(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
15 September 2022 (15.09.2022)

WIPO | PCT

(10) International Publication Number
WO 2022/189669 A1

(51) International Patent Classification:
E05B 77/34 (2014.01) *E05B 85/02* (2014.01)

(21) International Application Number:
PCT/EP2022/056454

(22) International Filing Date:
14 March 2022 (14.03.2022)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2103420.2 12 March 2021 (12.03.2021) GB

(71) Applicant: **JAGUAR LAND ROVER LIMITED** [GB/GB]; Abbey Road, Whitley, Coventry Warwickshire CV3 4LF (GB).

(72) Inventor: **EDWARDS, Sean**; c/o Jaguar Land Rover, Patents Department W/1/073, Abbey Road, Whitley, Coventry Warwickshire CV3 4LF (GB).

(74) Agent: **WESTCOTT, Matthew**; c/o Jaguar Land Rover, Patents Department W/1/073, Abbey Road, Whitley, Coventry Warwickshire CV3 4LF (GB).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(54) Title: SEALING BEAD FOR A VEHICLE SIDE DOOR LATCH APPARATUS

(57) Abstract: A side door latch apparatus (400) for a vehicle (10), the side door latch apparatus comprising: a housing arrangement (422) comprising a plurality of latch components (402, 404) and a latch throat (424) configured to receive a striker (300); and a sealing bead (426) extending around a portion (440, 444) of the housing arrangement comprising the latch throat to create a seal between a door cavity (482) of a side door (14) and the latch throat, wherein the sealing bead passes above the latch throat to, in use, divert descending liquid around the latch throat.

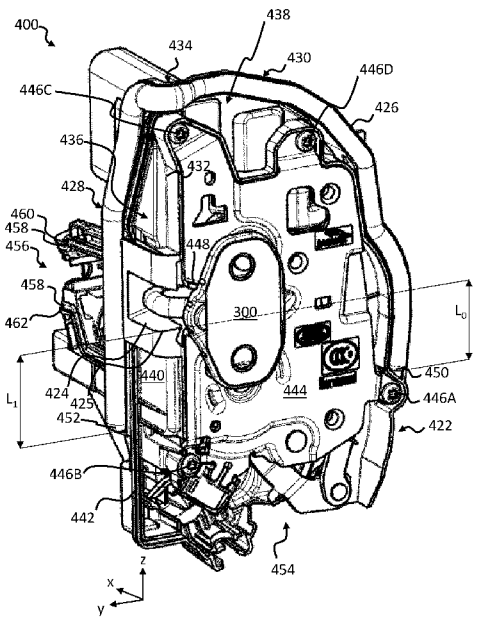


FIG. 3

WO 2022/189669 A1

SEALING BEAD FOR A VEHICLE SIDE DOOR LATCH APPARATUS

TECHNICAL FIELD

The present disclosure relates to a sealing bead for a vehicle side door latch apparatus.

BACKGROUND

Traditionally, a vehicle side door will comprise exterior and interior door handles and a latch apparatus. Typically, the latch apparatus comprises a door-mounted movable claw comprising a mouth configured to receive a vehicle-mounted striker as the door is closed. The claw can rotate into a primary latched position to hook around the received striker, keeping the door closed.

The door cavity, in which the latch apparatus is located, is classed as a wet area. It is preferred that liquid within the door cavity drains to the outside of the vehicle through drain holes at the bottom of the door cavity. If water works through the latch apparatus, it can escape the door cavity and enter a space between the door's primary and secondary seals. In addition, excessive exposure of internal components of the latch apparatus to water can accelerate corrosion and can interfere with electrical systems.

SUMMARY OF THE INVENTION

It is an aim of the present invention to provide an improved vehicle side door latch apparatus. The invention is as defined in the appended independent claims.

According to an aspect of the invention there is provided a side door latch apparatus for a vehicle, the side door latch apparatus comprising: a housing arrangement comprising a plurality of latch components and a latch throat configured to receive a striker; and a sealing bead extending around a portion of the housing arrangement comprising the latch throat to create a seal between a door cavity of a side door and the latch throat, wherein the sealing bead passes above the latch throat and has a variable cross-sectional area to, in use, divert descending liquid around the latch throat.

Advantageously this provides a side door latch apparatus, or latch apparatus, that is easy for an operator to mount and has good tolerances to ensure a good seal is provided.

A side door latch apparatus for a vehicle, the side door latch apparatus comprising: a housing arrangement comprising a plurality of latch components and a latch throat configured to receive a striker; and a sealing bead extending around a portion of the housing arrangement comprising the latch throat to create a seal between a door cavity of a side door and the latch throat, wherein the sealing bead passes above the latch throat to, in use, divert descending liquid around the latch throat, wherein the housing arrangement comprises a first face, a second nonparallel face, and a corner edge demarcating the first and second faces, and wherein the sealing bead extends along the first face, over the corner edge and along the second face, and the sealing bead is locally thickened where it extends over the corner edge relative to an average cross-sectional area of the sealing bead along each of the first and second faces.

Advantageously, by providing a sealing bead that is locally thickened where it extends over the corner edge relative to an average cross-sectional area of the sealing bead along each of the first and second faces, sufficient sealing bead material can be provided in the corner region to ensure a comprehensive and watertight seal is created between the exterior corner of the door latch housing and an interior corner of the door cavity, where due to tolerances more seal material is typically required, whilst avoiding excessive seal bead thickness along the first and second faces of the housing arrangement. Allowing such reduced seal bead thickness along the first and second faces of the housing arrangement reduces the effort required during assembly for an operator to compress the seal bead enough to start hand-tightening fixings that secure the door latch apparatus in place.

In some examples, the sealing bead comprises expanded material. In some examples, the latch apparatus is configured to be secured to a door cavity panel at an interior inboard corner of the door cavity.

In some examples, the sealing bead defines an open shape partially surrounding the portion of the housing arrangement

In some examples, the sealing bead extends along a peripheral edge of a moulding of the housing arrangement. In some examples, the housing arrangement comprises a first face having a first edge, a second nonparallel face having a second edge, and a third (corner) edge demarcating the first and second faces, wherein the first, second and third edges extend, in use, upwardly and converge to meet at a vertex, and wherein the sealing bead extends along the first edge of the first face, over the vertex and along the second edge.

In some examples, an average cross-sectional area of the sealing bead is greater along the first edge than along the second edge. In some examples, the sealing bead is locally thickened at the vertex.

In some examples, the portion comprises a first moulding comprising the latch throat, and wherein the housing arrangement comprises a second moulding comprising at least some of the latch components, and wherein the sealing bead is secured to the second moulding to at least partially surround the first moulding.

In some examples, the housing arrangement comprises a reinforcing portion secured to the first moulding, so that the sealing bead further at least partially surrounds the reinforcing portion.

In some examples, the reinforcing portion comprises a metallic plate comprising a slot aligned with the latch throat, wherein the slot is configured to enable the striker to enter the latch throat.

In some examples, the sealing bead terminates at lower ends, wherein a gap between the lower ends enables liquid to drain out of the portion of the housing arrangement.

In some examples, the lower ends of the sealing bead are far enough below the latch throat that the lower ends remain below a level of the latch throat when the body of the vehicle and therefore the side door latch apparatus is at an angle at least up to 18 degrees.

In some examples, the housing arrangement comprises an opening, different from the latch throat, configured to receive an end portion of a mechanism linking the side door latch apparatus to an actuator; and
wherein the side door latch apparatus comprises a second sealing bead configured to extend at least partially around the opening of the housing arrangement.

In some examples, the mechanism comprises a Bowden cable.

In some examples, wherein the end portion of the mechanism is configured to cover the opening, and wherein the second sealing bead is configured to create a seal between the end portion of the mechanism and the housing arrangement.

In some examples, the second sealing bead is secured to the housing arrangement, or wherein the second sealing bead is secured to the end portion of the mechanism.

In some examples, the housing arrangement comprises a further opening, different from the latch throat and the opening, configured to receive an end portion of a further mechanism linking the side door latch apparatus to a further actuator; and

wherein the side door latch apparatus comprises a further sealing bead configured to extend at least partially around the further opening of the housing arrangement.

In some examples, the further mechanism comprises a Bowden cable.

In some examples, the end portion of the further mechanism is configured to cover the further opening, and wherein the further sealing bead is configured to create a seal between the end portion of the further mechanism and the housing arrangement.

In some examples, the further sealing bead is secured to the housing arrangement, or wherein the further sealing bead is secured to the end portion of the further mechanism.

According to an aspect of the invention there is provided a latch apparatus for a vehicle, the latch apparatus comprising:
a housing arrangement comprising a plurality of latch components and opening configured to receive an end portion of a mechanism linking the side door latch apparatus to an actuator; and
a sealing bead extending at least partially around the opening to seal the opening from liquid ingress.

An advantage is that a good seal is provided.

In some examples, the mechanism comprises a Bowden cable.

In some examples, the end portion of the mechanism is configured to cover the opening, and wherein the second sealing bead is configured to create a seal between the end portion of the mechanism and the housing arrangement.

According to an aspect of the invention there is provided a side door latch apparatus for a vehicle, the side door latch apparatus comprising:
a housing arrangement comprising a plurality of latch components and a latch throat configured to receive a striker; and
a sealing bead extending around a portion of the housing arrangement comprising the latch throat to create a seal between a door cavity of a side door and the latch throat, wherein the sealing bead passes above the latch throat to, in use, divert descending liquid around the latch throat,
wherein the sealing bead terminates at lower ends having a gap therebetween, and

wherein each of the lower ends of the sealing bead is configured to extend at least 20 millimetres past a level of a bottom edge of the latch throat.

An advantage is that a good seal is provided even if the vehicle is an off-roader that can pitch or roll significantly.

According to an aspect of the invention there is provided a vehicle comprising the latch apparatus.

Within the scope of this application it is expressly intended that the various aspects, embodiments, examples and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings, and in particular the individual features thereof, may be taken independently or in any combination that falls within the scope of the appended claims. That is, all embodiments and/or features of any embodiment can be combined in any way and/or combination that falls within the scope of the appended claims, unless such features are incompatible. The applicant reserves the right to change any originally filed claim or file any new claim accordingly, including the right to amend any originally filed claim to depend from and/or incorporate any feature of any other claim although not originally claimed in that manner.

BRIEF DESCRIPTION OF THE DRAWINGS

One or more embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

FIG. 1 illustrates an example of a vehicle;

FIG. 2A illustrates an example of a vehicle side door latch assembly with a claw in a released position;

FIG. 2B illustrates an example of the vehicle side door latch assembly with the claw in a primary latched position;

FIG. 3 illustrates an example front perspective view of a housing arrangement of a latch apparatus, comprising sealing beads;

FIG. 4 illustrates an example rear perspective view of a housing arrangement of a latch apparatus, comprising a sealing bead;

FIG. 5 illustrates an example of an end portion of a mechanism, configured to seal against a housing arrangement of a latch apparatus;

FIG. 6 illustrates an example of an end portion of a mechanism, configured to seal against a housing arrangement of a latch apparatus;

FIG. 7 illustrates an example of a latch reinforcement structure to which a latch apparatus is secured; and

FIG. 8 illustrates an example of a door cavity comprising a latch apparatus and a latch reinforcement structure.

DETAILED DESCRIPTION

FIG. 1 illustrates an example of a vehicle 10 in which embodiments of the invention can be implemented. In some, but not necessarily all examples, the vehicle 10 is a passenger vehicle, also referred to as a passenger car or as an automobile. In other examples, embodiments of the invention can be implemented for other applications, such as commercial vehicles.

The vehicle 10 comprises side doors 12, 14 such as the illustrated rear side door 12 and front side door 14. Each side door 12, 14 has a respective exterior door handle 120, 140. The side doors 12, 14 enable access to inboard seats of the vehicle 10. When a side door is closed, it is sealed against a vehicle body 11 of the vehicle. Each side door 12, 14 comprises a vehicle side door latch assembly as described herein.

FIG. 2A illustrates an example of a vehicle side door latch assembly 200. The latch assembly 200 comprises a latch apparatus 400 and a striker 300. Various known features of the latch apparatus 400 are omitted for simplicity of the drawings. The latch apparatus 400 can be connected to a vehicle side door 12 or 14. In the following examples, the front door 14 is referred to for illustrative purposes. The striker 300 can be connected to a body 11 of the vehicle 10. The illustrated striker 300 is loop-shaped or can have another shape.

The latch apparatus 400 comprises a claw 402 and a pawl 404 which function together as a ratchet device. The claw 402 comprises a mouth 420 configured to receive the striker 300.

The claw 402 is rotatable about a claw pivot 406 defining a claw axis. The claw 402 is rotatable between a released position shown in FIG. 2A and a primary latched position as shown in FIG. 2B. In the primary latched position, the striker 300 is inside the mouth 420 and the claw 402 has rotated to hook around the striker 300, preventing the door 14 from swinging open. In other words, the striker 300 is 'latched'. In the released position, the claw 402 does not hook around the striker 300 so the door 14 can swing open. In other words, the striker 300 is 'released'/unlatched.

The claw 402 comprises a toothed edge 418 which contacts a tooth 416 of a pawl 404 to function as a ratchet. The toothed edge 418 of the claw 402 comprises a plurality of teeth 412, 414 (steps in the toothed edge 418) each configured to prevent rotation of the claw 402 away from a respective latched position.

The toothed edge 418 of the claw 402 can comprise a release position tooth 410 which engages with the pawl tooth 416 when the claw 402 is in the released (unlatched) position.

The toothed edge 418 of the claw 402 can comprise a secondary latch position tooth 412 which engages with the pawl tooth 416 when the claw 402 is in a secondary latch position. In this position, the striker 300 is latched although the door 14 may be slightly ajar.

The toothed edge 418 of the claw 402 can comprise a primary latch position tooth 414 which engages with the pawl tooth 416 when the claw 402 is in a primary latch position. In this position, the striker 300 is latched and the door 14 is fully closed.

The pawl 404 is rotatable about a pawl pivot 408 defining a pawl axis. If the pawl 404 is rotated away from the toothed edge 418 of the claw 402 far enough to disengage the pawl tooth 416 from one of the teeth 410, 412, 414 of the toothed edge 418 of the claw 402, the claw 402 may spring back into its released position, aided by a claw return spring (not shown). A locking system (not illustrated) can be operable to prevent at least one actuator from causing this rotation of the pawl 404, to prevent release.

FIG. 3 illustrates a housing arrangement 422 comprising a plurality of latch components such as the claw 402 and the pawl 404 (not visible). Further latch components (not shown) housed by the housing arrangement 422 can include one or more of:

- central locking system components configured to provide central locking, preventing the exterior door handle 140 from unlatching the latch apparatus 400;
- double locking system components configured to prevent the interior door handle and the exterior door handle 140 from unlatching the latch apparatus 400;
- key barrel locking system components (e.g., driver's door only) configured to couple to a key barrel to enable a physical key to control the locking system;
- interior release mechanism components configured to enable the interior door handle to unlatch the latch apparatus 400;
- exterior release mechanism components configured to enable the exterior door handle 140 to unlatch the latch apparatus 400;
- actuators for one or more of the above components; and/or
- status sensors for enabling circuitry to control the actuators described above.

In FIG. 3, but not necessarily all examples, the housing arrangement 422 comprises a plurality of mouldings 440, 442 (separately moulded polymeric parts) attached to each other. The housing arrangement 422 can also comprise a reinforcing portion such as a metallic plate layer 444.

A door cavity 482 is at least partially defined by one or more door cavity panels of the door 14. The housing arrangement 422 may be configured to be secured to at least one door cavity panel of the door 14 by a latch reinforcement structure 478 shown in FIGS. 7 and 8. The latch reinforcement structure 478 can comprise a metallic corner plate secured within the door cavity 482 to an interior surface of an inner door panel 484, at an inboard corner 486 of the inner door panel 484 (FIG. 8) facing the striker 300. The housing arrangement 422 can be secured to the latch reinforcement structure 478 by fixings such as screws (not shown). Said screws may also secure the housing arrangement 422 and the latch reinforcement structure 478 to the inner door panel 484 shown in FIG. 8.

The larger of the mouldings in FIG. 3 is an electronic component carrier 442 (ECC). The smaller of the mouldings is a striker guide 440 attached to the ECC 442. The striker guide 440 may be secured to the ECC 442 by screws 446A-446D or any other appropriate fixings. The illustrated plate layer 444 is secured to the striker guide 440 by the same screws 446A-446D or by any other appropriate fixings.

The ECC 442 can act as the main latch moulding containing most of the mechanisms, actuators and sensors. Secondary components such as the striker guide 440 may connect to the ECC 442.

The striker guide 440 may be a moulding supporting the claw 402 and the pawl 404 of FIGS. 2A-2B. The striker guide 440 may be moulded into a shape that comprises a latch throat 424 leading to the mouth 420 of the claw 402. The striker guide 440 refers to its function as a guiding structure for guiding the striker 300 into the claw 402. In FIG. 3, the claw 402 and mouth 420 are not visible within the latch throat 424 because the striker 300 is in the foreground.

The latch throat 424 of the striker guide 440 is configured to receive the striker 300 as the door 14 is closed in the illustrated y-direction. The entrance of the latch throat 424 can be at a corner of a vehicle inboard-facing surface of the striker guide 440, to receive the striker 300. The vehicle inboard-facing surface may face a J-plane 490 (FIG. 8) of an interior of the door 14. A J-plane refers to an inboard side of the door 14.

As the door 14 is fully closed, the striker 300 enters the latch throat 424 and is enters the mouth 420 of the claw 402, rotating the claw 402 into the primary latched position. As a result, a portion of the striker 300 is hooked within the mouth 420, within the latch throat 424. The striker 300 cannot be released from the latch throat 424 unless the claw 402 is unlatched.

The plate layer 444 can be secured to another surface of the striker guide 440, approximately orthogonal (e.g., ±15 degrees) to the inboard-facing surface of the striker guide 440. The other surface of the striker guide 440 may face a shut face 488 (FIG. 8) of the door, which is an edge of the door 14 that seals against a door frame so as to

not be visible when the door is closed. The J-plane 490 and shut face 488 are approximately orthogonal (e.g., ±15 degrees).

The striker guide 440 may be layered (sandwiched) between the plate layer 444 and the ECC 442.

The plate layer 444 may comprise a striker slot 448 open at an edge of the plate layer 444 aligned with the entrance of the latch throat 424, and extending in the y-direction parallel to the latch throat. The striker slot 448 enables the striker 300 to enter the latch throat 424 without interference because the striker 300 protrudes through a plane of the plate layer 444.

The housing arrangement 422 of FIG. 3 comprises a pair of approximately orthogonal faces 436, 438 configured to face the inboard corner 486 of the door cavity 482 (FIG. 8). The term 'approximately orthogonal' refers to an angle within 15 degrees of orthogonal. A definition of the faces is provided below, referring to the illustrated local x-y-z axes which are defined first.

The local axes may or may not be parallel to vehicle longitudinal-lateral-vertical axes, depending on the configured orientation of the latch apparatus 400, the geometry of the side door 14 and whether the side door 14 is open or closed.

In the present example, the y-axis is the axis most aligned with a vehicle lateral axis when the side door 14 is closed. For a vertically-hinged side door 14, the y-axis is parallel to the direction into and out of the latch throat 424/striker slot 448.

The z-axis is the vertical axis of the latch apparatus 400. The z-axis of the latch apparatus 400 of a front door 14 may be approximately parallel to a lower part of a shut face 488 (FIG. 8) of a front doorframe connected to a vehicle B-pillar, when the front door 14 is closed. The z-axis of the latch apparatus 400 of a rear door 12 may be approximately parallel to a lower part of a shut face 488 of a rear doorframe connected to a vehicle C-pillar, when the rear door 12 is closed. The term 'lower part' refers to a doorframe location below vehicle glazing at which the striker 300 is located. 'Upper' and 'lower' positions along the z-axis respectively refer to relatively high and relatively low positions when the latch apparatus 400 is secured to the vehicle 10. Descending water reaches an upper position along the z-axis before reaching a lower position along the z-axis.

The x-axis is orthogonal to the y-axis and the z-axis. The x-axis may be generally aligned with the vehicle longitudinal axis when the side door 14 is closed, if the latch apparatus 400 is not mounted at an extreme pitch angle.

The orthogonal faces of the housing arrangement comprise a first face 436 and a second face 438 meeting at a common edge 432 (corner which may have a radius). The first face 436 of the housing arrangement 422 is within ±15 degrees of an x-z plane in the illustration, and is configured to seal against the shut face 488 (FIG. 8). The first face 436 of the housing arrangement 422 is vehicle inboard-facing, and is configured to seal against the J-plane 490 (FIG. 8), and comprises the vehicle inboard-facing surface of the striker guide 440 having the latch throat 424.

The second face 438 of the housing arrangement 422 is within ±15 degrees of a y-z plane in the illustration. The second face 438 can be configured to seal against the J-plane 490 of the door 14. The first face 436 and the second face 438 are substantially orthogonal faces, but the angle could differ in other implementations (e.g., ±15 degrees, such as 93 degrees). The second face 438 of the housing arrangement 422 comprises the plate layer 444, the fixings 446A-446D, and visible portions of the striker guide 440 not covered by the plate layer 444.

The faces are not necessarily continuous planar surfaces, as shown in the illustrations, and can comprise various discontinuities and complex formations in their surfaces.

Peripheral edges of the first face 436 include a first, upwardly extending convergent edge 428. The first edge 428 can get closer to the plane of the second face 438 with increasing z-axis height. The illustrated first edge 428 extends upwardly (+z) while converging in the x-direction towards a corner vertex 434 between the faces 436, 438. The illustrated first edge 428 can follow a generally convex shape. The convex shape of the first edge 428 can be defined by a plurality of vertices as shown, or by a continuous curve.

Peripheral edges of the second face 438 also include an upwardly extending convergent edge 430 ('second edge'). The second edge 430 can get closer to the plane of the first face 436 with increasing z-axis height. The illustrated second edge 430 extends upwardly (+z) while converging in the y-direction (inboard) towards the corner vertex 434. The illustrated second edge 430 can follow a generally convex shape. The convex shape of the second edge 430 can be defined by a plurality of vertices as shown, or by a continuous curve.

The first and second edges 428, 430 meet at the top vertex 434 (corner) between the first face 436 and the second face 438, defining the top corner of the housing arrangement 422. The vertex 434 is configured to face the inboard corner 486 of the door cavity 482 (FIG. 8). The inboard corner 486 can be referred to as a radius between the shut face 488 and the J-plane 490 of the door 14.

The first edge 428 and the second edge 430 may be peripheral edges (perimeter edges) of the ECC 442. The perimeter of the ECC 442 may be configured to wrap around the striker guide 440 and the plate layer 444, forming a corner-shaped hood (428, 430). The ECC 442 seals against the latch reinforcement structure 478 (FIG. 8), encapsulating the striker guide 440 and the plate layer 444 within the resulting interior space. The corner-facing first and second faces 436, 438 are therefore not visible in-use, except the latch throat 424 which is visible through small openings in the side door 14 and the latch reinforcement structure 478.

FIG. 3 also shows that the first face 436 and the second face 438 of the housing arrangement 422 share a common, third edge 432, wherein the third edge 432 is configured to face the inboard corner 486 of the door cavity 482 and extends substantially along the z-axis towards the vertex 434. The third edge 432 may be an edge of the striker guide 440 between the orthogonal surfaces of the striker guide 440. The third edge 432 is not necessarily a continuous straight edge and can be discontinuous due to various complex surface formations. The third edge 432 is at least interrupted by the latch throat 424.

The housing arrangement 422 is sealed against the interior of the inner door panel 484 by a sealing bead 426 extending around a portion (e.g. 440, 444) of the housing arrangement 422. A sealing bead 426 refers to a line of sealant. For example, the sealing bead 426 can be configured to compressively seal the housing arrangement 422 to the latch reinforcement structure 478 shown in FIGS. 7 and 8. The sealing bead 426 may be compressed by other fixings (e.g. screws) biasing the housing arrangement 422 towards the latch reinforcement structure 478.

Alternatively, the sealing bead 426 may seal the housing arrangement 422 directly against the inner door panel 484, if the latch reinforcement structure 478 is omitted.

The sealing bead 426 may run along one or more edges of the housing arrangement 422. In FIG. 3, but not necessarily all examples, the sealing bead 426 is secured to the perimeter of the ECC 442, extending along the first edge 428 and along the second edge 430 to arch over the first and second faces 436, 438 of the housing arrangement 422, with the peak of the arch comprising a corner at the vertex 434. The sealing bead 426 is therefore an arch-shape that is corner-shaped. The sealing bead 426 may be secured to the ECC 442 by pre-treatment of the ECC 442 to change its surface energy. In an implementation, a sealing bead path on the 30% glass filled polypropylene ECC housing is pre-treated prior to the bead application, with atmospheric plasma. This changes the surface energy of the PP to allow the sealant (e.g., CeraPUR F15-60B, RTM) to stick.

The sealing bead 426 diverts descending water (or other liquids) within the door cavity 482 away from the latch throat 424 and therefore away from an associated striker opening 480 (FIG. 7) in the latch reinforcement structure 478 aligned with the latch throat 424 and striker slot 448. The sealing bead 426 substantially prevents water from

working its way between the housing arrangement 422 and the latch reinforcement structure 478, to prevent water escaping to the door cavity 482 through the striker opening 480. The sealing bead 426 therefore protects a keep-dry space between primary and secondary seals of the door 14 from water from the door cavity 482. The sealing bead 426 also helps to prevent moisture ingress into the latch apparatus 400 itself.

The sealing bead 426 comprises resiliently compressible sealant material. In at least some examples, the sealing bead 426 comprises an expanded material. In at least some examples, the sealing bead 426 comprises polyurethane. The sealing bead 426 may comprise expanded polyurethane foam, which can be robotically applied. In other examples, the sealing bead 426 can comprise a different expanded material that can be robotically applied as a bead. The average cross-sectional diameter of the sealing bead 426 can be at least $20mm^2$, for example.

The illustrated edge-mounted sealing bead 426 protects a larger portion of the latch apparatus 400 than would be possible using an adhesive sealing pad. The compressibility and diameter of the bead 426 also promote a continuous seal, with good tolerance for mounting on curved/angled surfaces.

The illustrated sealing bead 426 at least partially surrounds the striker guide 440, as well as the plate layer 444. The whole of the striker guide 440 and the whole of the plate layer 444 are protected from descending water. Effectively, the ECC 442 and the sealing bead 426 together form a sealed shroud/hood to protect the striker guide 440 and the plate layer 444.

In some examples, the sealing bead 426 comprises a single-shot bead extending along the first and second edges 428, 430 of the housing arrangement 422. This avoids the possibility of a small gap at the interfaces between multiple beads.

The sealing bead 426 may have variable cross-sectional area. The sealing bead 426 may be locally thickened above the latch throat. In an implementation, the sealing bead 426 is locally thickened at the vertex 434 to reduce sensitivity to manufacturing tolerance, and because the vertex 434 may be the wettest part. The vertex 434 may be exposed to larger amounts of water because the inboard corner 486 of the door cavity 482, against which the vertex 434 is abutted, may form a natural channel for water. Local thickening refers to an increased cross-sectional area of the sealing bead 426, relative to the average cross-sectional area of the sealing bead 426 along the whole bead length. The local thickening may be achieved by temporarily slowing down a robotic applicator at the vertex 434.

Additionally, or alternatively, the sealing bead 426 has a greater average cross-sectional area along the first edge 428 than along the second edge 430. For example, on the shut face side (438), the average cross-sectional area

can be a value between 15-50 mm^2 (or other) while on the J-plane side (436) it is 1.5 to 10 times greater. The shut face side section is smaller to make it easier for an operator to compress the latch apparatus 400 against the shut face 488 enough to start hand-tightening fixings (e.g., 446A-446C).

In some examples, the locally thickened part of the sealing bead 426 has an even greater cross-sectional area than the already-thick average cross-sectional area of the sealing bead 426 along the second edge 430.

In FIG. 3, the sealing bead 426 extends to below the level of the latch throat 424, but does not form a closed shape. In FIG. 3, but not necessarily in all examples, the sealing bead 426 defines an open shape (non-enclosed shape) such as an arch shape with a gap 454 between the lower ends 450, 452 of the sealing bead 426. The gap 454 enables water to drain out of the enclosed portion 426, 440, 444 of the housing arrangement 422. Therefore, if any water enters the latch apparatus 400, it can drain out.

In FIG. 3, one end 450 of the sealing bead 426 is at a lower portion of the second edge 430. The other end 452 of the sealing bead 426 is at a lower portion of the first edge 428.

The gap 454 refers to the area below the ends 450, 452 of the sealing bead 426. The gap 454 is below the level of the latch throat 424 and striker opening 480. The lengths of the left and right tails of the sealing bead 426 have been extended down past the latch throat 424 to make sure the ends 450, 452 of the sealing bead 426 are always below the bottom of the latch throat 424, taking into account the most extreme packaging angle of the latch into a door 14, the maximum pitch and roll the vehicle 10 is designed for, and a possible further margin of error. The characteristic maximum pitch and roll of the vehicle 10 may be at least 18 degrees, for an off-road capable vehicle. For a vehicle pitch/roll angle below this maximum, the ends 450, 452 of the sealing bead 426 remain below a level of a bottom edge 425 of the latch throat 424.

The bottom edge 425 of the latch throat 424 refers to the lowermost one of a pair of edges in the first face 436 defining an entrance of the latch throat 424, when the latch apparatus 400 is installed in a door 14, taking into account the packaging angle of the latch apparatus 400.

In an example, the ends 450, 452 of the sealing bead 426 extend past the bottom edge 425 of the latch throat 424 by an overlap length of at least 20mm along the z-axis of the latch apparatus 400.

In some examples, the overlap length of one of the ends 452 is greater than the overlap length of the other of the ends 450. For example, a second end 452 can have an overlap length L_1 greater than 35mm, and a first end 450

can have an overlap length L_0 less than 35mm. The difference between L_1 and L_0 may be at least 5mm or at least 10mm.

As mentioned earlier, the housing arrangement 422 may be configured to house various mechanisms. Some of these mechanisms may be mechanically connected to actuators outside the housing arrangement 422, for example, by Bowden cables. Therefore, openings 456, 464 in the housing arrangement 422 for receiving mechanical connectors such as Bowden cables can provide a possible point of entry for water.

For example, FIG. 3 illustrates an interior release cable opening 456 in the ECC 442 which is not within the space protected by the sealing bead 426. The interior release cable opening 456 is configured to receive an end portion of a mechanism (e.g., interior release cable) connected to an actuator 489 of an interior release mechanism (not shown), such as an interior door handle. The interior release cable may be actuated in dependence on user actuation of the interior door handle 489.

FIG. 5 illustrates an example of the end portion 4560 of an interior release cable 470. The interior release cable 470 comprises a Bowden cable 472 configured to attach to a mechanism within the ECC 442, and the end portion 4560 comprises an interior release cable end abutter configured to fit against the interior release cable opening 456 to seal the opening 456. The interior release cable end abutter 4560 is secured to an end region of the interior release cable 470. The mechanism could be different in other examples.

The interior release cable end abutter 4560 and the interior release cable opening 456 may have corresponding shapes to avoid gaps therebetween when secured to each other. The interior release cable end abutter 4560 of FIG. 5 comprises a moulded plug comprising a first portion and a second angled portion. The interior release cable 470 extends through the second portion to an interior side of the first portion, at an interior of the housing arrangement 422.

FIGS. 7 and 8 illustrate the interior release cable end abutter 4560 of FIG. 5 secured to the interior release cable opening 456. The interior release cable end abutter 4560 conforms to the shape of the interior release cable opening 456.

As shown in FIG. 3, one or more perimeter edges 460, 462 of the interior release cable opening 456 can each comprise a further sealing bead 458 extending along the edges 460, 462, to seal against the interior release cable end abutter 4560 and prevent moisture ingress.

The further sealing bead 458 may comprise the same type of sealant material as the aforementioned sealing bead 426. The further sealing bead 458 may have a smaller cross-section than the sealing bead 426.

In another example, the further sealing bead 458 is applied to the interior release cable end abutter 4560 instead of to the edges 460, 462 of the interior release cable opening 456.

As shown in FIG. 5, the interior release cable end abutter 4560 can optionally comprise fasteners 4562A-4562D configured to bias the interior release cable end abutter 4560 against the interior release cable opening 456. This improves the seal. The illustrated fasteners 4562A-4562D comprise cantilever snap-fit fasteners. Other fasteners could be used in other examples. In other examples, the fasteners 4562A-4562D are formed at the edges 460, 462 of the interior release cable opening 456 instead.

FIG. 4 illustrates the back of the ECC 442 which reveals a further opening 464 not within the space protected by the aforementioned sealing beads 426, 458. The further opening 464 may comprise a lock cable opening 464 configured to receive an end portion of a mechanism (e.g., lock cable) connected to a lock actuator 492 of a key barrel locking system, such as a key barrel. The lock cable may be actuated in dependence on user actuation of a key barrel 492 by a physical key.

In some examples, a key barrel locking system is only present on the latch apparatus 400 for the front door 14, e.g., only for the driver's door. The latch apparatus 400 for other side doors 12 not having a key barrel may not comprise this lock cable opening 464.

FIG. 6 illustrates an example of the end portion 4640 of a lock cable 474. The lock cable 474 comprises a Bowden cable 476 configured to transmit force to an internal lock mechanism within the ECC 442, and the end portion 4640 comprises a lock cable end abutter configured to fit against the lock cable opening 464 to seal the opening. The mechanism could be different in other examples.

The lock cable end abutter 4640 and the lock cable opening 464 may have corresponding shapes to avoid gaps therebetween when secured to each other. The lock cable end abutter 4640 of FIG. 6 comprises a moulded plug. The lock cable 474 extends through an opening of the lock cable end abutter 4640 to an interior side of the lock cable end abutter 4640, at an interior of the housing arrangement 422.

FIG. 8 illustrates the end abutter of FIG. 6 secured to the lock cable opening 464. The lock cable end abutter 4640 conforms to the shape of the lock cable opening 464.

As shown in FIG. 4, an outer edge 466 of the lock cable opening 464 can comprise a lock cable sealing bead 468 extending around the perimeter edge 466 of the lock cable opening 464, to seal against the lock cable end abutter 4640 and prevent moisture ingress. The lock cable sealing bead 468 may comprise the same type of sealant material as the aforementioned sealing beads 426, 458. The lock cable sealing bead 468 may have a small cross-section similar to that of the sealing bead 458 of the interior release cable opening 456.

In another example, the lock cable end abutter 4640 comprises the lock cable sealing bead 468.

As shown in FIG. 6, the lock cable end abutter 4640 can optionally comprise fasteners 4642A, 4642B configured to bias the lock cable end abutter 4640 against the lock cable opening 464. This improves the seal. The illustrated fasteners 4642A, 4642B comprise hook fasteners configured to hook around receiving formations (not shown) at the edge 466 of the lock cable opening 464.

FIG. 7 illustrates the latch reinforcement structure 478. The latch reinforcement structure 478 can be a metal corner-shaped plate as illustrated. The striker opening 480 of the latch reinforcement structure 478 is shown. The striker opening 480 exposes the latch throat 424 so that the striker 300 can enter the latch throat 424. The illustrated striker opening 480 is corner-shaped, exposing both the entrance of the latch throat 424 and the whole striker slot 448. The latch reinforcement structure 478 protects the latch apparatus 400 against attempts at forced entry. FIG. 7 also illustrates the latch apparatus 400 concealed behind the latch reinforcement structure 478, with cables 470, 474 attached.

FIG. 8 illustrates the latch reinforcement structure 478 of FIG. 7 from the opposite side, within the door cavity 482 of the side door 14. The interior surface of the inner door panel 484 is visible in this illustration. An inner door panel 484 is shown, comprising the interior surface. An outer door panel of the side door 14 is not shown to avoid obstructing the view.

The latch reinforcement structure 478 is secured to the corner of the inner door panel 484, facing the shut face 488 and the J-plane 490. A corner radius of the latch reinforcement structure 478 can be dependent on a door radius between the shut face 488 and the J-plane 490. The latch reinforcement structure 478 conforms to the shape of the inner door panel 484. The latch apparatus 400 conforms to the shape of the latch reinforcement structure 478. They are corner-shaped. Various cables are shown attached.

The latch reinforcement structure 478 may be secured to the inner door panel 484 by a structural adhesive. The structural adhesive may provide a watertight seal. Additionally, or alternatively, the latch reinforcement structure 478 may be secured to the inner door panel 484 by rivets or spot welds, for structural integrity.

The inner door panel 484 may comprise a plastic material, for example. In other examples, the latch apparatus 400 and latch reinforcement structure 478 are applied to the outer door panel, which may be a metal panel.

In a further alternative example, the latch apparatus 400 is secured directly to the interior surface of the inner door panel 484, without an intervening latch reinforcement structure 478.

It will be appreciated that various changes and modifications can be made to the present invention without departing from the scope of the present application.

Although embodiments of the present invention have been described in the preceding paragraphs with reference to various examples, it should be appreciated that modifications to the examples given can be made without departing from the scope of the invention as claimed. For example, a latch apparatus 400 not having the sealing bead 426 may still comprise sealing beads 458, 468 for the lock cable opening 464 and/or interior release cable opening 456. In further examples, one or more of the opening(s) 456, 464 are for different mechanisms than the lock cable or the interior release cable.

Features described in the preceding description may be used in combinations other than the combinations explicitly described.

Although functions have been described with reference to certain features, those functions may be performable by other features whether described or not.

Although features have been described with reference to certain embodiments, those features may also be present in other embodiments whether described or not.

Whilst endeavoring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

CLAIMS

1. A side door latch apparatus for a vehicle, the side door latch apparatus comprising:

a housing arrangement comprising a plurality of latch components and a latch throat configured to receive a striker; and

a sealing bead extending around a portion of the housing arrangement comprising the latch throat to create a seal between a door cavity of a side door and the latch throat, wherein the sealing bead passes above the latch throat to, in use, divert descending liquid around the latch throat,

wherein the housing arrangement comprises a first face, a second nonparallel face, and a corner edge demarcating the first and second faces, and wherein the sealing bead extends along the first face, over the corner edge and along the second face, and the sealing bead is locally thickened where it extends over the corner edge relative to an average cross-sectional area of the sealing bead along each of the first and second faces.

2. The side door latch apparatus of claim 1, wherein the sealing bead defines an open shape partially surrounding the portion of the housing arrangement.

3. The side door latch apparatus of any preceding claim, wherein the sealing bead extends along a peripheral edge of a moulding of the housing arrangement.

4. The side door latch apparatus of any preceding claim, wherein the first face has a first edge and the second face has a second edge, wherein the first, second and corner edges extend, in use, upwardly and converge to meet at a vertex, and wherein the sealing bead extends along the first edge of the first face, over the vertex and along the second edge and the sealing bead is locally thickened at the vertex.

5. The side door latch apparatus of claim 4, wherein an average cross-sectional area of the sealing bead is greater along the first edge than along the second edge.

6. The side door latch apparatus of any preceding claim, wherein the portion comprises a first moulding comprising the latch throat, and wherein the housing arrangement comprises a second moulding comprising at least some of the latch components, and wherein the sealing bead is secured to the second moulding to at least partially surround the first moulding; optionally the housing arrangement comprises a reinforcing portion secured to the first moulding, so that the sealing bead further at least partially surrounds the reinforcing portion.

7. The side door latch apparatus of any preceding claim, wherein the sealing bead terminates at lower ends, wherein a gap between the lower ends enables liquid to drain out of the portion of the housing arrangement;

optionally the lower ends of the sealing bead are far enough below the latch throat that the lower ends remain below a level of the latch throat when the body of the vehicle and therefore the side door latch apparatus is at an angle at least up to 18 degrees.

8. The side door latch apparatus of any preceding claim, wherein the housing arrangement comprises an opening, different from the latch throat, configured to receive an end portion of a mechanism linking the side door latch apparatus to an actuator; and wherein the side door latch apparatus comprises a second sealing bead configured to extend at least partially around the opening of the housing arrangement.

9. The side door latch apparatus of claim 8, wherein the end portion of the mechanism is configured to cover the opening, and wherein the second sealing bead is configured to create a seal between the end portion of the mechanism and the housing arrangement.

10. The side door latch apparatus of claim 8 or claim 9, wherein the housing arrangement comprises a further opening, different from the latch throat and the opening, configured to receive an end portion of a further mechanism linking the side door latch apparatus to a further actuator; and wherein the side door latch apparatus comprises a further sealing bead configured to extend at least partially around the further opening of the housing arrangement.

11. The side door latch apparatus of claim 10, wherein the end portion of the further mechanism is configured to cover the further opening, and wherein the further sealing bead is configured to create a seal between the end portion of the further mechanism and the housing arrangement.

12. A side door latch apparatus for a vehicle, the side door latch apparatus comprising:

a housing arrangement comprising a plurality of latch components and a latch throat configured to receive a striker; and

a sealing bead extending around a portion of the housing arrangement comprising the latch throat to create a seal between a door cavity of a side door and the latch throat, wherein the sealing bead passes above the latch throat to, in use, divert descending liquid around the latch throat,

wherein the sealing bead terminates at lower ends having a gap therebetween, and

wherein each of the lower ends of the sealing bead is configured to extend at least 20 millimetres past a level of a bottom edge of the latch throat.

13. A vehicle comprising a side door latch apparatus according to any preceding claim.

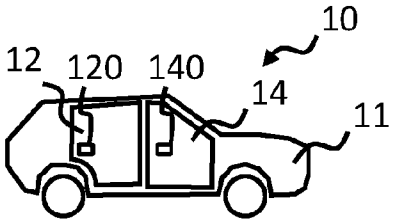


FIG. 1

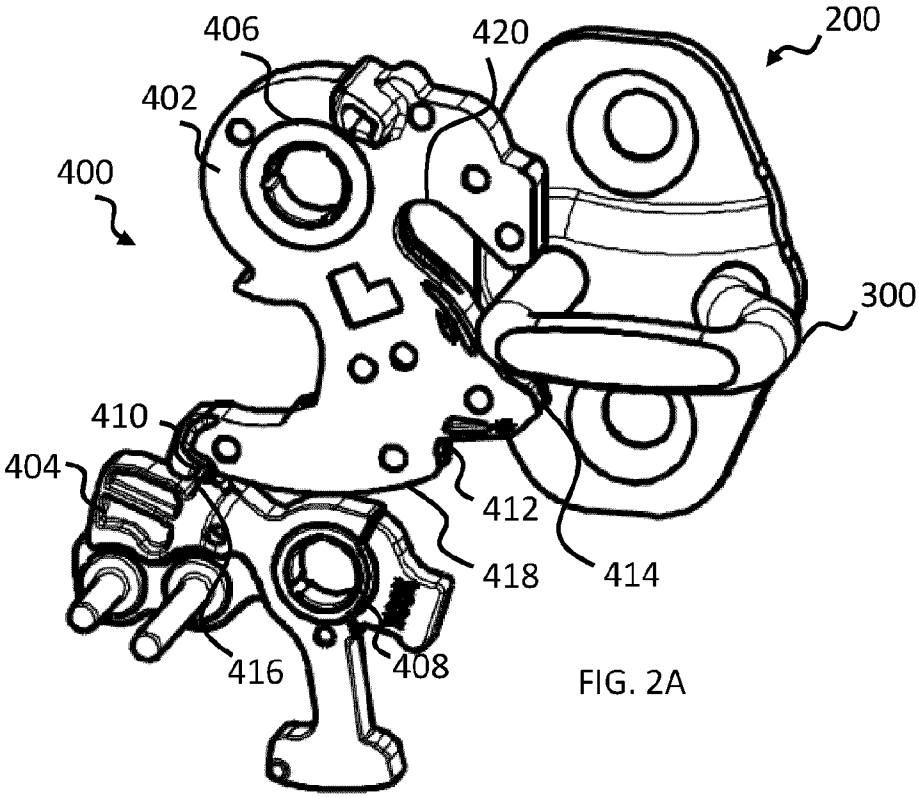


FIG. 2A

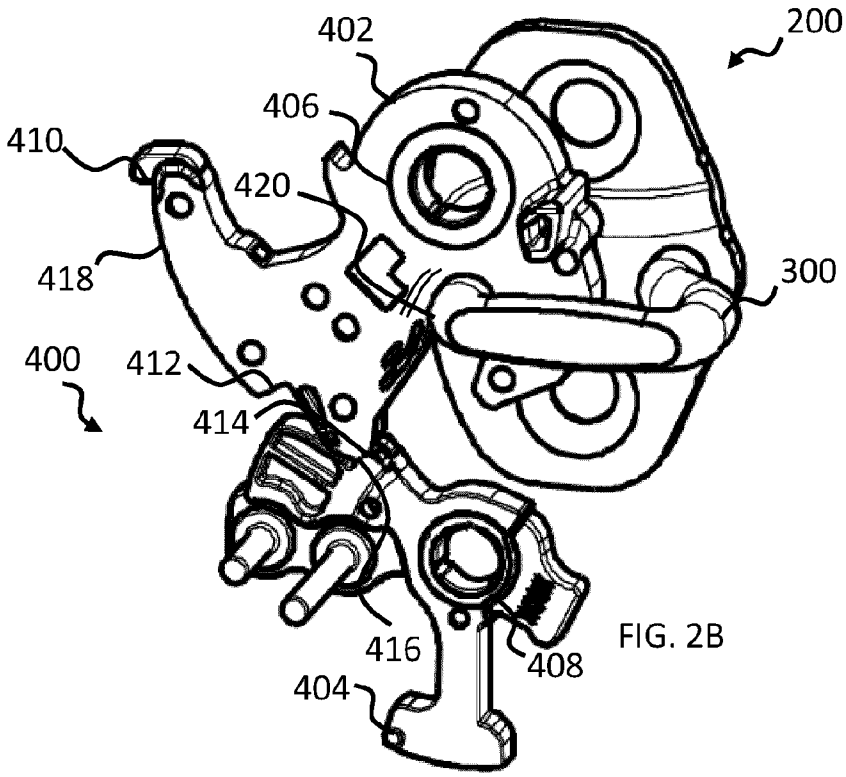


FIG. 2B

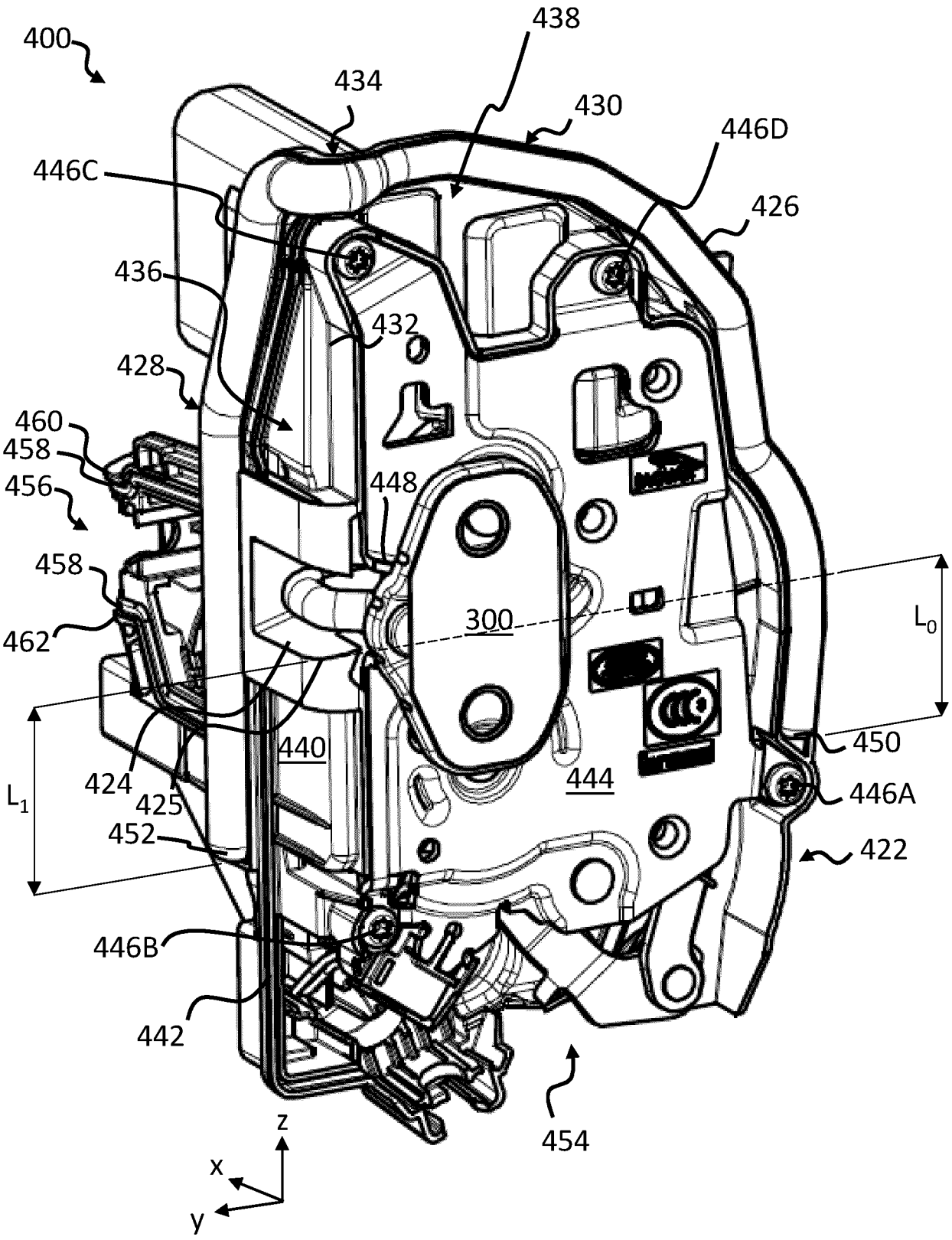

400
438
434
430
446D
446C
426
436
432
428
460
458
456
448
458
462
300
L_0
440
450
424
425
444
446A
L_1
452
422
446B
442
454
z
x
y

FIG. 3

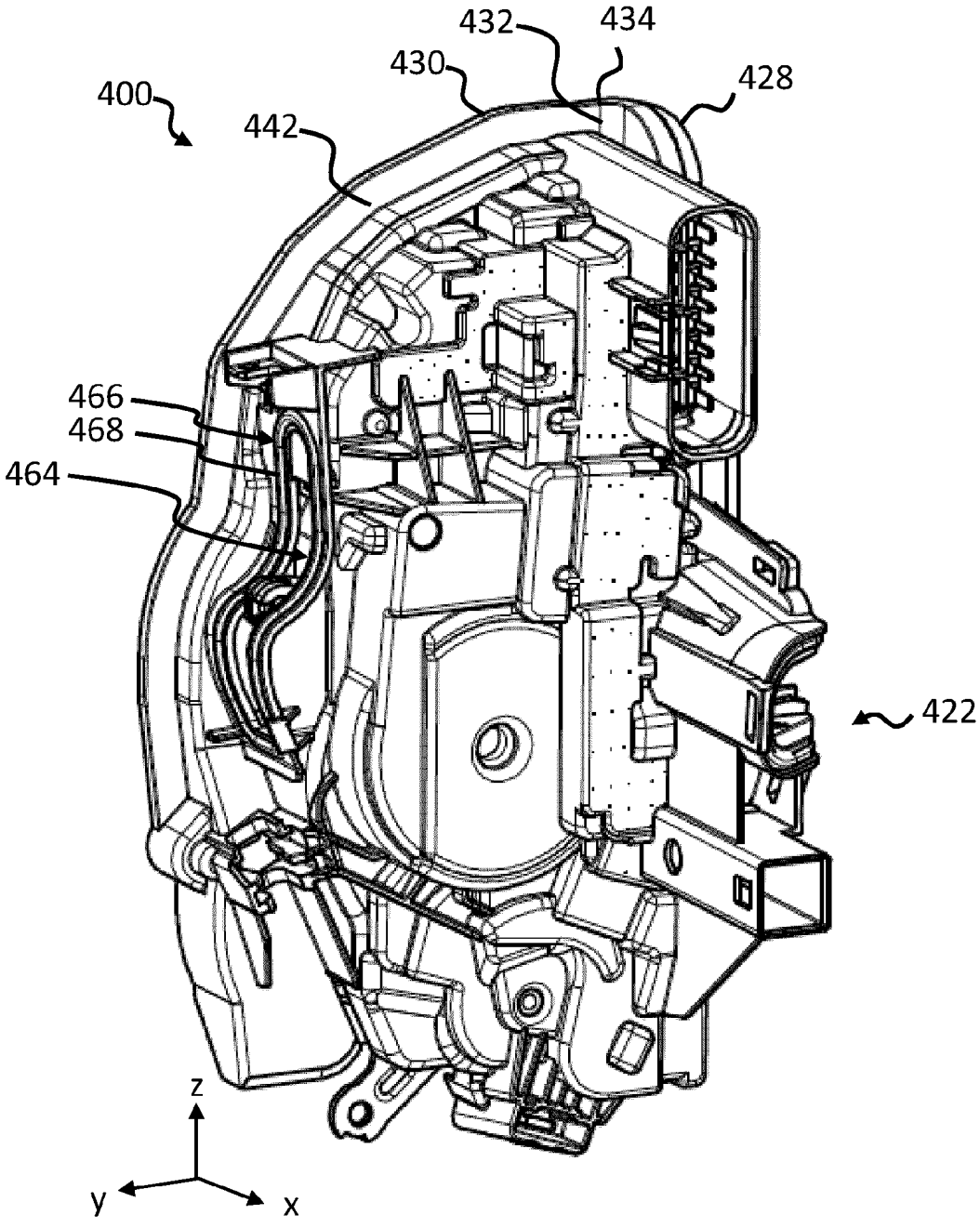


FIG. 4

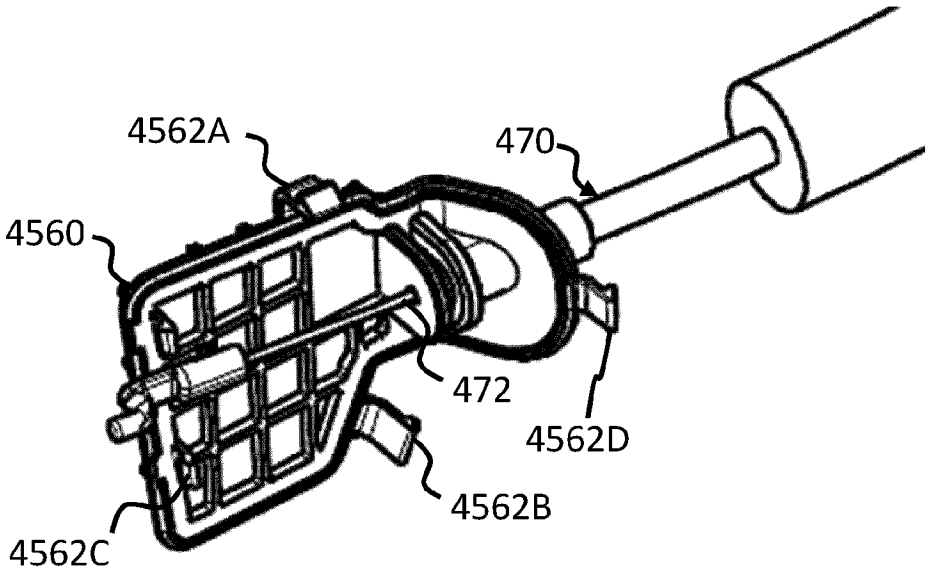

4562A
470
4560
472
4562D
4562B
4562C

FIG. 5

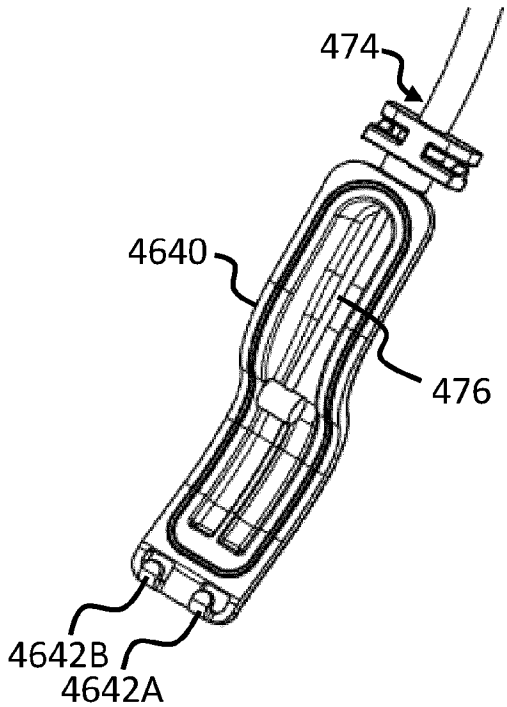

474
4640
476
4642B
4642A

FIG. 6

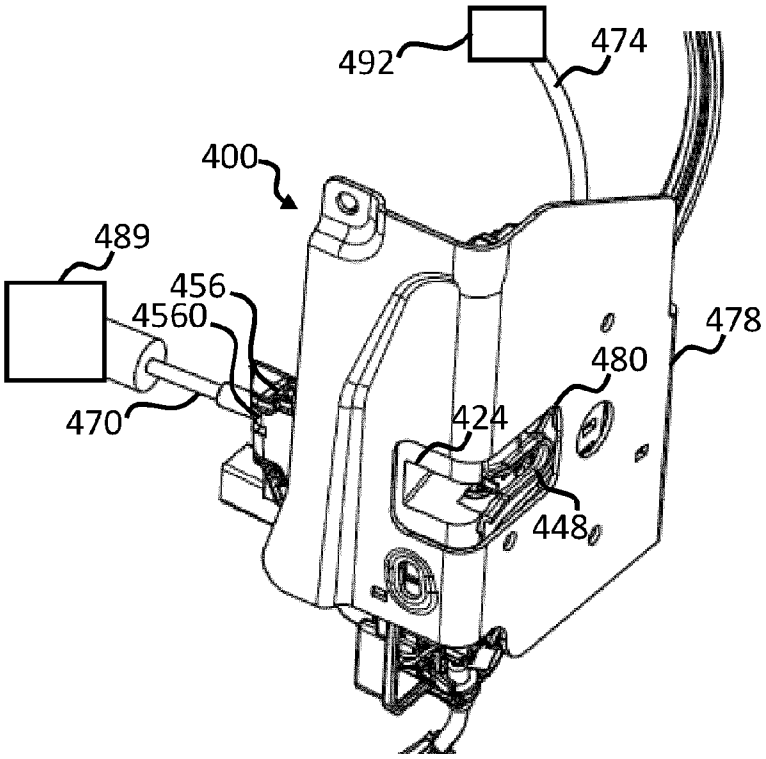

492
474
400
489
456
4560
478
480
470
424
448

FIG. 7

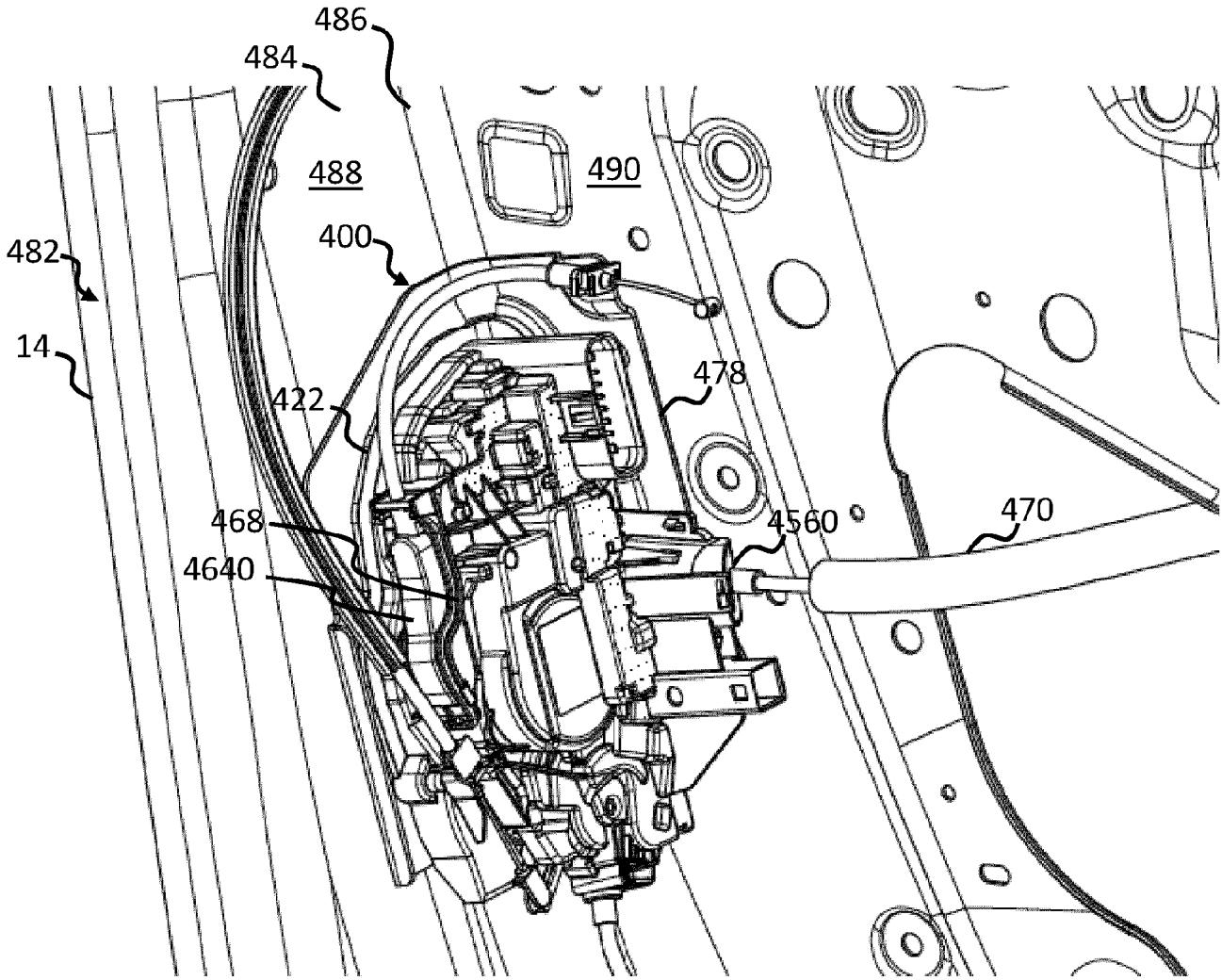

486
484
488
490
400
482
14
478
422
468
4640
4560
470

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2022/056454

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☒ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims;; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2022/056454

A. CLASSIFICATION OF SUBJECT MATTER
INV. E05B77/34 E05B85/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 528 747 A (MITSUI KINZOKU ACT CORP [JP]) 3 February 2016 (2016-02-03)	12,13
A	the whole document	1
A	WO 2015/072576 A1 (AISIN SEIKI [JP]) 21 May 2015 (2015-05-21) the whole document	1-11
A	JP 6 572486 B2 (MITSUI KINZOKU ACT CORP) 11 September 2019 (2019-09-11) the whole document	1,12
A	JP 2017 095954 A (AISIN SEIKI; AISIN KIKO CO LTD) 1 June 2017 (2017-06-01) the whole document	1,12

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 July 2022	18/07/2022

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Westin, Kenneth

3

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2022/056454

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2017/268264 A1 (SUZUMURA MAKOTO [JP] ET AL) 21 September 2017 (2017-09-21) the whole document	1-11
A	US 2013/199103 A1 (RASCHEGEWSKI PETER [DE] ET AL) 8 August 2013 (2013-08-08) the whole document	1-11
A	JP 6 320722 B2 (AISIN SEIKI; AISIN KIKO CO LTD) 9 May 2018 (2018-05-09) the whole document	1-11

3

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2022/056454

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2528747 A	03-02-2016	GB 2528747 A	03-02-2016
		JP 6361042 B2	25-07-2018
		JP 2015224457 A	14-12-2015
WO 2015072576 A1	21-05-2015	CN 205857987 U	04-01-2017
		WO 2015072576 A1	21-05-2015
JP 6572486 B2	11-09-2019	CN 107130865 A	05-09-2017
		JP 6572486 B2	11-09-2019
		JP 2017150285 A	31-08-2017
JP 2017095954 A	01-06-2017	JP 6352889 B2	04-07-2018
		JP 2017095954 A	01-06-2017
US 2017268264 A1	21-09-2017	US 2017268264 A1	21-09-2017
		WO 2016084786 A1	02-06-2016
US 2013199103 A1	08-08-2013	CN 103717817 A	09-04-2014
		DE 102010032744 A1	02-02-2012
		EP 2663424 A2	20-11-2013
		RU 2013105202 A	10-09-2014
		US 2013199103 A1	08-08-2013
		WO 2012013184 A2	02-02-2012
JP 6320722 B2	09-05-2018	JP 6320722 B2	09-05-2018
		JP 2014043769 A	13-03-2014

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-13

-

1.1. claims: 1-11(completely); 13(partially)

A side door latch apparatus for a vehicle with a sealing bead extending around a housing corner edge, whereby the sealing bead is locally thickened where it extends over the corner edge

1.2. claims: 12(completely); 13(partially)

A side door latch apparatus for a vehicle with a sealing bead creating a seal around a housing latch throat, whereby there is a gap between the lower ends of the bead and the ends of the bead extend >20mm below a lower edge of the latch throat

---