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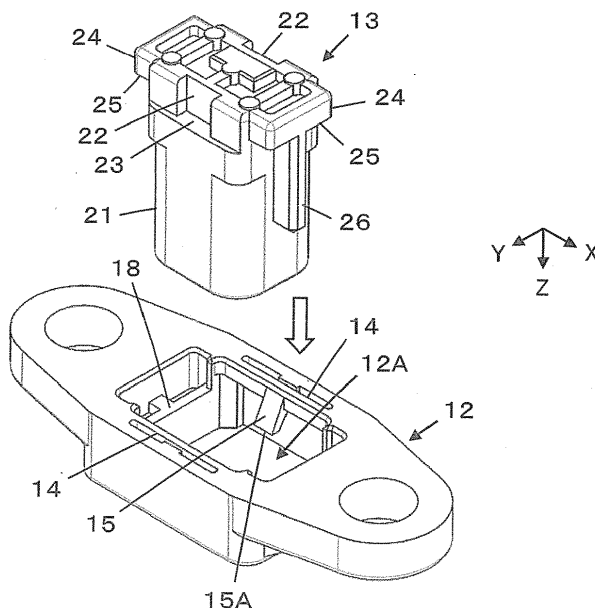
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(54) **CONNECTOR**

(57) A connector has a frame (12) and a connector housing (13), either one of a connector-housing accommodation portion (12A) of the frame (12) and the connector housing (13) includes a spring portion (14) capable of elastically deforming and a lance (15) capable of elastically deforming disposed on a surface of the spring portion (14) and extending from the spring portion (14) in an insertion direction of the connector housing (13),

the other one of the connector-housing accommodation portion (12A) of the frame (12) and the connector housing (13) includes a lance-opposing surface (23) facing a tip end (15A) of the lance (15) in the insertion direction of the connector housing (13), and the tip end (15A) of the lance (15) is caught by the lance-opposing surface (23) to prevent the connector housing (13) from falling off the frame (12).

FIG.7

Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a connector, in particular, to a connector having a structure in which a connector housing for accommodating a conductive contact is held by a frame.

[0002] As a connector of this type, for example, JP 08-115766 A discloses a connector 1 as illustrated in FIG. 12. The connector 1 has a structure in which a connector housing 4 is inserted and held in an accommodation hole 3 of a frame 2. The connector housing 4 is provided on an outer surface thereof with a projection 5, while the frame 2 is provided with a lance 6 that protrudes into the accommodation hole 3 and extends in an insertion direction of the connector housing 4. When the connector housing 4 is inserted into the accommodation hole 3 of the frame 2, the projection 5 of the connector housing 4 advances forward, while elastically deforming the lance 6 inside the accommodation hole 3, until the front face of the connector housing 4 abuts an abutment face 7 inside the accommodation hole 3. At this time, the projection 5 runs over the lance 6, and the lance 6 goes back to the original position due to its elastic force, to thereby open toward the inside of the accommodation hole 3. Accordingly, the projection 5 is caught by the lance 6, whereby the connector housing 4 can be prevented from falling off the accommodation hole 3 of the frame 2.

[0003] Once the connector housing 4 of the connector 1 is fitted with a connector housing 9 of a counter connector 8, a conductive contact (not shown) that is mounted on the connector housing 4 of the connector 1 is electrically connected to another conductive contact (not shown) that is mounted on the connector housing 9 of the counter connector 8.

[0004] However, in order for the connector housing 4 to be firmly held in the accommodation hole 3 of the frame 2, the lance 6 extending in the insertion direction of the connector housing 4 has to have such a length as to undergo a sufficient elastic deformation. Hence, it has been difficult to reduce a size of the connector 1.

SUMMARY OF THE INVENTION

[0005] The present invention has been made in order to solve the conventional problem described above and is aimed at providing a connector capable of reducing the size thereof while the connector housing is firmly held by the frame.

[0006] A connector according to the present invention comprises: a frame including a connector-housing accommodation portion; and a connector housing held at a housing holding position where at least a part of the connector housing is inserted in the connector-housing accommodation portion of the frame, the connector housing accommodating a conductive contact, wherein either one of the connector-housing accommodation portion of

the frame and the connector housing includes a spring portion capable of elastically deforming and a lance capable of elastically deforming disposed on a surface of the spring portion and extending from the spring portion in an insertion direction of the connector housing, wherein the other one of the connector-housing accommodation portion of the frame and the connector housing includes a lance-opposing surface facing a tip end of the lance in the insertion direction of the connector housing, and wherein the tip end of the lance is caught by the lance-opposing surface to prevent the connector housing from falling off the frame.

[0007] The spring portion may have a shape of a beam extending in a direction orthogonal to the insertion direction of the connector housing and having both ends of the beam fixed, and the lance may have a cantilever shape extending from a center part of the spring portion in the insertion direction of the connector housing.

[0008] It is preferable that the spring portion and the lance elastically deform when at least a part of the connector housing is inserted in the connector-housing accommodation portion, and are freed from elastic deformation when the connector housing is held at the housing holding position. Further, preferably, the spring portion elastically deforms such that the spring portion twists around a center axis thereof extending orthogonally to the insertion direction of the connector housing and that the center axis bends.

[0009] Preferably, the either one of the connector-housing accommodation portion of the frame and the connector housing includes: an opposing wall facing a surface of the spring portion on the opposite side from the lance; a first interference surface formed on the spring portion; and a second interference surface formed on the opposing wall so as to correspond to the first interference surface, and when the connector housing and the frame are applied with a force to draw one from the other, the first interference surface and the second interference surface interfere with each other to suppress deformation of the spring portion.

[0010] The first interference surface may be constituted of a part of a first projection formed on the spring portion so as to project toward the opposing wall, and the second interference surface may be constituted of a part of a second projection formed on the opposing wall so as to project toward the spring portion.

[0011] Preferably, either one of the first interference surface and the second interference surface faces in the insertion direction of the connector housing, and the other one of the first interference surface and the second interference surface faces in a direction opposite from the insertion direction of the connector housing.

[0012] Preferably, the frame and the connector housing include respectively a frame-side stopper and a housing-side stopper that abut to one another when the connector housing is held at the housing holding position to limit movement of the connector housing in the insertion direction.

[0013] It is preferable that the connector housing is held at the housing holding position so as to be movable in a plane that is perpendicular to the insertion direction of the connector housing.

[0014] Preferably, the frame includes a fixing portion that fixes the frame to an object to be connected.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIGS. 1A to 1D are a perspective view, a plan view, a bottom view and a front view, respectively, each showing a connector according to an embodiment of the present invention.

FIGS. 2A to 2D are a perspective view, a plan view, a bottom view and a front view, respectively, each showing a frame used in the connector according to the embodiment.

FIG. 3 is a partially broken perspective view showing the frame used in the connector according to the embodiment.

FIG. 4 is a partially enlarged cross-sectional view showing a spring portion and a lance of the frame used in the connector according to the embodiment.

FIG. 5 is a perspective view showing a connector housing used in the connector according to the embodiment.

FIG. 6 is a cross-sectional view showing the connector housing used in the connector according to the embodiment.

FIG. 7 is an assembly view of the connector according to the embodiment.

FIG. 8 is a cross-sectional view taken along line A-A of FIG. 1D.

FIG. 9 is a cross-sectional view corresponding to the view of FIG. 8 when the connector housing and the frame are applied with a force to pull one away from the other.

FIGS. 10A and 10B are a perspective view and a plan view, respectively, each showing a counter connector that is fitted with the connector according to the embodiment.

FIGS. 11A and 11B are a perspective view and a plan view, respectively, each showing the connector according to the embodiment when fitted with the counter connector.

FIG. 12 is a cross-sectional view showing a conventional connector.

DETAILED DESCRIPTION OF THE INVENTION

[0016] An embodiment of the present invention will be described below based on the appended drawings.

[0017] FIGS. 1A to 1D illustrate a configuration of a connector 11 according to the embodiment. The connector 11 electrically detects fitting, and includes a frame 12 and a connector housing 13 that is held by the frame 12.

The frame 12 is a plate-like member that is fixed to an object to be connected (not shown), and has in its center a connector-housing accommodation portion 12A that is a substantially rectangular through-hole and, on both sides of the connector-housing accommodation portion 12A, fixing portions 12B that are a pair of circular through-holes and that fix the frame 12 to the object to be connected.

[0018] The connector housing 13 is a columnar member that extends in a direction perpendicular to the plate-like frame 12. A part of the connector housing 13 is inserted in the connector-housing accommodation portion 12A of the frame 12, whereby the connector housing 13 is positioned at a housing holding position P and held by the frame 12.

[0019] For the sake of convenience, a direction connecting the pair of fixing portions 12B of the frame 12 is referred to as X direction, a direction in which the connector housing 13 extends is referred to as Z direction, and a direction orthogonal to the X direction and the Z direction is referred to as Y direction.

[0020] FIGS. 2A to 2D illustrate the configuration of the frame 12. The frame 12 has a pair of beam-like spring portions 14 that are respectively disposed in an end part in the +Y direction and in another end part in the -Y direction of the connector-housing accommodation portion 12A. Each of the spring portions 14 extends in the X direction, has both ends thereof fixed to the frame 12 and can elastically deform.

[0021] In addition, each of the spring portions 14 is provided on the surface of its center part with an elastically deformable lance 15 in a cantilever shape that protrudes in the Y direction toward the inside of the connector-housing accommodation portion 12A and extends in the +Z direction.

[0022] Moreover, the frame 12 has opposing walls 16 each of which faces the surface of the corresponding spring portion 14 facing in the Y direction on the opposite side from the lance 15.

[0023] In other words, the frame 12 has slits 17 extending in the X direction and disposed respectively in an end part in the +Y direction and in another end part in the -Y direction of the frame 12, and the spring portion 14 and the corresponding opposing wall 16 that face each other in the Y direction are shaped by one of the slits 17, while the lance 15 is formed on the surface of the spring portion 14 on the opposite side from the opposing wall 16.

[0024] The frame 12 is also provided with frame-side stoppers 18 that are planar surfaces facing in the -Z direction and respectively disposed at an end on the +X direction side and at another end on the -X direction side in the connector-housing accommodation portion 12A.

[0025] As illustrated in FIG. 2B, one of the frame-side stoppers 18 disposed at the end on the -X direction side in the connector-housing accommodation portion 12A continuously extends in the Y direction without being divided at the center thereof, whereas the other frame-side stopper 18 disposed at the other end on the +X direction

side in the connector-housing accommodation portion 12A has a notch 18A at the center thereof, being divided into a portion on the +Y direction side and another portion on the -Y direction side by the notch 18A.

[0026] As illustrated in FIG. 3, each of the lances 15 formed on the surfaces of the spring portions 14 has a cantilever shape protruding in the Y direction toward the inside of the connector-housing accommodation portion 12A and extending in the +Z direction, while each of the spring portions 14 extending in the X direction has a beam shape with both ends thereof fixed to the frame 12. Accordingly, during insertion of the connector housing 13 into the connector-housing accommodation portion 12A from the -Z direction to the +Z direction, as a tip end 15A that is a free end of each of the lances 15 comes into contact with the connector housing 13 and receives a force in the Y direction toward the corresponding opposing wall 16, not only each of the lances 15 elastically deforms in the Y direction, but also the spring portion 14 holding the lance 15 and extending in the X direction elastically deforms so as to twist around a center axis C1 and cause the center axis C1 bend toward the Y direction, supposing that the spring portion 14 has the center axis C1 extending in the X direction along the spring portion 14. Therefore, even if the lance 15 has a short length in the Z direction, elastic deformation of the lance 15 and elastic deformation of the spring portion 14 simultaneously occur, whereby the tip end 15A of the lance 15 can largely shift in the Y direction.

[0027] Moreover, as illustrated in FIG. 4, each of the spring portions 14 is provided with a first projection 19 that is formed on the surface of the spring portion 14 on the opposite side from the lance 15 so as to project in the Y direction toward the corresponding opposing wall 16, whereas the opposing wall 16 is provided with a second projection 20 that is formed so as to project in the Y direction toward the spring portion 14. The first projection 19 and the second projection 20 are disposed at the same position in the X direction, while the second projection 20 is located slightly away from the first projection 19 on the -Z direction side.

[0028] Furthermore, the first projection 19 is provided with a first interference surface 19A facing in the -Z direction, while the second projection 20 is provided with a second interference surface 20A facing in the +Z direction, the first interference surface 19A and the second interference surface 20A being disposed slightly apart from each other in the Y direction and the Z direction.

[0029] As illustrated in FIG. 5, the connector housing 13 has a columnar housing main body 21 extending in the Z direction, the housing main body 21 is provided at an end in the +Y direction and at the other end in the -Y direction thereof on the -Z direction side respectively with a pair of lance accommodation portions 22 in a convex shape corresponding to the pair of lances 15 of the frame 12, and each of the lance accommodation portions 22 is provided at an end in the +Z direction with a lance-opposing surface 23 facing in the -Z direction and parallel

to the XY plane. When the connector housing 13 is held by the frame 12, each of the lance accommodation portions 22 accommodates the corresponding lance 15 of the frame 12, while each of the lance-opposing surfaces 23 faces the tip end 15A of the corresponding lance 15 of the frame 12.

[0030] The housing main body 21 is provided at an end in the +X direction and the other end in the -X direction thereof on the -Z direction side respectively with overhang portions 24 overhanging in the +X direction and the -X direction, and surfaces of the overhang portions 24 on the +Z direction side constitute housing-side stoppers 25 that are planar surfaces facing in the +Z direction. The housing-side stoppers 25 abut the frame-side stoppers 18 of the frame 12 when the connector housing 13 is held by the frame 12, thereby limiting the position of the connector housing 13 in the Z direction.

[0031] In addition, the housing main body 21 is provided on the side surface thereof on the +X direction side with a protrusion 26 extending in the Z direction and protruding in the +X direction. The protrusion 26 is not formed on the other side surface on the -X direction side of the housing main body 21 and is inserted in the notch 18A of the frame 12 when the connector housing 13 is held by the frame 12, thereby preventing the connector housing 13 from being incorrectly attached to the frame 12.

[0032] As illustrated in FIG. 6, the connector housing 13 is provided with a counter-connector accommodation portion 27 that is open toward the +Z direction and accommodates a conductive contact 28. The conductive contact 28 branches into two portions, that is, two tip portions 28A each extending in the +Z direction inside the counter-connector accommodation portion 27. The tip portions 28A are apart from each other in the X direction, while only one of the tip portions 28A is visible in FIG. 6.

[0033] A thickness dimension T1 of the connector housing 13 in the Y direction at the pair of the lance accommodation portions 22 is set to be smaller than a dimension of a distance between the tip ends 15A of the pair of lances 15 of the frame 12, whereas a thickness dimension T2 of the housing main body 21 in the Y direction on the +Z direction side from the lance accommodation portions 22 is set to be smaller than a dimension of a distance between the pair of spring portions 14 of the frame 12 and larger than a distance between the tip ends 15A of the pair of lances 15 of the frame 12.

[0034] When the connector housing 13 is attached to the frame 12, the connector housing 13 is inserted into the connector-housing accommodation portion 12A of the frame 12 from the -Z direction to the +Z direction as illustrated in FIG. 7. In this process, since the thickness dimension T2 of the housing main body 21 of the connector housing 13 in the Y direction is set to be smaller than the dimension of the distance between the pair of spring portions 14 of the frame 12 and larger than the distance between the tip ends 15A of the pair of lances 15, both side surfaces of the housing main body 21 in

the Y direction respectively come into contact with the corresponding lances 15 of the frame 12, whereby each of the tip ends 15A of the lances 15 is applied with a force acting in the Y direction outward from the connector-housing accommodation portion 12A. Accordingly, the lances 15 elastically deform in the Y direction and, at the same time, the spring portions 14 holding the lances 15 elastically deform such that each of the spring portions 14 twists around the center axis C1 thereof extending in the X direction and that the center axis C1 bends in the Y direction, while the housing main body 21 of the connector housing 13 advances in the +Z direction as passing between the tip ends 15A of the pair of lances 15 of the frame 12.

[0035] In addition, the connector housing 13 is inserted while having the protrusion 26 on the side surface of the housing main body 21 of the connector housing 13 on the +X direction side inserted in the notch 18A of the frame 12. Hence, the connector housing 13 having the protrusion 26 to face in the -X direction cannot be inserted into the connector-housing accommodation portion 12A of the frame 12 since the protrusion 26 interferes with the frame-side stopper 18 of the frame 12, whereby the connector housing 13 can be prevented from being attached to the frame 12 in an incorrect orientation.

[0036] Moreover, when the pair of housing-side stoppers 25 of the connector housing 13 abut the frame-side stoppers 18 of the frame 12, insertion of the connector housing 13 into the connector-housing accommodation portion 12A of the frame 12 is stopped, being limited such that the connector housing 13 is prevented from further advancing in the +Z direction.

[0037] At this time, as illustrated in FIG. 8, the pair of lances 15 of the frame 12 are respectively accommodated in the corresponding lance accommodation portions 22 of the connector housing 13. Since the thickness dimension T1 of the connector housing 13 in the Y direction at the pair of lance accommodation portions 22 is set to be smaller than the dimension of the distance between the tip ends 15A of the pair of lances 15 of the frame 12, the lances 15 are accommodated in the lance accommodation portions 22 respectively so as to be freed from elastic deformation and return to the original state before insertion of the connector housing 13, whereby the tip ends 15A of the lances 15 face the corresponding lance-opposing surfaces 23 of the connector housing 13.

[0038] Because the tip ends 15A of the lances 15 are caught by the lance-opposing surfaces 23, the connector housing 13 is prevented from falling off the frame 12 in the -Z direction.

[0039] In this way, insertion of the connector housing 13 in the +Z direction is limited through abutment of the housing-side stoppers 25 of the connector housing 13 to the frame-side stoppers 18 of the frame 12, and the tip ends 15A of the lances 15 are caught by the lance-opposing surfaces 23 so as to prevent the connector housing 13 from falling off in the -Z direction, whereby the connector housing 13 is held by the frame 12 and posi-

tioned at the housing holding position P where an end portion of the connector housing 13 on the -Z direction side is inserted in the connector-housing accommodation portion 12A of the frame 12.

[0040] Although movements in the +Z direction and the -Z direction of the connector housing 13 positioned at the housing holding position P are limited, a predetermined distance is given each between the side surface of the housing main body 21 and the edge portion of the connector-housing accommodation portion 12A of the frame 12 and between the lateral face of each of the lance accommodation portions 22 and the tip end 15A of the corresponding lance 15 of the frame 12 as illustrated in FIG. 8, so the connector housing 13 is held by the frame 12 such that the connector housing 13 can move within the range of the above-described distances along the XY plane perpendicular to the insertion direction of the connector housing 13. In other words, the frame 12 and the connector housing 13 together form a so-called floating structure.

[0041] When the connector housing 13 is positioned at the housing holding position P, the pair of lances 15 and the pair of spring portions 14 of the frame 12 are back in the original state with no elastic deformation so that the first interference surface 19A formed on each of the spring portions 14 and the second interference surface 20A formed on the corresponding opposing wall 16 are located slightly away from each other in the Y direction and the Z direction.

[0042] When the connector housing 13 positioned at the housing holding position P and the frame 12 are applied with a force to pull one away from the other, such as when a force to pull the connector housing 13 from the housing holding position P is applied, the tip ends 15A of the pair of lances 15 of the frame 12 are caught by the pair of lance opposing surfaces 23 of the connector housing 13, and if the force is large, the tip ends 15A of the lances 15 are pulled up in the -Z direction by the lance opposing surfaces 23 of the connector housing 13 as illustrated in FIG. 9.

[0043] At this time, since the spring portions 14 hold the base parts of the lances 15, moments around the center axis C1 act on each of the spring portions 14, and at the same time, the force in the Y direction toward the corresponding opposing wall 16 and the force in the -Z direction to pull upward are applied on the spring portion 14, whereby the spring portion 14 elastically deforms in the Y direction and the -Z direction as twisting around the center axis C1, and the first interference surface 19A formed on the spring portion 14 comes into contact with the second interference surface 20A formed on the corresponding opposing wall 16.

[0044] Since each of the first interference surfaces 19A and the corresponding second interference surface 20A interfere with each other in this manner, the spring portions 14 are prevented from further elastically deforming, whereby the connector housing 13 is restrained from moving in the -Z direction.

[0045] The force that acted from the connector housing 13 on the tip ends 15A of the lances 15 is transmitted to the spring portions 14 and is then received by the second interference surfaces 20A of the opposing walls 16 via the first interference surfaces 19A. Therefore, the amount of deformation of the lances 15 and the spring portions 14 is reduced, and there is an effect of improving breaking strength of the lances 15 and the spring portions 14.

[0046] In the connector 11 according to the embodiment, since the frame 12 includes the spring portions 14 extending in the X direction and the lances 15 extending from the surfaces of the spring portions 14 in the Z direction, even if the length of each of the lances 15 in the Z direction is short, the lances 15 and the spring portions 14 simultaneously undergo elastic deformation so that the tip ends 15A of the lances 15 can largely move in the Y direction. Accordingly, it is possible to realize a connector having a short length in the Z direction that is the insertion direction of the connector housing 13, while the connector housing 13 is firmly held by the frame 12.

[0047] FIGS. 10A and 10B illustrate a counter connector 31 with which the connector 11 according to the embodiment is fitted.

[0048] The counter connector 31 includes a frame 32 and a connector housing 33 that is integrally formed with the frame 32 so as to protrude from the surface of the frame 32. The frame 32 is a plate-like member that is fixed to a counter-side object to be connected (not shown) and is provided at both ends thereof with fixing portions 34 that are a pair of circular through-holes for being fixed to the counter-side object to be connected. The connector housing 33 is a columnar member extending in a perpendicular direction to the plate-like frame 32 and is provided with two insertion holes 35 that are parallel to each other and extend in a perpendicular direction to the frame 32; conductive contacts 36 are respectively accommodated and held in the insertion holes 35.

[0049] When used, while the connector 11 is fixed to the object to be connected (not shown) by means of the pair of fixing portions 12B of the frame 12, and the counter connector 31 is fixed to the counter-side object to be connected (not shown) by means of the pair of fixing portions 34 of the frame 32, the connector housing 33 of the counter connector 31 is inserted in the counter-connector accommodation portion 27 of the connector housing 13 of the connector 11, whereby the connector 11 and the counter connector 31 are fitted with each other as illustrated in FIGS. 11A and 11B.

[0050] At this time, since the connector housing 13 of the connector 11 is held by the frame 12 so as to be movable in the XY plane, even if the frame 12 and the frame 32 are misaligned from one another due to a variation between the fixing position of the frame 12 to the object to be connected and the fixing position of the frame 32 to the counter-side object to be connected, a variation in relative positions between the object to be connected and the counter-object to be connected, and the like, the connector housing 13 moves in the XY plane with respect

to the frame 12, whereby the connector housing 13 of the connector 11 is positionally adjusted to the connector housing 33 of the counter connector 31, allowing the connector 11 to be fitted with the counter connector 31.

[0051] Once the connector 11 is fitted with the counter connector 31, the pair of tip portions 28A of the conductive contact 28 held by the connector housing 13 of the connector 11 come into contact with the pair of conductive contacts 36 held by the connector housing 33 of the counter connector 31, causing the pair of conductive contacts 36 of the counter connector 31 to short-circuit via the conductive contact 28 of the connector 11. Fitting of the connectors can be electrically detected in this manner.

[0052] In the above-described embodiment, the frame 12 includes the spring portions 14 and the lances 15, whereas the connector housing 13 includes the lance accommodation portions 22 and the lance-opposing walls 23. Conversely, however, even if the connector housing 13 is provided with the spring portions 14 and the lances 15, and the frame 12 is provided with the lance accommodation portions 22 and the lance-opposing walls 23, a connector in a small size can be realized while the connector housing 13 is firmly held by the frame 12 in the same manner.

[0053] Moreover, in the above-described embodiment, the spring portions 14 of the frame 12 each have a beam-like shape with both ends thereof being fixed. However, this is not the sole case, and the spring portions 14 may have a cantilever shape, for example, and be provided on the surfaces thereof with the lances 15, respectively.

[0054] The connector 11 according to the embodiment described above is a fitting-detecting connector for electrically detecting fitting. However, this is not the sole case, and the present invention can be similarly applied to a circuit connector that is used for connection of electrical signals.

Claims

1. A connector comprising: a frame (12) including a connector-housing accommodation portion (12A); and a connector housing (13) held at a housing holding position where at least a part of the connector housing (13) is inserted in the connector-housing accommodation portion (12A) of the frame (12), the connector housing accommodating a conductive contact (28), wherein either one of the connector-housing accommodation portion (12A) of the frame (12) and the connector housing (13) includes a spring portion (14) capable of elastically deforming and a lance (15) capable of elastically deforming disposed on a surface of the spring portion (14) and extending from the spring portion (14) in an insertion direction of the connector housing (13), wherein the other one of the connector-housing ac-

- commodation portion (12A) of the frame (12) and the connector housing (13) includes a lance-opposing surface (23) facing a tip end (15A) of the lance (15) in the insertion direction of the connector housing (13), and
 wherein the tip end (15A) of the lance (15) is caught by the lance-opposing surface (23) to prevent the connector housing (13) from falling off the frame (12).
2. The connector according to claim 1, wherein the spring portion (14) has a shape of a beam extending in a direction orthogonal to the insertion direction of the connector housing (13) and having both ends of the beam fixed, and
 the lance (15) has a cantilever shape extending from a center part of the spring portion (14) in the insertion direction of the connector housing (13).
 3. The connector according to claim 1 or 2, wherein the spring portion (14) and the lance (15) elastically deform when at least a part of the connector housing (13) is inserted in the connector-housing accommodation portion (12A), and are freed from elastic deformation when the connector housing (13) is held at the housing holding position.
 4. The connector according to claim 3, wherein the spring portion (14) elastically deforms such that the spring portion (14) twists around a center axis (C1) thereof extending orthogonally to the insertion direction of the connector housing (13) and that the center axis (C1) bends.
 5. The connector according to any one of claims 1 to 4, wherein the either one of the connector-housing accommodation portion (12A) of the frame (12) and the connector housing (13) includes: an opposing wall (16) facing a surface of the spring portion (14) on the opposite side from the lance (15); a first interference surface (19A) formed on the spring portion (14); and a second interference surface (20A) formed on the opposing wall (16) so as to correspond to the first interference surface (19A), and
 when the connector housing (13) and the frame (12) are applied with a force to draw one from the other, the first interference surface (19A) and the second interference surface (20A) interfere with each other to suppress deformation of the spring portion (14).
 6. The connector according to claim 5, wherein the first interference surface (19A) is constituted of a part of a first projection (19) formed on the spring portion (14) so as to project toward the opposing wall (16), and the second interference surface (20A) is constituted of a part of a second projection (20) formed on the opposing wall (16) so as to project toward the spring portion (14).
 7. The connector according to claim 5 or 6, wherein either one of the first interference surface (19A) and the second interference surface (20A) faces in the insertion direction of the connector housing (13), and the other one of the first interference surface (19A) and the second interference surface (20A) faces in a direction opposite from the insertion direction of the connector housing (13).
 8. The connector according to any one of claims 1 to 7, wherein the frame (12) and the connector housing (13) include respectively a frame-side stopper (18) and a housing-side stopper (25) that abut to one another when the connector housing (13) is held at the housing holding position to limit movement of the connector housing (13) in the insertion direction.
 9. The connector according to any one of claims 1 to 8, wherein the connector housing (13) is held at the housing holding position so as to be movable in a plane that is perpendicular to the insertion direction of the connector housing (13).
 10. The connector according to any one of claims 1 to 9, wherein the frame (12) includes a fixing portion that fixes the frame (12) to an object to be connected.

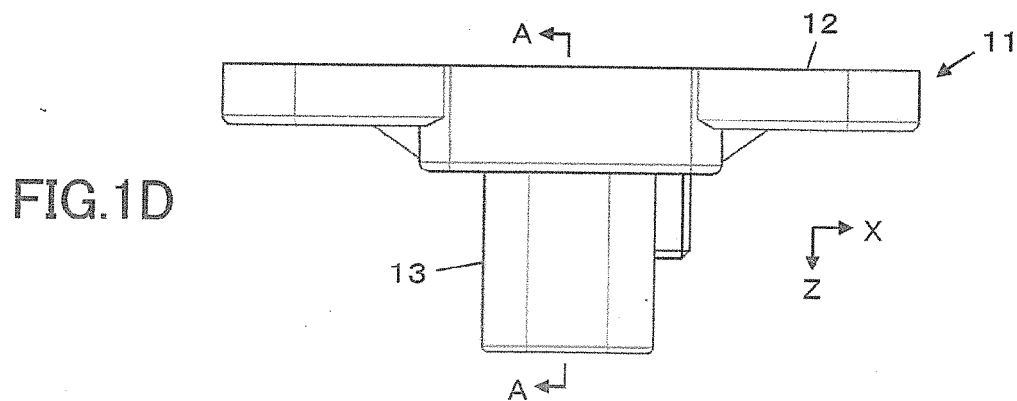
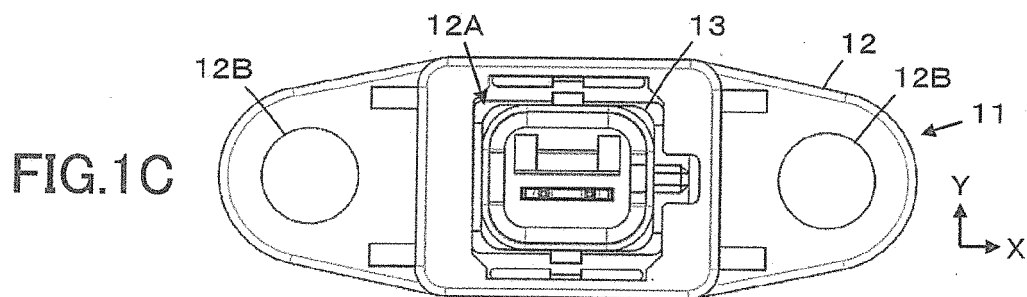
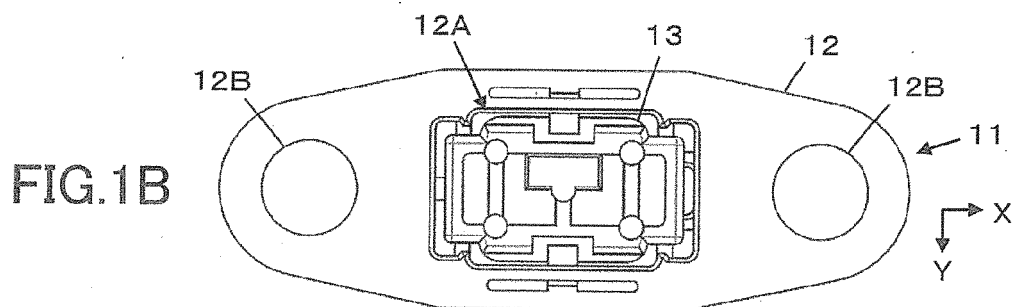
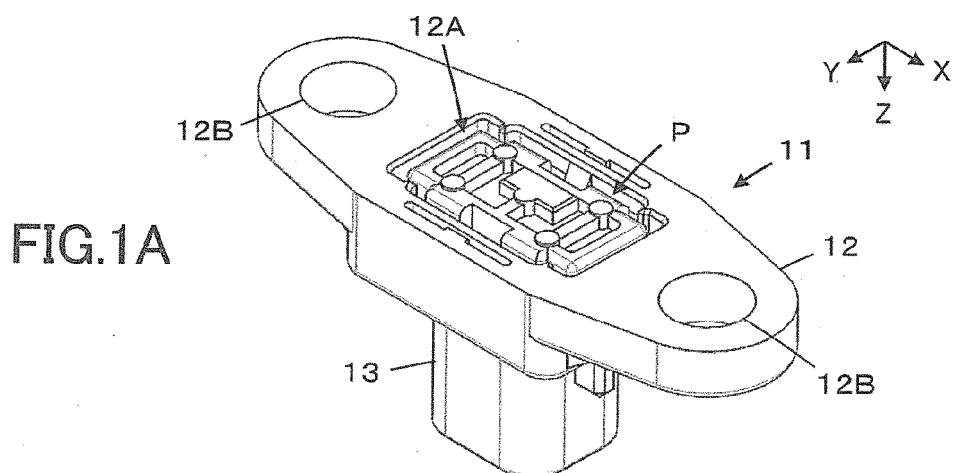


FIG.2A

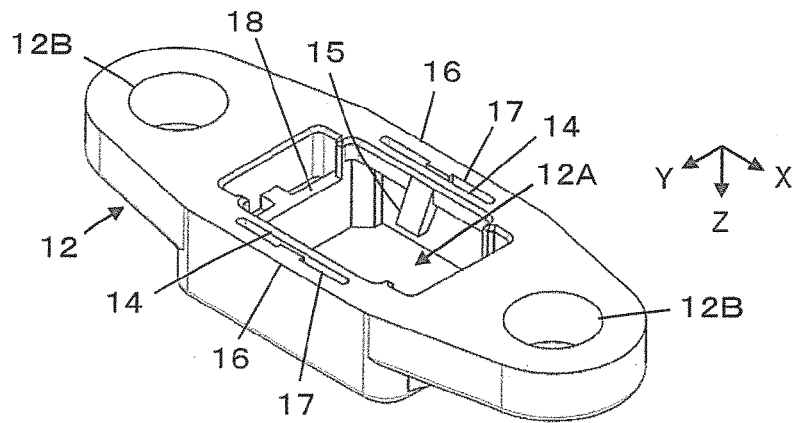


FIG.2B

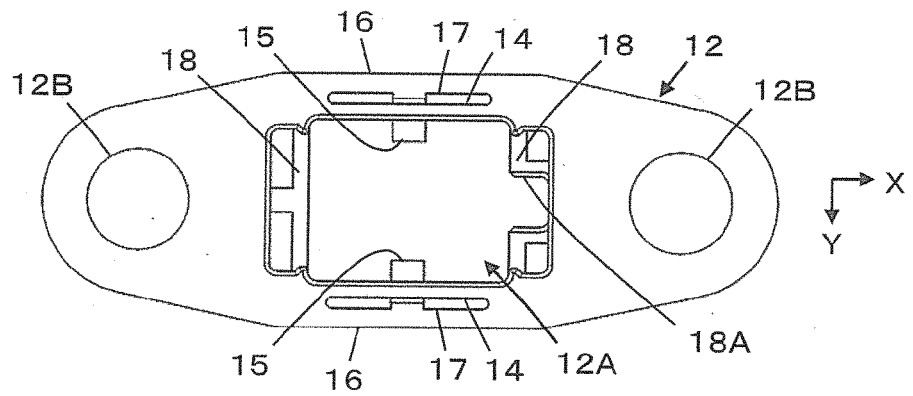


FIG.2C

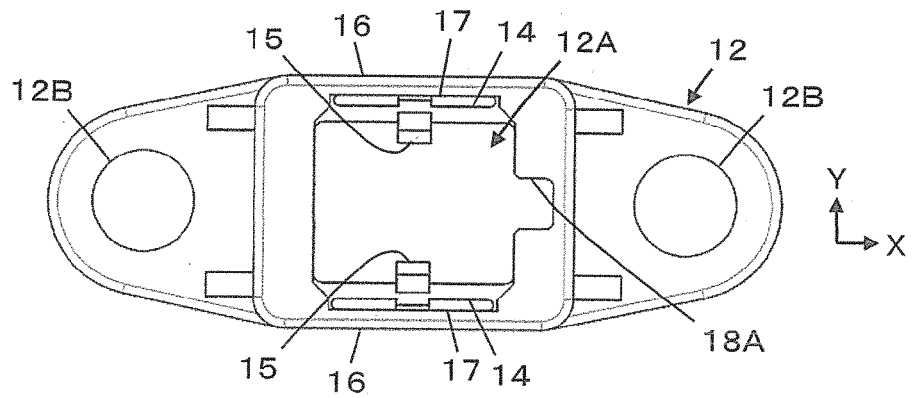


FIG.2D

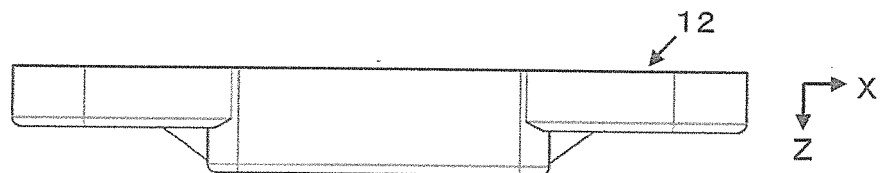


FIG.6

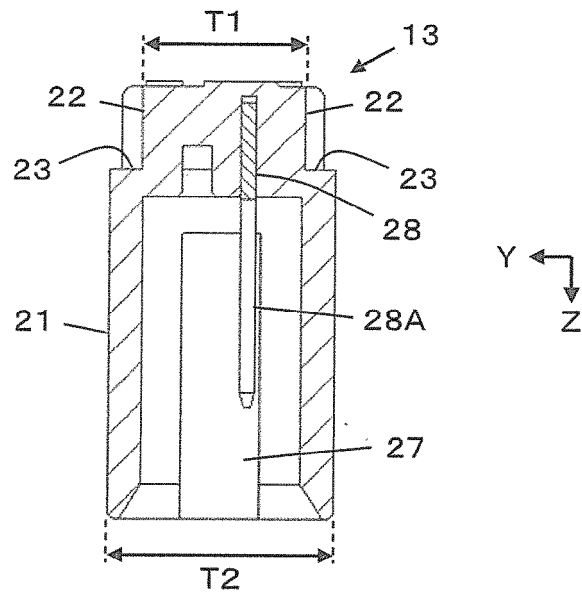


FIG.7

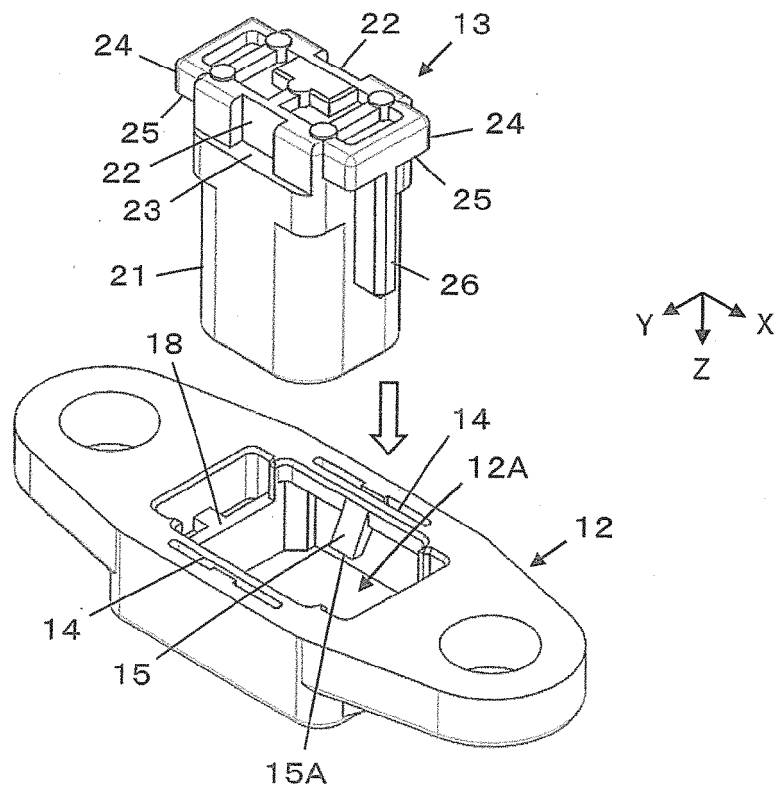


FIG.8

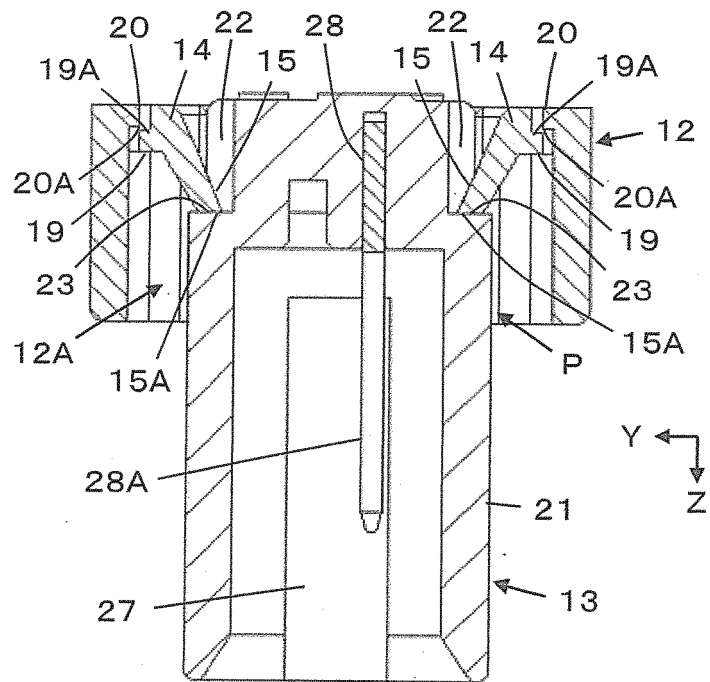


FIG.9

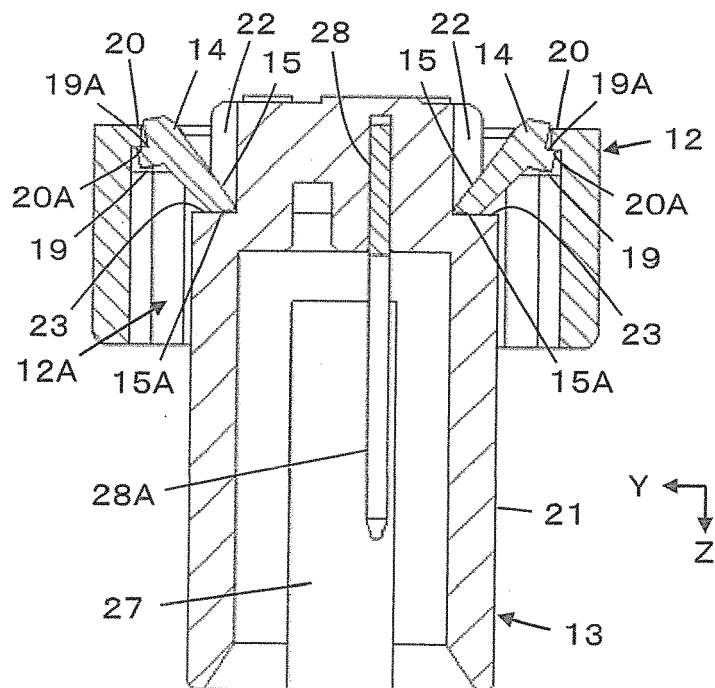


FIG.10A

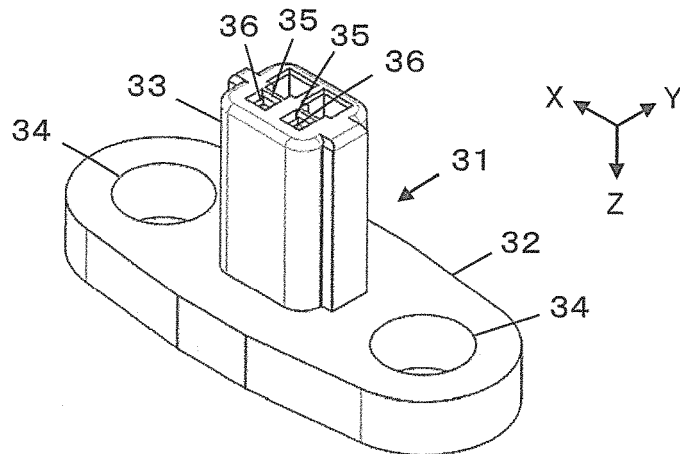


FIG.10B

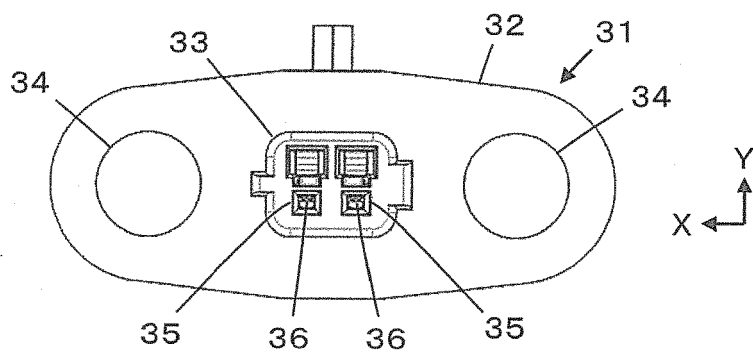


FIG.11A

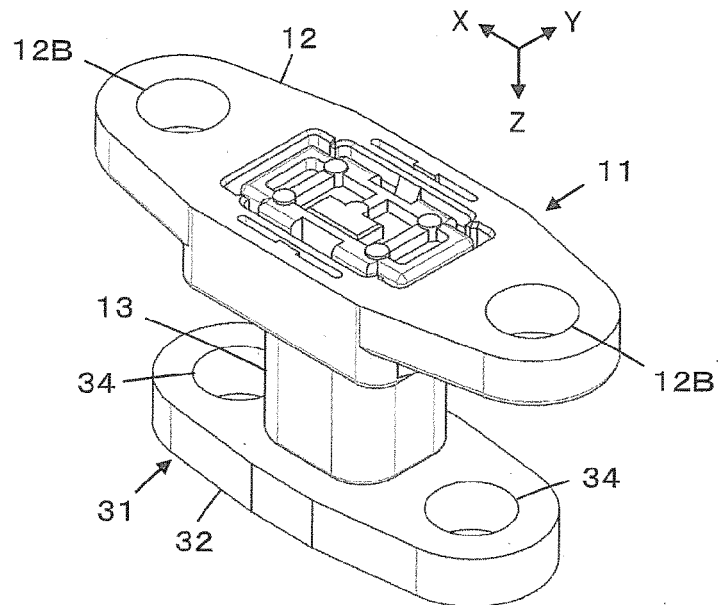


FIG.11B

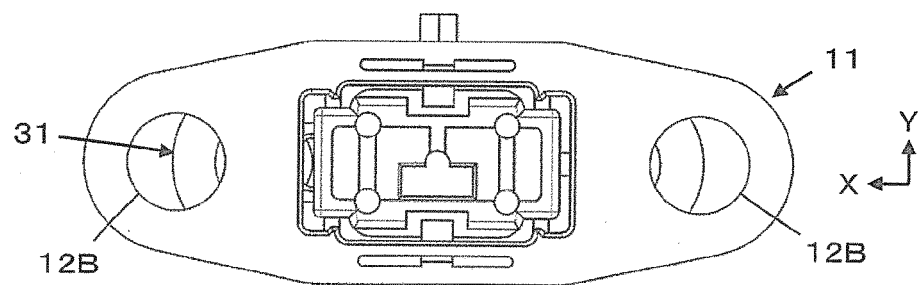
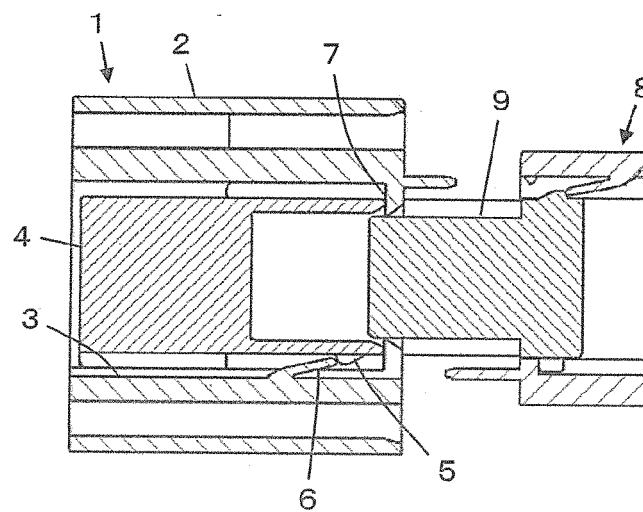


FIG.12





EUROPEAN SEARCH REPORT

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Y	* paragraph [0030] - paragraph [0104]; figures 5-7 *	2	
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		7 March 2016	Philippot, Bertrand
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