

(19)



(11)

EP 3 024 097 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.05.2016 Bulletin 2016/21

(51) Int Cl.:
H01R 13/641 ^(2006.01) **H01R 13/627** ^(2006.01)
H01R 43/26 ^(2006.01)

(21) Application number: **15003115.1**

(22) Date of filing: **30.10.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

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(30) Priority: **19.11.2014 JP 2014234482**

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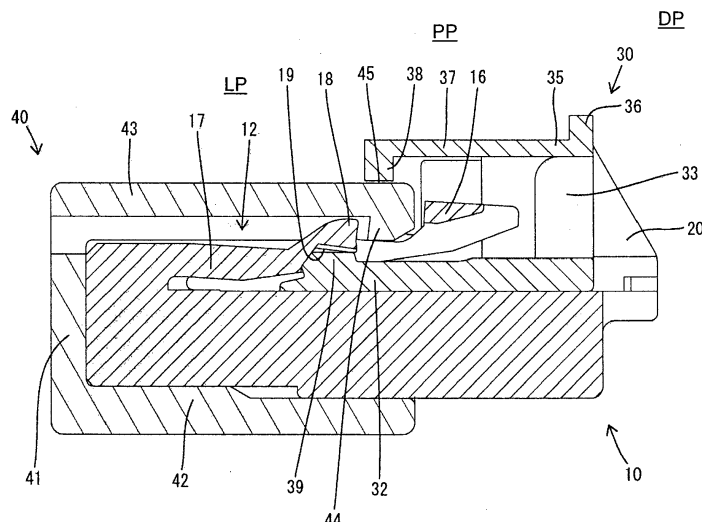
(54) **CONNECTOR, CONNECTOR ASSEMBLY AND ASSEMBLING METHOD THEREFOR**

(57) It is aimed to protect a lock arm without impairing operability in unlocking the lock arm.

A connector includes a detecting member 30 configured to be held at an initial position in a state where two housings 10, 40 are incompletely connected and permitted to move to a detection position when the two housings 10, 40 are properly connected, a movable protecting portion 37 provided on the detecting member 30, configured to be normally held in a protecting posture to cover the

lock arm 12 and resiliently deflectable to take a pressing posture to apply a pressing force in an unlocking direction to the lock arm 12, and a posture holding portion 45 configured to permit the movable protecting portion 37 to be resiliently deflected to take the pressing posture when the detecting member 30 is at the initial position and hold the movable protecting portion 37 in the protecting posture when the detecting member 30 is at the detection position.

FIG. 10



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Description

[0001] The present invention relates to a connector, to a connector assembly and to an assembling or production method therefor.

[0002] Japanese Unexamined Patent Publication No. 2013-214495 discloses a connector with a housing main body formed with a lock arm extending in a cantilever manner and a detecting member mounted on the housing main body. In a state before the housing main body is connected to a mating housing, the detecting member is kept at an initial position by being held in contact with the lock arm. When the housing main body is connected to the mating housing, the detecting member and the lock arm are brought out of contact, wherefore the detecting member can be pushed from the initial position to a connection position. In this way, a connected state of the housing main body and the mating housing can be detected based on whether or not the detecting member can be pushed to the connection position.

[0003] An extending end part of the lock arm serves as an unlocking portion for applying an operation force to deflect the lock arm in an unlocking direction. The housing main body is formed with such an arch-like protection wall as to cover the unlocking portion as a means for preventing the unlocking portion from being inadvertently pressed and from being interfered with by an external matter.

[0004] However, if the protection wall is covering the unlocking portion, an operator's finger interferes with the protection wall when the operator is trying to intentionally press the unlocking portion for unlocking. Thus, a problem of poor operability is presented.

[0005] The present invention was completed based on the above situation and aims to enable the protection of a lock arm without impairing operability in unlocking the lock arm.

[0006] This object is solved according to the invention by the features of the independent claims. Particular embodiments of the invention are subject of the dependent claims.

[0007] According to one aspect of the invention, there is provided a connector, comprising: a housing connectable with a mating housing of a mating connector; a lock arm formed resiliently deflectably on the housing and configured to lock the housing with the mating housing in a connected state by locking the mating housing; a detecting member mounted on or to the housing and configured to be held at an initial position by contact with the lock arm in a state where the housing is incompletely connected to the mating housing and separated from the lock arm and permitted to move to a detection position when the housing is properly connected to the mating housing; a movable protecting portion provided on the detecting member, configured to be normally held in a protecting posture to at least partly cover the lock arm and resiliently deflectable to take a pressing posture to apply a pressing force in an unlocking direction to the

lock arm; and a posture holding portion configured to permit the movable protecting portion to be resiliently deflected to take the pressing posture when the detecting member is at the initial position and hold the movable protecting portion in the protecting posture when the detecting member is at the detection position.

[0008] According to a particular embodiment, the movable protecting portion is formed with at least one pressing portion which can press upon displacement of the movable protecting portion a pressure receiving portion of the lock arm to resiliently deflect the lock arm in the unlocking direction.

[0009] Particularly, with the detecting member located at the initial position, the pressing portion is located to substantially correspond to the pressure receiving portion of the lock arm in a moving direction of the detecting member and/or wherein when the detecting member moves to the detection position, the pressing portion is located offset from the pressure receiving portion.

[0010] According to a further aspect of the invention, there is provided a connector assembly comprising: a connector according to the above aspect of the invention or a particular embodiment thereof, and a mating connector comprising a mating housing connectable to the housing of the connector.

[0011] According to a particular embodiment, the posture holding portion is formed on the mating housing.

[0012] Particularly, the mating housing includes a receptacle formed with a lock portion capable of locking the lock arm on an inner surface.

[0013] Further particularly, an outer surface of the receptacle serves as the posture holding portion.

[0014] According to a particular embodiment, there is provided a connector assembly including a first housing, a second housing connectable to the first housing, a lock arm formed resiliently deflectably on the first housing and configured to lock the first and second housings in a connected state by locking the second housing, a detecting member mounted on the first housing and configured to be held at an initial position by contact with the lock arm in a state where the first and second housings are incompletely connected and separated from the lock arm and permitted to move to a detection position when the first and second housings are properly connected, a movable protecting portion provided on the detecting member, configured to be normally held in a protecting posture to cover the lock arm and resiliently deflectable to take a pressing posture to apply a pressing force in an unlocking direction to the lock arm, and a posture holding portion configured to permit the movable protecting portion to be resiliently deflected to take the pressing posture when the detecting member is at the initial position and hold the movable protecting portion in the protecting posture when the detecting member is at the detection position.

[0015] The connector may be configured such that the posture holding portion is formed on the second housing. According to this configuration, the shape of the first housing can be simplified as compared with the case

where the posture holding portion is formed on the first housing.

[0016] The connector may be configured such that the second housing includes a receptacle formed with a lock portion capable of locking the lock arm on an inner surface, and an outer surface of the receptacle serves as the posture holding portion. According to this configuration, since the receptacle on which the lock portion is formed also functions as the posture holding portion, the shape of the second housing can be simplified as compared with the case where the posture holding portion is formed separately from the receptacle.

[0017] According to a further aspect of the invention, there is provided a method of assembling or producing a connector assembly, in particular according to the above aspect of the invention or a particular embodiment thereof, comprising: providing a connector comprising a housing; providing a mating connector comprising a mating housing connectable to the housing; resiliently deflectably forming a lock arm on the housing, wherein the lock arm is configured to lock the housing with the mating housing in a connected state by locking the mating housing; mounting a detecting member on or to the housing, wherein the detecting member is configured to be held at an initial position by contact with the lock arm in a state where the housing is incompletely connected to the mating housing and separated from the lock arm and permitted to move to a detection position when the housing is properly connected to the mating housing; providing a movable protecting portion on the detecting member, wherein the movable protecting portion is configured to be normally held in a protecting posture to at least partly cover the lock arm and resiliently deflectable to take a pressing posture to apply a pressing force in an unlocking direction to the lock arm; and providing a posture holding portion which is configured to permit the movable protecting portion to be resiliently deflected to take the pressing posture when the detecting member is at the initial position and hold the movable protecting portion in the protecting posture when the detecting member is at the detection position.

[0018] According to a particular embodiment, the movable protecting portion is formed with at least one pressing portion which can press upon displacement of the movable protecting portion a pressure receiving portion of the lock arm to resiliently deflect the lock arm in the unlocking direction.

[0019] Particularly, with the detecting member located at the initial position, the pressing portion is located to substantially correspond to the pressure receiving portion of the lock arm in a moving direction of the detecting member and/or wherein when the detecting member moves to the detection position, the pressing portion is located offset from the pressure receiving portion.

[0020] Further particularly, the posture holding portion is formed on the mating housing.

[0021] Further particularly, the mating housing includes a receptacle formed with a lock portion capable

of locking the lock arm on an inner surface.

[0022] Further particularly, an outer surface of the receptacle serves as the posture holding portion.

[0023] Since the movable protecting portion is held in the protecting posture with the detecting member located at the detection position, the lock arm is or can be reliably protected by the movable protecting portion. In deflecting the lock arm in the unlocking direction, the detecting member may be moved to the initial position and the movable protecting portion may be displaced to take the pressing posture. As just described, according to the present invention, the lock arm can be protected without impairing operability in unlocking the lock arm.

[0024] These and other objects, features and advantages of the present invention will become more apparent upon reading of the following detailed description of preferred embodiments and accompanying drawings. It should be understood that even though embodiments are separately described, single features thereof may be combined to additional embodiments.

FIG. 1 is a plan view of a first housing showing a state where a detecting member is at an initial position in one embodiment,

FIG. 2 is a side view in section of the first housing showing the state where the detecting member is at the initial position,

FIG. 3 is a plan view of the first housing,

FIG. 4 is a rear view of the first housing,

FIG. 5 is a front view of the detecting member,

FIG. 6 is a plan view of the detecting member,

FIG. 7 is a side view of the detecting member,

FIG. 8 is a side view in section showing the process of connecting two housings,

FIG. 9 is a side view in section showing a state where the two housings are connected and the detecting member is at the initial position, and

FIG. 10 is a side view in section showing a state where the two housings are connected and the detecting member is at a detection position, and

FIG. 11 is a side view in section showing a state where the two housings are connected and a lock arm is resiliently deflected in an unlocking direction by pressing a movable protecting portion with the detecting member located at the initial position.

<Embodiment>

[0025] Hereinafter, one specific embodiment of the present invention is described with reference to FIGS. 1 to 11. A connector assembly of this embodiment includes a connector having a first housing 10 (as a particular housing) made e.g. of synthetic resin and a detecting member 30 made e.g. of synthetic resin and a mating connector having a second housing 40 (as a particular mating housing) made e.g. of synthetic resin.

[0026] The first housing 10 (as a particular housing) is configured by integrally or unitarily forming a (particularly

substantially block-like) terminal accommodating portion 11, a lock arm 12 and one or more, particularly a pair of (particularly lateral or left and/or right) guide wall portions 20. One or more, particularly a plurality of female terminal fittings (not shown) of a known form at least partly are to be accommodated in the terminal accommodating portion 11. The lock arm 12 substantially is arranged along (particularly the upper or lateral surface of) the terminal accommodating portion 11. Particularly a front end part (left end part in FIG. 2) of the lock arm 12 is supported on (particularly the upper surface of) the terminal accommodating portion 11 via at least one leg portion 13. That is, the lock arm 12 particularly is cantilevered backward. A deflection space 14 for permitting the resilient deflection of the lock arm 12 in an unlocking direction is formed between (particularly the upper surface of) the terminal accommodating portion 11 and (particularly the lower surface of) the lock arm 12. The lock arm 12 is normally held in a locking posture LP (see FIGS. 2, 9 and 10), but is resiliently deflectable with the leg portion 13 substantially as a supporting point to take an unlocking posture UP (see FIGS. 8 and 11) in which the lock arm 12 at least partly is located in the deflection space 14.

[0027] The lock arm 12 particularly includes a pair of (particularly substantially bilaterally symmetrical) arm portions 15 substantially extending backward from opposite lateral (left and right) end parts of the leg portion 13. The both arm portions 15 (particularly rear end parts thereof) are bridged and coupled by at least one pressure receiving portion 16. The lock arm 12 includes a (particularly substantially plate-like) coupling portion 17 coupling front portions (particularly substantially front half areas) of the both lateral (left and right) arm portions 15. At least one lock projection 18 particularly projecting from the upper or outer surface (surface on a side substantially opposite to the deflection space 14) is formed on or near a rear end part (extending end part) of the plate-like coupling portion 17. A locking recess 19 open on the lower or inner surface (surface substantially facing the terminal accommodating portion 11 and/or substantially facing the deflection space 14) of the plate-like coupling portion 17 and/or the rear end surface of the plate-like coupling portion 17 is formed (particularly substantially likewise) on the rear end part of the plate-like coupling portion 17. The locking recess 19 particularly is positioned to substantially correspond to the lock projection 18 in a front-back direction and/or a lateral direction.

[0028] The one or more, particularly pair of guide wall portions 20 substantially extend outward or upward from adjacent to (particularly from substantially opposite lateral (left and right) edges of) a rear end part of (particularly the upper surface of) the terminal accommodating portion 11. The one or more, particularly pair of guide wall portions 20 are located adjacent to the pressure receiving portion 16 of the lock arm 12 (particularly at substantially opposite left and right sides of the pressure receiving portion 16 of the lock arm 12) in a noncontact manner. Further, one or more, particularly a pair of stoppers (not

shown) are formed at positions of (particularly the upper surface of) the terminal accommodating portion 11 close to the inner surfaces of the one or more, particularly the pair of guide wall portions 20.

[0029] As shown in FIGS. 5 to 7, the detecting member 30 particularly is an integral or unitary assembly of a bottom or base wall portion 31, a pair of (particularly substantially bilaterally symmetrical) side wall portions 33, a pair of (particularly substantially bilaterally symmetrical plate-like) locking portions 34, a (particularly substantially plate-like) supporting portion 35 and a movable protecting portion 37. The locking arm 32 substantially is cantilevered forward (leftward in FIGS. 2, 6 and 7) from an intermediate position (particularly substantially a center position) of the front end edge of the bottom or base wall portion 31. The locking arm 32 is resiliently deflectable downwardly or inwardly with a rear end part thereof (particularly front end edges of the side wall portions 33) substantially as a supporting point. The upper surface of the locking arm 32 is formed with a contact portion 39 particularly projecting at a position slightly behind a front end part thereof. The pair of side wall portions 33 particularly substantially extend upward or outward from rear end parts on opposite left and right edges of the bottom wall portion 31. The pair of (plate-like) locking portions 34 particularly are cantilevered forward from the front end edges of the side wall portions 33.

[0030] The detecting member 30 is mounted or mountable on an outer surface of the first housing 10 in a state where the bottom or base wall portion 31 particularly is held substantially in contact with (particularly the upper or outer surface of) the terminal accommodating portion 11 and the lateral (left and/or right) side wall portion(s) 33 and the (plate-like) locking portion 34 are in contact with or proximately facing the inner surfaces of the guide wall portion(s) 20. In a state where the two housings 10, 40 are not yet connected, the (plate-like) locking portion 34 particularly is locked by the stopper(s) of the first housing 10. By this locking action, the detecting member 30 is held or positioned at an initial position IP (see FIGS. 1, 2, 8, 9 and 11) where a backward movement relative to the first housing 10 is regulated. Further, the detecting member 30 particularly is movable substantially in parallel to a detection position DP (see FIG. 10) located offset (particularly before) the initial position IP while causing the bottom or base wall portion 31 to slide substantially in contact with the upper or outer surface of the terminal accommodating portion 11.

[0031] With the two housings 10, 40 unconnected and the detecting member 30 located at the initial position IP, the locking arm 32 slips under the pressure receiving portion 16 and/or the front end part of the locking arm 32 at least partly is fitted into the locking recess 19 of the lock arm 12 as shown in FIG. 2. The contact portion 39 of the locking arm 32 particularly is held substantially in contact with or proximately facing (particularly the rear end surface of) the plate-like coupling portion 17 of the lock arm 12 e.g. from behind. When the contact portion

39 comes into contact with the lock arm 12, a movement of the detecting member 30 to the detection position DP (e.g. forward) is regulated. When the front end part of the locking arm 32 is separated from the lock arm 12, the detecting member 30 is permitted to move to the detection position DP. When the detecting member 30 moves to the detection position DP, the locking arm 32 is resiliently deflected downwardly or inwardly and/or the contact portion 39 slips into the locking recess 19 as shown in FIG. 10.

[0032] The (particularly substantially plate-like) supporting portion 35 particularly at least partly couples the upper or outer or distal end edges (extending end edges) of the both lateral (left and right) side wall portions 33. The upper surface of the plate-like supporting portion 35 is formed with a (particularly substantially rib-like) finger placing portion 36 projecting upwardly or outwardly particularly from the rear end edge thereof. The movable protecting portion 37 substantially is cantilevered forward from the front end edge of the plate-like supporting portion 35 and/or in the form of a flat plate. The movable protecting portion 37 is normally held in a protecting posture PP (see FIGS. 2 and 8 to 10). The movable protecting portion 37 in the protecting posture PP particularly is substantially parallel to a moving direction of the detecting member 30 between the initial position IP and the detection position DP. The movable protecting portion 37 is resiliently deflectable downwardly or inwardly to take a pressing posture PreP (see FIG. 11) particularly with the rear end edge thereof (front end edge of the plate-like supporting portion 35) substantially as a supporting point. Further, the movable protecting portion 37 particularly is formed with at least one (particularly substantially rib-like) pressing portion 38 projecting downwardly or inwardly from the front end edge thereof.

[0033] With the detecting member 30 located at the initial position IP, the pressing portion 38 is located to substantially correspond to the pressure receiving portion 16 of the lock arm 12 in the front-back direction (moving direction of the detecting member 30). Specifically, the lower surface of the pressing portion 38 is positioned to proximately face the upper surface of the pressure receiving portion 16 or applies a downward pressing force to (particularly the upper surface of) the pressure receiving portion 16. Further, when the detecting member 30 moves to the detection position DP, the pressing portion 38 is located before the pressure receiving portion 16 as shown in FIG. 10.

[0034] As shown in FIGS. 8 to 11, the second housing 40 (as a particular mating housing) particularly is an integral or unitary assembly of a terminal holding portion 41 facing the front end surface of the terminal accommodating portion 11 and a receptacle 42 particularly substantially in the form of a rectangular tube cantilevered forward (rightward in FIGS. 8 to 11) from the outer peripheral edge of the terminal holding portion 41. One or more, particularly a plurality of male terminal fittings (not shown) at least partly are to be held in the terminal holding

portion 41 and front end part(s) of the one or more, particularly of the plurality of male terminal fittings at least partly are (particularly substantially collectively) surrounded by the receptacle 42. An upper wall portion 43 constituting or forming part of the receptacle 42 particularly is formed with at least one (particularly substantially rib-like) lock portion 44 projecting downwardly (inwardly) from the front end edge thereof or near thereto. Further, an outer surface of the upper wall portion 43 particularly serves as a posture holding portion 45.

[0035] Next, functions of this embodiment are described. In connecting the first and second housings 10, 40 (or the housing 10 and the mating housing 40), the terminal accommodating portion 11 and the lock arm 12 at least partly are inserted into the receptacle 42. In a connecting process, as shown in FIG. 8, the lock projection 18 interferes with the lock portion 44, whereby the lock arm 12 is resiliently deflected from the locking posture LP to the unlocking posture UP. Particularly associated with this, the locking arm 32 whose front end part is located in the locking recess 19 is (particularly also) resiliently deflected downwardly or inwardly, but the detecting member 30 is kept at the initial position IP since a contact state of the contact portion 39 with the lock arm 12 is maintained. Further, as the lock arm 12 is resiliently deflected downwardly or inwardly, the pressure receiving portion 16 is moved downwardly or inwardly away from the pressing portion 38 of the movable protecting portion 37.

[0036] As the connection proceeds from this state, the lock projection 18 passes over the lock portion 44 and, as shown in FIG. 9, the two housings 10, 40 are substantially properly connected and the female and male terminal fittings are connected. When the lock projection 18 passes over the lock portion 44, the lock arm 12 resiliently returns to take the locking posture LP. As the lock arm 12 resiliently returns, the lock projection 18 and the lock portion 44 are locked to each other. By this locking action, the two housings 10, 40 in a properly connected state are locked to regulate the separation of the two housings 10, 40.

[0037] Further, when the lock arm 12 resiliently returns to the locking posture LP, the locking recess 19 is separated (particularly substantially upwardly or outwardly) from the front end part of the locking arm 32. On the other hand, the locking arm 32 is not displaced (particularly upwardly or outwardly) since the contact portion 39 is in contact with (particularly the lower surface of) the lock portion 44. Thus, the contact portion 39 and the lock arm 12 are brought out of contact and the detecting member 30 is permitted to move to the detection position DP. When the detecting member 30 is pushed or displaced forwardly and moved to the detection position DP from this state, the contact portion 39 at least partly slips or enters into the locking recess 19 and/or the locking arm 32 substantially comes into contact with the upper surface of the terminal accommodating portion 11 as shown in FIG. 10. In this way, a movement of the lock arm 12

in the unlocking direction (downward) is regulated, wherefore the reliability of a lock function by the lock arm 12 and the lock portion 44 is enhanced.

[0038] When the detecting member 30 moves to the detection position DD, the pressing portion 38 of the movable protecting portion 37 comes into contact with or is proximately facing the posture holding portion 45 of the receptacle 42. In this way, the resilient deflection of the movable protecting portion 37 to take the pressing posture PreP is regulated and/or the movable protecting portion 37 is held or positioned in the protecting posture PP. When the movable protecting portion 37 is in the protecting posture PP, the pressure receiving portion 16 (rear end part) of the lock arm 12 at least partly is covered from above or outside by the movable protecting portion 37. Thus, there is no possibility that an external matter interferes with the pressure receiving portion 16 from above or outside and the pressure receiving portion 16 is pressed downwardly (in the unlocking direction), and the lock arm 12 is held in the locking posture LP. Further, since the rear end part (pressure receiving portion 16) of the lock arm 12 at least partly is covered from lateral side(s) (particularly from substantially opposite left and right sides) by the one or more, particularly the pair of side wall portions 33, there is little or no possibility that external matters laterally interfere with the rear end part of the lock arm 12.

[0039] In separating the two housings 10, 40 from a state where the two housings 10, 40 are properly connected and the detecting member 30 is located at the detection position DP, the detecting member 30 is first moved from the detection position DP to or towards the initial position IP. At this time, this operation can be easily performed by placing a finger on the finger placing portion 36. When the detecting member 30 moves to or toward the initial position IP, the pressing portion 38 of the movable protecting portion 37 is separated backward from the posture holding portion 45 of the receptacle 42 and the pressing portion 38 faces the pressure receiving portion 16 as shown in FIG. 9.

[0040] When the movable protecting portion 37 is displaced (e.g. pressed) downwardly or inwardly from this state, the pressing portion 38 presses the pressure receiving portion 16 as shown in FIG. 11, wherefore the lock arm 12 is resiliently deflected downwardly or inwardly (in the unlocking direction). In this way, a locked state (lock state) between the lock projection 18 and the lock portion 44 is released. Thus, if the detecting member 30 and the first housing 10 are integrally moved backward while the movable protecting portion 37 is kept pressed, the two housings 10, 40 can be separated. Since the upper surface of the movable protecting portion 37 particularly is inclined downwardly or inwardly toward the front, operability is good in moving the detecting member 30 and the first housing 10 backward.

[0041] The connector of this embodiment is intended to enable the protection of the lock arm 12 without impairing operability in unlocking the lock arm 12 and in-

cludes the first housing 10, the second housing 40 connectable to the first housing 10 and the detecting member 30. The first housing 10 is formed with the lock arm 12 resiliently deformable and configured to lock the two housings 10, 40 in the connected state by locking the second housing 40. Further, the first housing 10 is provided with the detecting member 30 configured to be positioned or held at the initial position IP particularly by contact with the lock arm 12 in a state where the two housings 10, 40 are incompletely connected and separated from the lock arm 12 and permitted to move to the detection position DP when the two housings 10, 40 are properly connected.

[0042] The detecting member 30 particularly is provided with the movable protecting portion 37 normally held or positioned in the protecting posture PP to at least partly cover the lock arm 12 and/or resiliently deflectable to take the pressing posture PreP in which a pressing or displacement force of the unlocking direction is or can be applied to the lock arm 12. On the other hand, the second housing 40 particularly is provided with the posture holding portion 45 configured to permit the resilient deflection of the movable protecting portion 37 to take the pressing posture PreP when the detecting member 30 is at the initial position IP and hold the movable protecting portion 37 in the protecting posture PP when the detecting member 30 is at the detection position DP.

[0043] According to this configuration, the movable protecting portion 37 particularly is held in the protecting posture PP by the posture holding portion 45 with the detecting member 30 located at the detection position DP, wherefore the lock arm 12 is reliably protected by the movable protecting portion 37. Further, in deflecting the lock arm 12 in the unlocking direction, the detecting member 30 may be moved to the initial position IP and the movable protecting portion 37 may be displaced to take the pressing posture PreP. As just described, according to this embodiment, the lock arm 12 can be protected without impairing operability in unlocking the lock arm 12.

[0044] Further, since the posture holding portion 45 particularly is formed on the second housing 40, the shape of the first housing 10 is simplified as compared with the case where the posture holding portion 45 is formed on the first housing 10. Further, the second housing 40 includes the receptacle 42 formed with the lock portion 44 capable of locking the lock arm 12 on the inner surface and the outer surface of the receptacle 42 functions as the posture holding portion 45. According to this configuration, since the receptacle 42 on which the lock portion 44 particularly is formed also functions as the posture holding portion 45, the shape of the second housing 40 can be simplified as compared with the case where the posture holding portion 45 is formed separately from the receptacle 42.

[0045] Accordingly, to protect a lock arm without impairing operability in unlocking the lock arm, a connector includes a detecting member 30 configured to be held at

an initial position IP in a state where two housings 10, 40 are incompletely connected and permitted to move to a detection position DD when the two housings 10, 40 are properly connected, a movable protecting portion 37 provided on the detecting member 30, configured to be normally held in a protecting posture PP to at least partly cover the lock arm 12 and resiliently deflectable to take a pressing posture PreP to apply (or allow application of) a pressing force in an unlocking direction to the lock arm 12, and a posture holding portion 45 configured to permit the movable protecting portion 37 to be resiliently deflected to take the pressing posture when the detecting member 30 is at the initial position IP and hold or position the movable protecting portion 37 in the protecting posture PP when the detecting member 30 is at the detection position DP.

<Other Embodiments>

[0046] The present invention is not limited to the above described and illustrated embodiment. For example, the following embodiments are also included in the technical scope of the present invention.

- (1) Although the posture holding portion particularly is formed on the outer surface of the receptacle in the above embodiment, it may be formed on a part different from the receptacle.
- (2) Although the posture holding portion particularly is formed on the second housing in the above embodiment, it may be formed on the first housing.
- (3) Although the lock arm particularly substantially extends in a cantilever manner in the above embodiment, it may be supported on both end parts.

Reference Signs

[0047]

10	first housing (housing)
12	lock arm
30	detecting member
37	movable protecting portion
38	pressing portion
40	second housing (mating housing)
42	receptacle
44	lock portion
45	posture holding portion
DP	detecting position (20)
IP	initial position (20)
PP	protecting posture (37)
PreP	pressure posture (37)
LP	locking posture (12)
UP	unlocking posture (12)

Claims

1. A connector, comprising:

a housing (10) connectable with a mating housing (40) of a mating connector;
 a lock arm (12) formed resiliently deflectably on the housing (10) and configured to lock the housing (10) with the mating housing (40) in a connected state by locking the mating housing (40);
 a detecting member (30) mounted on or to the housing (10) and configured to be held at an initial position (IP) by contact with the lock arm (12) in a state where the housing (10) is incompletely connected to the mating housing (40) and separated from the lock arm (12) and permitted to move to a detection position (DD) when the housing (10) is properly connected to the mating housing (40);
 a movable protecting portion (37) provided on the detecting member (30), configured to be normally held in a protecting posture (PP) to at least partly cover the lock arm (12) and resiliently deflectable to take a pressing posture (PreP) to apply a pressing force in an unlocking direction to the lock arm (12); and
 a posture holding portion (45) configured to permit the movable protecting portion (37) to be resiliently deflected to take the pressing posture (PreP) when the detecting member (30) is at the initial position (IP) and hold the movable protecting portion (37) in the protecting posture (PreP) when the detecting member (30) is at the detection position (DP).

2. A connector according to claim 1, wherein the movable protecting portion (37) is formed with at least one pressing portion (38) which can press upon displacement of the movable protecting portion (37) a pressure receiving portion (16) of the lock arm (12) to resiliently deflect the lock arm (12) in the unlocking direction.

3. A connector according to claim 2, wherein with the detecting member (30) located at the initial position (IP), the pressing portion (38) is located to substantially correspond to the pressure receiving portion (16) of the lock arm (12) in a moving direction of the detecting member (30) and/or wherein when the detecting member (30) moves to the detection position (DP), the pressing portion (38) is located offset from the pressure receiving portion (16).

4. A connector assembly comprising:

a connector according to any one of the preceding claims, and
 a mating connector comprising a mating hous-

- ing (40) connectable to the housing (10) of the connector.
5. A connector assembly according to claim 4, wherein the posture holding portion (45) is formed on the mating housing (40). 5
 6. A connector assembly according to claim 5, wherein the mating housing (40) includes a receptacle (42) formed with a lock portion (44) capable of locking the lock arm (12) on an inner surface. 10
 7. A connector assembly according to claim 6, wherein an outer surface of the receptacle (42) serves as the posture holding portion (45). 15
 8. A method of assembling a connector assembly, comprising:
 - providing a connector comprising a housing (10); 20
 - providing a mating connector comprising a mating housing (40) connectable to the housing (10);
 - resiliently deflectably forming a lock arm (12) on the housing (10), wherein the lock arm (12) is configured to lock the housing (10) with the mating housing (40) in a connected state by locking the mating housing (40); 25
 - mounting a detecting member (30) on or to the housing (10), wherein the detecting member (30) is configured to be held at an initial position (IP) by contact with the lock arm (12) in a state where the housing (10) is incompletely connected to the mating housing (40) and separated from the lock arm (12) and permitted to move to a detection position (DD) when the housing (10) is properly connected to the mating housing (40); 30
 - providing a movable protecting portion (37) on the detecting member (30), wherein the movable protecting portion (37) is configured to be normally held in a protecting posture (PP) to at least partly cover the lock arm (12) and resiliently deflectable to take a pressing posture (PreP) to apply a pressing force in an unlocking direction to the lock arm (12); and 35
 - providing a posture holding portion (45) which is configured to permit the movable protecting portion (37) to be resiliently deflected to take the pressing posture (PreP) when the detecting member (30) is at the initial position (IP) and hold the movable protecting portion (37) in the protecting posture (PreP) when the detecting member (30) is at the detection position (DP). 40 45 50 55
 9. A method according to claim 8, wherein the movable protecting portion (37) is formed with at least one pressing portion (38) which can press upon displacement of the movable protecting portion (37) a pressure receiving portion (16) of the lock arm (12) to resiliently deflect the lock arm (12) in the unlocking direction.
 10. A method according to claim 9, wherein with the detecting member (30) located at the initial position (IP), the pressing portion (38) is located to substantially correspond to the pressure receiving portion (16) of the lock arm (12) in a moving direction of the detecting member (30) and/or wherein when the detecting member (30) moves to the detection position (DP), the pressing portion (38) is located offset from the pressure receiving portion (16).
 11. A method according to any one of the preceding claims 8 to 10, wherein the posture holding portion (45) is formed on the mating housing (40).
 12. A method according to claim 11, wherein the mating housing (40) includes a receptacle (42) formed with a lock portion (44) capable of locking the lock arm (12) on an inner surface.
 13. A method according to claim 12, wherein an outer surface of the receptacle (42) serves as the posture holding portion (45).

FIG. 1

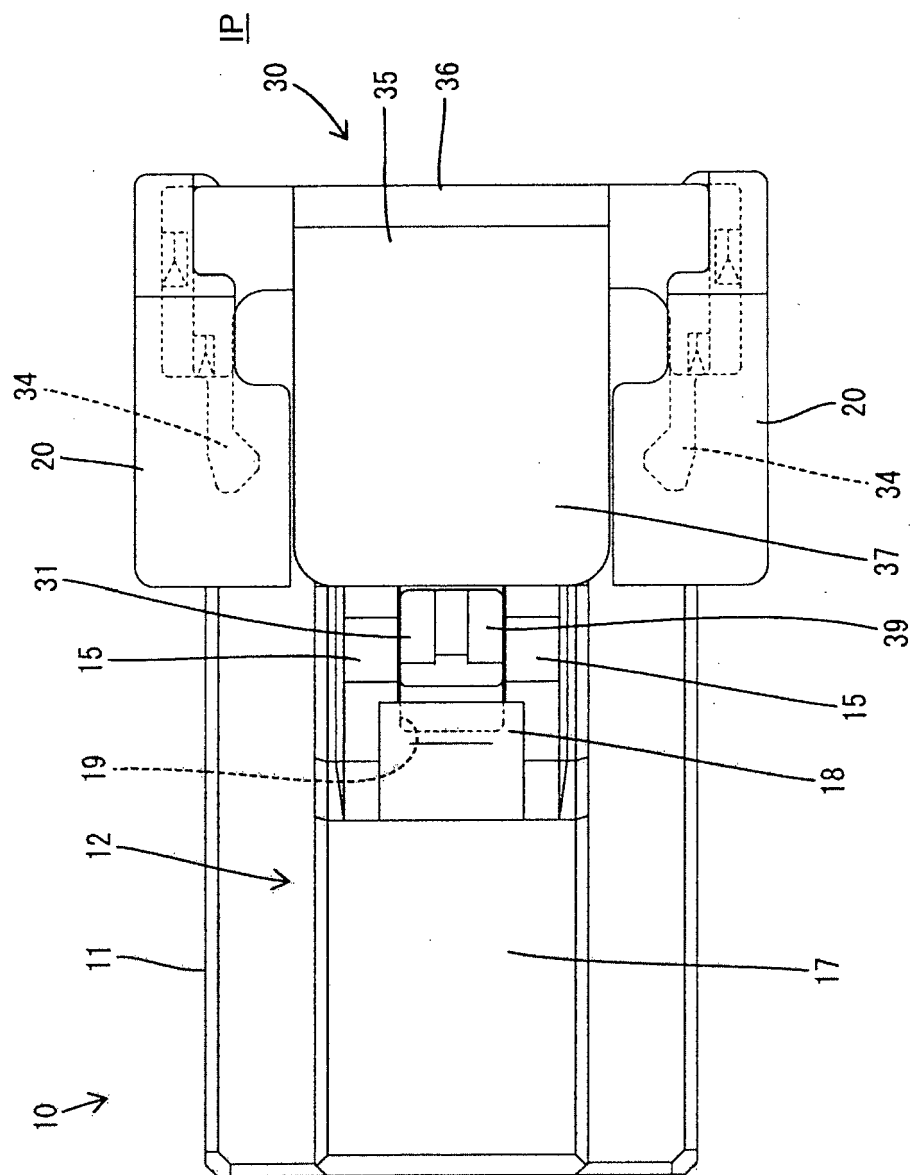


FIG. 2

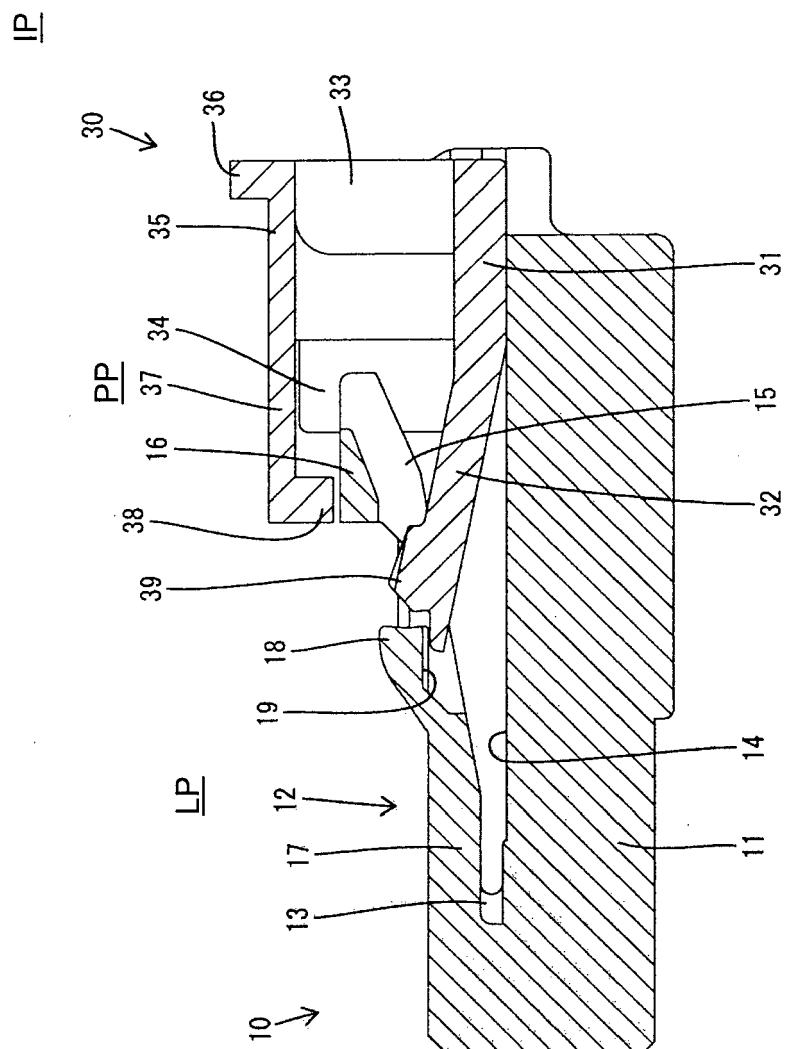


FIG. 3

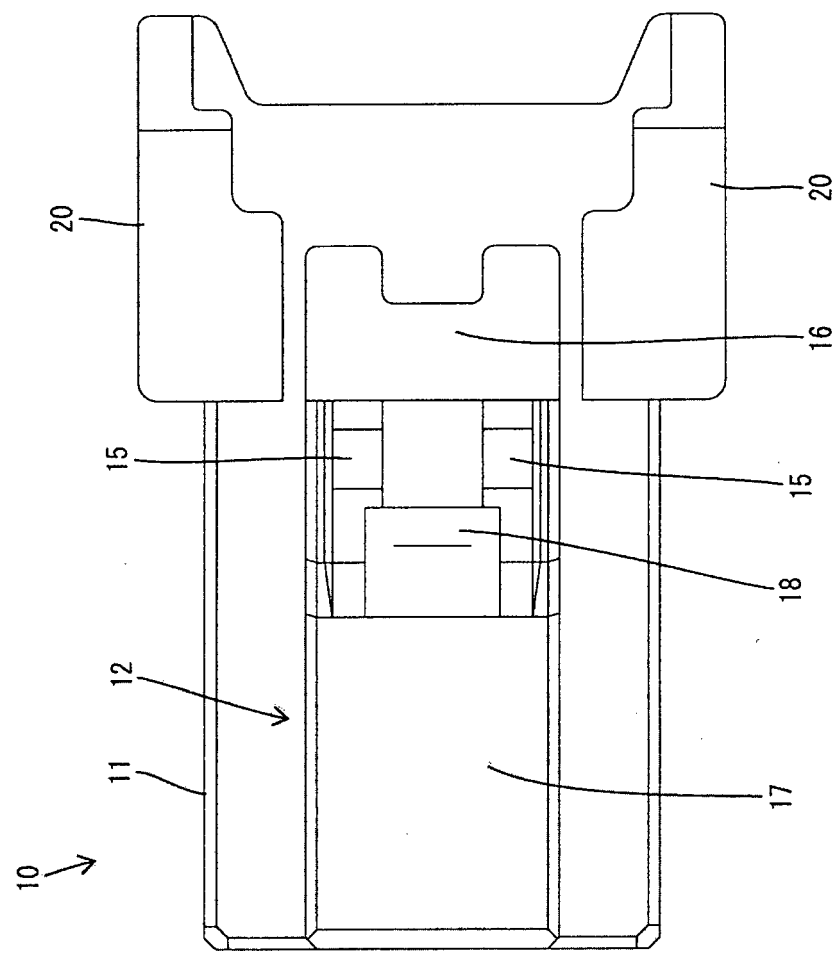


FIG. 4

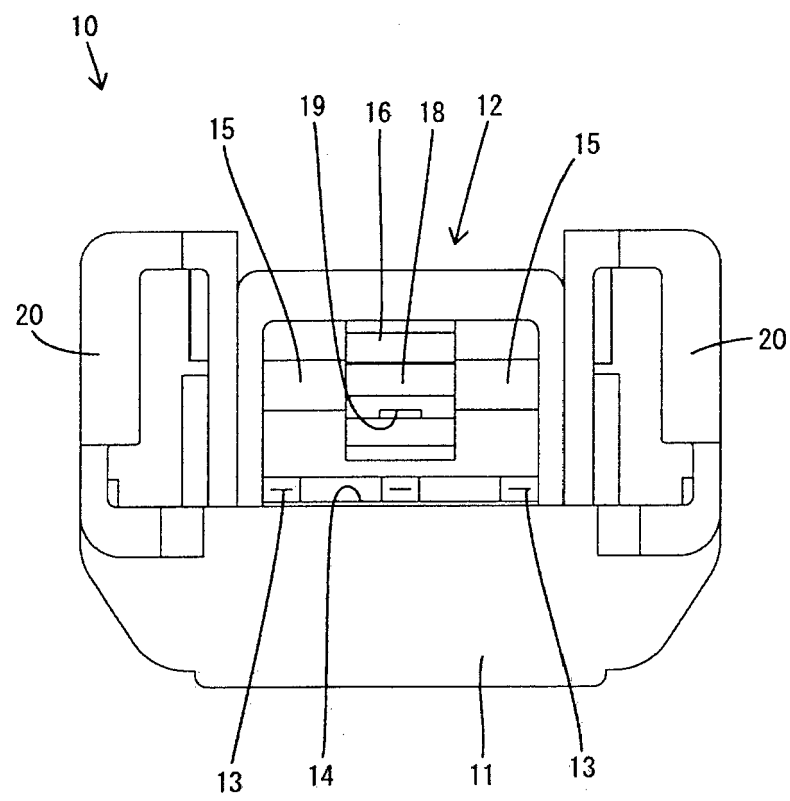


FIG. 5

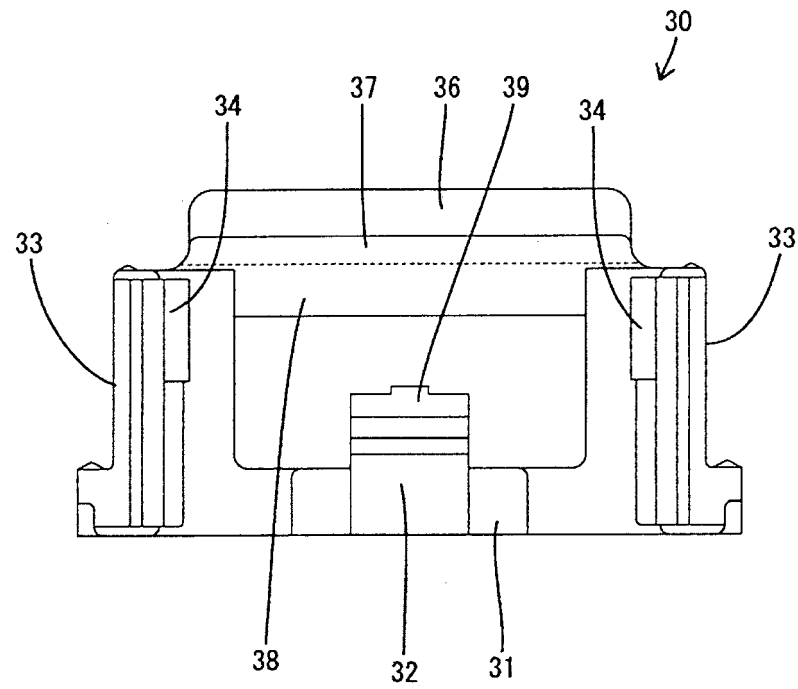


FIG. 6

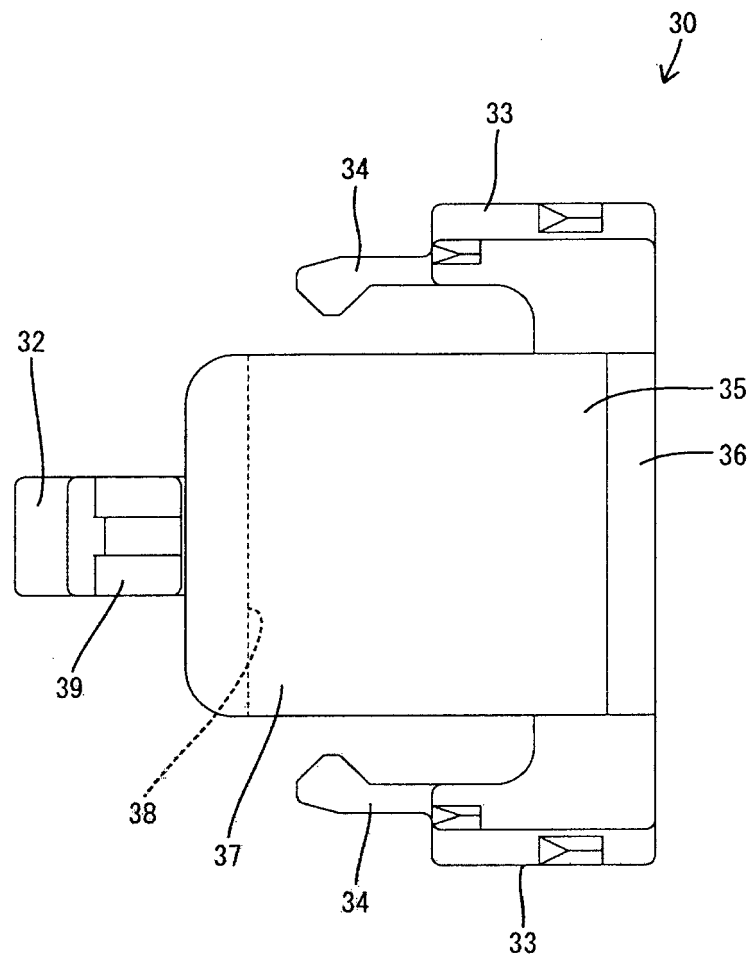


FIG. 7

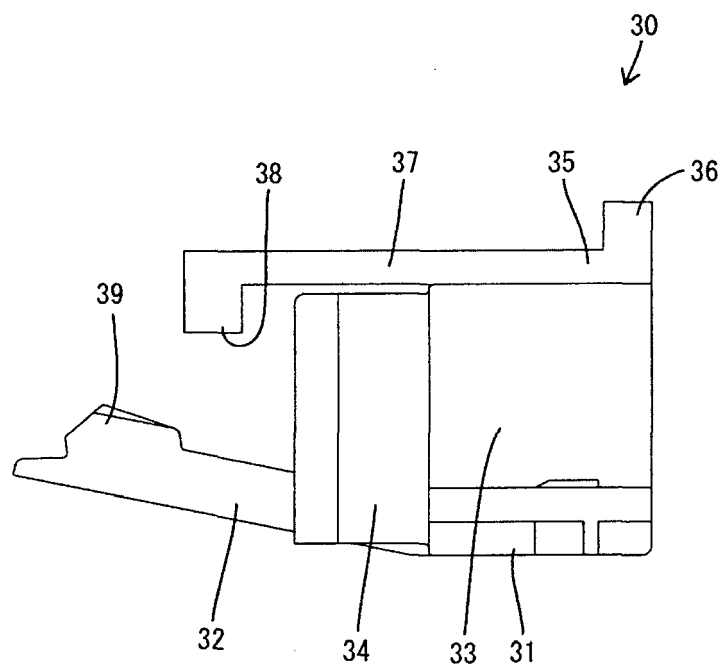


FIG. 8

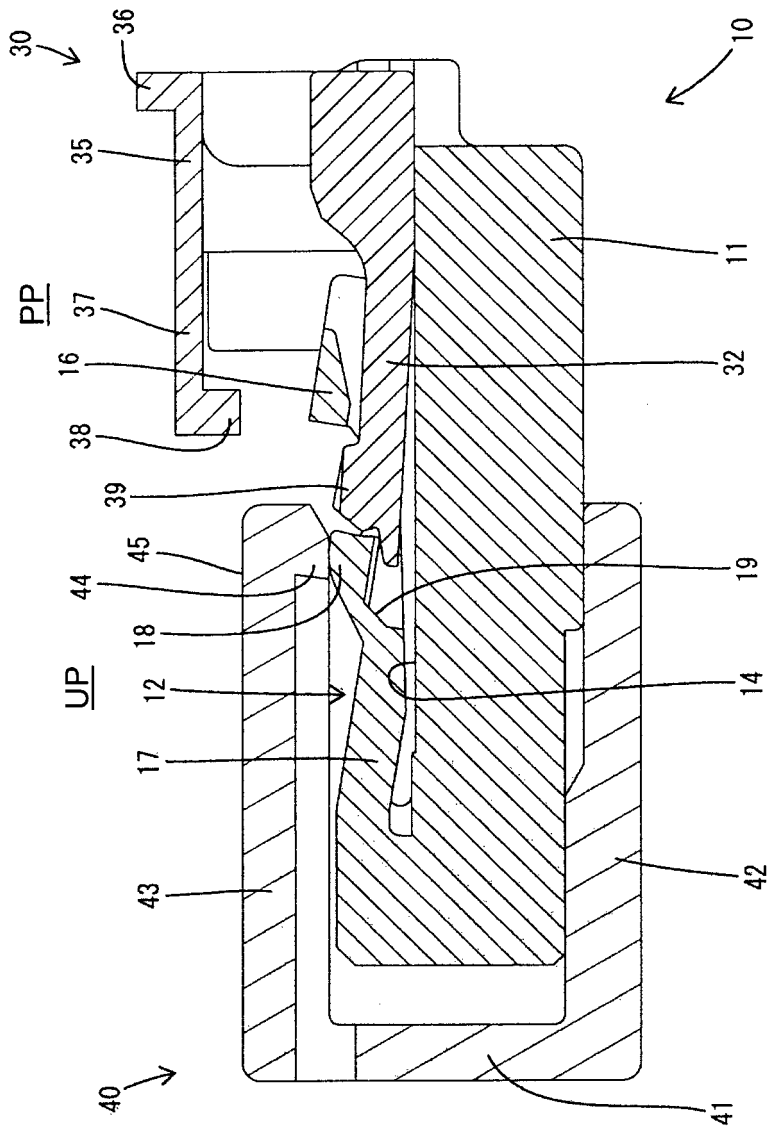


FIG. 9

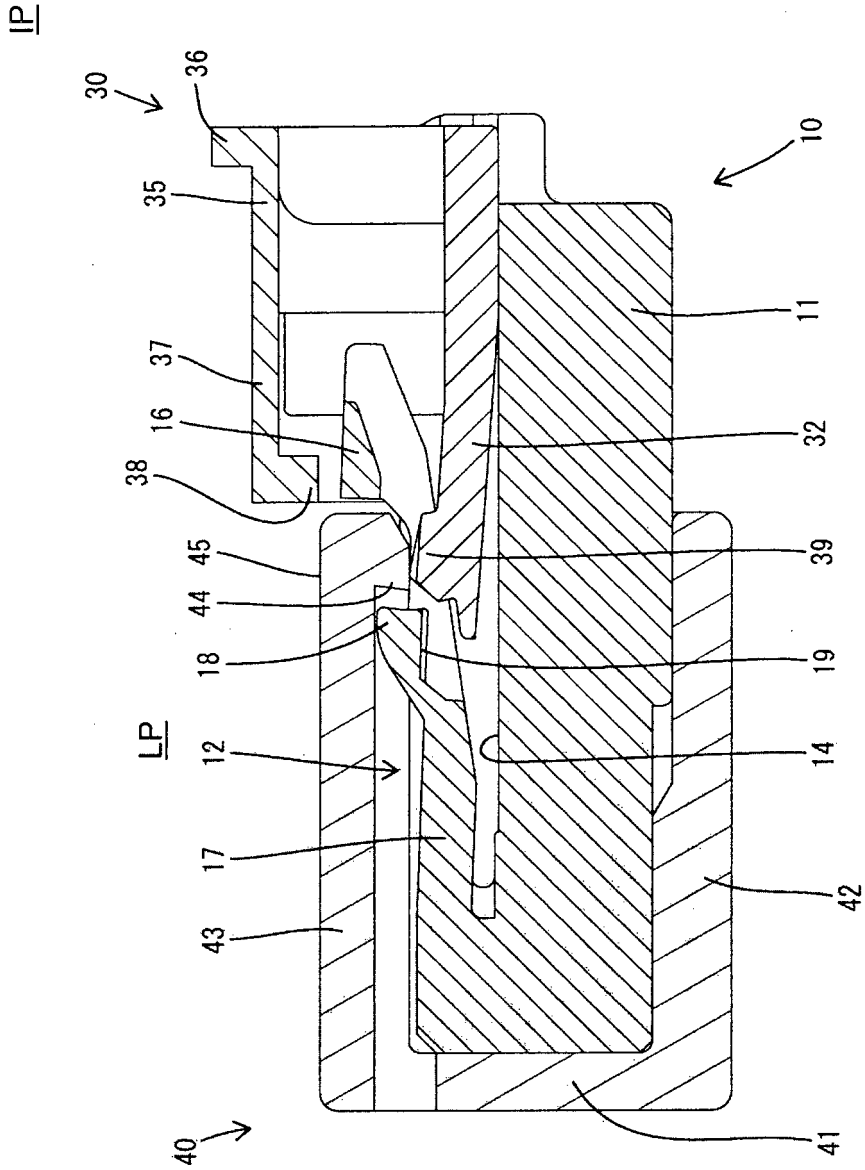
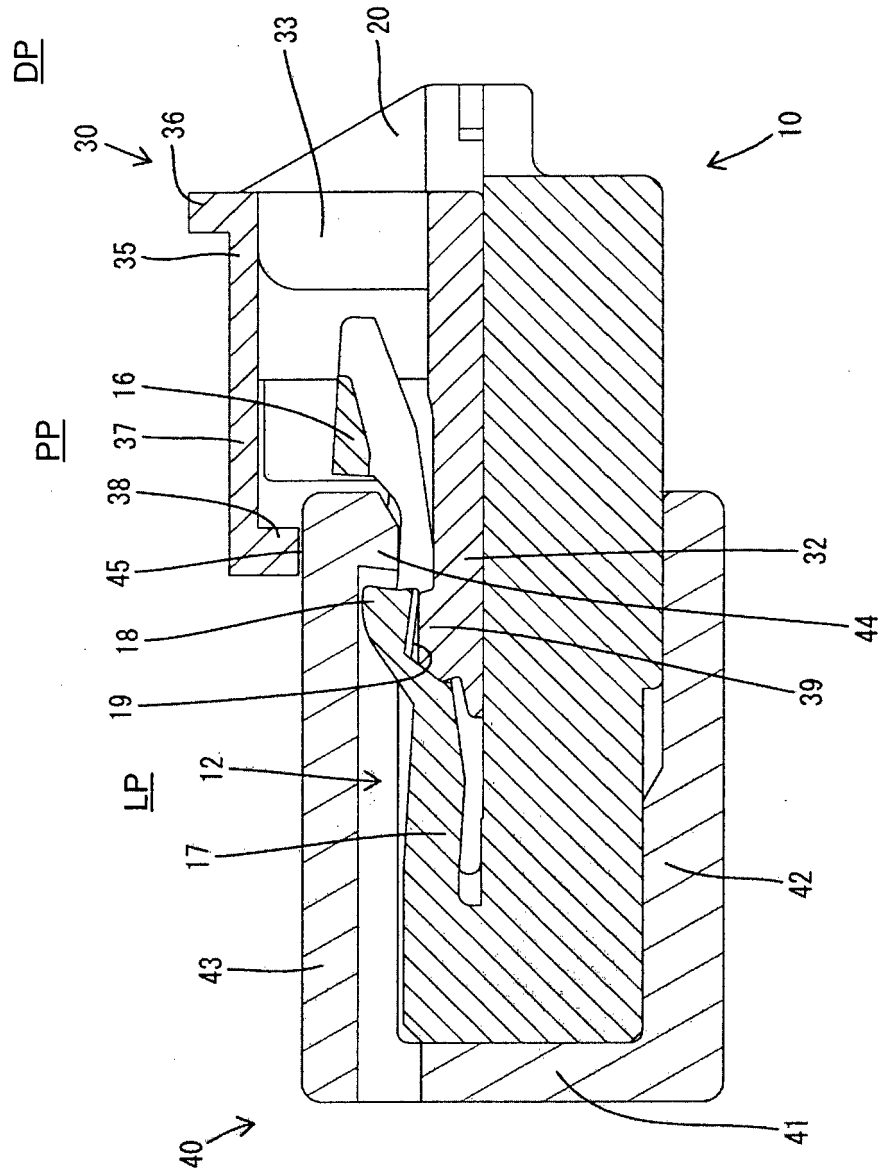


FIG. 10



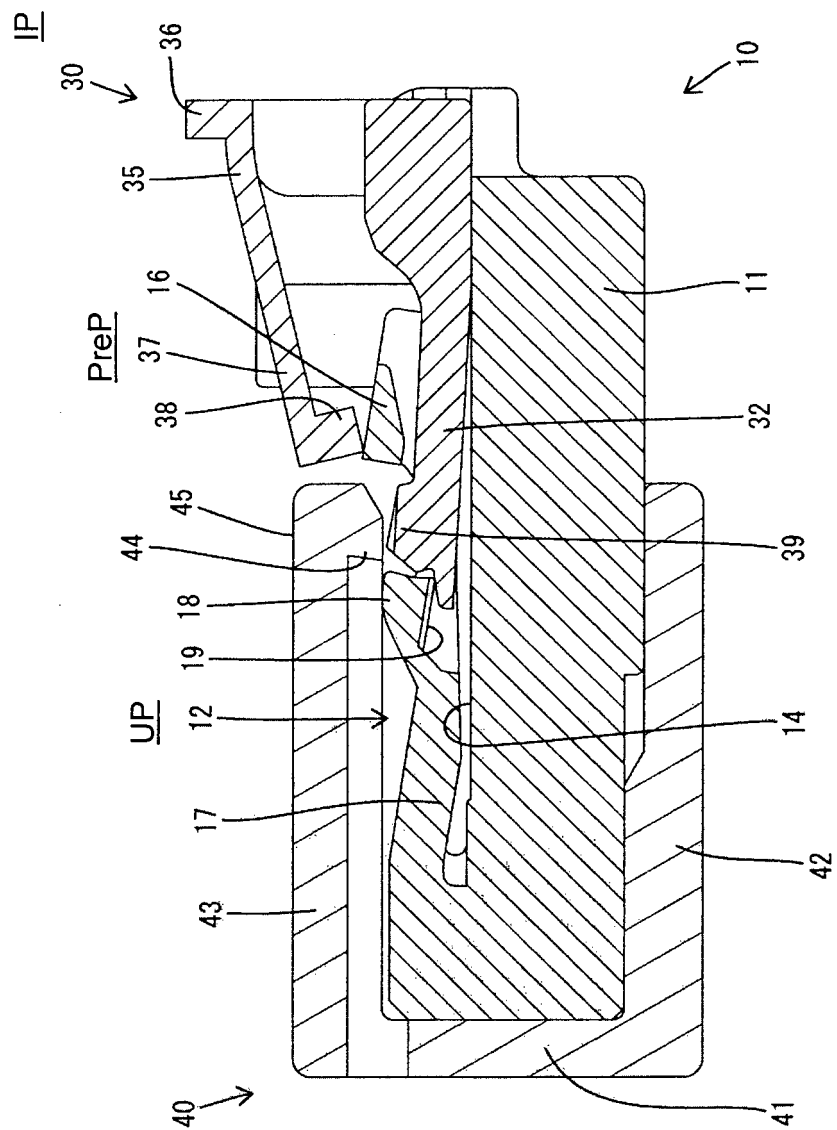


FIG. 11



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