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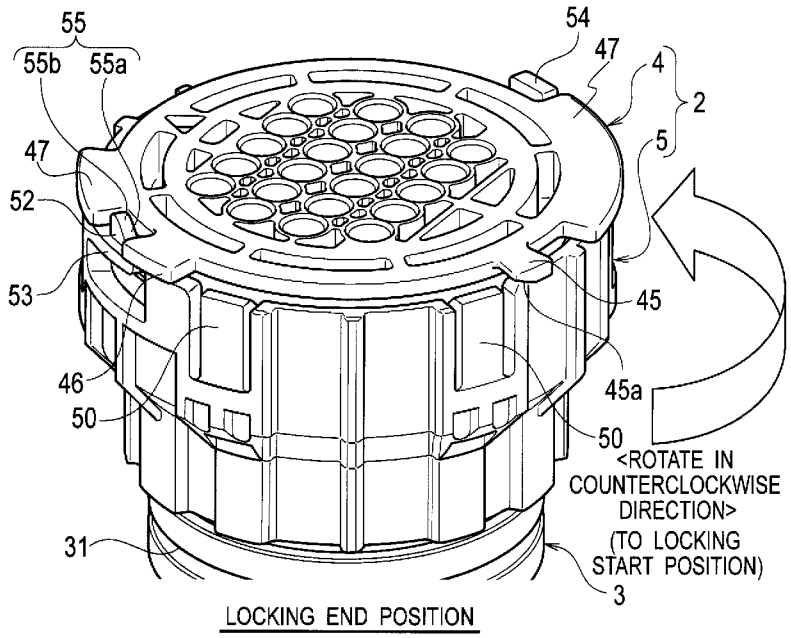
(54) **Title**: CONNECTOR



(57) **Abstract**: A connector (2) includes a male connector housing (4), and a bayonet ring (5) attached to the male connector housing (4) in a manner as to be rotatable between a locking start position and a locking end position of the connector. The bayonet ring (5) includes a locking arm (53) having a lock claw (52), the locking arm (53) being deflectable. The male connector housing (4) includes a first position regulation wall (45) that locks the lock claw (52) located in the locking start position, and a second position regulation wall (46) that locks the lock claw (52) located in the locking end position. The lock claw (52) has a locking surface (55) including a inclined surface (55a) linearly inclined to a base of the locking arm (53) and a curved surface (55b) located at the top portion of the lock claw (52) each at an unlocking direction side.

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Description

Title of Invention: CONNECTOR

Technical Field

[0001] The present invention relates to a connector having a bayonet structure to switch a locking state and an unlocking state between a pair of connectors with a weak operation force.

Background Art

[0002] A connector having a bayonet structure to switch a locking state and an unlocking state between a pair of connectors with a weak operation force, is conventionally known (refer to PTL 1).

[0003] As an example of such a conventional connector, a male connector 100 illustrated in Fig. 1 to Fig. 4 includes a male connector housing 110, and a bayonet ring (rotation member) 120 attached to the male connector housing 110 in a manner as to rotate between a locking start position and a locking end position of the connector.

[0004] The male connector housing 110 is provided with a plurality of terminal chambers 111 therein to accommodate male terminals (not illustrated). The male connector housing 110 is provided, at a rear edge, with a first position regulation wall 112 and a second position regulation wall 113 each projecting outward. A first lock wall surface 112a and a second lock wall surface 112b are each vertically formed on both sides of the first position regulation wall 112.

[0005] The bayonet ring 120 is provided with a plurality of cam projections 121 on the inner wall adjacent to a front edge of the bayonet ring 120. The cam projections 121 can engage with cam grooves 202 provided on a female connector housing 201 of a mating female connector 200. The bayonet ring 120 is provided, at the rear edge, with a locking arm 123 which can be deflected by a cantilever structure and provided with a lock claw 122, and an excessive rotation regulation projection 124. The lock claw 122 has a locking surface 122a that sequentially comes into contact with the second position regulation wall 113 and the first position regulation wall 112 of the male connector housing 110 when the bayonet ring 120 is rotated in an unlocking direction. The locking surface 122a is curved outward.

[0006] When the bayonet ring 120 is located in the locking end position, the second position regulation wall 113 locks the lock claw 122 as illustrated in Fig. 4(a). Once the bayonet ring 120 is rotated in the unlocking direction, the second position regulation wall 113 comes into contact with the locking surface 122a of the lock claw 122, thereby deflecting the locking arm 123 as illustrated in Fig. 4(b). The second position regulation wall 113 is then allowed to pass over the lock claw 122.

[0007] In the configuration described above, the male terminals are accommodated in the terminal chambers 111 of the male connector 100, and female terminals are accommodated in terminal chambers (not illustrated) of the mating female connector 200. The male connector housing 110 is set in the locking start position with respect to the female connector housing 201 in a manner as to position the cam projections 121 at entrances of the cam grooves 202, followed by rotating the bayonet ring 120 from the locking start position to the locking end position (namely, in a locking direction). The lock claw 122 then sequentially passes across the first position regulation wall 112 and the second position regulation wall 113 due to the deflection of the locking arm 123, so that the lock claw 122 moves to the locking end position. As a result, as illustrated in Figs. 5 and 6, the second position regulation wall 113 regulates the rotation of the lock claw 122 so as to hold the lock claw 122. In association with the movement of the lock claw 122, the male connector housing 110 and the female connector housing 201 move to the locking end position, and the cam projections 121 of the male connector housing 110 move along the cam grooves 202 of the female connector housing 201. Accordingly, the male connector 100 locks with the female connector 200, so that the male terminals are electrically connected to the female terminals.

[0008] When the bayonet 120 is rotated from the locking end position to the locking start position (namely, in the unlocking direction), the lock claw 122 sequentially passes across the second position regulation wall 113 and the first position regulation wall 112 due to the deflection of the locking arm 123, and thereby moves to the locking start position. As a result, the male connector housing 110 and the female connector housing 201 shift to the locking start position. At this point, the first position regulation wall 112 regulates the rotation of the lock claw 122 so as to hold the lock claw 122.

[0009] The connector according to the conventional example is desired to keep the bayonet ring 120 in the locking end position illustrated in Fig. 5 and Fig. 6 more stably because the connector is used under strong vibration condition and the like.

Citation List

Patent Literature

[0010] PTL 1: US 6811423 B2

Summery of Invention

[0011] The male connector 100 of the conventional example is provided with the locking surface 122a curved outward, which comes into contact with the second position regulation wall 113. Since the lock claw 122 is biased by reaction force applied to the locking surface 122a from the second position regulation wall 113, the lock claw 122 easily moves in the unlocking direction. Further, as illustrated in Figs. 4(a) and 4(b), the inclined angle I of the locking surface 122a to the moving direction of the second

position regulation wall 113 in the state where the locking arm 123 is not deflected, is approximately equal to the inclined angle J of the locking surface 122a in the state where the locking arm 123 is deflected. This also allows the lock claw 122 to easily move in the unlocking direction. This easy movement limits the ability to keep the bayonet ring 120 in the locking end position.

[0012] The increase of the inclined angle of the locking surface 122a may keep the bayonet ring 120 in the locking end position more stably. However, if the inclined angle of the locking surface 122a excessively increases; for example, if the inclined angle increases to a right angle, the possibility that the locking arm 123 is damaged increases.

[0013] The present invention has been made in view of the above-described problem. It is an object of the present invention to provide a connector capable of preventing damage to a locking arm provided in a rotation member and keeping the rotation member in a locking end position more stably.

[0014] A connector according to a first aspect of the present invention includes: a connector housing for accommodating one or more terminals; a rotation member attached to the connector housing in a manner as to be rotatable between a locking start position and a locking end position of the connector; a locking arm provided in the rotation member and including a lock claw having a locking surface, an unlocking direction side of the locking surface including a inclined surface linearly inclined to a base of the locking arm and a curved surface located at a top of the lock claw and formed in curved shape, the locking arm being deflectable; a first position regulation wall provided in the connector housing to lock the lock claw when the rotation member is located in the locking start position; and a second position regulation wall provided in the connector housing to lock the lock claw when the rotation member is located in the locking end position. In the state where the connector housing is set in the locking start position with respect to a mating connector housing, the lock claw passes across the first position regulation wall and the second position regulation wall due to a deflection of the locking arm and moves to the locking end position when the rotation member is rotated from the locking start position to the locking end position, so that the connector housing and the mating connector housing move to the locking end position in association with the movement of the lock claw. The lock claw passes across the second position regulation wall and the first position regulation wall due to the deflection of the locking arm and moves to the locking start position when the rotation member is rotated from the locking end position to the locking start position, so that the connector housing and the mating connector housing move to the locking start position in association with the movement of the lock claw.

[0015] A locking wall surface of the first position regulation wall that comes into contact with the locking arm when the rotation member is rotated from the locking end

position to the locking start position, is preferably formed in a tapered shape.

[0016] In the connector according to the first aspect of the present invention, the locking surface of the lock claw has the inclined surface that comes into contact with the second position regulation wall when the rotation member is rotated in the unlocking direction from the locking end position. Since the second position regulation wall presses the edge thereof into the locking surface, it is possible to keep the rotation member in the locking end position more stably without increasing a inclined angle of the locking surface. Further, due to the inclined surface provided in the locking surface, the inclined angle of the inclined surface changes to increasing with increasing of deflected level of the lock claw. This also contributes to keeping the rotation member in the locking end position more stably without increasing the inclined angle in the state in which the lock claw is not deflected. Moreover, the curved surface at the top of the locking surface of the lock claw allows the second position regulation wall to smoothly pass over the lock claw, which provides a sense of completion of engagement. Once the second position regulation wall passes over the lock claw, the second position regulation wall surely makes a sound when the deflection of the lock claw is released and the lock claw thus returns to the initial position, which provides an operator with a stable unlocking operability of the connector.

Brief Description of Drawings

[0017] [fig.1]Fig. 1 is an exploded perspective view of a male connector and a female connector in a conventional example.

[fig.2]Fig. 2(a) is a front view of a male connector housing in the conventional example, and Fig. 2(b) is an enlarged front view of the part of G in Fig. 2(a).

[fig.3]Fig. 3(a) is a front view of a rotation member in the conventional example, and Fig. 3(b) is an enlarged front view of the part of H in Fig. 3(a).

[fig.4]Fig. 4(a) illustrates a state where a second position regulation wall of the male connector housing comes into contact with a lock claw of the rotation member in the conventional example, and Fig. 4(b) illustrates a state where a locking arm is deflected when the second position regulation wall of the male connector housing comes into contact with the lock claw of the rotation member in the conventional example.

[fig.5]Fig. 5 illustrates the rear end of the male connector housing and the rotation member in the conventional example.

[fig.6]Fig. 6(a) is a front view of the male connector housing and the rotation member in the conventional example, and Fig. 6(b) is an enlarged front view of the part of K in Fig. 6(a).

[fig.7]Fig. 7 is an exploded perspective view of a connector device according to an embodiment.

[fig.8]Fig. 8(a) is a front view of a male connector housing according to the embodiment, and Fig. 8(b) is an enlarged front view of the part of A in Fig. 8(a).

[fig.9]Fig. 9(a) is a front view of a rotation member according to the embodiment, and Fig. 9(b) is an enlarged front view of the part of B in Fig. 9(a).

[fig.10]Fig. 10 is a front perspective view of the male connector housing and the rotation member according to the embodiment.

[fig.11]Fig. 11 is a rear perspective view of the male connector housing and the rotation member according to the embodiment.

[fig.12]Fig. 12 is a perspective view illustrating a state where a front holder is to be attached to the male connector housing according to the embodiment.

[fig.13]Fig. 13 is a perspective view of a male connector completed as a final harness product according to the embodiment.

[fig.14]Fig. 14 is a perspective view illustrating a state where the rotation member is located in a locking start position according to the embodiment.

[fig.15]Fig. 15 is a perspective view illustrating a state where the rotation member is located in a locking end position according to the embodiment.

[fig.16]Fig. 16 illustrates the rear end of the male connector housing and the rotation member according to the embodiment.

[fig.17]Fig. 17(a) is a front view of the male connector housing and the rotation member according to the embodiment, and Fig. 17(b) is an enlarged front view of the part of C in Fig. 17(a).

[fig.18]Fig. 18(a) is an explanatory view of a locking arm and a lock claw of the rotation member, Fig. 18(b) is a view illustrating a state where a second position regulation wall of the male connector housing comes into contact with the lock claw of the rotation member, Fig. 18(c) is an enlarged view of the part of E in Fig. 18(b), and Fig. 18(d) is a view illustrating a state where the locking arm is deflected when the second position regulation wall of the male connector housing comes into contact with the lock claw of the rotation member.

[fig.19]Fig. 19(a) is an explanatory view of the lock claw of the rotation member and the second position regulation wall of the male connector housing, Fig. 19(b) is a view illustrating a state where the lock claw is engaging with the second position regulation wall of the male connector housing, and Fig. 19(c) is a view illustrating a state where the engagement of the lock claw with the second position regulation wall is completed.

Description of Embodiments

[0018] An embodiment of the present invention will be explained below with reference to the drawings.

[0019] Fig. 7 to Fig. 19 illustrate the embodiment of the present embodiment.

[0020] As illustrated in Fig. 7, a connector device 1 includes a male connector 2 serving as a connector according to the embodiment, and a female connector 3 serving as a mating connector. The male connector 2 includes a male connector housing 4, and a bayonet ring 5 that is a rotation member. The bayonet ring 5 is attached to the male connector housing 4 in a manner as to rotate between a locking start position and a locking end position of the connector. Here, the locking start position of the connector is a position where the male connector 2 is unlocked with the female connector 3 via the bayonet ring 5. The locking end position of the connector is a position where the male connector 2 is locking with the female connector 3 via the bayonet ring 5.

[0021] The male connector housing 4 accommodates a sealant 6. A front end of the female connector 3 comes into contact with the sealant 6 when the female connector 3 locks with the male connector 2. The sealant 6 seals a gap between the male connector 2 and the female connector 3.

[0022] A front holder 41 is attached to a front end of the male connector housing 4. The inside of the male connector housing 4 is provided with a plurality of terminal chambers 44 each for accommodating a male terminal 43 crimped to a wire 42. A rear end of the male connector housing 4 is provided with a first position regulation wall 45 and a second position regulation wall 46 each laterally projecting to lock a lock claw 52 of a locking arm 53 provided on the bayonet ring 5. The rear end of the male connector housing 4 is provided with two excessive rotation regulation walls 47 each laterally projecting to come into contact with an excessive rotation regulation projection 54 of the bayonet ring 5.

[0023] As illustrated in Fig. 14, the first position regulation wall 45 locks the lock claw 52 when the male connector housing 4 and the bayonet ring 5 are placed in the locking start position. Then the bayonet ring 5 is located at the locking start position by the first position regulation wall 45. At this point, the bayonet ring 5 is positioned in a manner such that cam projections 51 of the bayonet ring 5 are located at entrances of cam grooves 32 of the female connector 3. As illustrated in Figs. 15 and 16, the second position regulation wall 46 locks the lock claw 52 when the male connector housing 4 and the bayonet ring 5 are located in the locking end position. Then the bayonet ring 5 is located at the locking end position by the second position regulation wall 46.

[0024] As illustrated in Figs. 8(a) and 8(b), the first position regulation wall 45 includes a first locking wall surface 45a formed in tapered shape and a second locking wall surface 45b formed in vertical. The locking arm 53 comes into contact with the first locking wall surface 45a when the bayonet ring 5 is rotated from the locking end position to the locking start position (namely, in an unlocking direction). The locking arm 53 is gradually deflected along the tapered shape of the first locking wall surface 45a in association with the relative movement between the locking arm 53 and the first

position regulation wall 45.

[0025] The bayonet ring 5 is provided, adjacent to the front end of the outer wall, with rotation supporting projections 50 projecting inward and located at certain intervals in the circumferential direction. The rotation supporting projections 50 enter a circumferential groove 40 provided on the periphery of the male connector housing 4. The bayonet ring 5 is rotatably supported by the male connector housing 4 in a manner such that the rotation supporting projections 50 slide along the circumferential groove 40.

[0026] The cam projections 51 are provided on the front of the inner wall of the bayonet ring 5. The cam projections 51 engage with the cam grooves 32 provided on a female connector housing 31 of the female connector 3. The rear end of the bayonet ring 5 is provided with the locking arm 53 which can be deflected by a cantilever structure and including the lock claw 52, and the excessive rotation regulation projection 54.

[0027] As illustrated in Figs. 9(a) and 9(b), the lock claw 52 includes a first locking surface 55 and a second locking surface 56 that come into contact with the first position regulation wall 45 and the second position regulation wall 46. The first locking surface 55 comes into contact with the first position regulation wall 45 and the second position regulation wall 46 when the bayonet ring 5 rotates in the unlocking direction from the locking end position. The first locking surface 55 includes an inclined surface 55a linearly formed at a base side, and a curved surface 55b integrated with the inclined surface 55a and located adjacent to the top of the first locking surface 55. The second locking surface 56 comes into contact with the first position regulation wall 45 and the second position regulation wall 46 when the bayonet ring 5 rotates from the locking start position to the locking end position (namely, in a locking direction). The second locking surface 56 is elongated vertically.

[0028] The female connector housing 31 of the female connector 3 is also provided with a plurality of terminal chambers (not illustrated) each for housing a female terminal (not illustrated).

[0029] The terminal chambers 44 of the male connector 2 accommodate the male terminals 43, and the terminal chambers of the female connector 3 accommodate the female terminals. The male connector housing 4 is set in the locking start position with respect to the female connector housing 31 in a manner such that the cam projections 51 are positioned at the entrances of the cam grooves 32.

[0030] The bayonet ring 5 rotates from the locking start position to the locking end position (in the clockwise direction indicated by the arrow in Fig. 14, namely, in the locking direction). The lock claw 52 sequentially passes across the first position regulation wall 45 and the second position regulation wall 46 due to the deflection of the locking arm 53, and the lock claw 52 thus moves to the locking end position. As illustrated in

Fig. 15, the second position regulation wall 46 prevents the rotation of the lock claw 52 so as to hold the lock claw 52. Further, the male connector housing 4 and the female connector housing 31 move to the locking end position in association with the movement of the lock claw 52. The cam projections 51 of the male connector housing 4 move along the cam grooves 32 of the female connector housing 31. As a result, the male connector 2 locks with the female connector 3, and the male terminals 43 are thus electrically connected to the female terminals.

[0031] When the bayonet ring 5 is rotated from the locking end position to the locking start position (in the counterclockwise direction indicated by the arrow in Fig. 15, namely, in the unlocking direction), the lock claw 52 engages with the second position regulation wall 46 as illustrated in Fig. 19(a), the lock claw 52 then passes across the first position regulation wall 46 due to the deflection of the locking arm 53 as illustrated in Fig. 19(b), and passes through the second position regulation wall 46 as illustrated in Fig. 19(c). The lock claw 52 further passes across the first position regulation wall 45, and thereby moves to the locking start position. As a result, the male connector housing 4 and the female connector housing 31 move to the locking start position. As illustrated in Fig. 14, the first position regulation wall 45 prevents the rotation of the lock claw 52 of the locking arm 53 so as to hold the lock claw 52.

[0032] According to the embodiment, when the bayonet ring 5 located in the locking end position rotates in the unlocking direction because of, for example, vibration during driving a vehicle, the inclined surface 55a located at the base side of the lock claw 52 comes into contact with the second position regulation wall 46 as illustrated in Fig. 18(b). Since the inclined surface 55a is formed linearly, an edge 46a of the second position regulation wall 46 bites the inclined surface 55a of the lock claw 52 as illustrated in Fig. 18(c). Thus, it is possible to keep the bayonet ring 5 in the locking end position more stably without increasing the inclined angle of the inclined surface 55a. Further, since the inclined surface 55a of the locking surface 55 is linear, the inclined angle of the inclined surface 55a changes to increasing with increasing of deflected level of the lock claw 52. That is, as illustrated in Figs. 18(b) and 18(d), an inclined angle F of the inclined surface 55a to the moving direction of the second position regulation wall 46 in the state where the locking arm 53 is deflected, is larger than an inclined angle D of the inclined surface 55a in the state where the locking arm 53 is not deflected. Such a configuration keeps the bayonet ring 5 in the locking end position more stably without increasing the inclined angle in the state in which the lock claw 52 is not deflected.

[0033] According to the embodiment, the curved surface 55b is located at the top of the locking surface 55 of the lock claw 52. The second position regulation wall 46 thus can smoothly pass over the lock claw 52 as illustrated in Fig. 19(b), which provides a sense

of completion of engagement. Further, once the second position regulation wall 46 passes over the lock claw 52, the second position regulation wall 46 surely makes a sound when the deflection of the lock claw 52 is released and the lock claw 52 thus returns to the initial position as illustrated in Fig. 19(c), which provides the operator with a stable unlocking operability of the connector.

[0034] According to the embodiment, since the first locking wall surface 45a of the first position regulation wall 45 is formed in tapered shape, the bayonet ring 5 can easily rotates in a manner such that the locking arm 53 is gradually deflected as the inclined surface 55a of the lock claw 52 moves along the tapered first locking wall surface 45a, when the locking arm 53 located in the position between the first position regulation wall 45 and the second position regulation wall 46 moves to return to the locking start position. Accordingly, the bayonet ring 5 can be rotated smoothly compared to the case where the locking wall surface of the first position regulation wall is vertically formed as in the case of the conventional example (PTL1: US 6811423 B2).

[0035] According to the embodiment, the locking surface of the lock claw 52 can be made fundamentally in a manner such that the curved surface indicated by the two-dot chain line illustrated in Fig. 18(a) (the locking surface of the lock claw of the conventional example) is changed to the inclined surface 55a indicated by the solid line illustrated in Fig. 18(a). Thus, the embodiment can be realized by slight changes of conventional dies. Here, a spring constant of the locking arm 53 may be possibly increased in order to keep the bayonet ring 5 more stably. However, such a case may require great changes of the conventional dies. Therefore, changing the shape of the locking surface of the lock claw 52 as in the case of the embodiment may be an inexpensive way compared to increasing the spring constant of the locking arm of the conventional example.

[0036] According to the embodiment, the locking surface 55 of the lock claw 52 also can be formed in a manner such that the locking surface of the lock claw of the conventional example indicated by the two-dot chain line illustrated in Fig. 18(a), is cut along the inclined surface 55a indicated by the solid line in Fig. 18(a). Since only simple process may be needed for the conventional example, the conventional example can be effectively utilized.

[0037] The embodiment exemplifies the case where the bayonet ring 5 that is the rotation member is attached to the male connector housing 4. However, the embodiment is not limited to this case, and the bayonet ring may be attached to the female connector housing.

Industrial Applicability

[0038] The present invention provides a connector capable of preventing damage to a

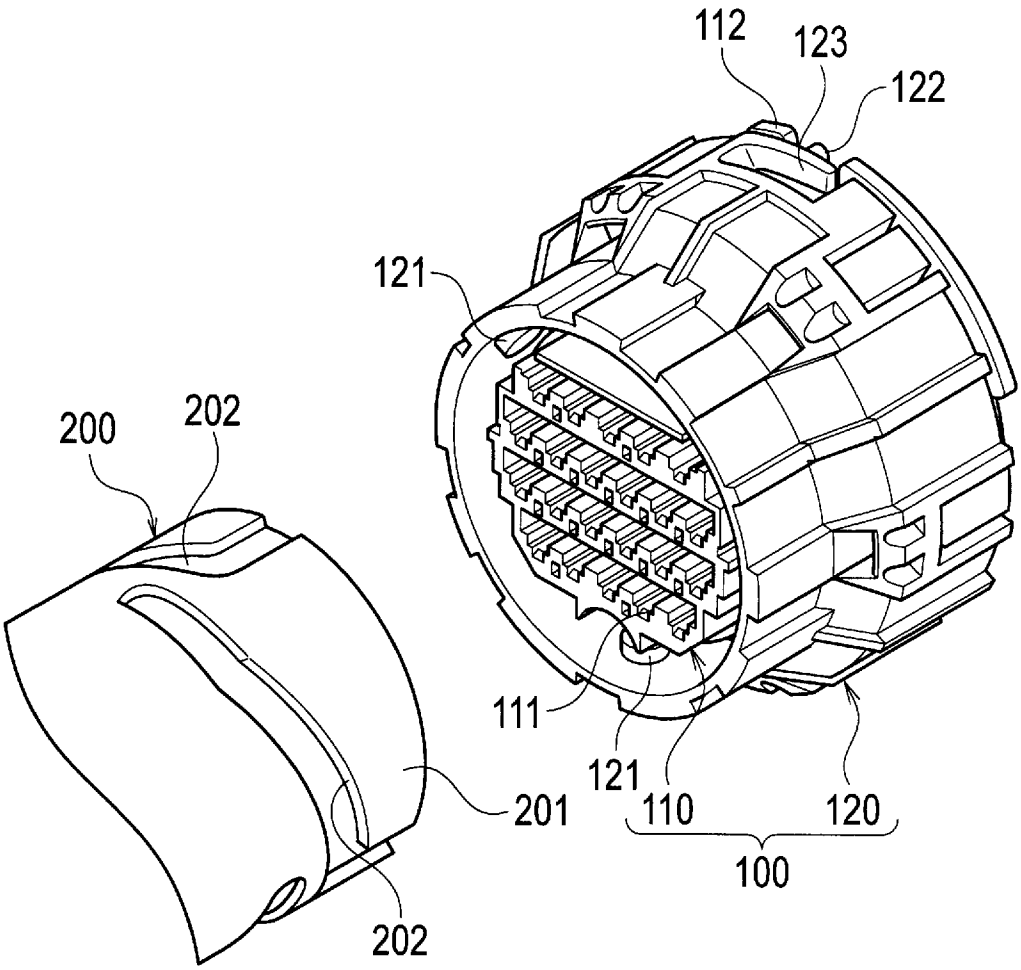
locking arm provided in a rotation member and keeping the rotation member in a locking end position of the connector more stably.

Claims

[Claim 1] A connector comprising:
a connector housing for accommodating one or more terminals;
a rotation member attached to the connector housing in a manner as to be rotatable between a locking start position and a locking end position of the connector;
a locking arm provided in the rotation member and including a lock claw having a locking surface, an unlocking direction side of the locking surface including a inclined surface linearly inclined to a base of the locking arm and a curved surface located at a top of the lock claw and formed in curved shape, the locking arm being deflectable;
a first position regulation wall provided in the connector housing to lock the lock claw when the rotation member is located in the locking start position; and
a second position regulation wall provided in the connector housing to lock the lock claw when the rotation member is located in the locking end position, wherein,
in the state where the connector housing is set in the locking start position with respect to a mating connector housing, the lock claw passes across the first position regulation wall and the second position regulation wall due to a deflection of the locking arm and moves to the locking end position when the rotation member is rotated from the locking start position to the locking end position, so that the connector housing and the mating connector housing move to the locking end position in association with the movement of the lock claw, and
the lock claw passes across the second position regulation wall and the first position regulation wall due to the deflection of the locking arm and moves to the locking start position when the rotation member is rotated from the locking end position to the locking start position, so that the connector housing and the mating connector housing move to the locking start position in association with the movement of the lock claw.

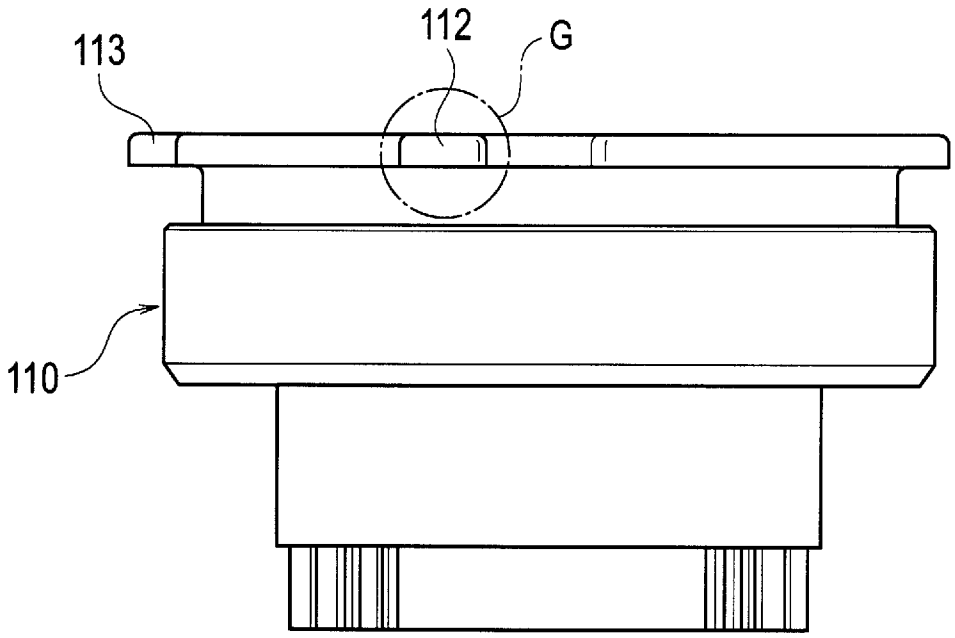
[Claim 2] The connector according to claim 1, wherein a locking wall surface of the first position regulation wall that comes into contact with the locking arm when the rotation member is rotated from the locking end position to the locking start position, is formed in a tapered shape.

[Fig. 1]

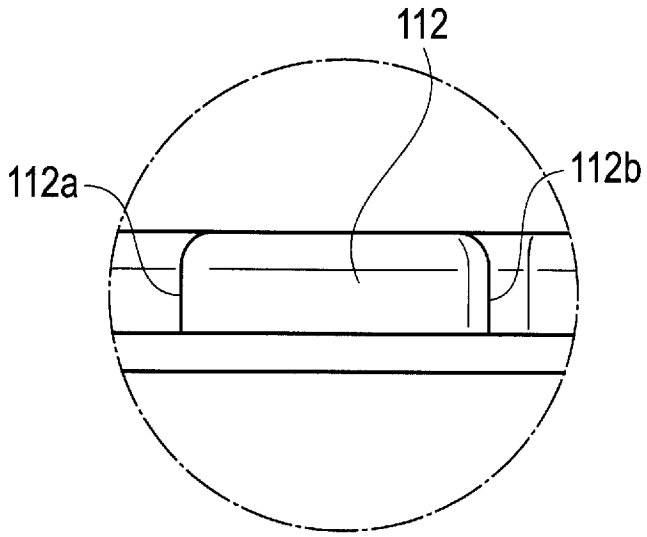


[Fig. 2]

(a)

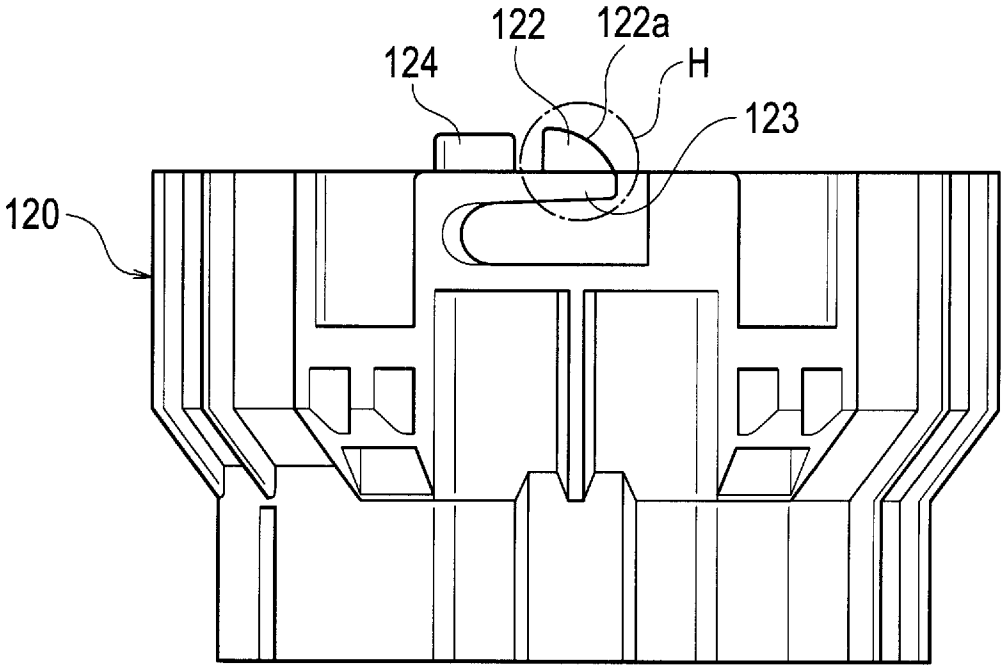


(b)

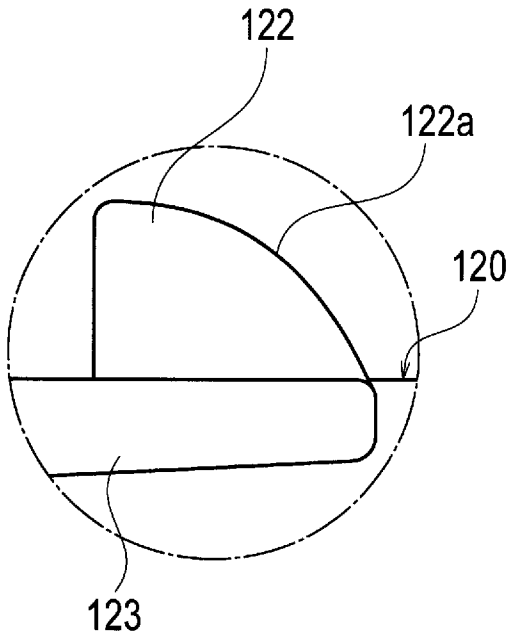


[Fig. 3]

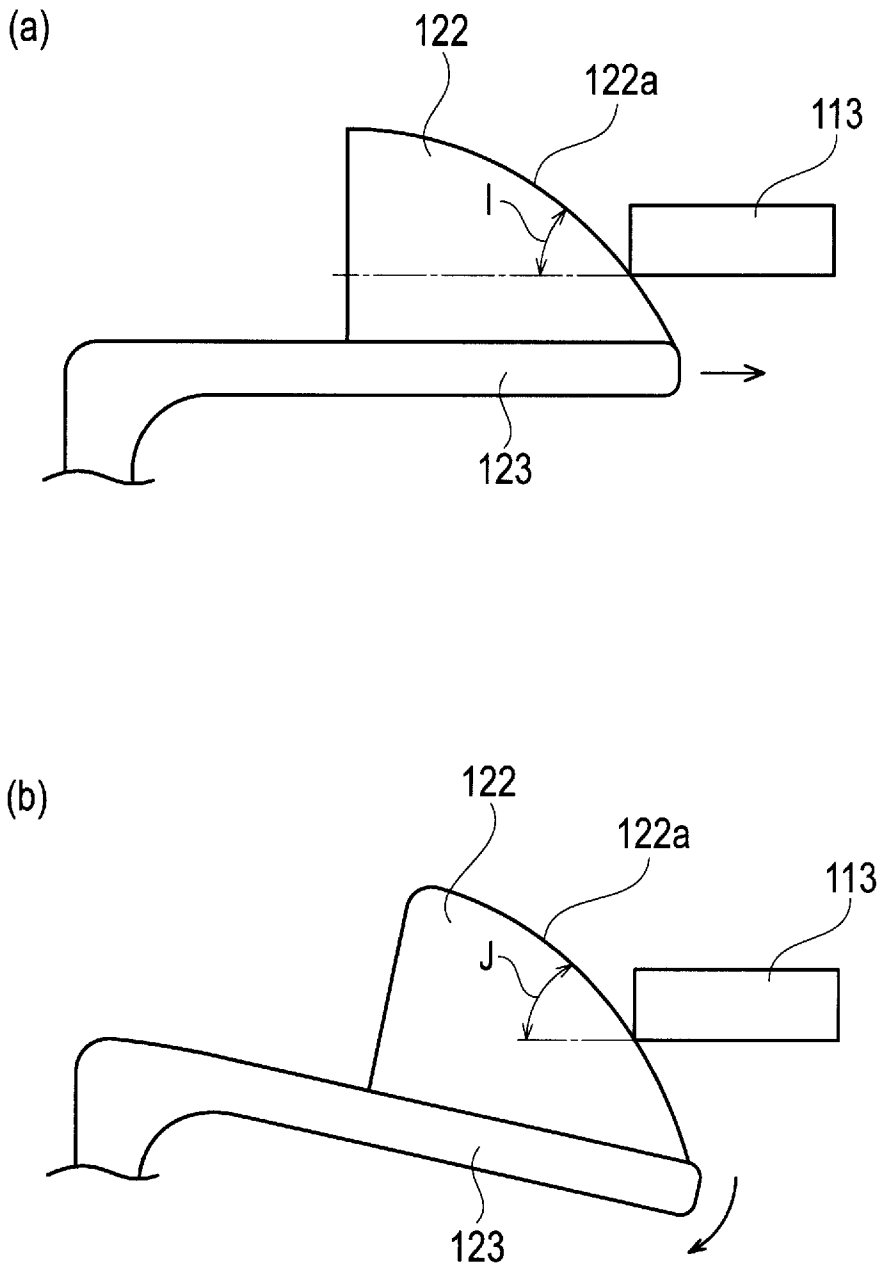
(a)



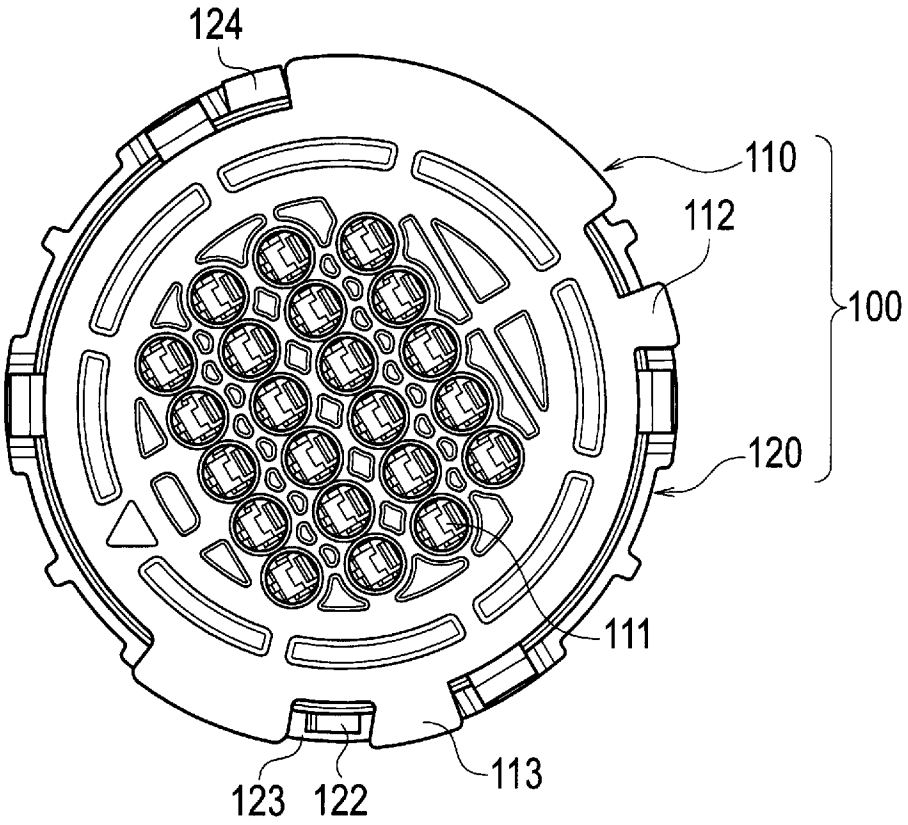
(b)



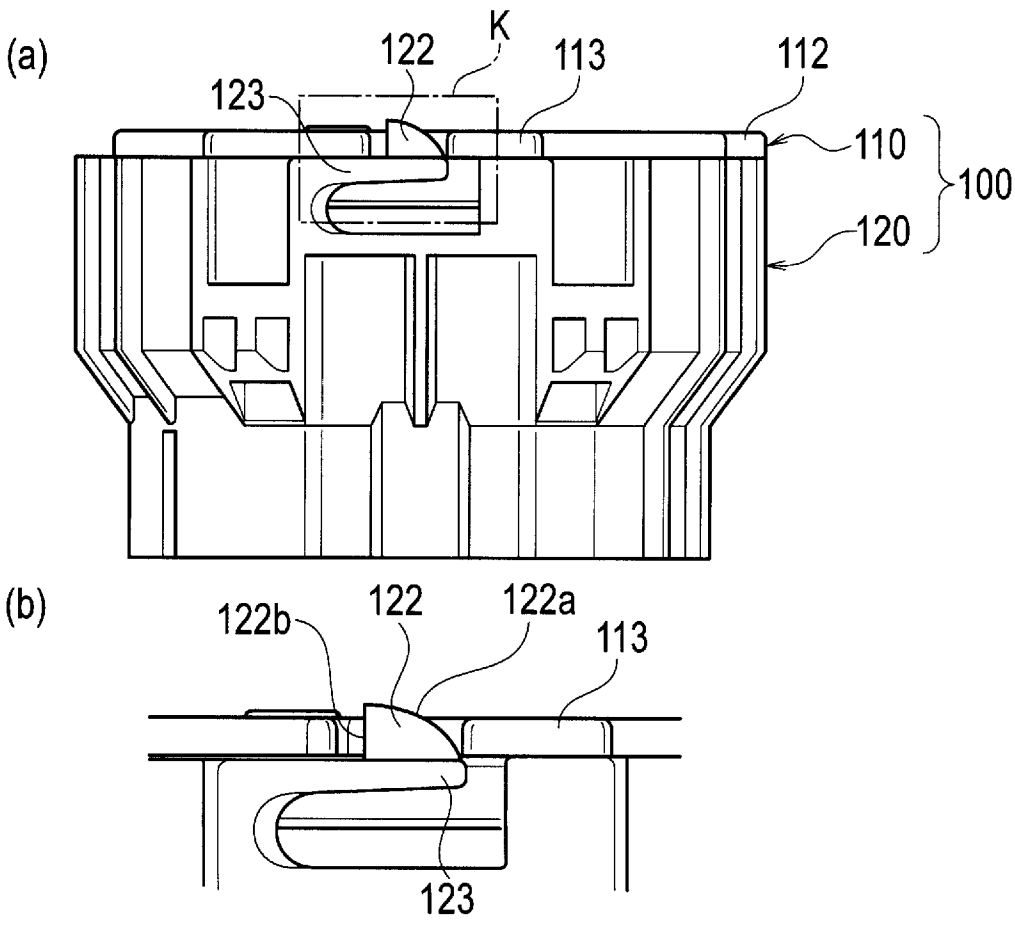
[Fig. 4]



[Fig. 5]


124
110
112
100
120
111
113
123
122

[Fig. 6]


(a)
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120
(b)
122b
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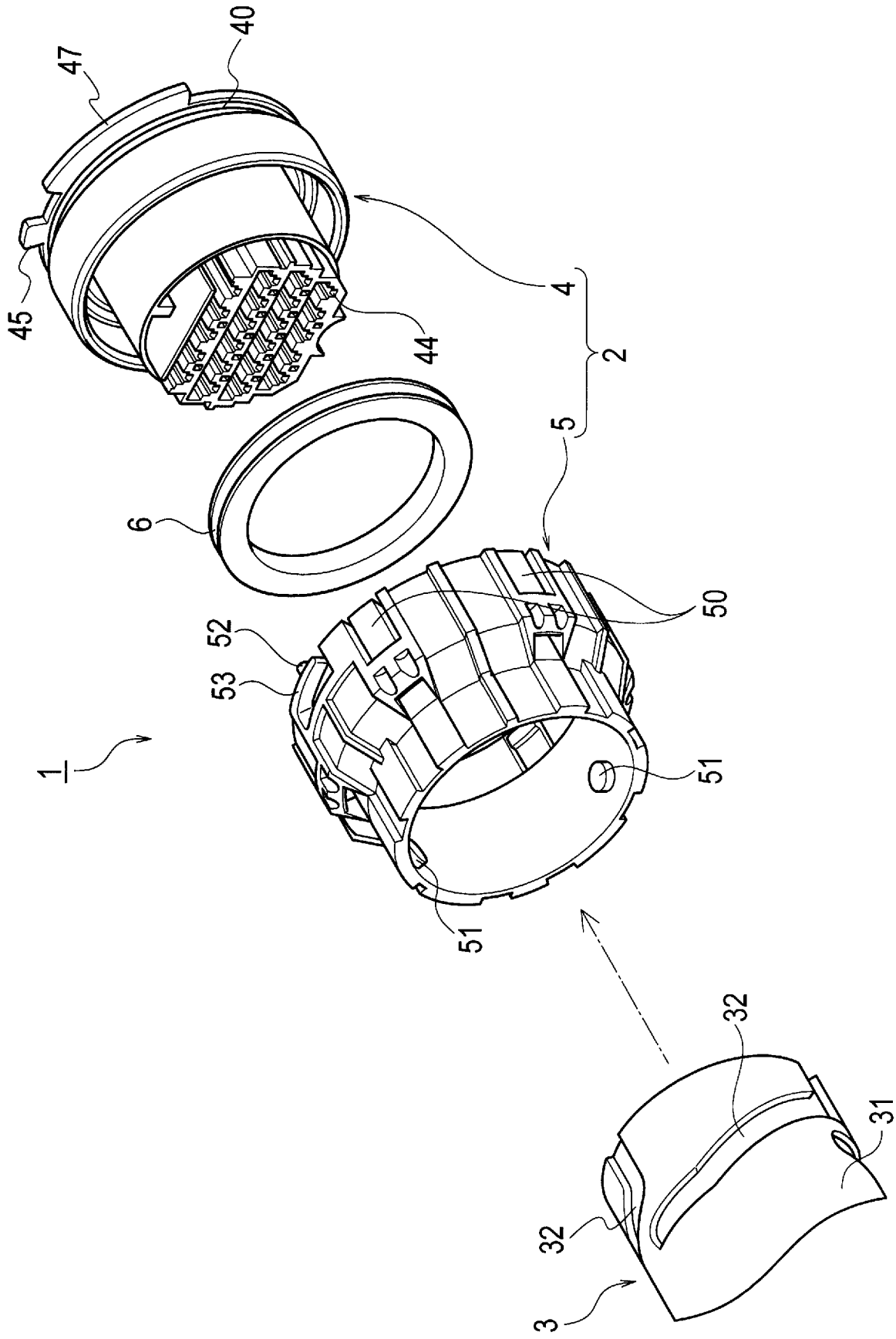
122a
113
123

[Fig. 7]



[Fig. 8]

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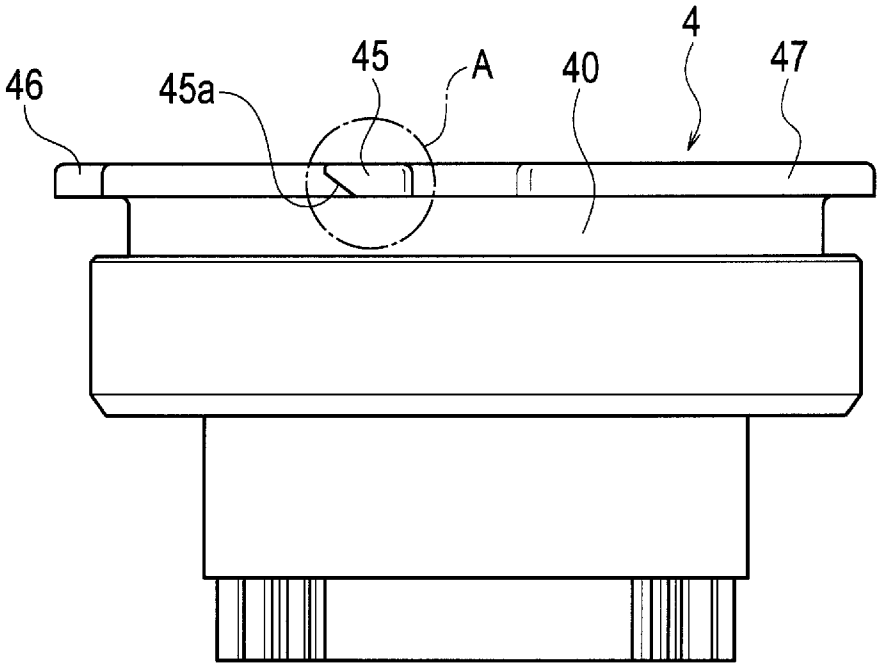
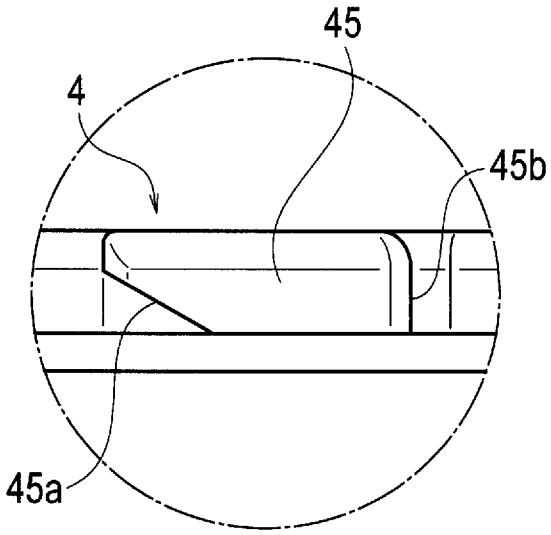
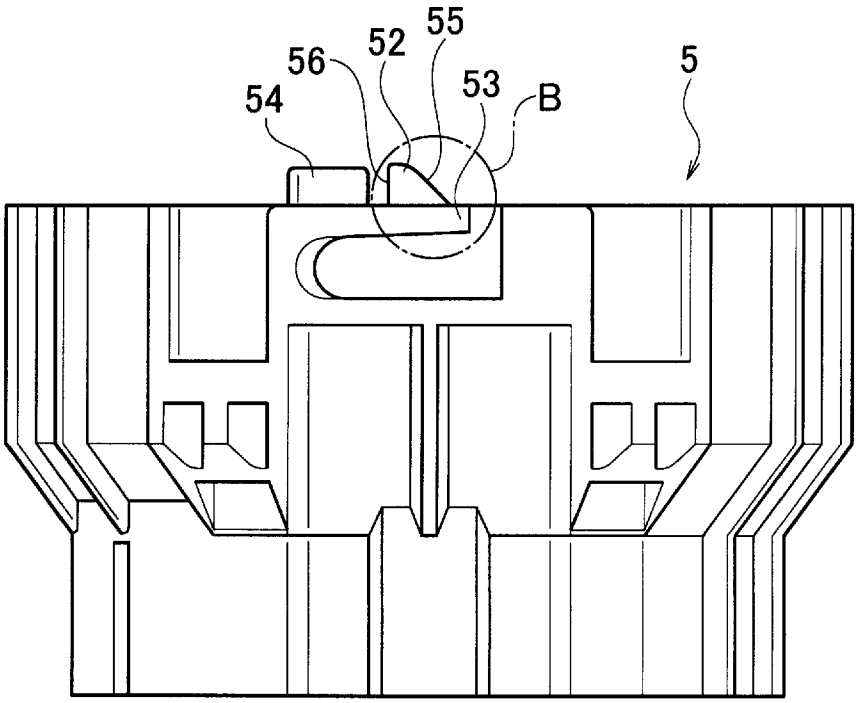


(b)

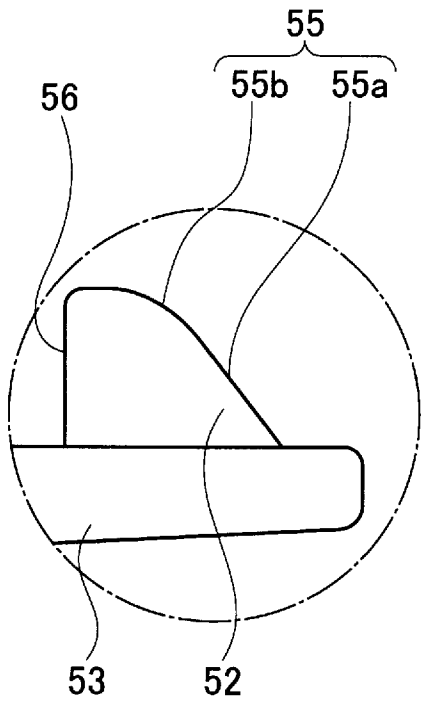


[Fig. 9]

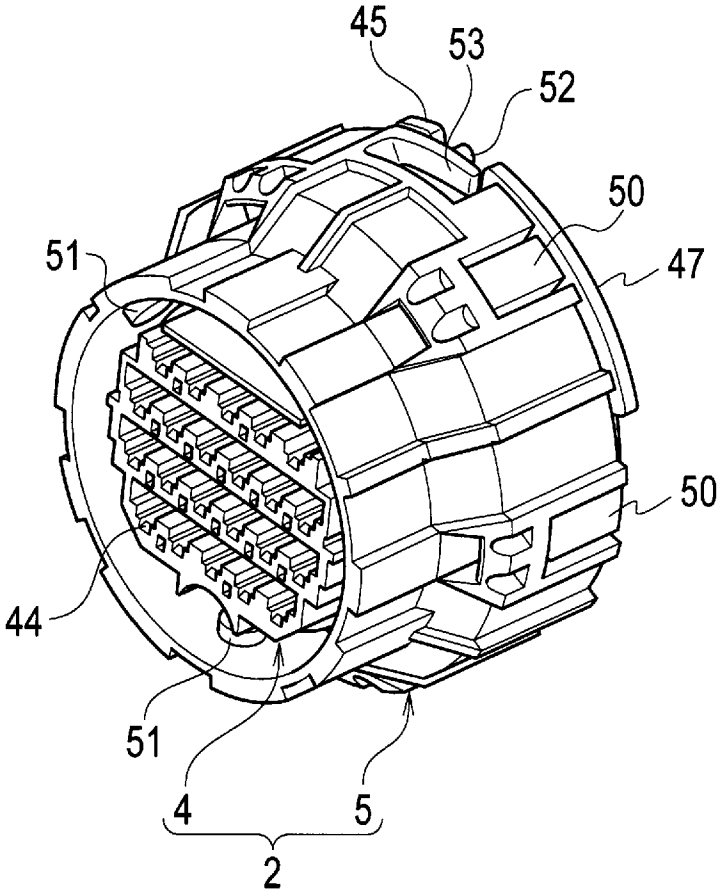
(a)



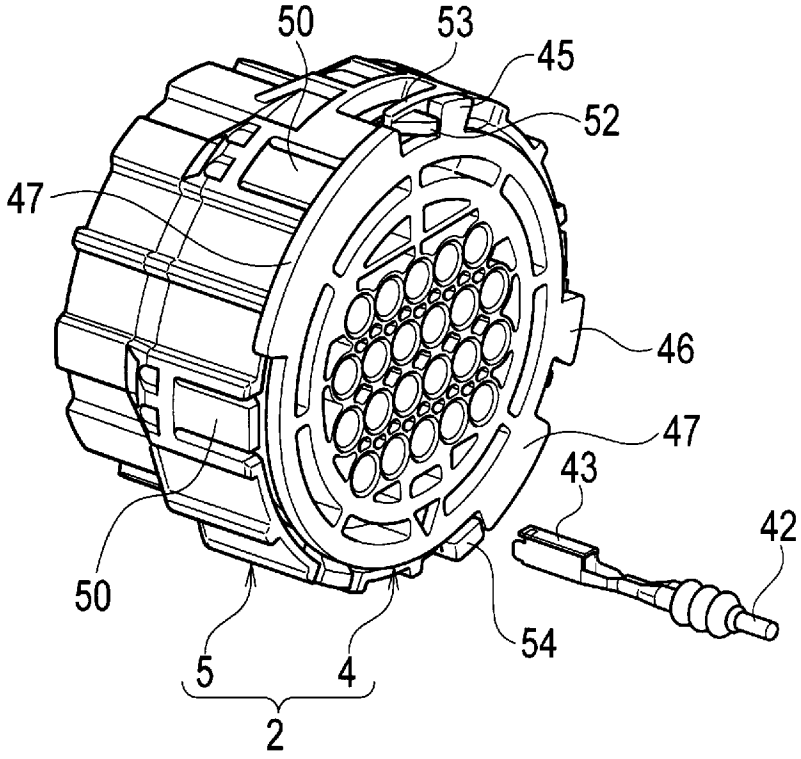
(b)



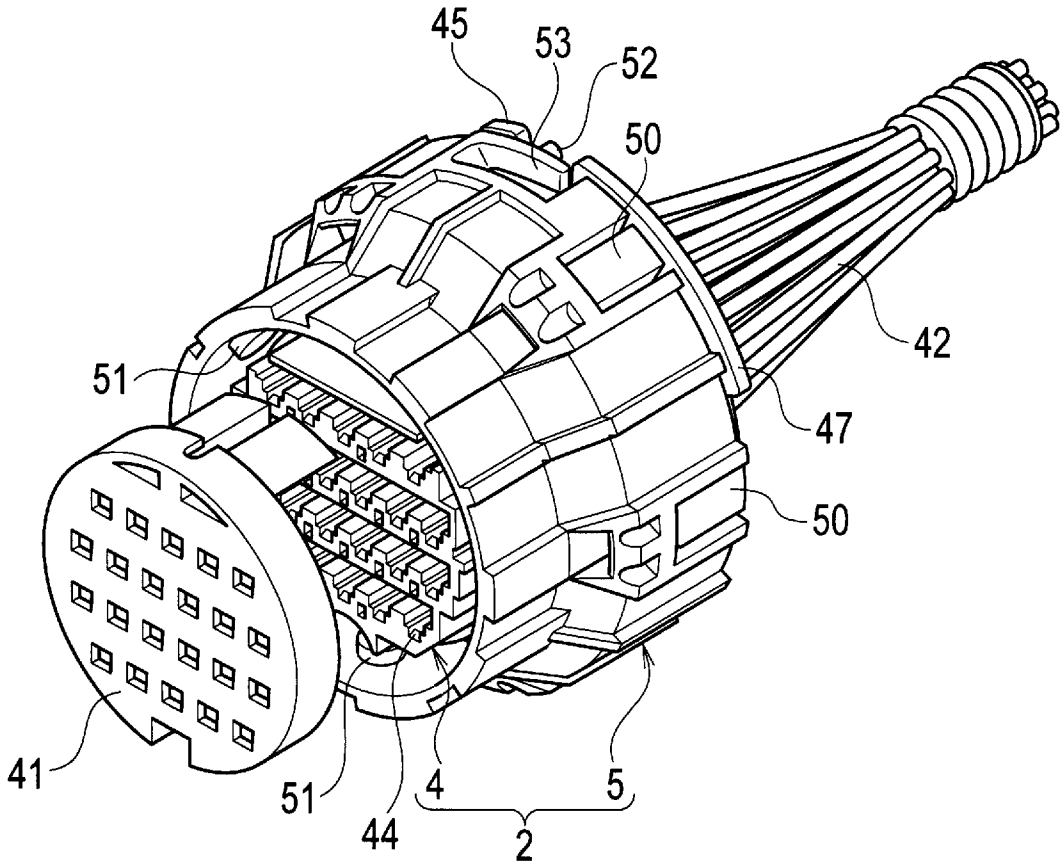
[Fig. 10]



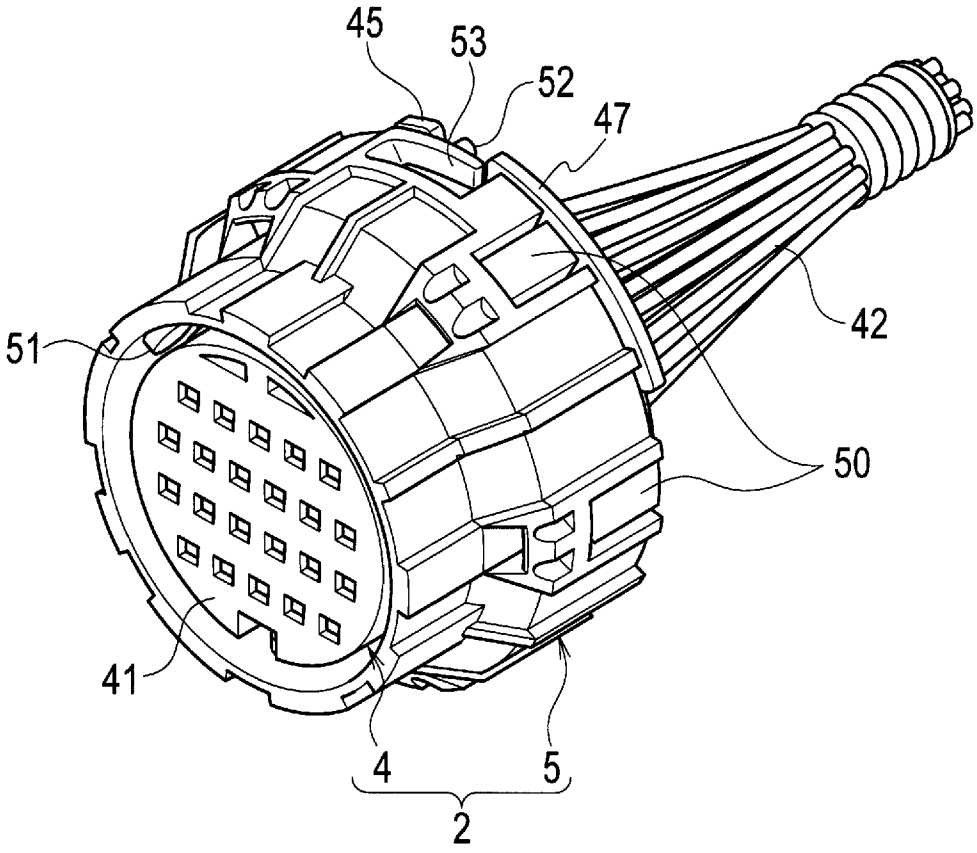
[Fig. 11]



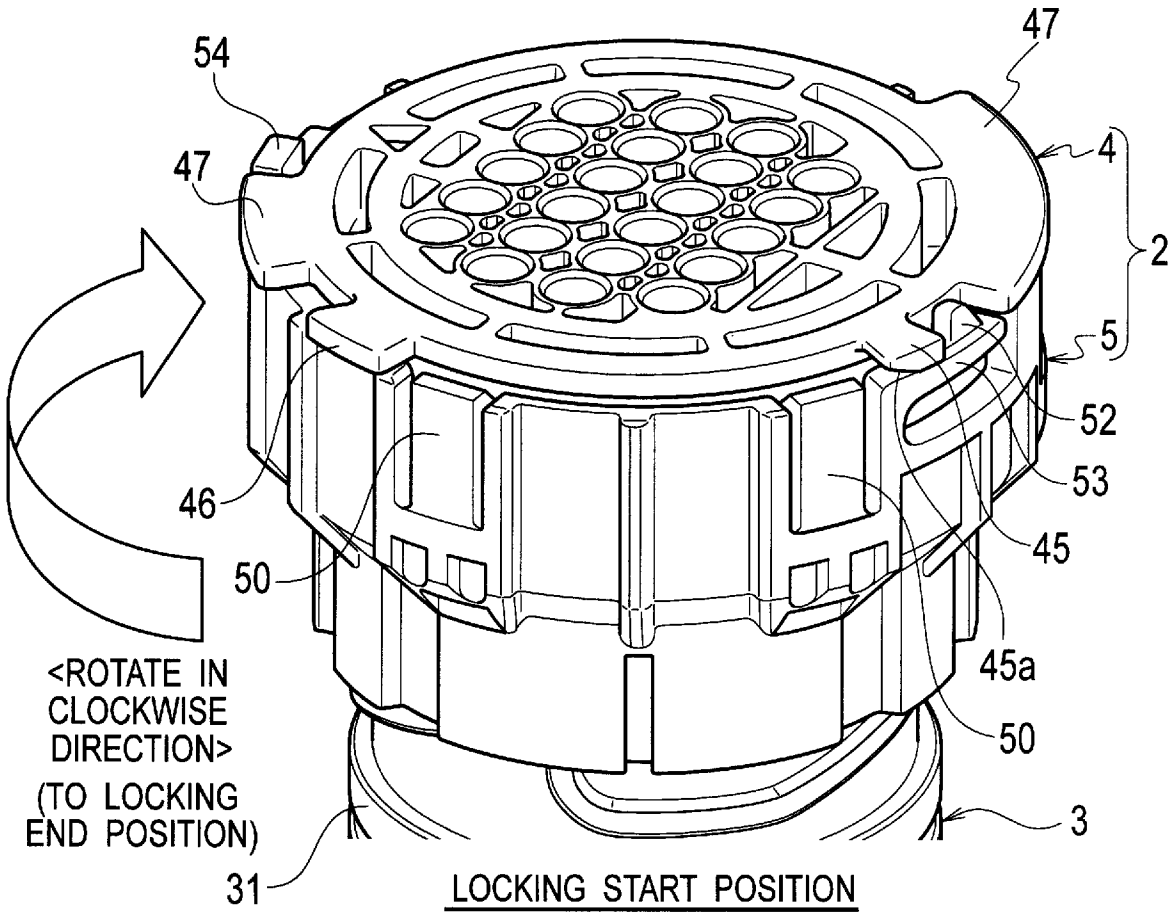
[Fig. 12]



[Fig. 13]



[Fig. 14]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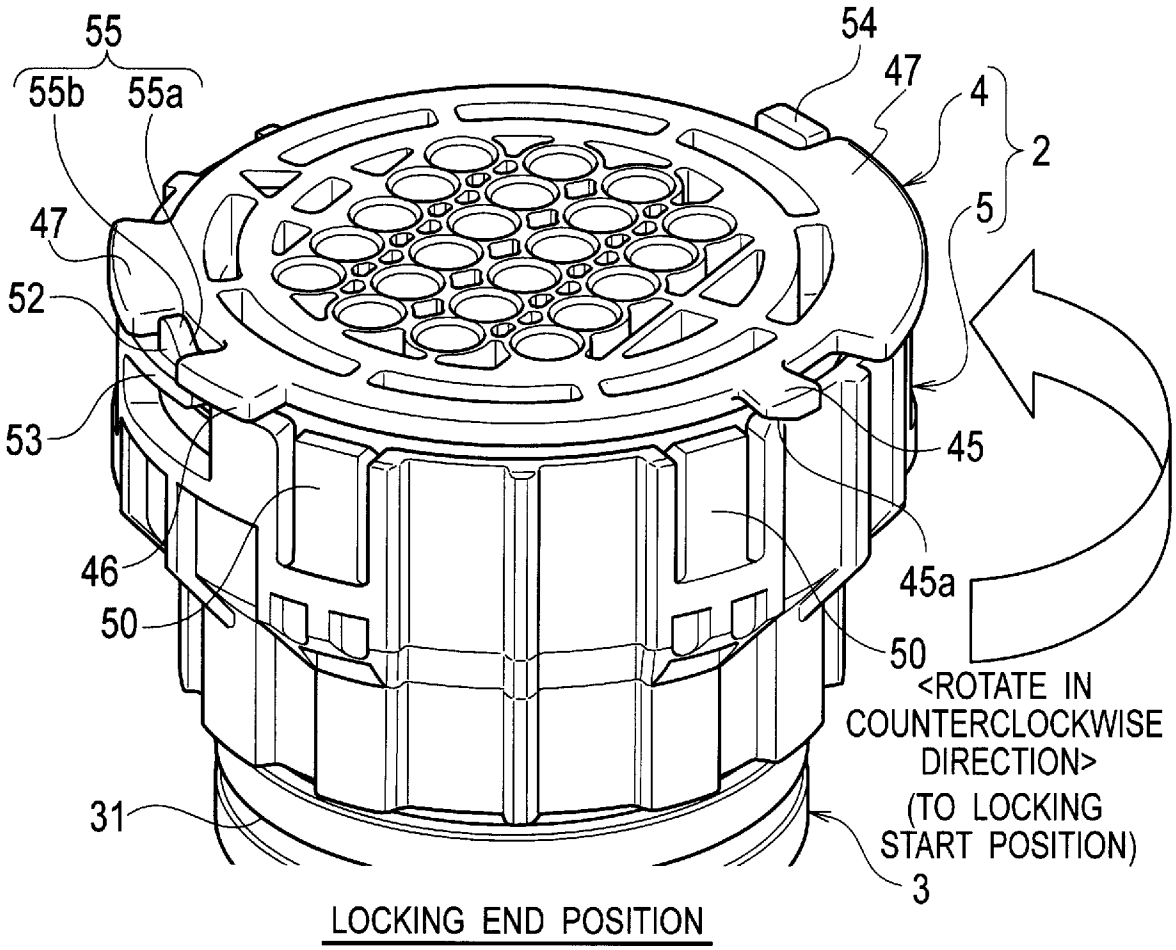
2
5
52
53
45
45a
50
50
46
3
31
<ROTATE IN CLOCKWISE DIRECTION>
(TO LOCKING END POSITION)
LOCKING START POSITION

[Fig. 15]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55b
55a
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2
5
47
52
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45a
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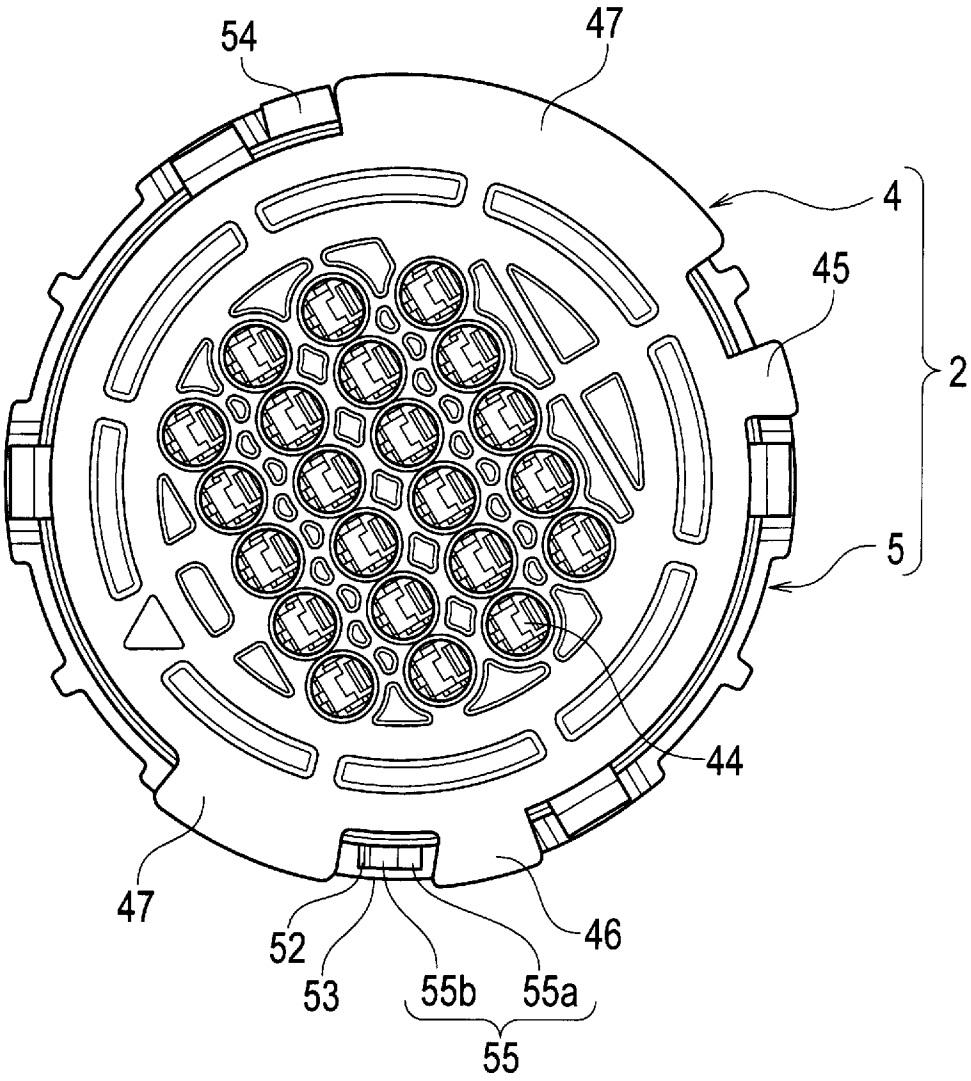
<ROTATE IN COUNTERCLOCKWISE DIRECTION>
(TO LOCKING START POSITION)
31
3
LOCKING END POSITION

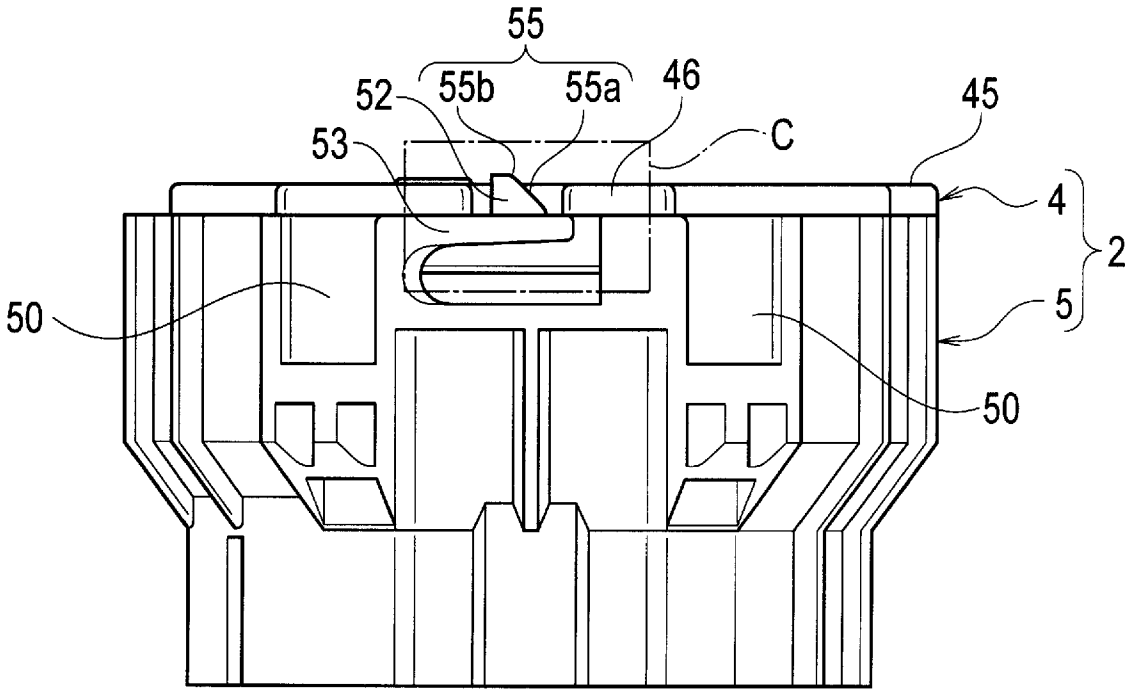
[Fig. 16]



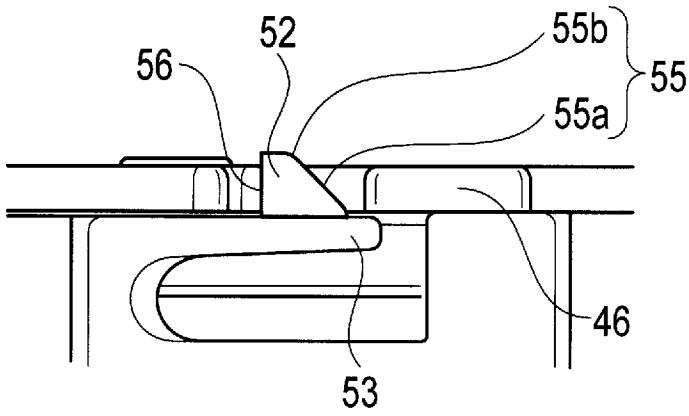
LOCKING END POSITION

[Fig. 17]

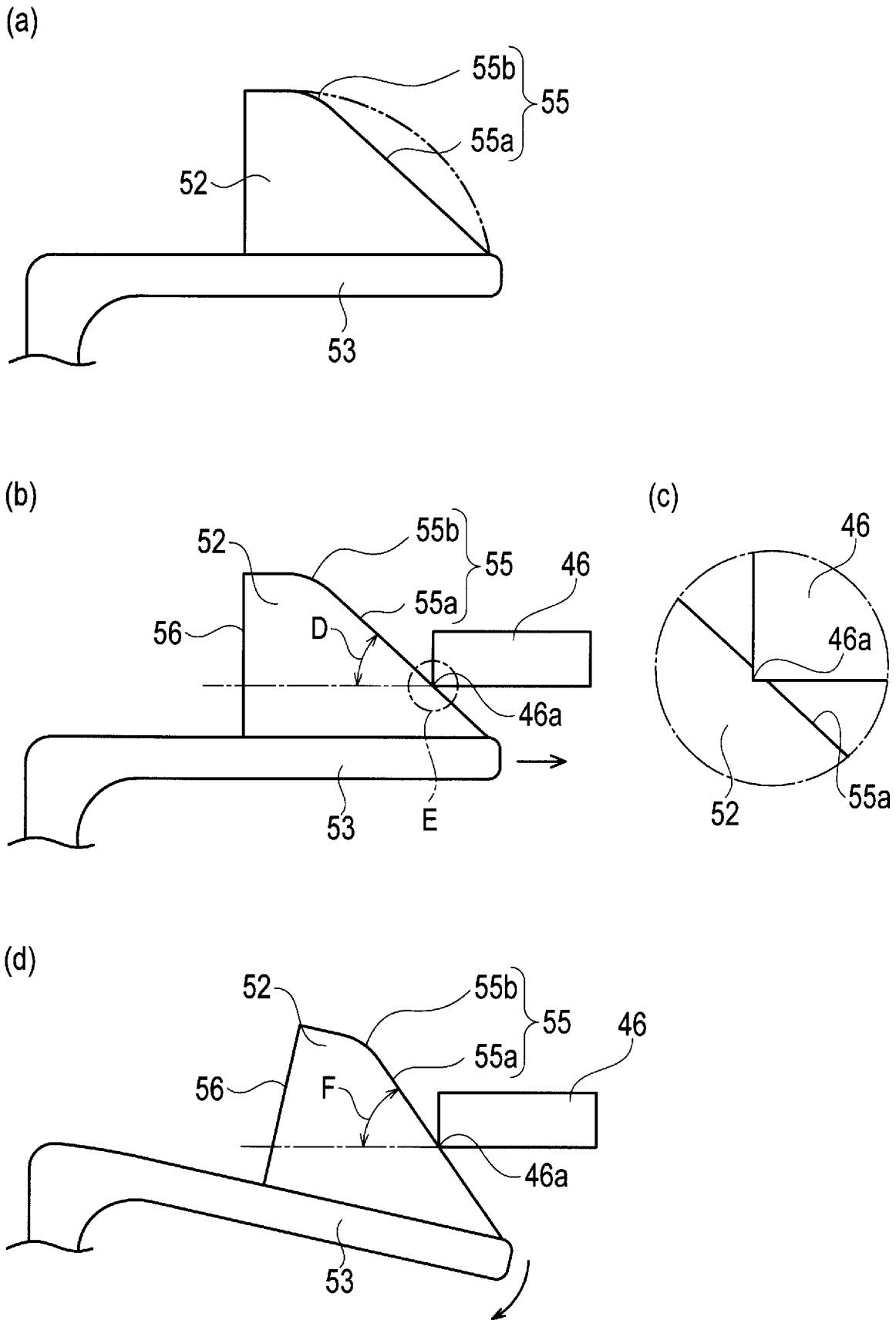
(a)



(b)



[Fig. 18]


(a)
55b
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55a
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53
(b)
52
55b
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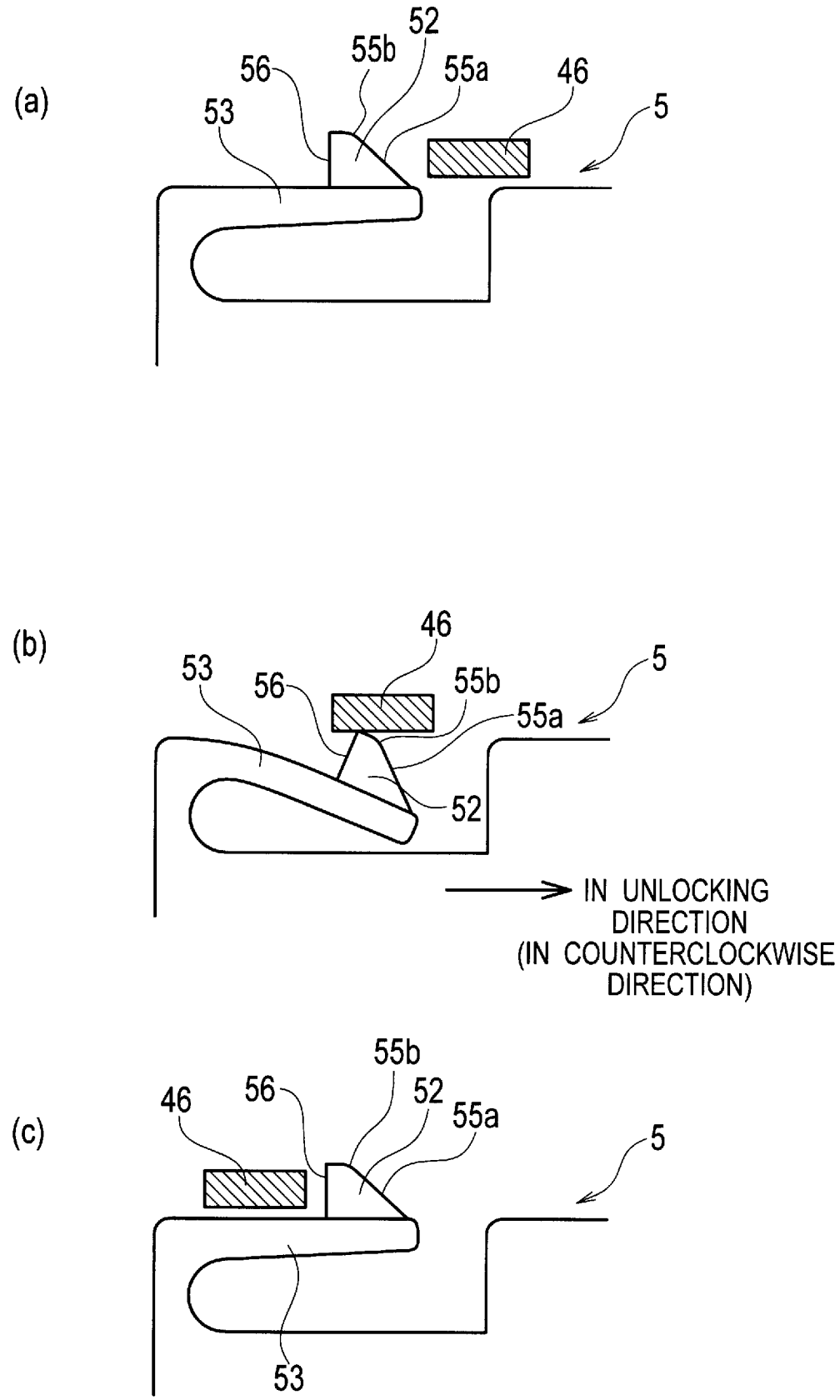
46
55a
56
D
46a
53
E
(c)
46
46a
52
55a
(d)
52
55b
55
46
55a
56
F
46a
53

[Fig. 19]


(a)
52
55b
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55a
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(b)
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55b
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55a
52
IN UNLOCKING DIRECTION (IN COUNTERCLOCKWISE DIRECTION)
(c)
55b
46
56
52
55a
5
53

INTERNATIONAL SEARCH REPORT

International application No
PCT/JP2013/002999

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01R13/625 H01R13/627
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)
H01R

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 811 423 B2 (YOSHIGI TOSHIMASA [JP] ET AL) 2 November 2004 (2004-11-02) cited in the application column 4, line 11 - column 6, line 10; figures 1-8 column 6, line 58 - column 7, line 63	1,2
X	US 2006/240698 A1 (SANUKI HIDENORI [JP] ET AL) 26 October 2006 (2006-10-26) paragraph [0041] - paragraph [0060]; figures 1,,4,5,6,7,8	1,2
A	GB 2 431 526 A (SOURIAU [FR]) 25 April 2007 (2007-04-25) page 7, line 18 - page 9, line 15; figure 2	1,2

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 August 2013	21/08/2013

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/JP2013/002999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6811423 B2	02-11-2004	DE 10254645 A1	26-06-2003
		JP 3943914 B2	11-07-2007
		JP 2003163056 A	06-06-2003
		US 2003100213 A1	29-05-2003
US 2006240698 A1	26-10-2006	DE 102006018927 A1	02-11-2006
		US 2006240698 A1	26-10-2006
GB 2431526 A	25-04-2007	DE 102006049345 A1	03-05-2007
		FR 2892568 A1	27-04-2007
		GB 2431526 A	25-04-2007
		US 2007093109 A1	26-04-2007