[0048] Further, the dimension D is set to be smaller than the dimension B. That is, the bottom end position of the cover portion 6 is set to be placed above the distal end part (the vertex) of the projection 7. The bottom end position of the cover portion 6 is set as such in consideration that, in a gripped state of the door handle 1, the first joint of the finger F is more likely to overlap with the distal end part of the projection 7, for example, and in this case, the finger-tip is placed above the distal end part of the projection 7. That is, in this case, even in a case where the cover portion 6 is placed above the distal end part of the projection 7, when the fingers F1 to F4 abut with the cover portion 6, it is possible to exercise a function to restrain the slip of the fingers F1 to F4 as described above (it is possible to exercise a function to restrain the slip without placing the bottom end position of the cover portion 6 below the distal end part of the projection 7). That is, while the function to restrain the slip is exercised, the bottom end position of the cover portion 6 can be set to be placed above the distal end part of the projection 7, thereby making it possible to restrain the person from feeling narrow (tight) for the space when the person inserts the fingers F1 to F4 into the opened portion 5. Accordingly, it is possible to balance the improvement of the operability in the door opening operation with the restraint of the uncomfortable feeling to be caused when a person grips the door handle 1.

[0049] The relationship between the dimension B and the dimension D is not limited to the relationship described above, and the dimension B and the dimension D may be set to the same dimension, or the dimension D may be set to be larger than the dimension B.

[0050] In a case where the projection 7 is provided as such, when the finger F is inserted into the opened portion 5 of the door handle 1 to grip the door handle 1, the finger F can be caught on the projection 7, as illustrated in FIG. 5, thereby making it possible to restrain the finger F from slipping out of the door handle 1 toward the lower side.

In the up-down direction, the position (the position X6 in FIG. 5) of the edge (the bottom end) of the projection 7 on the side closer to the opened portion 5 is set between the position (the position X3 in FIG. 4) of the distal end (the bottom end) of the cover portion 6 on the side closer to the opened portion 5 and the position (the position X5 in FIGS. 4, 5) of the edge (the bottom end) of the vertical wall portion 3 on the side closer to the opened portion 5. Accordingly, at the time when the finger F is inserted into the opened portion 5 of the door handle 1, the projection 7 is not present in the open end (the open end on the lower side) of the opened portion 5, so that a sufficient distance can be secured between the bottom end of the door handle 1 and the outer surface 21 of the side door 2. This also makes it possible to restrain the person from feeling narrow (tight) for the space when the person inserts the finger F into the opened portion 5 of the door handle 1.

[0051] FIG. 9 is a view corresponding to FIG. 5 and illustrates one example of the door handle a according to the comparative example. In the door handle a illustrated in FIG. 9 and also in FIG. 6 described above, a projection i is placed in the bottom end of the vertical wall portion g. In the door handle a according to the comparative example, a sufficient distance cannot be secured between the bottom end of the door handle a and an outer surface j of a side door due to the presence of the projection i (the distance is smaller than that in the present embodiment illustrated in FIG. 5), so that the person feels narrow (tight) for the space when the person inserts the finger f into the opened portion h of the door handle a.

[0052] In contrast, in the door handle 1 according to the present embodiment as illustrated in FIG. 5, it is possible to restrain the person from feeling narrow (tight) for the space when the person inserts the finger F into the opened portion 5 of the door handle 1 as described above. That is, while it is possible to restrain an uncomfortable feeling from being caused when the person inserts the finger F into the opened portion 5 of the door handle 1, it is possible to stably maintain a gripped state of the door handle 1 due to the presence of the projection 7 at the time when the person grips the door handle 1.

45 Modification

[0053] Next will be described a modification. The above embodiment deals with a case where the door handle 1 rotatably supported by the hinge disposed at a position closer to the front end of the door handle 1 in the handle longitudinal direction can be gripped such that the fingers are inserted into the space inside the door handle 1 from the lower side. Instead of this, in the present modification, the door handle 1 rotatably supported by the hinge disposed at a position closer to the rear end of the door handle 1 in the handle longitudinal direction can be gripped such that the fingers are inserted into the space inside the door handle 1 from the upper side.

[0054] FIG. 10 is a perspective view of the vicinity of the gripped area G of the door handle 1 according to the present modification that is viewed from the inner side. The door handle 1 illustrated in FIG. 10 is provided on the side door on the left side and is rotatably supported by a hinge disposed at a position (a position closer to the left side in FIG. 10) closer to the rear end of the door handle 1 in the handle longitudinal direction (the vehicle-body front-rear direction in the closed state of the side door 2 and in the storage posture of the door handle 1). In FIG. 10, the same constituent as in the above embodiment has the same reference sign as used in the above embodiment.

[0055] The door handle 1 according to this modification has a configuration symmetric to the door handle 1 in the above embodiment in the up-down direction. That is, similarly to the door handle 1 described in the above embodiment, the door handle 1 includes the vertical wall portion 3, the extending portion 4, the opened portion 5, and the cover portion 6, but the extending portion 4 extends in the horizontal direction toward the inner side of the side door 2 from the bottom edge of the vertical wall portion 3.

[0056] Further, the opened portion 5 is provided on the upper edge side of the vertical wall portion 3, and the fingers are insertable into a space inside the door handle 1 from the upper side.

[0057] Further, the cover portion 6 is continuous with the front side of the extending portion 4 in the vehicle-body front-rear direction and is also continuous with the side door 2 side (the inner side in the vehicle width direction) of the vertical wall portion 3, and the cover portion 6 curves along the outer edge of a front end part of the vertical wall portion 3. Hereby, the cover portion 6 extends in a direction intersecting with the handle longitudinal direction (the horizontal direction).

[0058] The dimension of each part of the cover portion 6 is similar to that in the above embodiment. That is, in the horizontal direction (the vehicle width direction in the closed state of the side door 2 and in the storage posture of the door handle 1), the dimension A between the outer surface 31 of the vertical wall portion 3 (a position X4 in FIG. 10) and the position of the reference inner edge part 62 (more specifically, an upper end position of the reference inner edge part 62; a position X2 in FIG. 10) is set by being selected from a range from 5 mm to 15 mm.

[0059] Further, in the up-down direction, the dimension B between a position (a position X3 in FIG. 10) of a distal end (an upper end) of the cover portion 6 on the side closer to the opened portion 5 and a position (a position X5 in FIG. 10) of an edge (an upper end) of the vertical wall portion 3 on the side closer to the opened portion 5 is set by being selected from a range from 10 mm to 20 mm.

[0060] Further, the dimension of each part of the projection 7 provided on the inner surface of the vertical wall portion 3 that faces the inner side of the side door 2 (the inner side in the vehicle width direction) is also similar to that in the above embodiment.

[0061] That is, in the up-down direction, the position of the edge (the upper end) of the projection 7 on the side closer to the opened portion 5 is set between the position (the position X3 in FIG. 10) of the distal end (the upper end) of the cover portion 6 on the side closer to the opened portion 5 and the position (the position X5 in FIG. 10) of the edge (the upper end) of the vertical wall portion 3 on the side closer to the opened portion 5.

[0062] Further, as the dimension of each of the projection 7, the projecting dimension from the inner surface of the vertical wall portion 3 (the projecting dimension in the horizontal direction) is set by being selected from a range from 1 mm to 4 mm. Further, in the up-down direction, the dimension between the position (the position X5 in FIG. 10) of the edge (the upper end) of the vertical wall portion 3 on the side closer to the opened portion 5 and the position of the distal end part of the projection 7 at which the projection dimension is maximum is set by being selected from a range from 10 mm to 15 mm.

[0063] The other configuration is similar to that in the above embodiment.

[0064] Even in the present modification, it is possible to yield the same effect as the above embodiment. That is, it is possible to restrain an uncomfortable feeling from being caused time when a person grips the door handle 1 and to improve the operationability in the door opening operation. Further, while it is possible to restrain an uncomfortable feeling from being caused when the person inserts the finger F into the opened portion 5 of the door handle 1, it is possible to stably maintain a gripped state of the door handle 1 due to the presence of the projection 7 at the time when the person grips the door handle 1.

Other Embodiments

[0065] Note that the present invention is not limited to the above embodiment and the above modification, and all modifications and applications included within the scope of Claims and within a scope equivalent thereto can be made.

[0066] For example, the above embodiment and the above modification deal with a case where the present invention is applied to the door handle 1 provided in a front side door (a door on a driver side and a door on a front passenger seat side) 2 of a vehicle. The present invention is not limited to this and is also applicable to a door handle provided in a rear side door or the like.

[0067] Further, the above embodiment deals with a case where the door handle 1 rotatably supported by the hinge disposed at a position closer to the front end of the door handle 1 in the handle longitudinal direction can be gripped such that the fingers are inserted into the space inside the door handle 1 from the lower side. Further, the above modification deals with a case where the door handle 1 rotatably supported by the hinge disposed at a position closer to the rear end of the door handle 1 in the handle longitudinal direction can be gripped such that the fingers are inserted into the space inside the door

handle 1 from the upper side. The present invention is not limited to this and may be applied to the following cases. That is, the door handle 1 rotatably supported by the hinge disposed at a position closer to the front end of the door handle 1 in the handle longitudinal direction may be gripped such that the fingers are inserted into the space inside the door handle 1 from the upper side, or the door handle 1 rotatably supported by the hinge disposed at a position closer to the rear end of the door handle 1 in the handle longitudinal direction may be gripped such that the fingers are inserted into the space inside the door handle 1 from the lower side.

[0068] Further, the above embodiment and the above modification deal with a case where the thickness dimension of a part of the vertical wall portion 3 that is placed above the projection 7 is the same as the thickness dimension of a part of the vertical wall portion 3 that is placed below the projection 7. The present invention is not limited to this, and the thickness dimension of the part of the vertical wall portion 3 that is placed above the projection 7 may be different from the thickness dimension of the part of the vertical wall portion 3 that is placed below the projection 7. For example, the thickness dimension of the part of the vertical wall portion 3 that is placed above the projection 7 may be made smaller than the thickness dimension of the part of the vertical wall portion 3 that is placed below the projection 7 by providing a recessed portion on the inner surface of the part of the vertical wall portion 3 that is placed above the projection 7. In this case, a large space can be obtained above the projection 7 as the space into which the fingers are inserted, so that the gripped state of the door handle 1 can be maintained still more stably. In the meantime, in a case where the thickness dimension is made small such that the inner surface of the part of the vertical wall portion 3 below the projection 7 recedes, a large space can be obtained on the open end side of the opened portion 5, and hereby, it is possible to secure a larger space when the finger F is inserted into the opened portion 5 of the door handle 1.

[0069] Further, the above embodiment and the above modification deal with a case where the present invention is applied to the door handle 1 configured to rotate between the storage posture and the pop-up posture by the operation of the actuator. The present invention is not limited to this, and the present invention is applied to the door handle 1 configured to rotate between the storage posture and the pop-up posture by a manual operation (by the hand of a person).

[0070] The present invention is applicable to a door handle for a vehicle, the door handle being supported by a hinge disposed at a position closer to a first side in the handle longitudinal direction such that the door handle is rotatable between a storage posture where the door handle is stored in a door and a projecting posture where the door handle projects from the door.

Claims

1. A door handle (1) for a vehicle (V), the door handle (1) being supported by a hinge disposed at a position closer to a first side of the door handle (1) in a handle longitudinal direction such that the door handle is rotatable between a storage posture where the door handle (1) is stored in a door (2) and a projecting posture where the door handle (2) projects from the door (2), the door handle (1) comprising:

a vertical wall portion (3) configured to be generally flush with an outer surface of the door (2) in the storage posture;

an extending portion (4) extending toward an inner side of the door (2) from either one of an upper edge and a bottom edge of the vertical wall portion (3);

an opened portion (5) provided in the other one of the upper edge and the bottom edge of the vertical wall portion (3), the opened portion (5) being a part into which a finger (F) is insertable in the projecting posture; and

a cover portion (6) continuous with the extending portion (4) and the vertical wall portion (3) and disposed at a position closer to a second side of the door handle (1) in the handle longitudinal direction, the cover portion (6) extending in a direction intersecting with the handle longitudinal direction, wherein an inner edge part (61) of the cover portion (6), the inner edge part (61) of the cover portion (6) being placed closer to the inner side of the door (2), recedes toward the vertical wall portion (3) from an inner edge part (41) of the extending portion (4), the inner edge part (41) of the extending portion (4) being placed closer to the inner side of the door (2).

2. The door handle (1) according to claim 1, wherein:

a projection (7) extending in the handle longitudinal direction and projecting toward the inner side of the door (2) is provided on an inner surface of the vertical wall portion (3), the inner surface facing the inner side of the door (2); and in an up-down direction, a position of an edge of the projection (7) on a side closer to the opened portion (5) is set between a position of a distal end of the cover portion (6) on the side closer to the opened portion (5) and a position of an edge of the vertical wall portion (3) on the side closer to the opened portion (5).

3. The door handle (1) according to claim 1 or 2, wherein:

the extending portion (4) extends toward the inner side of the door (2) from the upper edge of

the vertical wall portion (3);
 the opened portion (5) is provided on the bottom
 edge side of the vertical wall portion (3); and
 the cover portion (6) is continuous with the ex-
 tending portion (4) and the vertical wall portion 5
 (3) and extends downward along an outer edge
 shape of the vertical wall portion (3) at a position
 closer to the second side of the door handle (1)
 in the handle longitudinal direction. 10

4. The door handle (1) according to claims 1 to 3,
 wherein:

an inner edge part (61) of the cover portion (6)
 includes a reference inner edge part (62) ex- 15
 tending along the handle longitudinal direction;
 and
 a dimension (A) in a horizontal direction between
 an outer surface (31) of the vertical wall portion
 (3) and the reference inner edge part (62) is set 20
 by being selected from a range from 5 mm to 15
 mm.

5. The door handle (1) according to any one of claims
 1 to 4, wherein, in an up-down direction, a dimension 25
 (B) between a position (X3) of a distal end of the
 cover portion (6) on a side closer to the opened por-
 tion (5) and a position (X5) of an edge of the vertical
 wall portion (3) on the side closer to the opened por-
 tion (5) is set by being selected from a range from 30
 10 mm to 20 mm.

6. The door handle (1) according to claim 2, wherein a
 projecting dimension of the projection (7) from the
 inner surface of the vertical wall portion (3) is set by 35
 being selected from a range from 1 mm to 4 mm.

7. The door handle (1) according to claim 2 or 6, where-
 in in the up-down direction, a dimension between the
 position of the edge of the vertical wall portion (3) on 40
 the side closer to the opened portion (5) and a posi-
 tion of a distal end part of the projection (7) at which
 a projection dimension of the projection (7) is maxi-
 mum is set by being selected from a range from 10
 mm to 15 mm. 45

50

55

FIG. 1

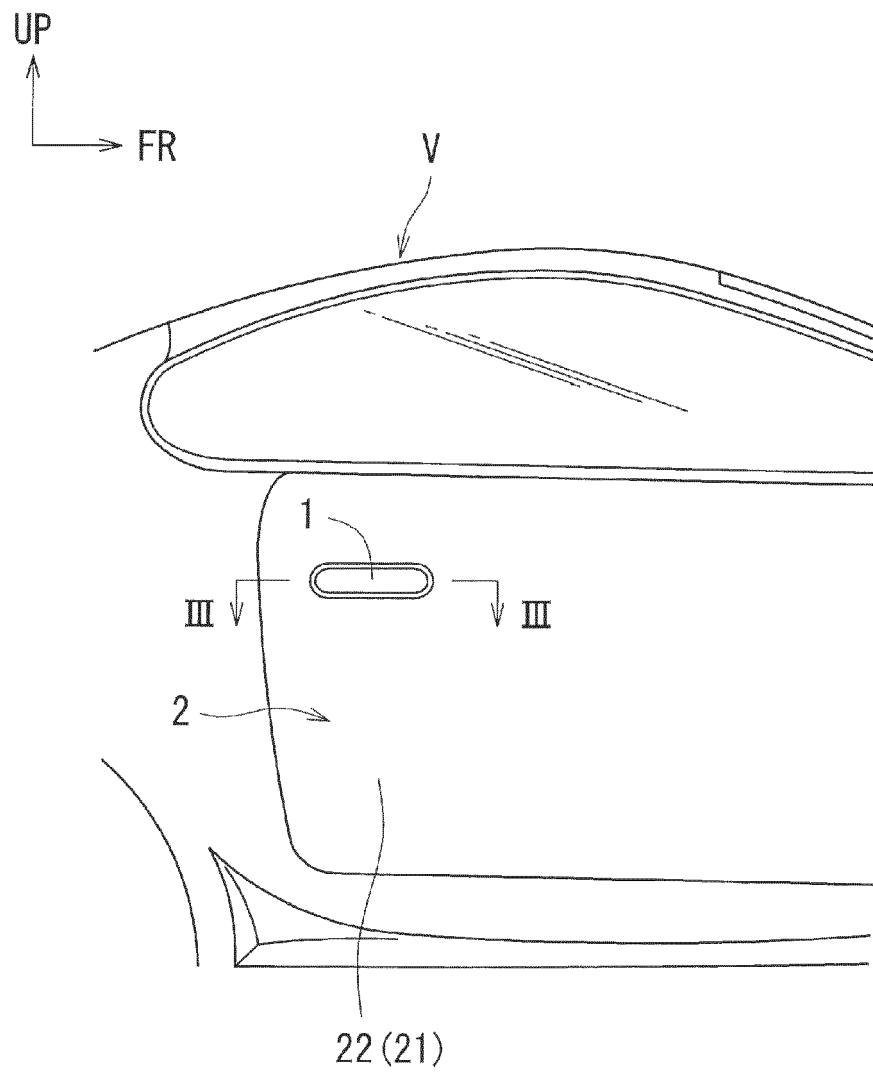


FIG. 2A

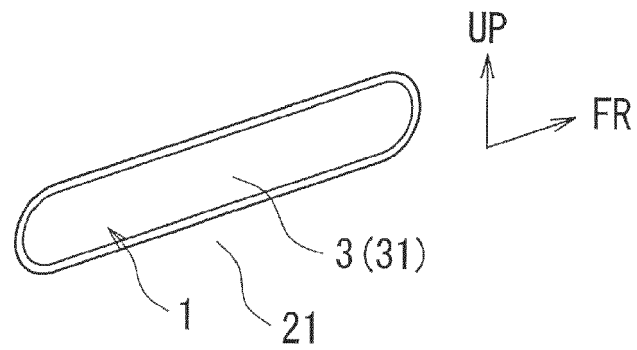


FIG. 2B

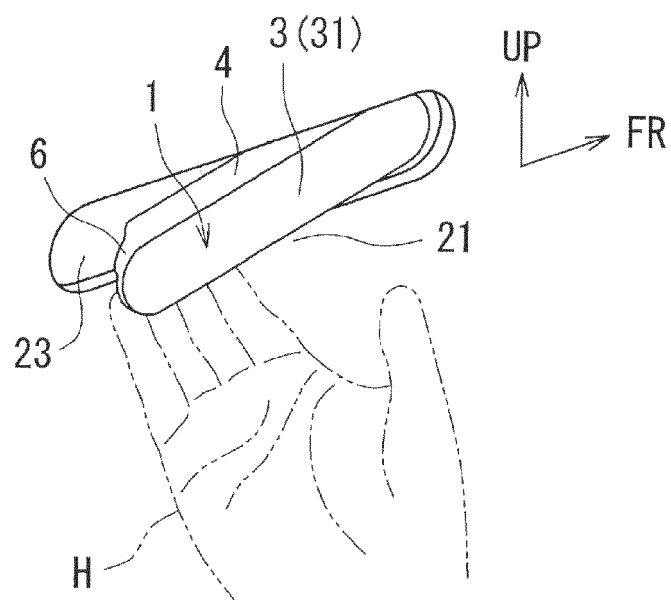


FIG. 3

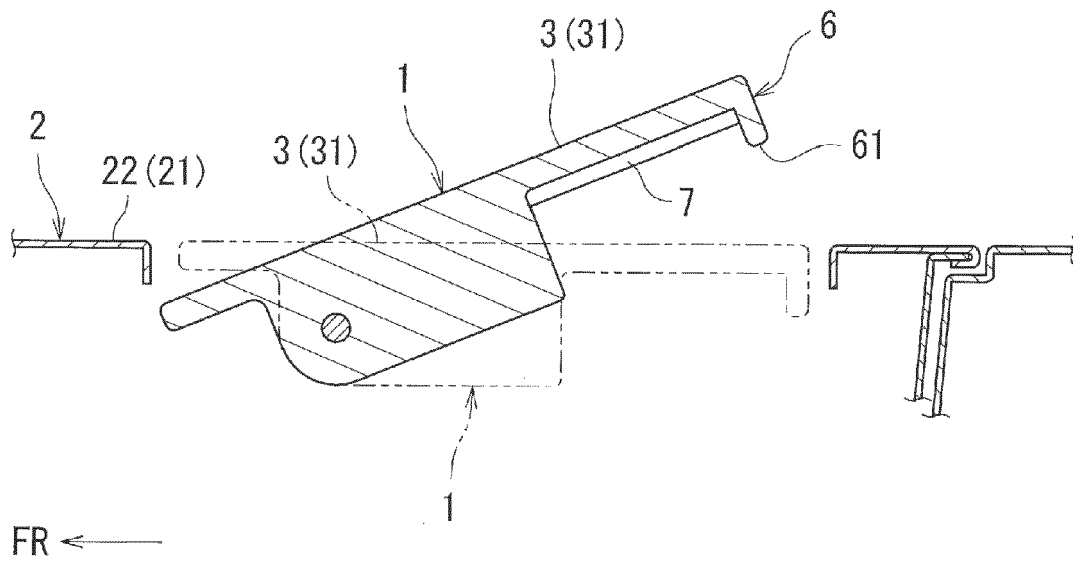


FIG. 4

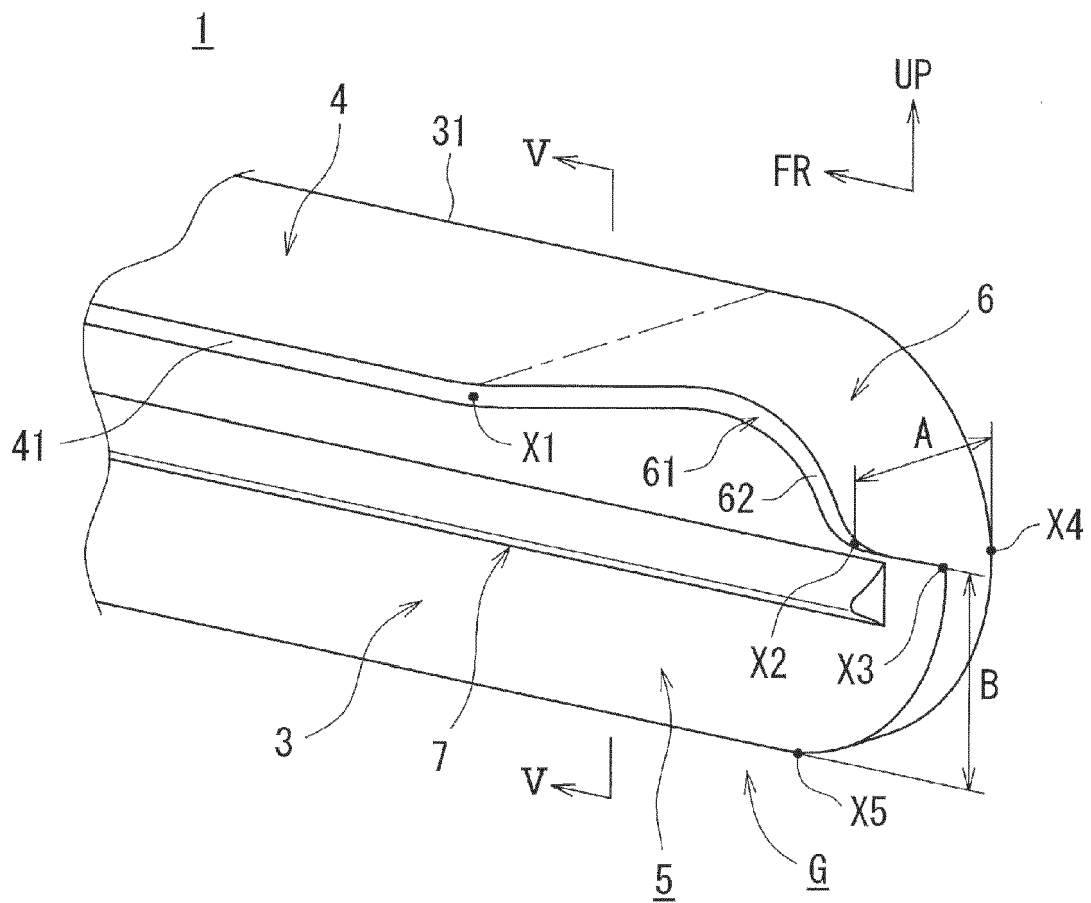


FIG. 5

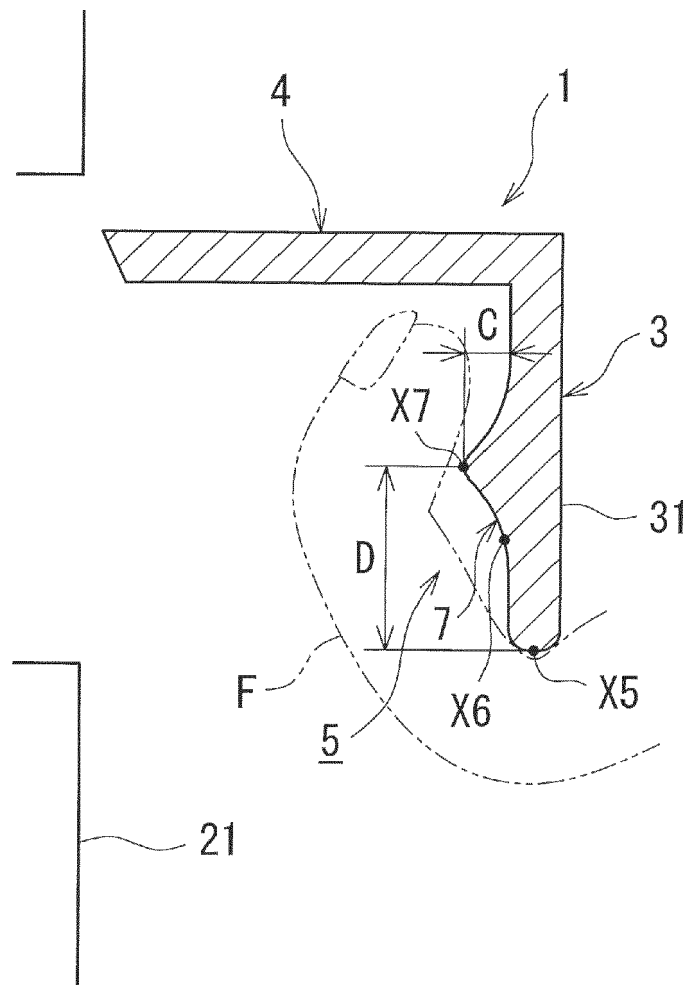


FIG. 6

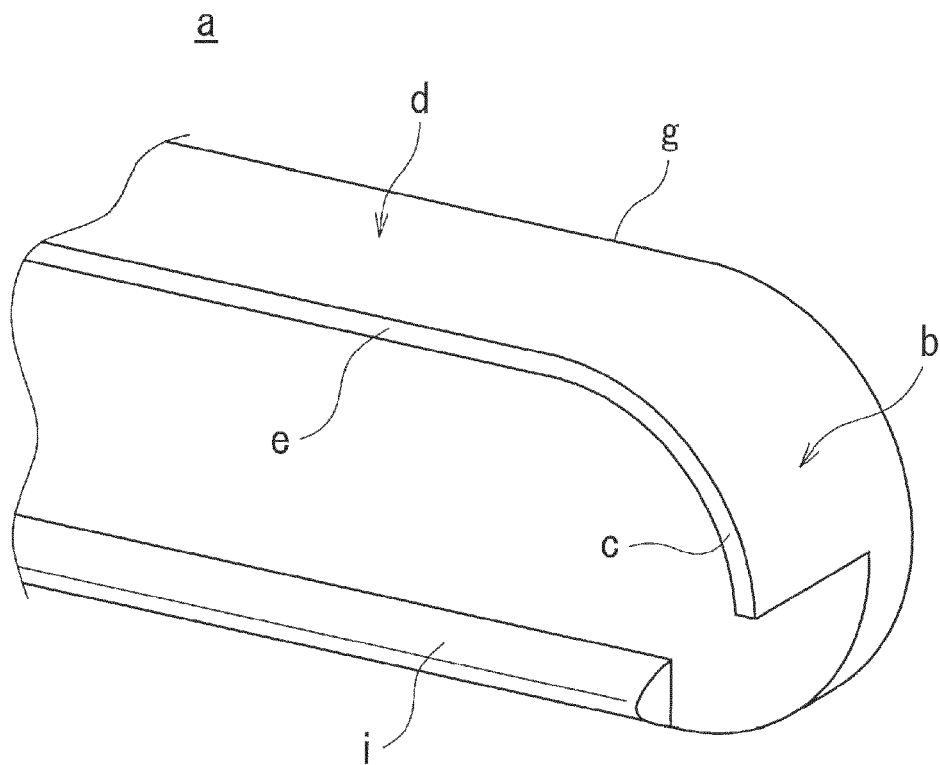
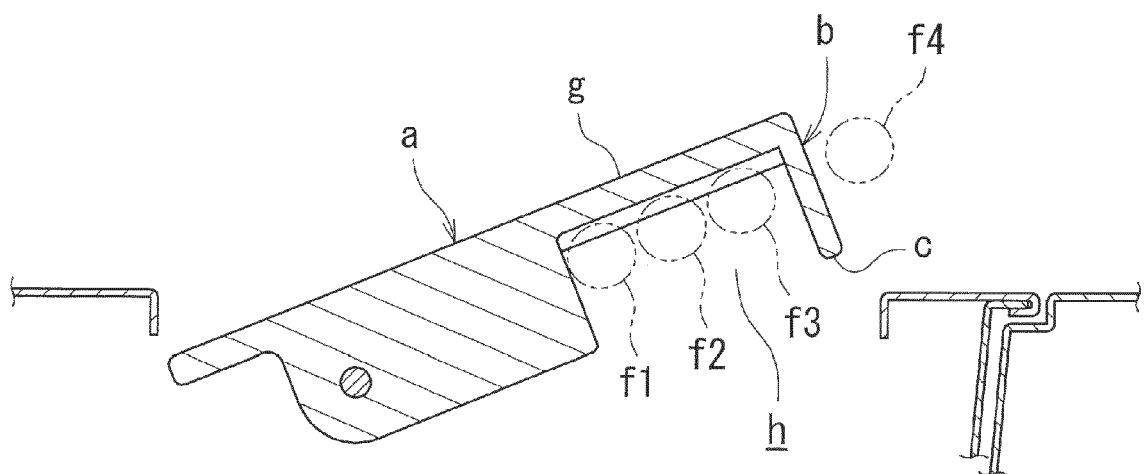
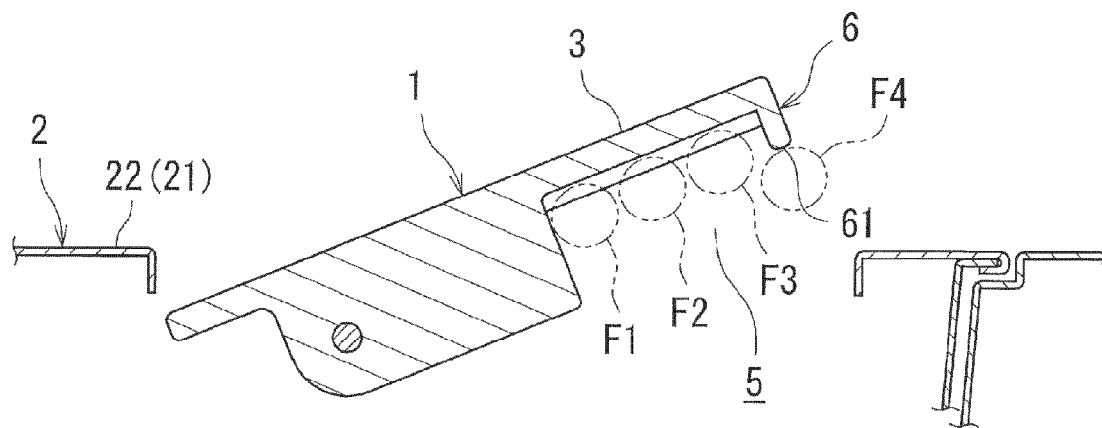


FIG. 7



FR ←

FIG. 8



FR ←

FIG. 9

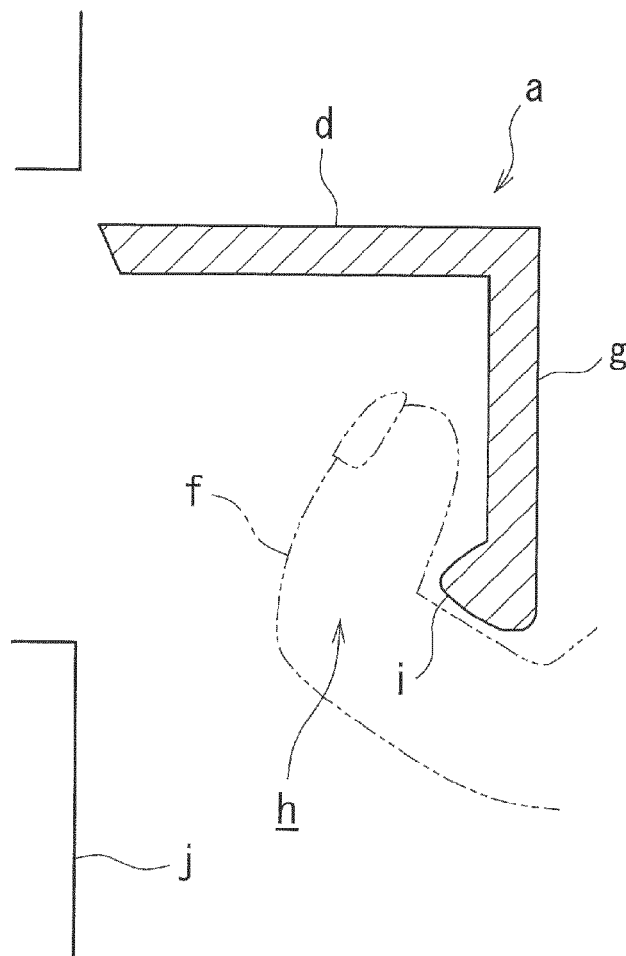
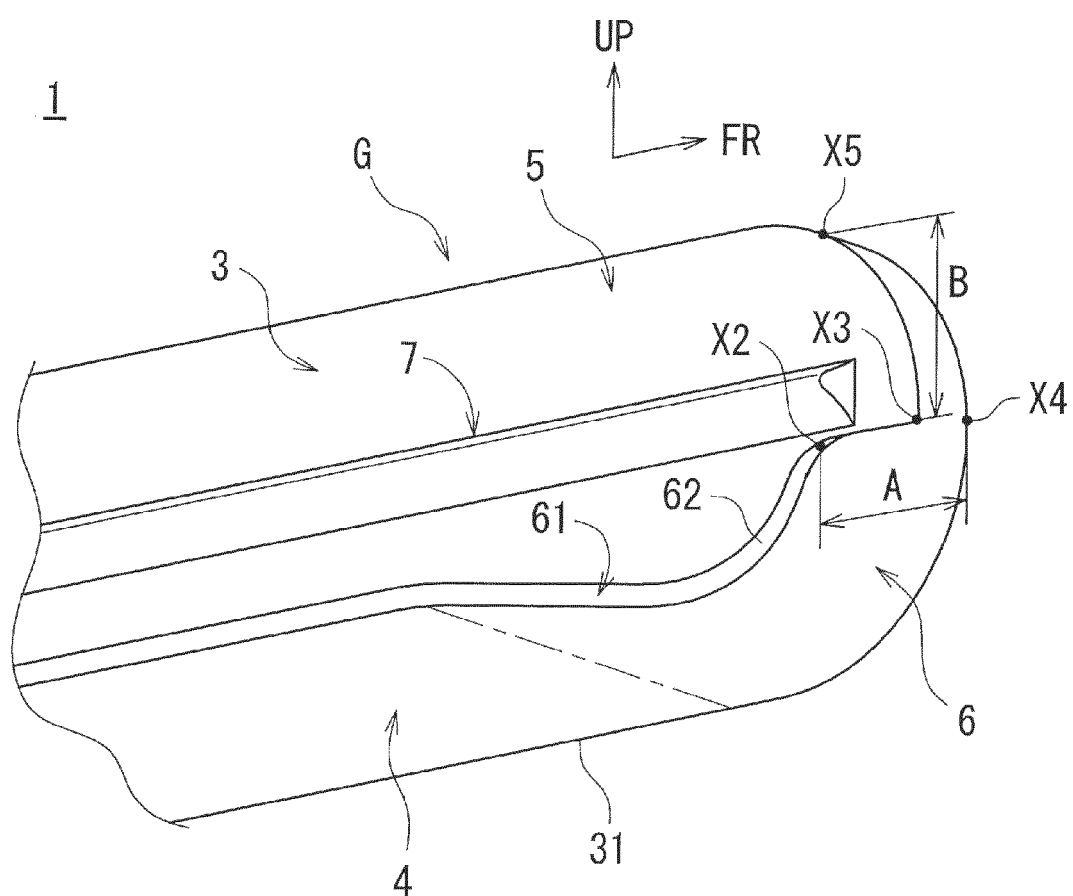


FIG. 10





EUROPEAN SEARCH REPORT

Application Number

EP 22 21 5889

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)
A	WO 2017/077077 A1 (U-SHIN ITALIA S P A [IT]) 11 May 2017 (2017-05-11) * page 11, line 14 - page 15, line 6 * * figures 9-12 *	1-7	INV. E05B85/10 E05B85/16
A	GB 2 548 146 A (BENTLEY MOTORS LTD [GB]) 13 September 2017 (2017-09-13) * page 9, line 20 - page 11, line 18 * * figures 1-5 *	1-7	
A	JP 2008 248632 A (ALPHA CORP) 16 October 2008 (2008-10-16) * paragraph [0006] - paragraph [0021] * * figures 1-2 *	1-7	
A	KR 102 329 207 B1 (SUNG WOO HITECH CO LTD [KR]) 22 November 2021 (2021-11-22) * paragraph [0031] - paragraph [0043] * * figures 1-3 *	1-7	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 12 July 2023	Examiner Antonov, Ventseslav
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 22 21 5889

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.

12-07-2023

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 2017077077	A1	11-05-2017	CN	106256982 A		28-12-2016
			CN	106256983 A		28-12-2016
			CN	108350709 A		31-07-2018
			EP	3106594 A1		21-12-2016
			EP	3106595 A1		21-12-2016
			EP	3106596 A1		21-12-2016
			JP	7065777 B2		12-05-2022
			JP	7079561 B2		02-06-2022
			JP	7079564 B2		02-06-2022
			JP	2017008712 A		12-01-2017
			JP	2017089373 A		25-05-2017
			JP	2019500528 A		10-01-2019
			US	2016369537 A1		22-12-2016
			US	2017130493 A1		11-05-2017
			US	2018245380 A1		30-08-2018
			WO	2017077077 A1		11-05-2017
			WO	2017077078 A1		11-05-2017

GB 2548146	A	13-09-2017	NONE			

JP 2008248632	A	16-10-2008	JP	4774133 B2		14-09-2011
			JP	2008248632 A		16-10-2008

KR 102329207	B1	22-11-2021	NONE			

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2019049188 A [0003] [0006]