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(54) **Title:** ELECTRICAL CONNECTOR

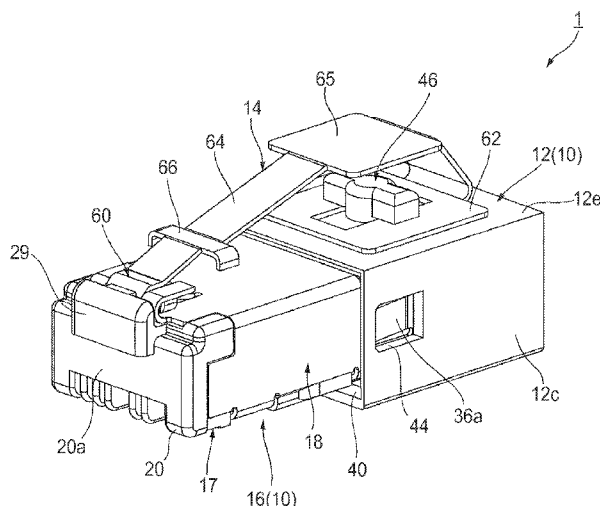


FIG. 1

(57) **Abstract:** An electrical connector 1 is provided with a connector main body section 10 and a latch member 14, wherein the connector main body section 10 is provided with a connector portion 16 inserted into a mating connector and a connector case 12 disposed in a Y-direction relative to the connector portion 16; a latch member 14 is provided with a fixing portion 60 fixed to the connector portion 16, a slide portion 62 provided with an ability to slide in the connector case 12, an arm portion 64 that links the fixing portion 60 and the slide portion 62, and a latch portion 66 provided on the arm portion 64 to engage the mating connector; the connector case 12 is provided with a protruding portion 46 to provide the slide portion 62 with an ability to slide in the Y-direction; and when the arm portion 64 is pressed at a time of releasing the engagement of the latch portion 66 and the mating connector, the slide portion 62 slides in the Y-direction

ELECTRICAL CONNECTOR

Technical Field

The present invention relates to an electrical connector.

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Background

A connector described in Patent Document 1 below, for example, is known as an electrical connector attached to a communication cable.

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Patent Document 1 describes, "A connector having a latching arm protruding outward from the connector, provided with a free end portion that is formed on the latching arm and protrudes inward, wherein the free end portion protrudes inward toward an upper surface of the connector, reaches a position sufficiently near the upper surface above the upper surface, and makes it less likely that the latching arm becomes entangled with or caught on other components."

Prior Art Documents

Japanese Unexamined Patent Application Publication No. 2006-222097

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Summary

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With a latch member of the electrical connector, if an end of an arm is made to be a free end, a possibility of the arm becoming caught on another component or the like is unavoidable. Moreover, if the arm is pressed at a time of removing and inserting the latch member from and into a receptacle connector (modular jack), the latch member may become damaged by a load being applied on the arm. Therefore, with the latch member of the electrical connector, a demand is rising for a structure that can prevent damage of the arm.

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An aspect of the present invention relates to an electrical connector provided with a connector main body section and a latch member attached to the connector main body section. The connector main body section is provided with a front portion that inserts into a mating connector and a rear portion disposed in a first direction relative to the front portion. The latch member forms an elongated shape extending in the first direction, and is provided with a fixed end fixed to the front portion, a sliding end

provided so as to be capable of sliding in the rear portion, an arm that links the fixed end and the sliding end, and a latch portion provided on the arm to engage the mating connector. The rear portion is provided with a protruding portion to provide the sliding end with an ability to slide in the first direction. When the arm is pressed at a time of releasing the engagement of the latch portion and the mating connector, the sliding end slides in the first direction.

According to the present invention, the fixed end that is an end of the arm is fixed, and the sliding end that is another end of the arm is able to slide in the first direction due to the protruding portion. Therefore, because both ends of the arm are not free ends, damage due to the arm becoming caught on other components and the like can be prevented. Moreover, because the sliding end slides in the first direction when the arm is pressed, the load applied on the arm can be reduced. Therefore, damage of the latch member can be prevented.

Brief Description of the Drawings

FIG. 1 is a perspective view illustrating an electrical connector according to a first embodiment.

FIG. 2 is a perspective view illustrating the electrical connector of FIG. 1 from a lower portion side.

FIG. 3 is a perspective view illustrating a connector main body section.

FIG. 4 is an exploded perspective view of the electrical connector of FIG. 1.

FIG. 5 is a perspective view illustrating a connector portion and a connector case.

FIGs. 6(a) and (b) are perspective top and bottom views illustrating a latch member.

FIG. 7 is an enlarged perspective view illustrating the connector portion and a fixing portion of the latch member.

FIG. 8 is an enlarged perspective view illustrating the connector case and a slide portion of the latch member.

FIGs. 9(a) and (b) are enlarged respective plan and side diagrams illustrating the connector case and the slide portion of the latch member.

FIGs. 10(a), (b) and (c) are diagrams illustrating an assembly procedure of the electrical

connector of FIG. 1.

FIG. 11 is a further diagram illustrating the assembly procedure of the electrical connector of FIG. 1.

FIGs. 12(a) and (b) are further diagrams illustrating the assembly procedure of the electrical connector of FIG. 1.

Detailed Description

Embodiments of the present invention will be described in detail below while referencing the attached drawings. In describing the drawings, identical signs will be used for identical or equivalent elements, and redundant description will be omitted.

FIG. 1 is a perspective view illustrating an electrical connector according to a first embodiment. FIG. 2 is a perspective view illustrating the electrical connector of FIG. 1 from a lower portion side. FIG. 3 is a perspective view illustrating a connector main body section. FIG. 4 is an exploded perspective view of the electrical connector of FIG. 1. FIG. 5 is a perspective view illustrating a connector portion and a connector case. FIG. 6 is a perspective view illustrating a latch member. FIG. 7 is an enlarged perspective view illustrating the connector portion and a fixing portion of the latch member. FIG. 8 is an enlarged perspective view illustrating the connector case and a slide portion of the latch member. FIG. 9(a) is an enlarged plan view illustrating the connector case and the slide portion of the latch member, and FIG. 9(b) is an enlarged side view illustrating the connector case and the slide portion of the latch member.

In the description below, as illustrated in FIGS. 1 and 2, a width direction of an electrical connector 1 is defined as an X-direction (second direction), a length direction of the electrical connector 1 (direction in which the electrical connector 1 is inserted) is defined as a Y-direction (first direction), and a height direction of the electrical connector 1 is defined as a Z-direction (third direction). The X-direction, the Y-direction, and the Z-direction are, for example, mutually orthogonal. Moreover, in the present embodiment, a side where the electrical connector 1 is inserted into a plug insertion opening (not illustrated) of a receptacle connector (modular jack) that is a mating connector is defined as the

“front,” and a side where a cable 3 is inserted is defined as the “rear.”

The electrical connector 1 illustrated in FIGS. 1 and 2 is, for example, an RJ (registered jack)-45 connector standardized by ISO/IEC8877 and is configured as a plug connector inserted into the plug insertion opening of the receptacle connector. The electrical connector 1 is attached to a terminal of the cable 3 (see FIG. 11). The cable 3 is a communication cable and is, for example, a local area network (LAN) cable having four core wires 5 (see FIG. 11) and a shield (not illustrated) covering an entire outer periphery of these core wires 5.

The electrical connector 1 is provided with a connector main body section 10 and a latch member 14. With the electrical connector 1, the latch member 14 is attached to the connector main body section 10.

The connector main body section 10 is provided with a connector portion (front portion) 16 and a connector case (rear portion) 12. The connector main body section 10 is configured by a portion of the connector portion 16 being housed in the connector case 12. The connector portion 16 is a portion that is inserted into the plug insertion opening of the receptacle connector that is to be connected. The connector portion 16 is provided with an assembly (housing) 17 and a shield member 18.

The assembly 17 is provided with a housing 20, a cable cover 22, and a contact member (contact portion) 24. The housing 20 is formed from an industrial plastic material, for example, a material having an insulation property, such as polybutylene terephthalate (PBT) or polyamide (PA). The housing 20 has a housing portion 26, a contact member holding portion 28, and a protruding portion 29. The housing portion 26 is a portion that houses and holds the cable cover 22. The housing portion 26 is provided in a rear portion of the housing 20. The housing portion 26 is opened to the rear. A locking portion 26a that locks the cable cover 22 is provided on the housing portion 26. A front end portion 20a of the housing 20 (connector portion 16) is an insertion end of the electrical connector 1 that is inserted into the receptacle connector.

The contact member holding portion 28 is a portion that holds and fixes the contact member 24. The contact member holding portion 28 has a plurality of (here, four) groove portions 28a in which each contact member 24 is disposed. The groove portions 28a are provided from the housing portion 26

across to the front end portion 20a of the housing 20. The groove portions 28a have a shape corresponding to a shape of the contact member 24. The protruding portion 29 is a portion abutted by a fixing portion 60 (described below) of the latch member 14 and regulates movement of the fixing portion 60 to the front. The protruding portion 29 is provided on the front end portion 20a of the housing 20 and protrudes upward.

The cable cover 22 is formed from, for example, a material such as polybutylene terephthalate or polyamide. The cable cover 22 houses the core wires 5 of the cable 3. The cable cover 22 has a plurality of (here, four) insertion openings 23 into which the core wires 5 of the cable 3 are inserted. The insertion openings 23 are disposed in a rear end portion in the cable cover 22 and are opened to a rear side. The cable cover 22, when housed in the housing portion 26 of the housing 20, is provided with opening portions (not illustrated) into which contacts 30 (described below) are inserted in positions corresponding to the contacts 30 of the contact member 24.

A locking claw 22a is provided on a sidewall portion of the cable cover 22. The locking claw 22a engages with the locking portion 26a provided on the housing portion 26 of the housing 20. By this, the cable cover 22 is fixed to the housing 20.

The contact member 24 is provided in a plurality (here, four) according to a number of the core wires 5 of the cable 3. Each contact member 24 is formed from, for example, a conductive member such as metal. Each contact member 24 is provided with the contact 30 and a contact terminal 32. The contact 30 and the contact terminal 32 are provided integrally. The contacts 30 are disposed in a staggered pattern in the housing portion 26 (see FIG. 11). The contact 30 is of a bifurcated shape formed with a slit 30a. The core wires 5 are electrically connected to the contacts 30 by the core wires 5 being inserted (press fitted) into the slits 30a of the contacts 30. That is, the contacts 30 cut into a coating cover of the core wires 5, and the contacts 30 are electrically connected by reaching to conductors of conducting wires of the core wires 5.

The contact terminals 32 perform electrical connection to each contact of the receptacle connector that is the mating connector and are portions that conduct one-to-one with the contacts of the receptacle

connector. The contact terminals 32 exhibit substantially a U-shape. The contact terminals 32 are disposed in the groove portions 28a of the housing 20 and are exposed to a front end side of the housing 20 (front end portion 20a of the electrical connector 1).

The shield member 18 is formed from, for example, a metal material having a spring property.

5 The shield member 18 partially surrounds the assembly 17. The shield member 18 electrically conducts the receptacle connector and the shield of the cable 3 and has a function of electrostatic shielding. The shield member 18 is configured from a base portion 18a and a pair of sidewall portions 18b and 18c rising from both end portions of the base portion 18a, and a cross section intersecting with the Y-direction exhibits substantially a U-shape. The shield member 18 is provided with a fixing portion 34, protruding
10 portions 36a and 36b, and a crimping portion 38.

The fixing portion 34 is a portion for fixing the fixing portion 60 (described below) of the latch member 14. The fixing portion 34 is disposed on a front end side of the shield member 18. The fixing portion 34 has two fixing pieces 34a and 34b and a protruding piece 34c. The two fixing pieces 34a and 34b are members for regulating movement of the fixing portion 60 in the X-direction and the Z-direction.
15 The fixing pieces 34a and 34b are disposed at a predetermined interval in the X-direction. The fixing pieces 34a and 34b are provided integrally with the base portion 18a of the shield member 18. With the fixing pieces 34a and 34b, a cross section intersecting with the X-direction exhibits substantially a U-shape, and the fixing pieces 34a and 34b are folded back so as to be opened to the rear side (connector case 12 side).

20 The protruding piece 34c is a member for regulating movement of the fixing portion 60 to the rear. The protruding piece 34c is disposed between the two fixing pieces 34a and 34b. The protruding piece 34c protrudes diagonally upward toward a front side from a surface 18S of the base portion 18a. The fixing portion 60 of the latch member 14 is fixed by cooperation between the two fixing pieces 34a and 34b and the protruding piece 34c.

25 The protruding portions 36a and 36b are respectively disposed on each sidewall portion 18b and 18c. The protruding portions 36a and 36b are provided on a rear side of the shield member 18. The

protruding portions 36a and 36b are plate-like members exhibiting a substantially rectangular shape.

With the protruding portions 36a and 36b, rear end portions are linked to the sidewall portions 18b and 18c, and the protruding portions thereof protrude in the X-direction so as to move away from an outer top surface of the sidewall portions 18b and 18c to an outer side and head toward tip portions. The

5 protruding portions 36a and 36b have elasticity. By this, the protruding portions 36a and 36b elastically deform when pressed to sidewall portions 18b and 18c sides, the tip portions are movable in a direction approaching the outer top surface, and the protruding portions 36a and 36b return to original positions when pressing is released.

Crimping portions 38a and 38b are portions that crimp and fix the cable 3 and hold and fix the
10 cable 3 on the connector main body section 10. The crimping portions 38a and 38b extend to the rear from each sidewall portion 18b and 18c and oppose each other. The crimping portions 38a and 38b are electrically connected to the shield of the cable 3. By this, the shield member 18 is electrically connected to the shield of the cable 3.

The connector case 12 is formed from an industrial plastic material, for example, an insulating
15 material such as polybutylene terephthalate or polyamide. The connector case 12 is provided so as to enable operation without touching the shield member 18 in a situation where a charge is occurring in the shield member 18 of the connector portion 16. The connector case 12 is disposed in the Y-direction relative to the connector portion 16.

The connector case 12 exhibits a hollow, substantially rectangular parallelepiped shape. The
20 connector case 12 defines a housing space S that houses the connector portion 16. The connector case 12 is provided with an opening portion 40, a cable insertion portion (opening portion) 42, an engaging portion (opening portion) 44, and a protruding portion 46. A rear end portion 12a of the connector case 12 is a rear end of the electrical connector 1. The front end portion (insertion end) 20a of the connector portion 16 and the rear end portion 12a of the connector case 12 oppose each other in the Y-direction, that
25 is, in a length direction of the connector body main section 10.

The opening portion 40 is a portion into which the connector portion 16 is inserted. The

opening portion 40 is provided in a front end portion of the connector case 12. The opening portion 40 is, for example, of a shape corresponding to an outer shape of the connector portion 16 and exhibits, for example, a substantially rectangular shape.

The cable insertion portion 42 is a portion into which the cable 3 is inserted. The cable insertion portion 42 is provided in the rear end portion 12a of the connector case 12. The cable insertion portion 42 exhibits, for example, a substantially circular shape.

The engaging portion 44 is a portion that engages with the protruding portions 36a and 36b provided on the shield member 18 of the connector main body section 10. The engaging portion 44 is provided respectively on sidewall portions 12c and 12d of the connector case 12. The engaging portion 44 is disposed on a front end side of the connector case 12 and is an opening that penetrates the sidewall portions 12c and 12d. When the connector portion 16 is inserted into the connector case 12, the engaging portion 44 abuts and engages the tip portions of the protruding portions 36a and 36b. With the electrical connector 1, the connector portion 16 and the connector case 12 are attached so as to be detachable due to the engaging portion 44 and the protruding portions 36a and 36b. That is, the connector portion 16 can be removed from the connector case 12 by pressing the protruding portions 36a and 36b.

The protruding portion 46 is a portion for providing a slide portion 62 (described below) of the latch member 14 such that the slide portion 62 is capable of sliding in the Y-direction. The protruding portion 46 engages with an opening portion 72 (described below) of the slide portion 62. A cross section intersecting with a Y-direction of the protruding portion 46 exhibits, for example, substantially a T-shape. The protruding portion 46 is provided with a support portion 47 and a regulating portion 48. The support portion 47 is a portion extending upward in the Z-direction from a top surface 12e of the connector case 12. The support portion 47 exhibits, for example, a cylindrical shape. In a state where the latch member 14 is attached to the connector main body section 10, the support portion 47 penetrates and extends through the opening portion 72 of the slide portion 62.

The regulating portion 48 is a portion for preventing the slide portion 62 from separating from the

connector case 12 in a normal direction (Z-direction) of the top surface 12e of the connector case 12.

The regulating portion 48 is separated from the top surface 12e of the connector case 12 and extends intersecting the support portion 47. The regulating portion 48 extends, for example, in the X-direction.

The regulating portion 48 is disposed substantially parallel to the top surface 12e of the connector case 12.

5 The regulating portion 48 has a pair of extended portions 48a and 48b. The pair of extended portions 48a is a pair of portions extending in mutually opposite directions in the X-direction from the support portion 47.

The protruding portion 46 is provided with a slide groove 50 provided in the Y-direction. The slide groove 50 has a pair of slide grooves 50a and 50b. The slide groove 50a is regulated by the top
10 surface 12e, the support portion 47, and the extended portion 48a. The slide groove 50b is regulated by the top surface 12e, the support portion 47, and the extended portion 48b.

The latch member 14 forms an elongated shape and is provided with the fixing portion (fixed end) 60, the slide portion (sliding end) 62, an arm portion (arm) 64, and a latch portion 66. The latch member 14 extends in the Y-direction in a state of being attached to the connector main body section 10
15 (the connector portion 16 and the connector case 12), and the fixing portion 60, the latch portion 66, the arm portion 64, and the slide portion 62 are provided in that order from the front side.

The fixing portion 60 is a portion fixed to the connector portion 16. The fixing portion 60 is fixed to the shield member 18 of the connector portion 16 by, for example, the fixing portion 34. The fixing portion 60 is made to be detachable from the fixing portion 34. The fixing portion 60 is provided
20 with an abutting portion 60a, an extended portion 60b, an extended portion 60c, and a protruding portion 60d. The abutting portion 60a is a portion that abuts the protruding portion 29 of the housing 20 and is interposed by the fixing piece 34a and the fixing piece 34b of the fixing portion 34. The abutting portion 60a is provided in the front by being connected to the arm portion 64 and is folded back to a lower side of the arm portion 64 so as to be opened to the rear side. A cross section intersecting with an
25 X-direction of the abutting portion 60a exhibits, for example, a U-shape.

The extended portion 60b is a portion interposed by being inserted into the fixing piece 34a of the

fixing portion 34. The extended portion 60c is a portion interposed by being inserted into the fixing piece 34b of the fixing portion 34. The extended portion 60b and the extended portion 60c are provided so as to protrude from the abutting portion 60a in mutually opposite directions in the X-direction. The extended portion 60b extends further to an outer side in the X-direction than a first side portion (one end portion) of the arm portion 64 and curves upward at a tip thereof. The extended portion 60c extends further to an outer side in the X-direction than a second side portion (another end portion) of the arm portion 64 and curves upward at a tip thereof. A cross section intersecting with a Y-direction of the extended portion 60b and the extended portion 60c exhibits, for example, an L-shape.

The protruding portion 60d is a portion locked by the protruding piece 34c of the fixing portion 34. The protruding portion 60d is provided in the rear by being connected to the abutting portion 60a and curves upward at a tip thereof. A cross section intersecting with an X-direction of the protruding portion 60d exhibits, for example, an L-shape.

The slide portion 62 is a portion provided with an ability to slide on the connector case 12. The slide portion 62 is provided so as to be removable on the protruding portion 46 of the connector case 12. The slide portion 62 is provided with a base portion 70 and the opening portion 72 provided on the base portion 70. The base portion 70 is a portion disposed on the top surface 12e of the connector case 12. The base portion 70 is, for example, a plate-like member of a substantially rectangular shape. The opening portion 72 is an opening that penetrates the base portion 70 in the Z-direction and exhibits a rectangular shape extending in the Y-direction. The opening portion 72 is regulated by a front edge 72a, a rear edge 72b, a side edge 72c, and a side edge 72d. The opening portion 72 engages with the protruding portion 46.

The support portion 47 of the protruding portion 46 penetrates the opening portion 72. The base portion 70 is disposed between the top surface 12e of the connector case 12 and the regulating portion 48 of the protruding portion 46 such that the side edge 72c of the opening portion 72 is positioned in the slide groove 50a and the side edge 72d of the opening portion 72 is positioned in the slide groove 50b. That is, the slide portion 62 is provided between the connector case 12 and the regulating portion 48 and

slides in the Y-direction along the slide groove 50a and the slide groove 50b.

Here, a dimension H1 between the top surface 12e and the extended portion 48a in the slide groove 50a and a dimension H2 between the top surface 12e and the extended portion 48b in the slide groove 50b are substantially equivalent to a thickness T_s of the base portion 70 of the slide portion 62 or slightly larger than the thickness T_s of the base portion 70 of the slide portion 62. A width of the opening portion 72 of the slide portion 62 (dimension between the side edge 72c and the side edge 72d) W_s is substantially equivalent to a length (diameter) $D1$ in an X-direction of the support portion 47 or slightly larger than the length $D1$ in the X-direction of the support portion 47, and is smaller than a length $W1$ in an X-direction of the protruding portion 46 (regulating portion 48). A length of the opening portion 72 of the slide portion 62 (dimension between the front edge 72a and the rear edge 72b) L_s is larger than a length $L1$ in the Y-direction of the protruding portion 46.

By such a configuration, in the slide groove 50a and the slide groove 50b, movement of the slide portion 62 of the latch member 14 in the X-direction, which intersects with the Y-direction, and the Z-direction, which intersects with the X-direction and the Y-direction, is regulated. In other words, the protruding portion 46 regulates (restricts) movement of the slide portion 62 of the latch member 14 in the X-direction and the Z-direction. Moreover, when the slide portion 62 slides to the front in the Y-direction, the rear edge 72b of the opening portion 72 abuts the support portion 47 of the protruding portion 46. That is, with the slide portion 62, movement in a direction approaching the fixing portion 60 (to the front end side) in the slide groove 50a and the slide groove 50b is regulated by the support portion 47 and the rear edge 72b. Meanwhile, when the slide portion 62 slides to the rear in the Y-direction, the front edge 72a of the opening portion 72 abuts the support portion 47 of the protruding portion 46. That is, with the slide portion 62, movement in a direction away from the fixing portion 60 (to the rear end side) in the slide groove 50a and the slide groove 50b is regulated by the support portion 47 and the front edge 72a.

Furthermore, the width W_s of the opening portion 72 of the slide portion 62 is larger than the length $L1$ in the Y-direction of the protruding portion 46. The length L_s of the opening portion 72 of the

slide portion 62 is larger than the length W1 in the X-direction of the protruding portion 46. By such a configuration, the protruding portion 46 becomes able to be inserted into the opening portion 72 of the slide portion 62, and the slide portion 62 becomes removable from the protruding portion 46 of the connector case 12.

5 The arm portion 64 is a portion that links the fixing portion 60 and the slide portion 62. The arm portion 64 is a member of an elongated shape having flexibility and elasticity. The arm portion 64 holds the fixing portion 60 and the slide portion 62 at substantially identical height positions. The arm portion 64 curves convexly in the Z-direction when viewed from the X-direction. A pressing portion 65 that is pressed down when the latch member 14 is operated is provided on the arm portion 64.

10 The latch portion 66 is a portion provided on the arm portion 64 to engage with the receptacle connector. The latch portion 66 is provided near the fixing portion 60. The latch portion 66 extends in the X-direction. A cross section intersecting with a Y-direction of the latch portion 66 exhibits substantially a U-shape. The latch portion 66 has a first portion 66a and a second portion 66b. The first portion 66a extends further to an outer side in the X-direction than a first side portion 64a of the arm
15 portion 64 and curves downward at a tip thereof. The second portion 66b extends further to an outer side in the X-direction than a second side portion 64b of the arm portion 64 and curves downward at a tip thereof.

Next, an operation of the latch member 14 of the electrical connector 1 will be described. When removing the electrical connector 1 from the receptacle connector that is the mating connector, the
20 pressing portion 65 provided on the arm portion 64 of the latch member 14 is pressed toward a connector case 12 side. In conjunction with the pressing-down operation of the pressing portion 65, the slide portion 62 linked to the arm portion 64 slides to the rear side (in a direction away from the fixing portion 60) along the slide groove 50a and the slide groove 50b. By this, the latch portion 66 is lowered to a connector portion 16 side, and engagement between the receptacle connector and the latch portion 66 is
25 released.

That is, when the pressing portion 65 of the arm portion 64 is pressed when releasing the engagement between the latch portion 66 and the receptacle connector, the slide portion 62 slides in a direction associated with the protruding portion 46. In other words, when the pressing portion 65 of the arm portion 64 is pressed when releasing the engagement between the latch portion 66 and the receptacle connector, the slide portion 62 slides in the Y-direction along the slide groove 50a and the slide groove 50b.

After the engagement between the latch portion 66 and the receptacle connector is released, when pressing of the latch member 14 is released, due to an elastic force of the latch member 14 (arm portion 64), the slide portion 62 slides to the front side (in the direction approaching the fixing portion 60) and returns to an initial position (position illustrated in FIG. 9A).

Next, an assembly method of the electrical connector 1 will be described. FIGS. 10 to 12 are diagrams illustrating an assembly procedure of the electrical connector.

As illustrated in FIG. 10(a), the connector case 12 and the latch member 14 are prepared. Furthermore, the orientation of the latch member 14 is adjusted so that the direction where the front end edge 72a and the back end edge 72b of the opening portion 72 of the slide portion 62 are opposing matches the direction in which the regulating portion 48 of the protruding portion 46 extends. Next, as illustrated in FIG. 10(b), the protruding portion 46 is inserted into the opening portion 72 of slide portion 62, and the base portion 70 of slide portion 62 is placed on the top surface 12e of the connector case 12.

Next, as illustrated in FIG. 10(c), the latch member 14 is rotated around the support portion 47, as an axis, of the protrusion portion 46 so that the fixing part 60 of the latch member 14 is positioned on the side (front) of the opening portion 40 of the connector case 12. At this time, the base portion 70 of the slide portion 62 is interposed between the regulating portion 48 and the top surface 12e of the connector case 12. In this way, the slide portion 62 of the latch member 14 is attached to the connector case 12.

Next, as illustrated in FIG. 11, the end of the cable 3 is inserted in a cable insertion portion 42 of the connector case 12. Subsequently, in the end of the cable 3, the core wires 5 are respectively inserted into each of insertion openings 23 of a cable cover 22.

Next, as illustrated in FIG. 12(a), the cable cover 22 is housed in the housing portion 26 of housing 20 with the core wires 5 of cable 3 in a state of being held in the cable cover 22. At this time, the core wires 5 are press fit into a contact 30 of a contact member 24, and the conducting wires of the core wire 5 are electrically connected to the contact 30. Subsequently, crimping portions 38a and 38b of a shield member 18 are crimped to fix the cable 3 to the shield member (connector main body section 10).

Next, as illustrated in FIG. 12(b), the connector case 12 is moved along the cable 3 to the connector portion 16 side, and the connector portion 16 and connector case 12 are connected. Lastly, as illustrated in FIG. 1, the fixing part 60 of the latch member 14 is fixed to the fixing part 34 of the connector portion 16 (shield member 18). According to the above, the electrical connector 1 is attached to the end of the cable 3.

As described above, with the electrical connector 1, the fixing part 60 of the latch member 14 is fixed to the connector portion 16 of the connector main body section 10, and the slide portion 62 slides in the direction Y along a slide groove 50a and slide groove 50b regulated by the protruding portion 46 of the connector case 12 of connector main body section 10. Through this, because both ends of the arm portion 64 of the latch member 14 are not free (free ends), damage caused to the arm portion 64 by catching, and the like, on other parts, and the like, can be prevented with the electrical connector 1.

Further, with the electrical connector 1, because the slide portion 62 slides in the Y direction when the pressing portion 65 of the arm portion 64 is pressed, the load of the arm portion 64 can be reduced compared to a configuration where both ends of the arm portion 64 are fixed. Therefore, damage to the arm portion 64 can be prevented with the electrical connector 1. This configuration, in particular, is effective for size reduction of the electrical connector 1.

In the electrical connector 1, an opening portion 72 having a rectangular shape that extends in the Y direction is provided in the slide portion 62. The support portion 47 of the protruding portion 46 extends with the opening portion 72 penetrating from the top surface 12e of the connector case 12, the regulating portion 48 of protruding portion 46 is separated from the top surface 12e of the connector case 12 and intersects with the support portion 47, extending in the X direction. For this reason, the slide

groove 50a and the slide groove 50b, which extend in the Y direction, are regulated by the top surface 12e of the connector case 12, the support portion 47, and the regulating portion 48. Further, the opening portion 72 of the slide portion 62 extends in the Y direction. As a result, the slide portion 62 can slide along the slide groove 50a and the slide groove 50b in the Y direction, and the movement of the slide portion 62 in the Y direction is restricted by the front edge 72a and a rear edge 72b of the opening portion 72. Therefore, the addition of an excess load to the arm portion 64 can be prevented with the electrical connector 1. As a result, damage to the arm portion 64 can be prevented with the electrical connector 1.

With the electrical connector 1, the slide portion 62 is provided between the regulating portion 48 and the top surface 12e of the connector case 12. Further, the regulating portion 48 prevents the slide portion 62 from separating from the connector case 12 in the normal direction of the top surface 12e of the connector case 12. Therefore, the movement of the slide portion 62 in the Z direction is regulated. Through this, the degree of freedom in the movement of the slide portion 62 in the electrical connector 1 can be further reduced, and the potential for damage to the arm portion 64 by catching on other goods, and the like, can be further decreased.

The width W_s of the opening portion 72 in the electrical connector 1 is substantially equivalent to the length D_1 in the X direction of the supporting portion 47, or slightly larger than the length D_1 in the X direction of the supporting portion 47. Therefore, the movement in the X direction of the slide portion 62 is regulated. Through this, the degree of freedom in the movement of the slide portion 62 in the electrical connector 1 can be further reduced, and the potential for damage to the arm portion 64 by catching on other goods, and the like, can be further decreased.

The width W_s of the opening portion 72 of the slide portion 62 in the electrical connector 1 is larger than the length L_1 in the Y direction of the protruding portion 46 and is smaller than the length W_1 in the X direction of the protruding portion 46. Further, the length L_s of the opening portion 72 of the slide portion 62 is larger than the length W_1 in the direction X of the protruding portion 46. With this type of configuration, the slide portion 62 can be attached to the connector case 12 by inserting the protruding portion 46 into the opening portion 72 of slide portion 62 and rotating the latch member 14

with the supporting portion 47 as an axis. Therefore, the attachment of the slide portion 62 to connector case 12 can be simplified.

The present invention is not limited to the above embodiments, and various modifications are possible within a scope that does not deviate from the spirit of the invention.

5 In the above embodiment, one cable 3 is attached to the electric connector 1, but one or a plurality of cables may be attached to the electrical connector 1. In this case, the cable insertion portion 42 of the connector case 12 may be formed according to the number of cables.

In the above embodiment, the protruding portions 36a and 36b are provided on the shield member 18 of the connector portion 16, the engaging portion 44 (opening portion) is provided in connector case 10 12, but a configuration in which the opening portion is provided on the shield member 18 and the protruding portion is provided in the connector case 12 may also be provided.

Description of the Reference Numerals

1 ... electrical connector, 10 ... connector main body section, 12 ... connector case (rear portion), 12e ... top surface, 14 ... latch member, 16 ... connector portion (front portion), 46 ... protruding portion, 15 47 ... support portion, 48 ... regulating portion, 50a and 50b ... slide groove, 60 ... fixing portion (fixed end), 62 ... slide portion (sliding end), 64 ... arm portion (arm), 66 ... latch portion, 72 ... opening portion.

What is Claimed is:

1. An electrical connector, comprising a connector main body section and a latch member attached to the connector main body section; wherein

5 the connector main body section comprises

a front portion that inserts into a mating connector, and

a rear portion disposed in a first direction relative to the front portion;

the latch member, forming an elongated shape extending in the first direction, comprises

a fixed end fixed to the front portion,

10 a sliding end provided so as to be capable of sliding in the rear portion,

an arm that links the fixed end and the sliding end, and

a latch portion provided on the arm to engage the mating connector; and

the rear portion comprises a protruding portion to provide the sliding end with an ability to slide in the first direction; wherein

15 when the arm is pressed at the time of releasing the engagement of the latch portion and the mating connector, the sliding end slides in the first direction.

2. The electrical connector according to claim 1, wherein

when the arm is pressed at the time of releasing the engagement of the latch portion and the mating

20 connector, the sliding end slides in the first direction in association with the protruding portion.

3. The electrical connector according to claim 1, wherein

the protruding portion is provided with a slide groove provided in the first direction, and

when the arm is pressed at the time of releasing the engagement of the latch portion and the mating

25 connector, the sliding end slides in the slide groove along the first direction.

4. The electrical connector according to claim 1, wherein
the protruding portion regulates movement of the sliding end in a second direction intersecting the first direction and in a third direction intersecting the first direction and the second direction.

5. The electrical connector according to claim 4, wherein
the first direction, the second direction, and the third direction are mutually orthogonal.

6. The electrical connector according to claim 1, wherein
the sliding end is provided with an opening part having a rectangular shape that extends in the first
direction, and
the protruding portion engages with the opening part.

7. The electrical connector according to claim 6, wherein
the protruding portion comprises a support portion extending through the opening part from a top
surface of the rear portion and a regulating portion that extends intersecting the support portion away
from the top surface of the rear portion.

8. The electrical connector according to claim 7, wherein
the sliding end is provided between the regulating portion and the top surface of the rear portion.

9. The electrical connector according to claim 7, wherein
the regulating portion prevents the sliding end from separating from the rear portion in a normal
direction of the top surface of the rear portion.

10. The electrical connector according to claim 7, wherein
a length of the opening part is longer than a length of the regulating part, and

a width of the opening part is shorter than a length of the regulating part.

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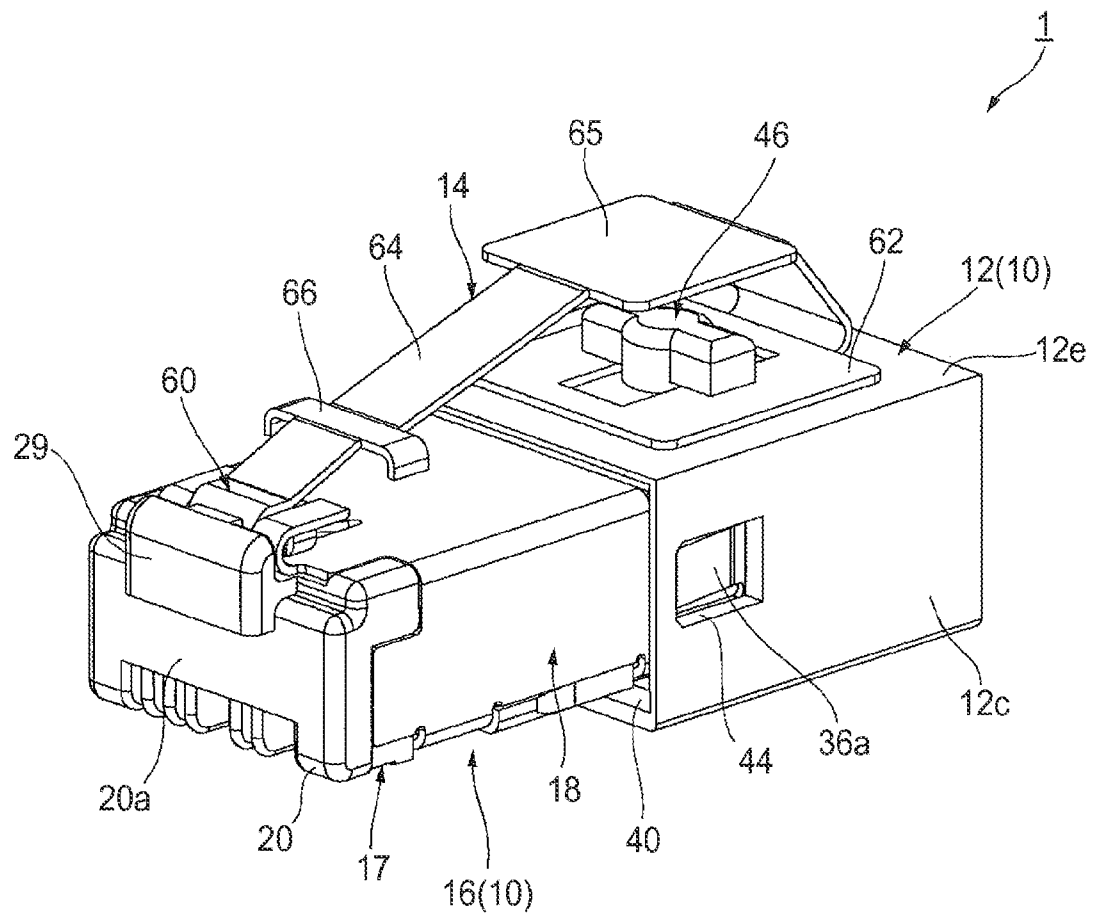
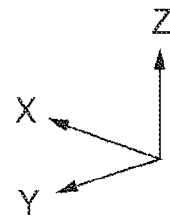


FIG. 1



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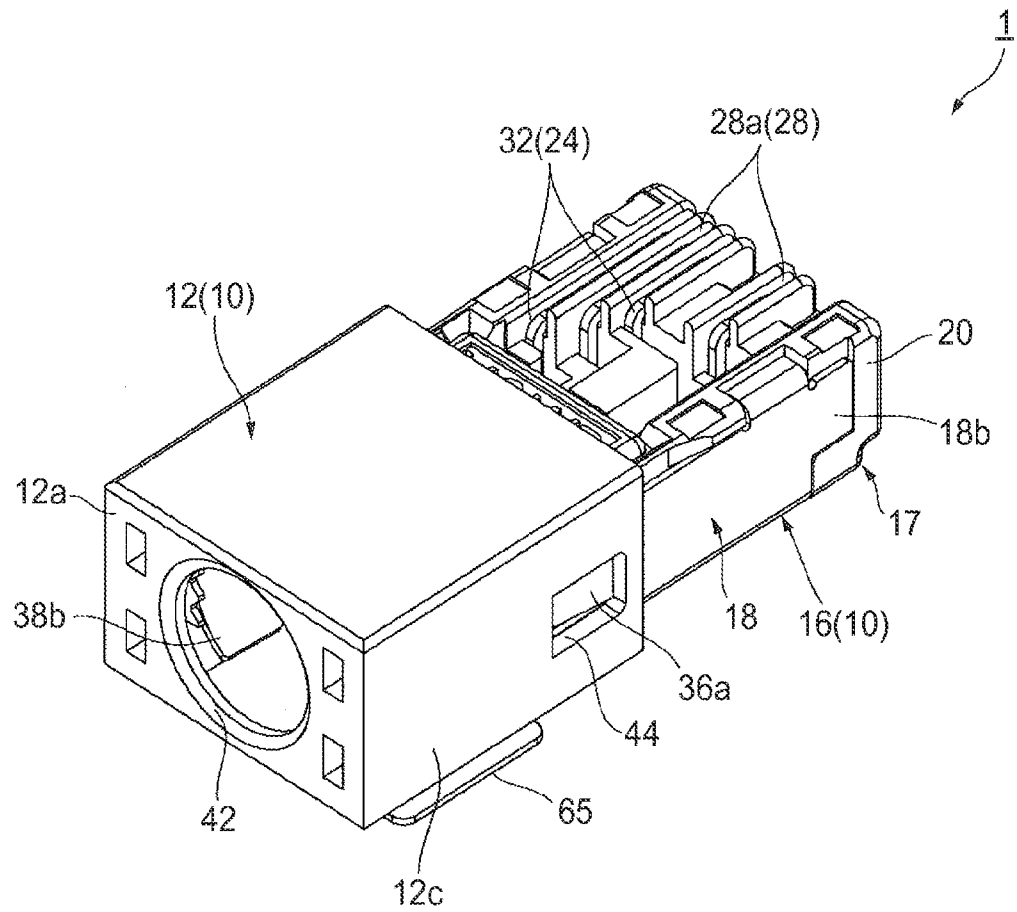


FIG. 2

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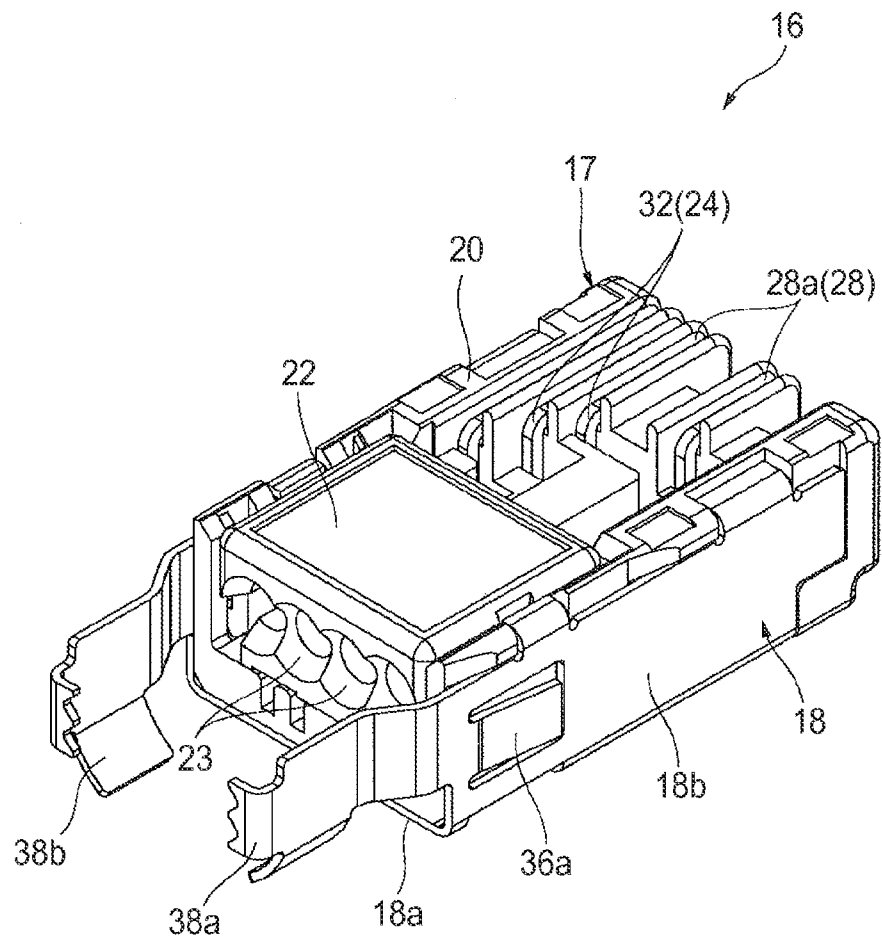


FIG. 3

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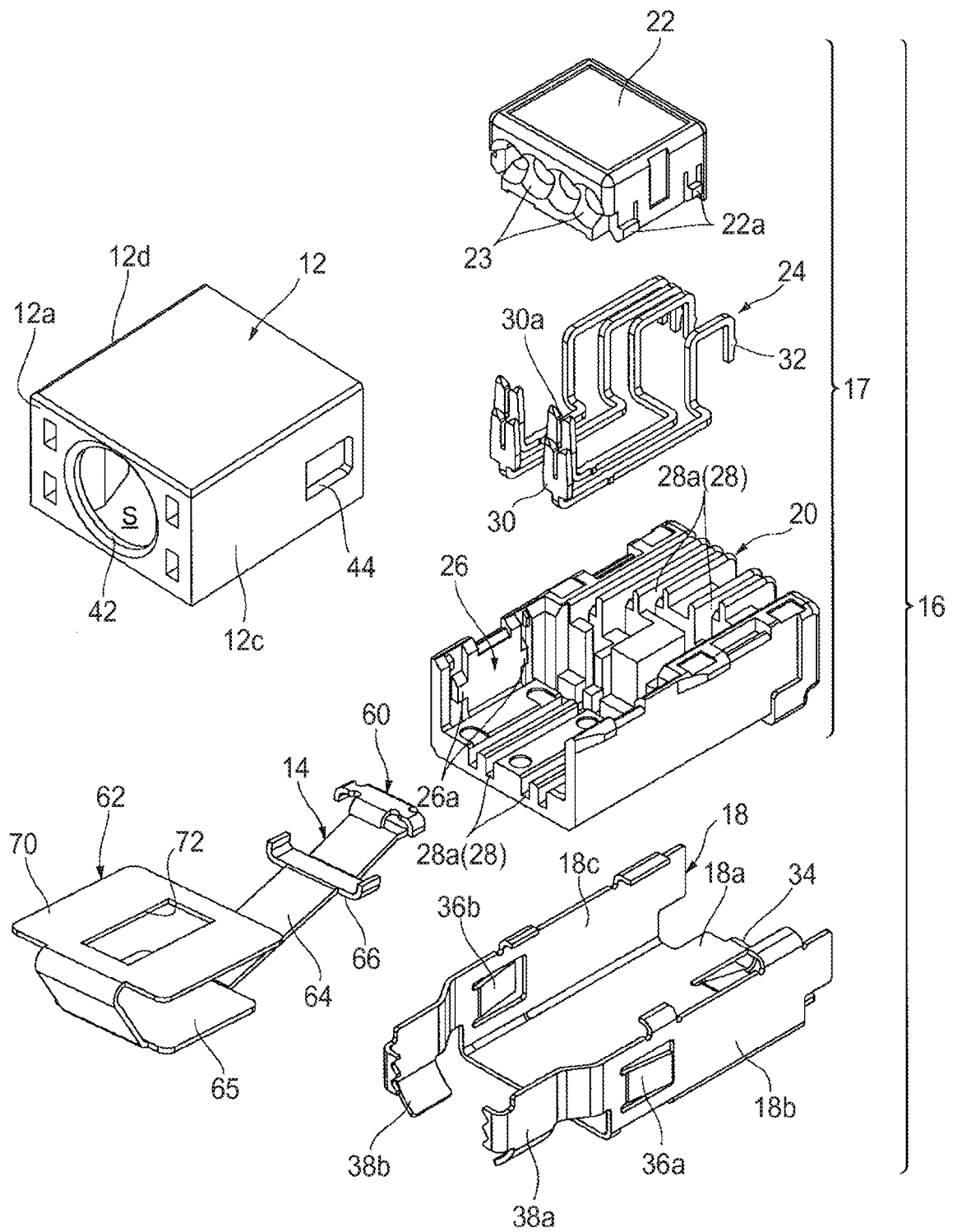


FIG. 4

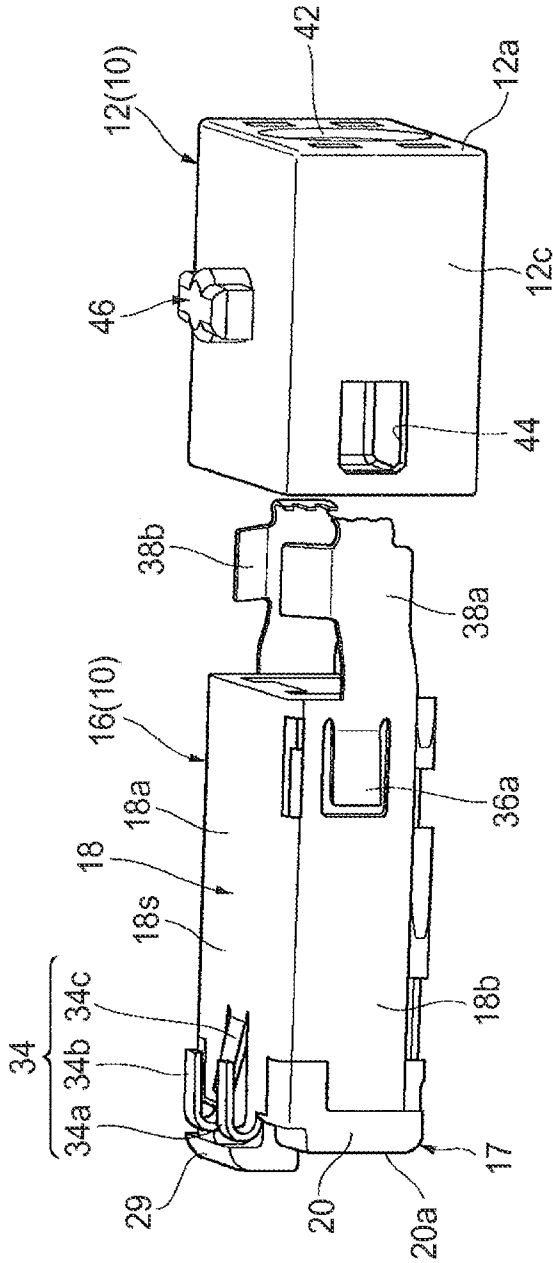


FIG. 5

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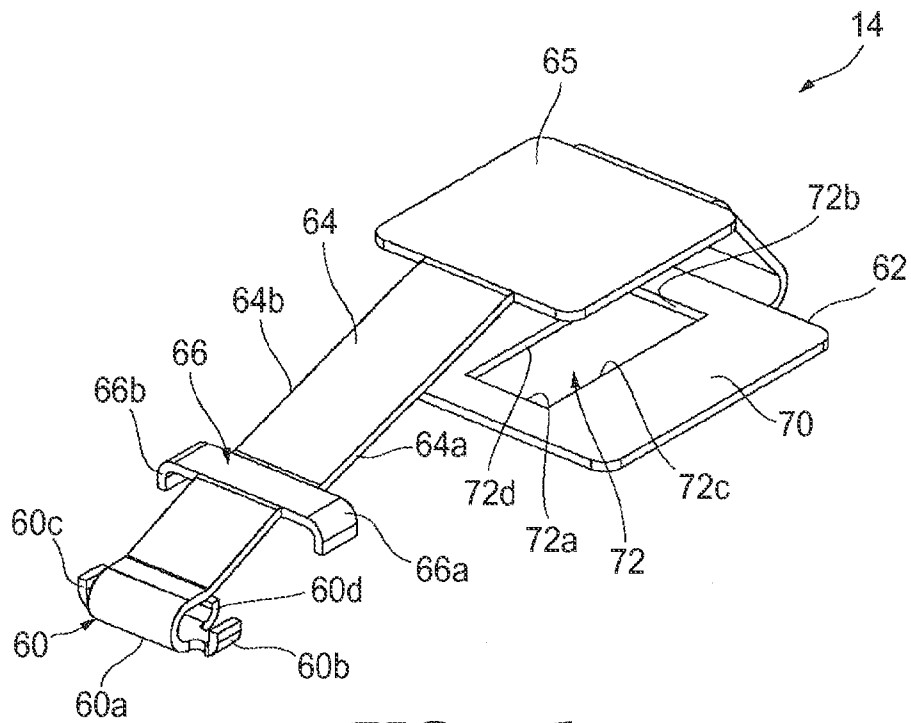


FIG. 6A

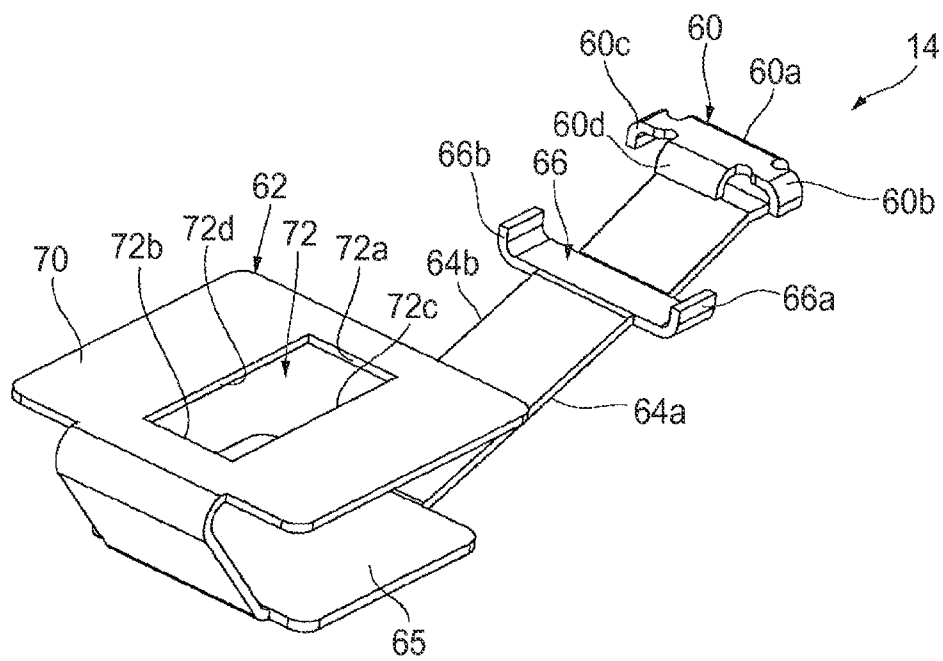


FIG. 6B

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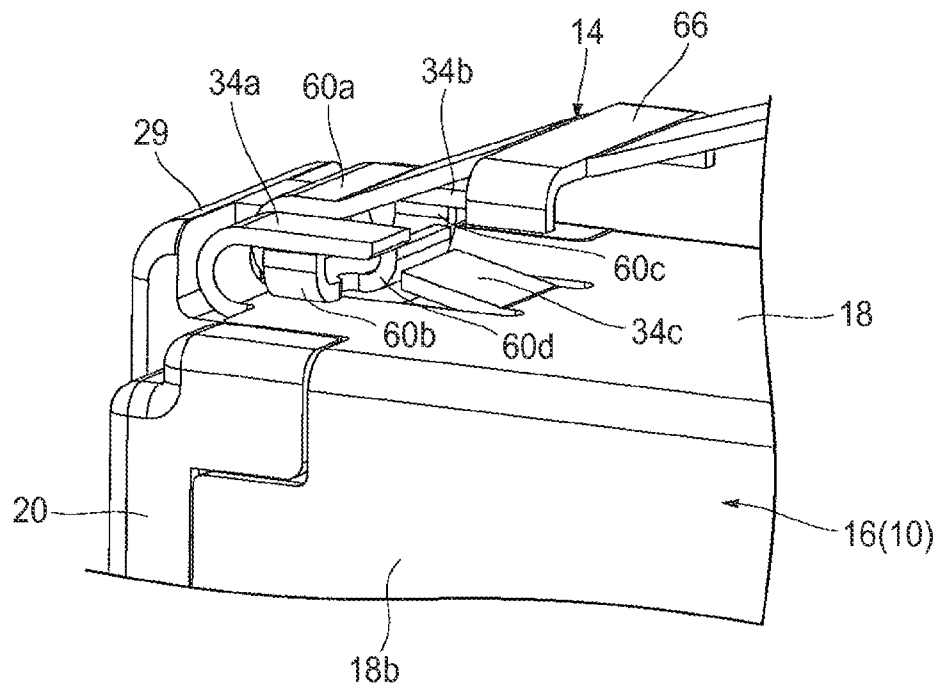
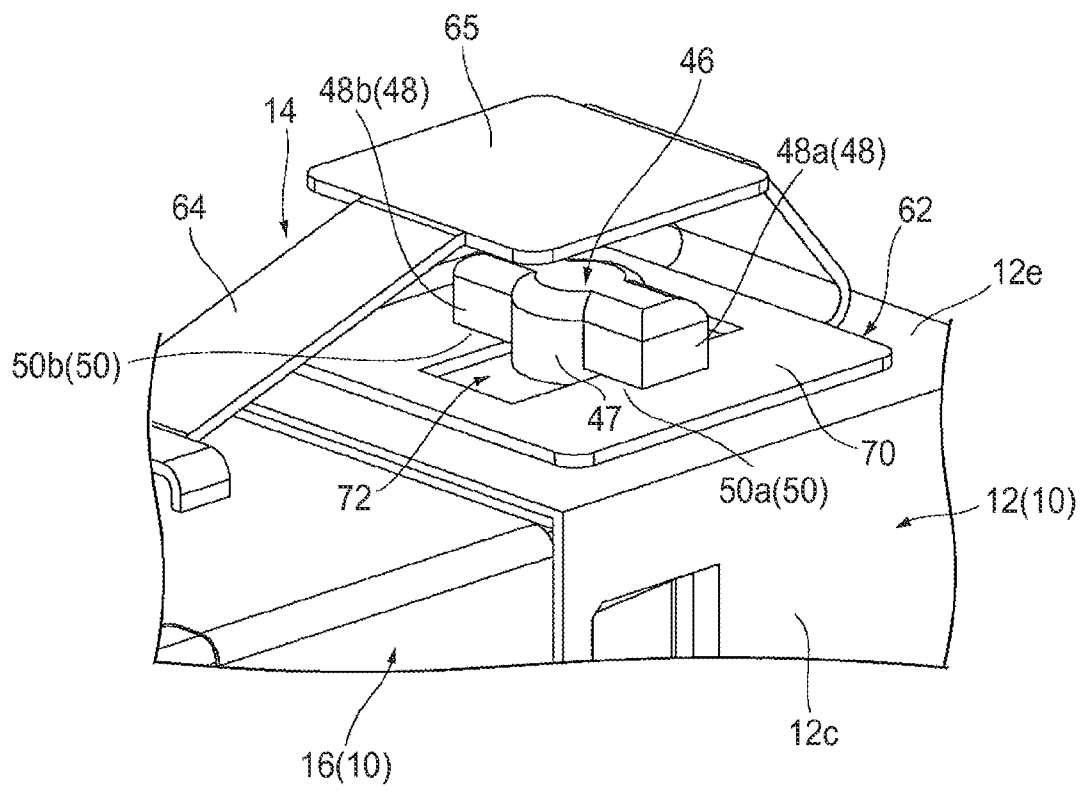


FIG. 7

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*FIG. 8*

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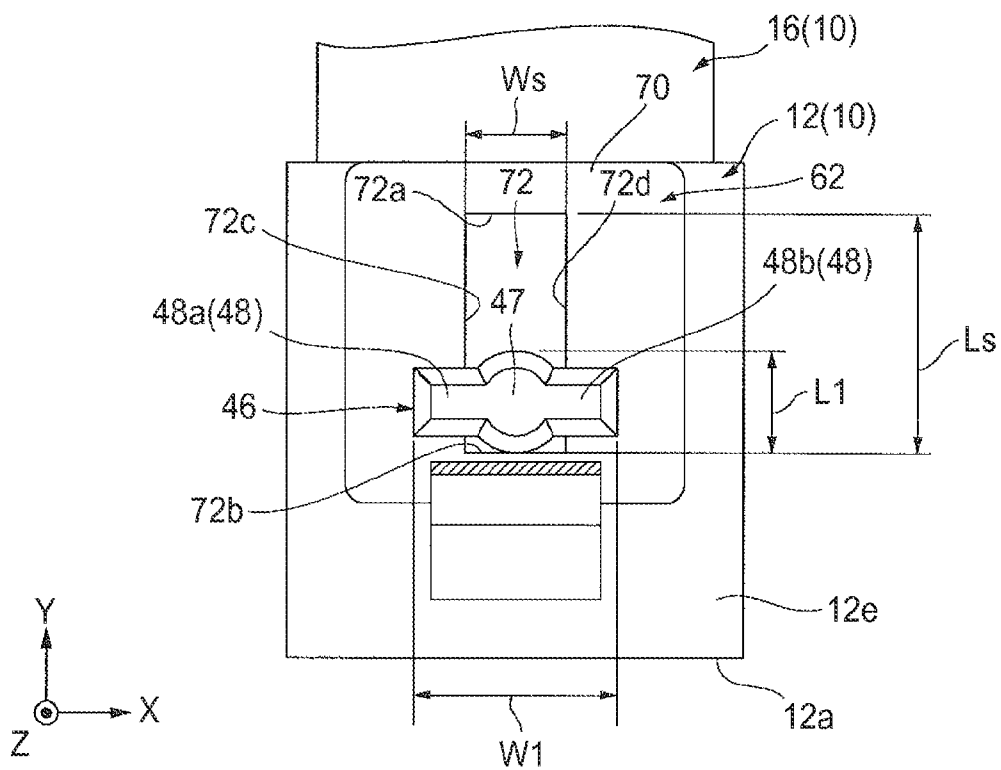


FIG. 9A

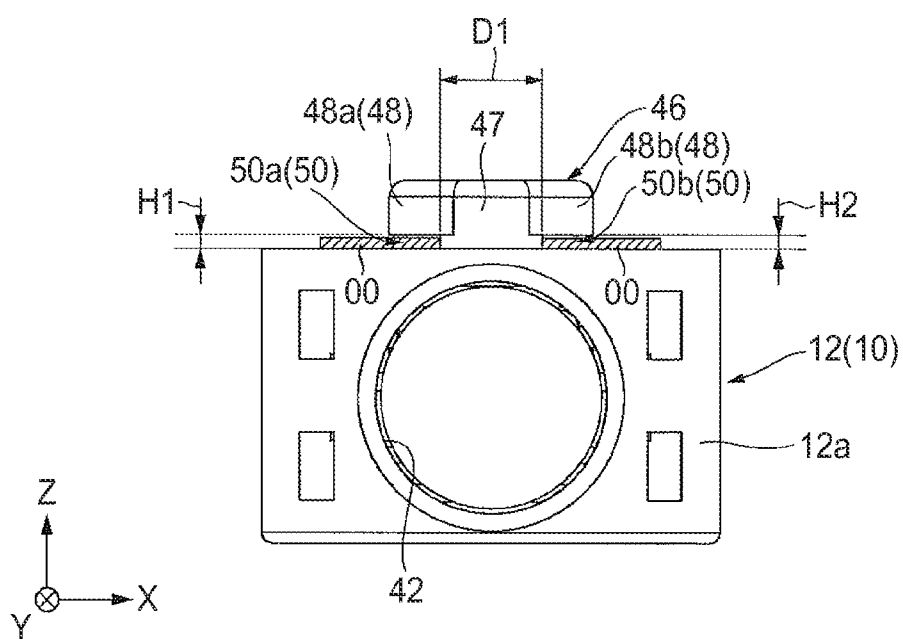


FIG. 9B

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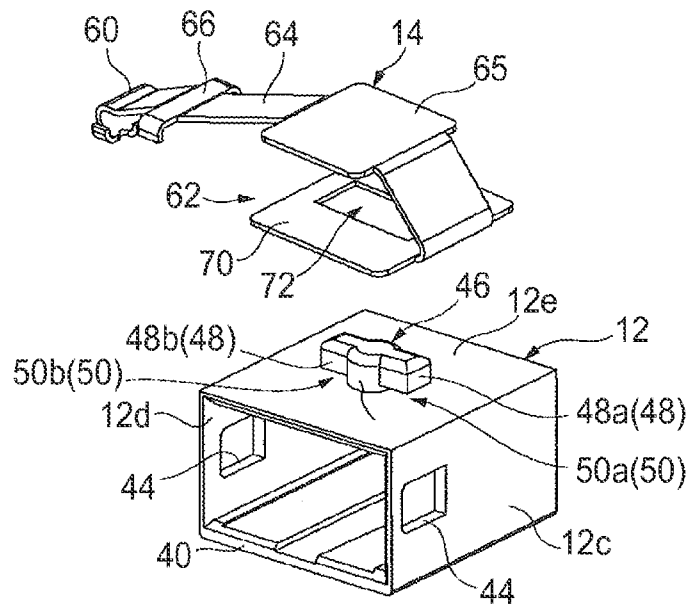


FIG. 10A

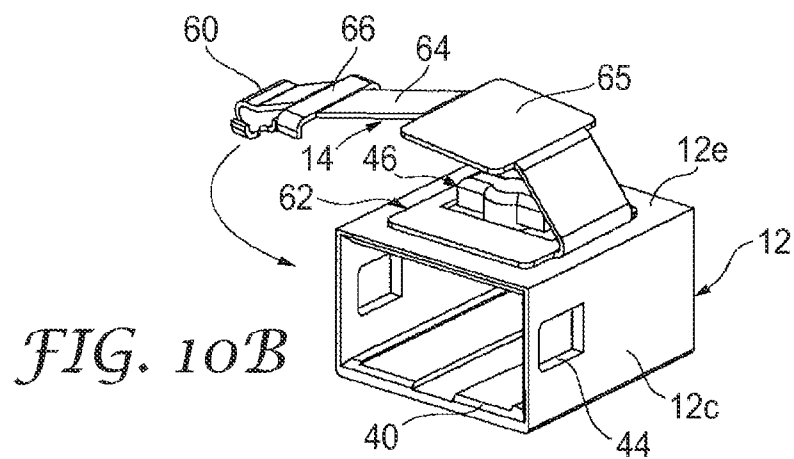


FIG. 10B

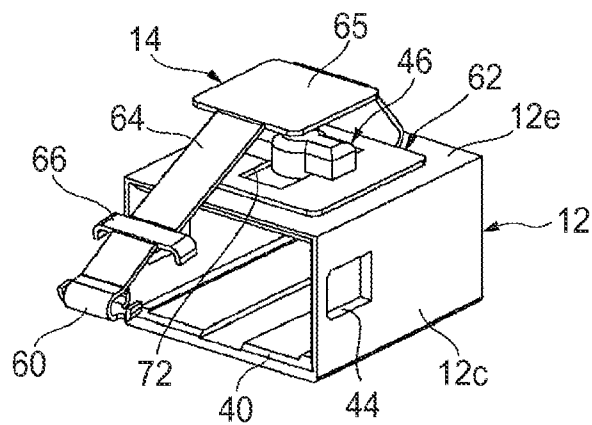


FIG. 10C

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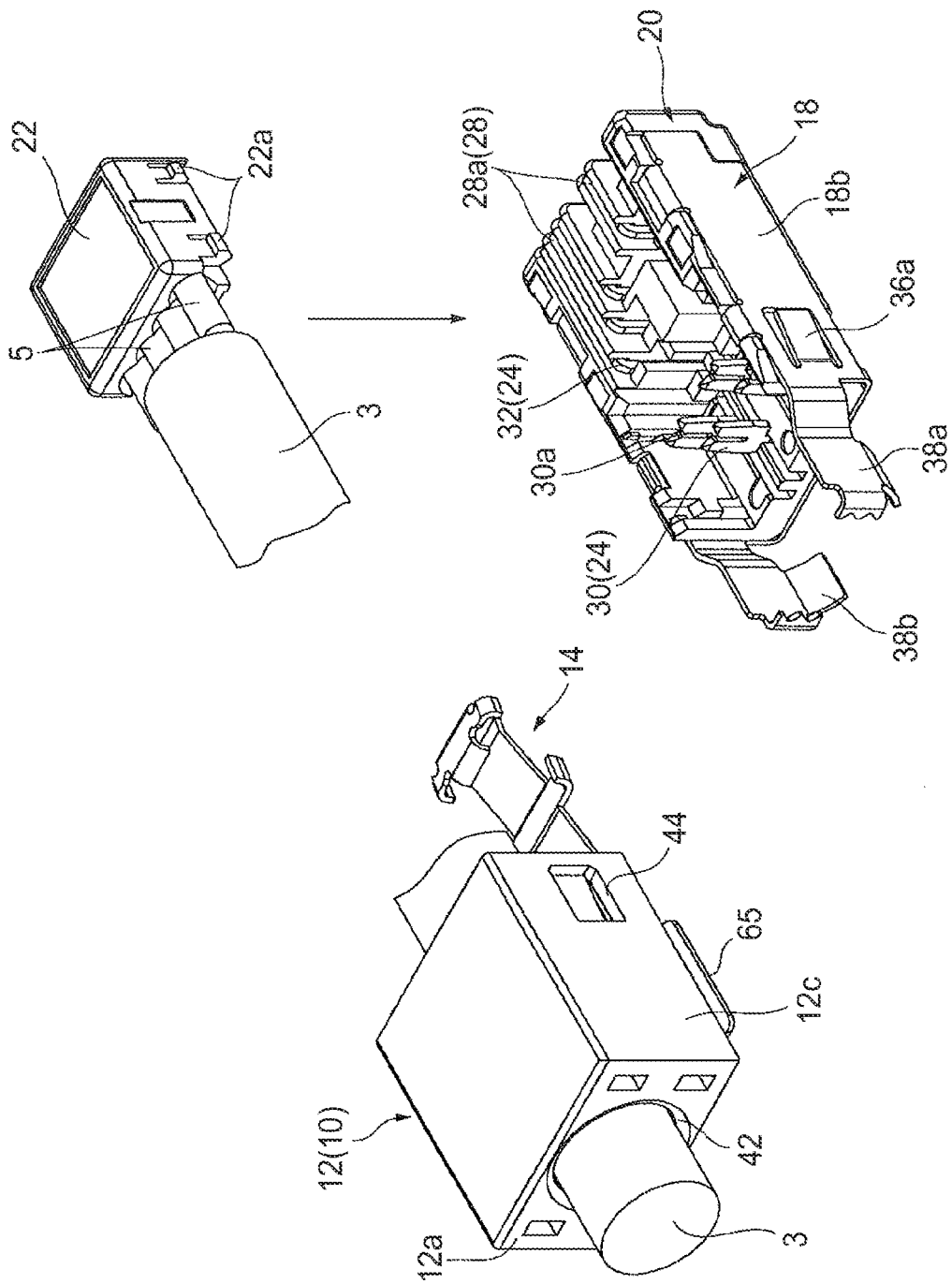
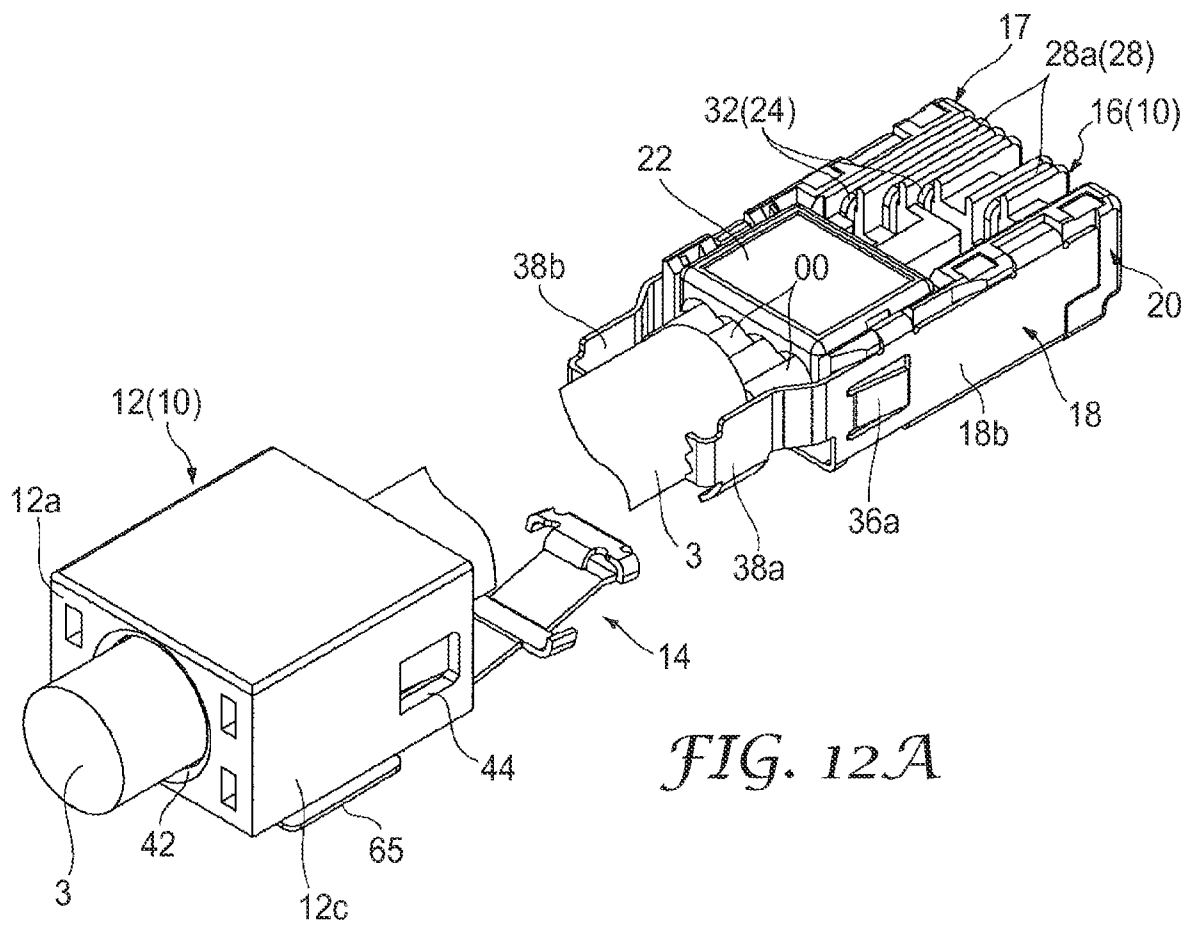
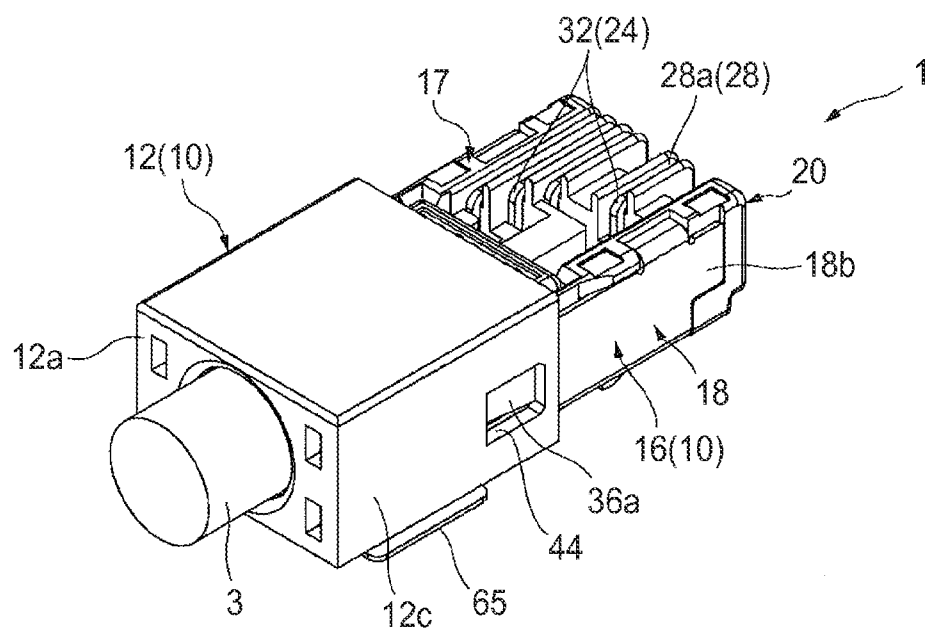


FIG. 11

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*FIG. 12A**FIG. 12B*

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2014/071376

A. CLASSIFICATION OF SUBJECT MATTER

INV. H01R13/627

ADD. H01R24/64

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 2003/017729 A1 (HUANG WAYNE [US]) 23 January 2003 (2003-01-23) abstract; figure 2 -----	1,2,4-9
X	US 6 835 086 B1 (TSAI SHOU-CHUN [TW]) 28 December 2004 (2004-12-28) abstract; figure 4 -----	1-5
X	EP 2 337 163 A1 (FUJITSU LTD [JP]) 22 June 2011 (2011-06-22) figure 20 -----	1,2,4,5



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search

5 March 2015

Date of mailing of the international search report

12/03/2015

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Authorized officer

Corrales, Daniel

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/071376

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