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Tanaka et al.

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(54) **CONNECTOR**

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H01R 13/502 (2006.01)
H01R 13/516 (2006.01)
H01R 13/533 (2006.01)

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CPC ***H01R 13/415*** (2013.01); ***H01R 13/2407*** (2013.01); ***H01R 13/502*** (2013.01); ***H01R 13/516*** (2013.01); ***H01R 13/533*** (2013.01); *H01R 2201/26* (2013.01)

(58) **Field of Classification Search**
CPC H01R 13/415; H01R 13/2407; H01R 13/502; H01R 13/516; H01R 13/533; H01R 2201/26; H01R 13/112; H01R 12/712; H01R 12/91
See application file for complete search history.

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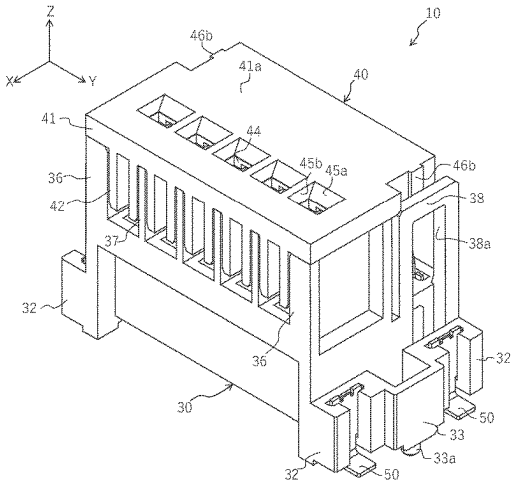
(74) *Attorney, Agent, or Firm* — Westman, Champlin & Koehler, P.A.

(57) **ABSTRACT**

The connector **10** includes a movable housing **40** that is displaceable with respect to an attachment object **90** in an X direction, which is a direction perpendicular to a connection direction, and a terminal **20** configured to electrically connect the attachment object **90** and a connection object **80**. The terminal **20** includes the displacement portion **24** that is displaceable in the X direction with respect to the attachment object **90**. The contact portions **24***c***1** and **24***f***1** configured to contact the connection object **80** are formed in the displacement portion **24**. Here, the displacement portion **24** is displaceable with respect to the movable housing **40**.

9 Claims, 13 Drawing Sheets



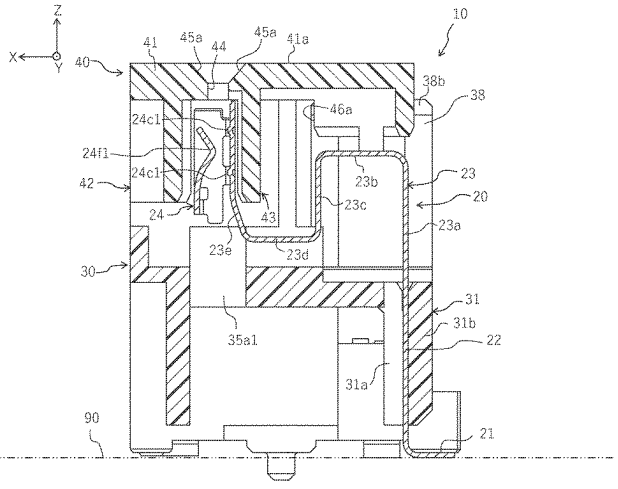


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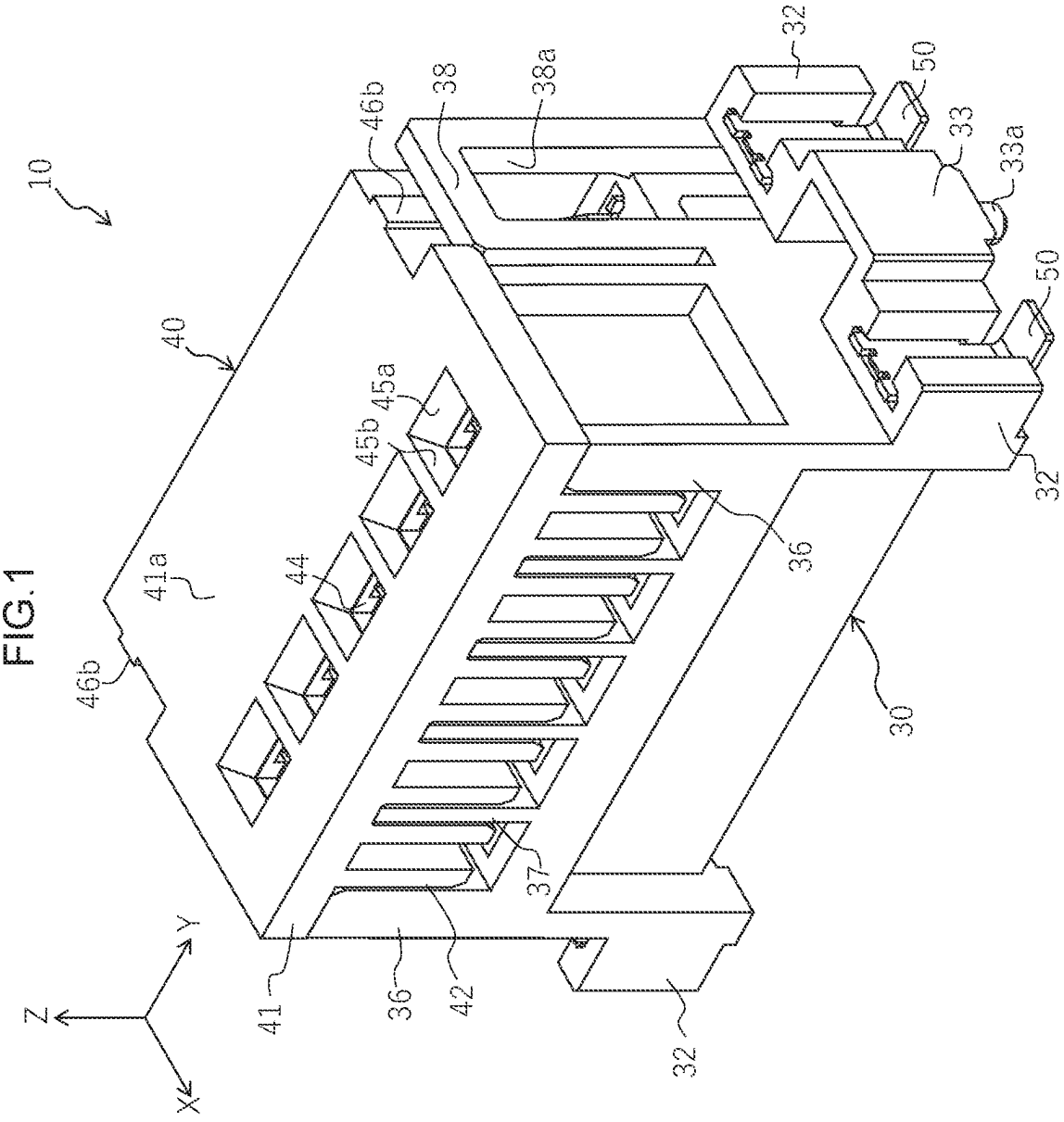
FIG. 1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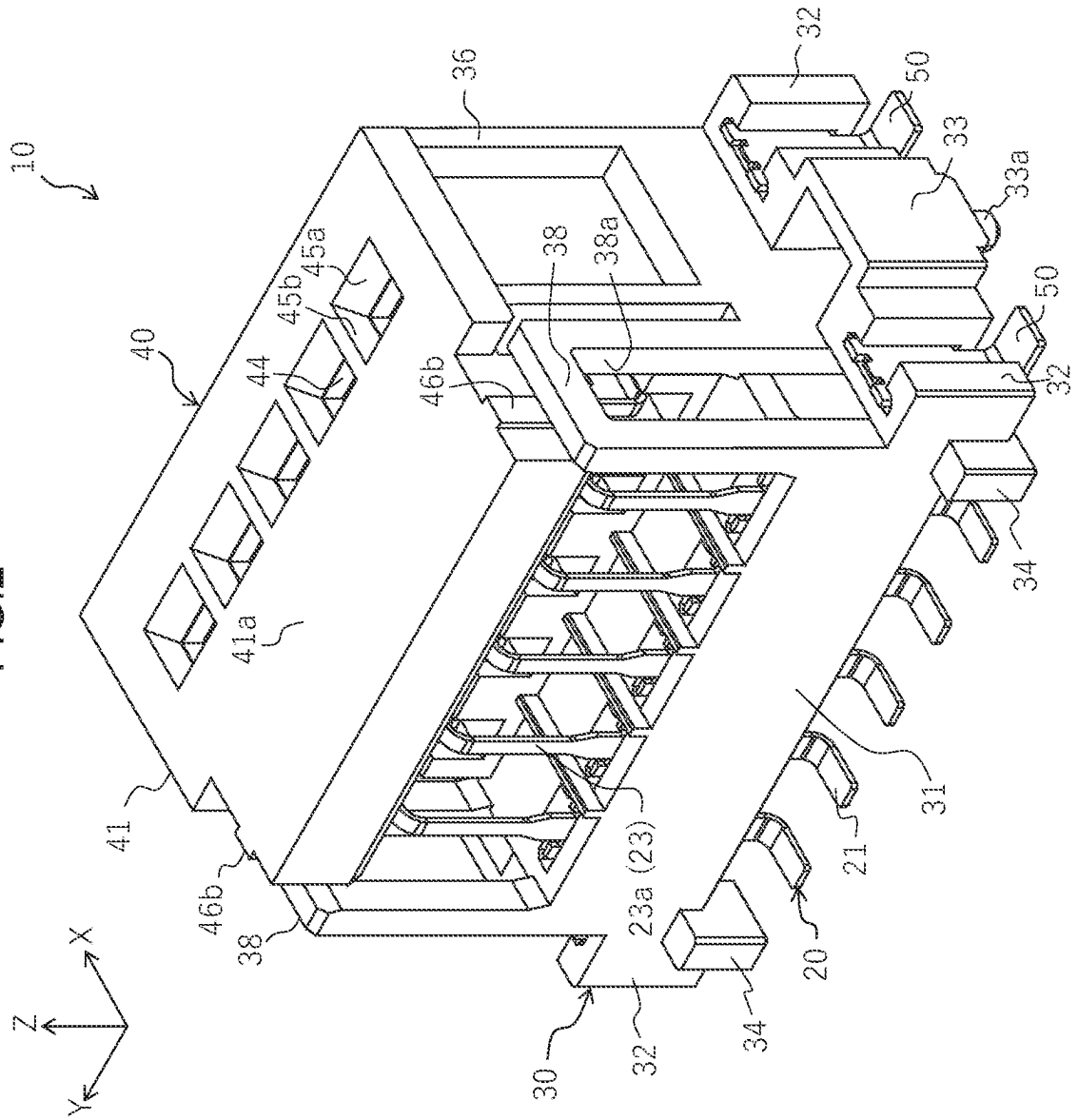
40
46b
38
38a
32
50
33
33a
50
45a
45b
44
41a
46b
36
32
30
37
41
36
42
32
Y
Z
X

FIG.2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40
41
41a
44
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45b
46b
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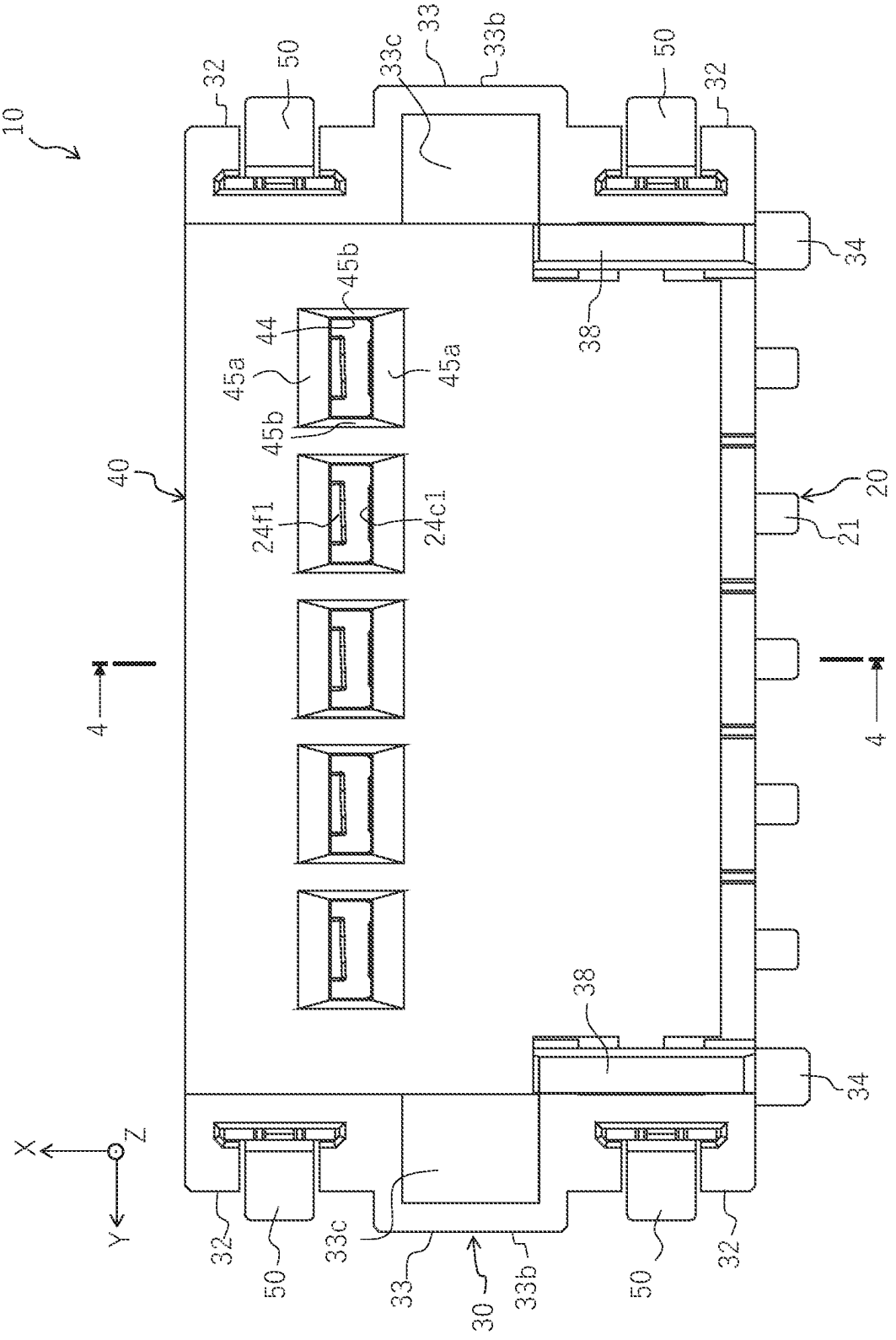
38
38a
32
50
33
33a
34
31
21
20
23a (23)
30
Z
X
Y

FIG.3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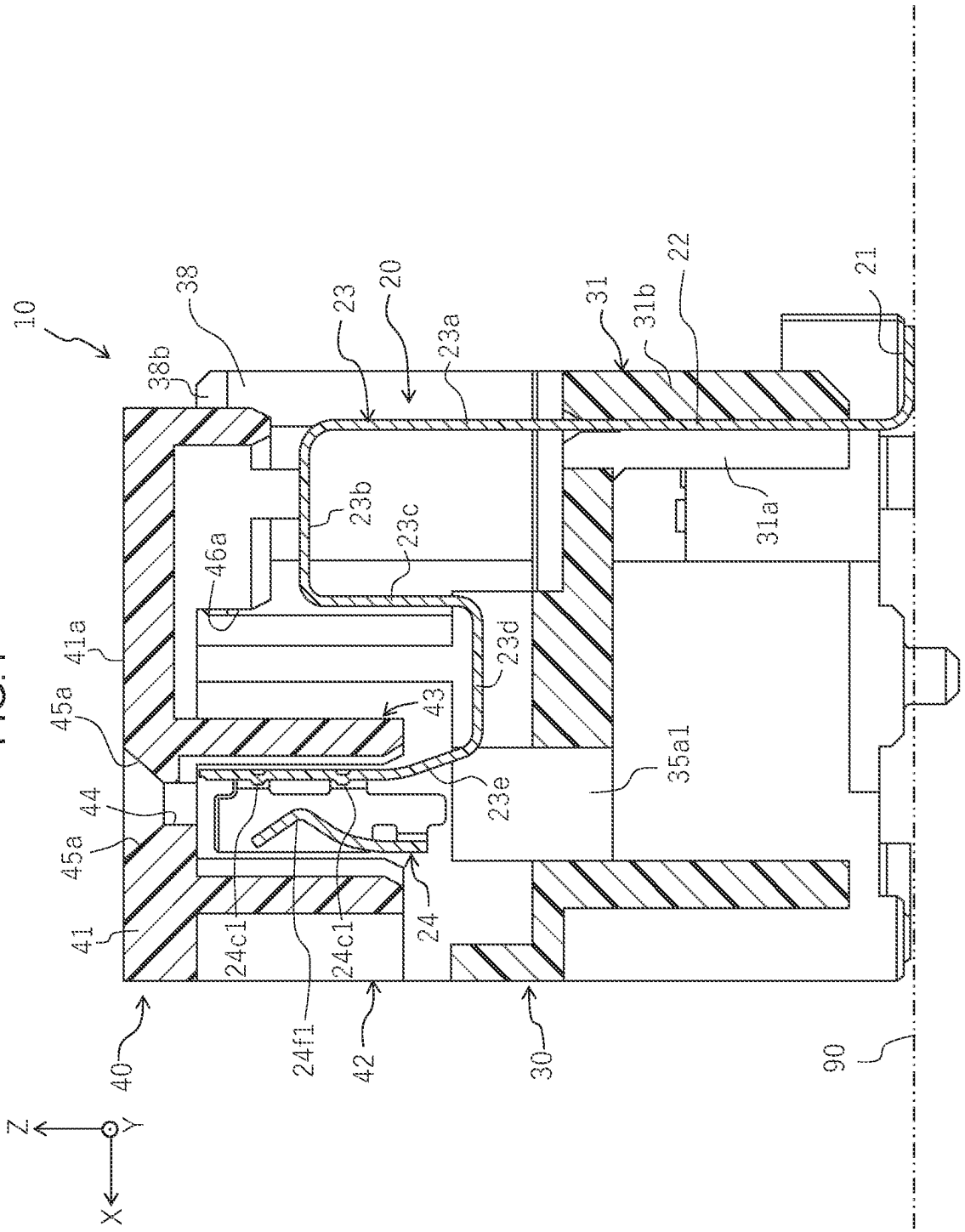
32
50
33c
33
33b
50
32
34
38
45b
44
45a
45a
45b
40
24f1
24c1
20
21
4
4
38
34
X
Z
Y
32
50
33c
33
30
33b
50
32

FIG.4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38
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23a
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22
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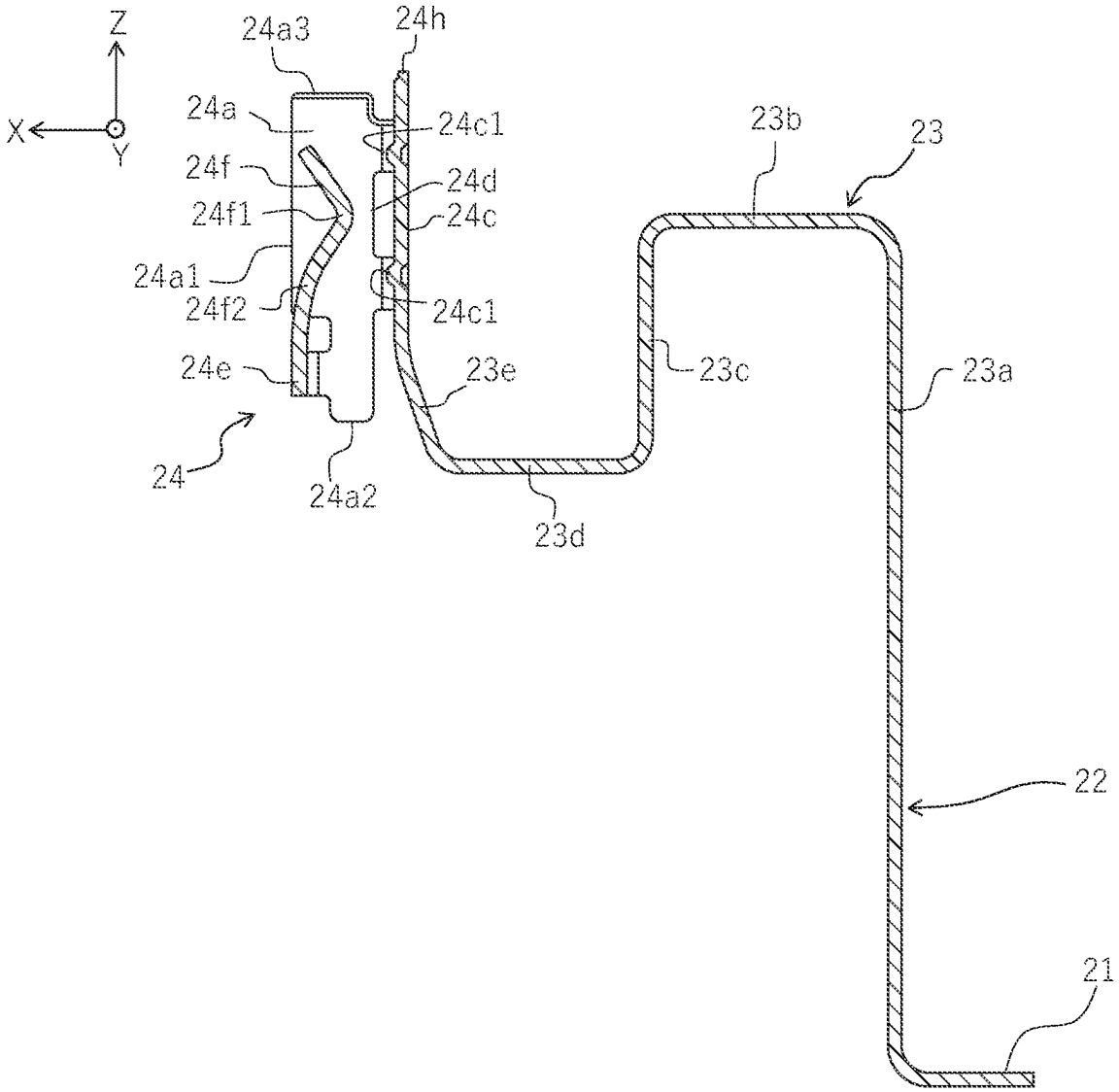
23b
23c
46a
31a
41a
23d
45a
43
35a1
44
23e
45a
24
41
24c1
24c1
24f1
40
42
30
90
Z
Y
X

FIG.5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X
Y
24a3
24h
24a
24c1
23b
23
24f
24d
24f1
24c
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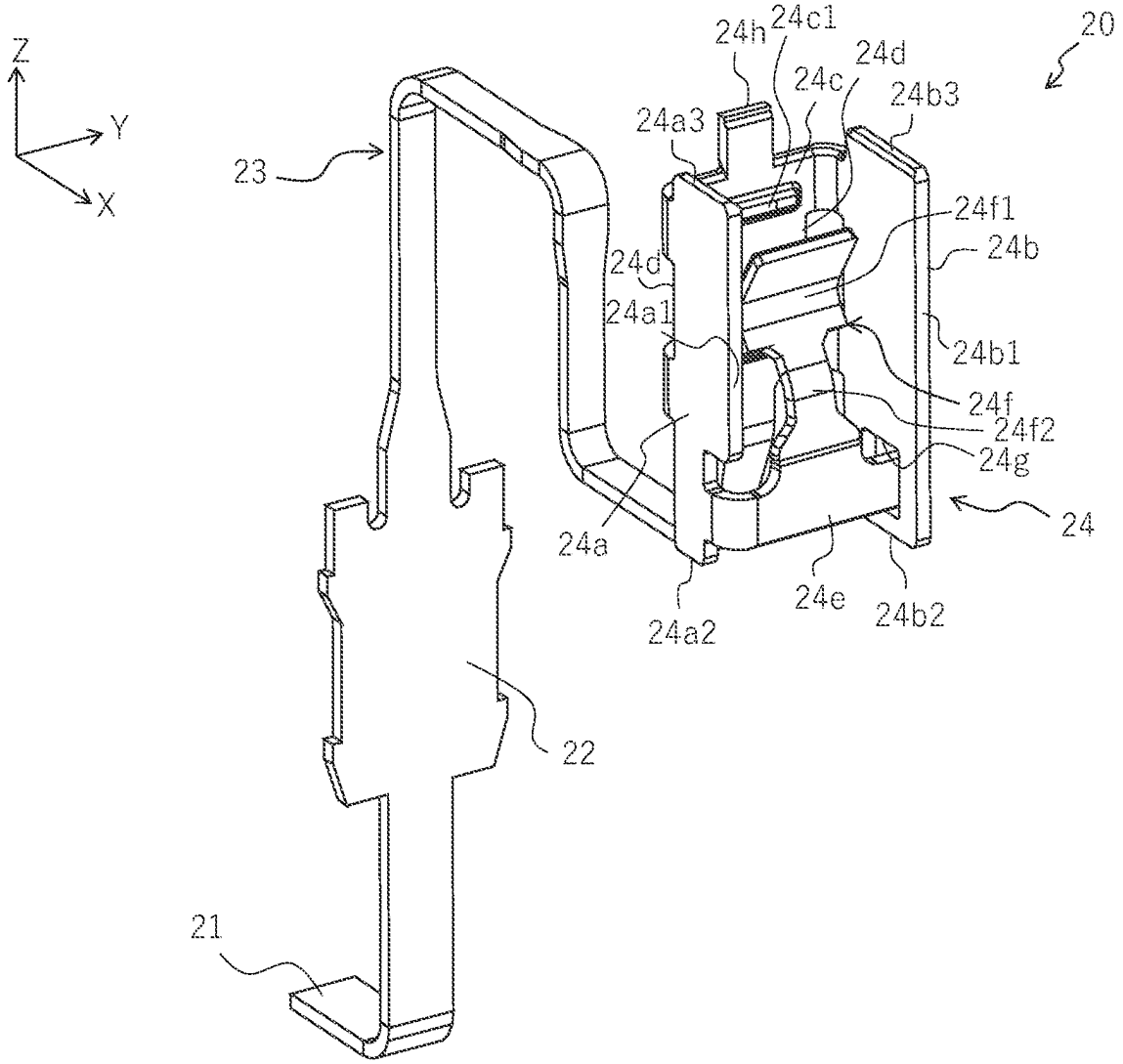
23c
23a
24
24a2
23d
22
21

FIG.6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24h
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24f1
24b
24d
24a1
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24g
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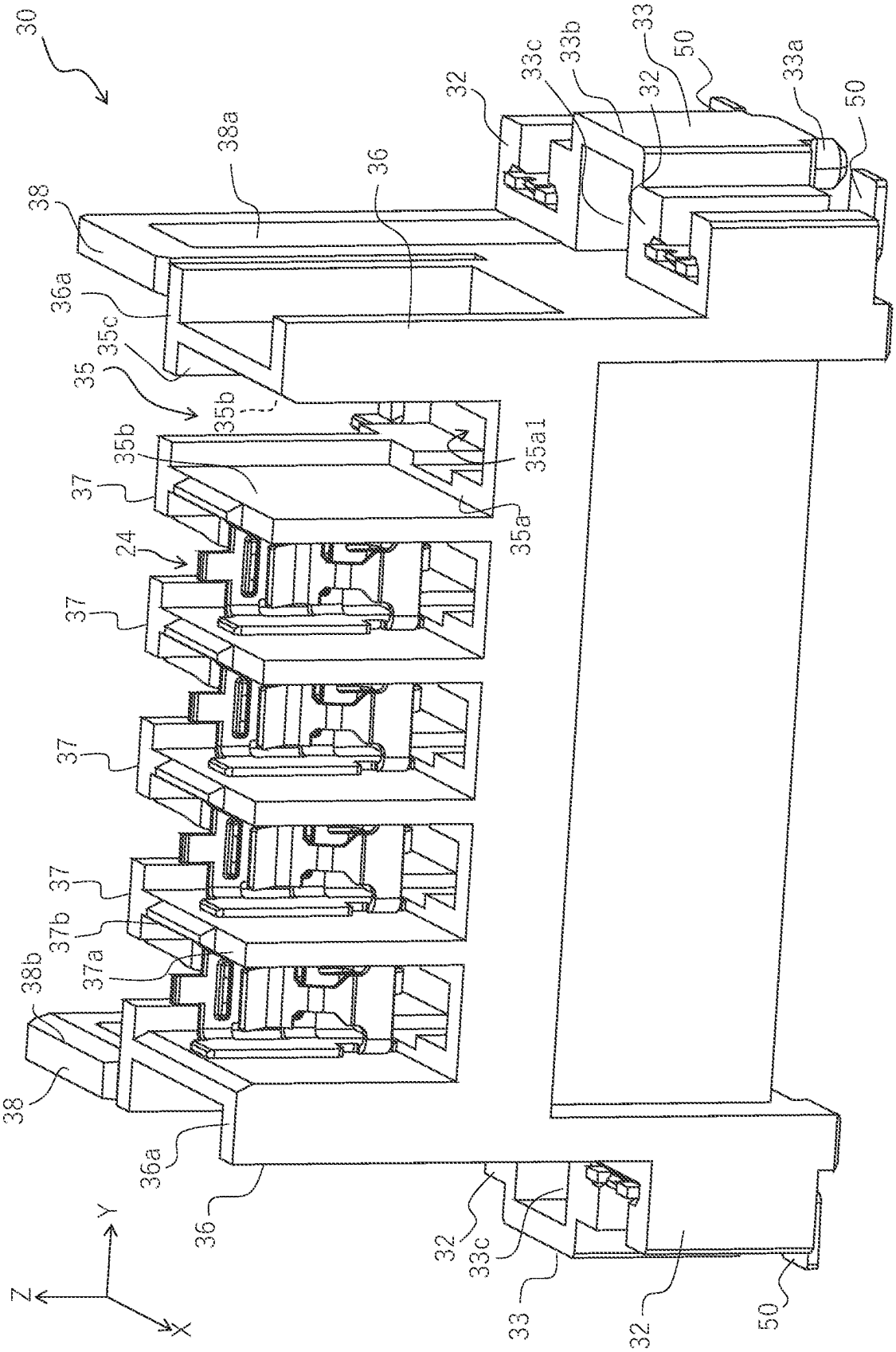
24a
24a2
24e
24b2
22
21

FIG.7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38
36a
35c
35
35b
35b
35a1
37
35a
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37
37
37
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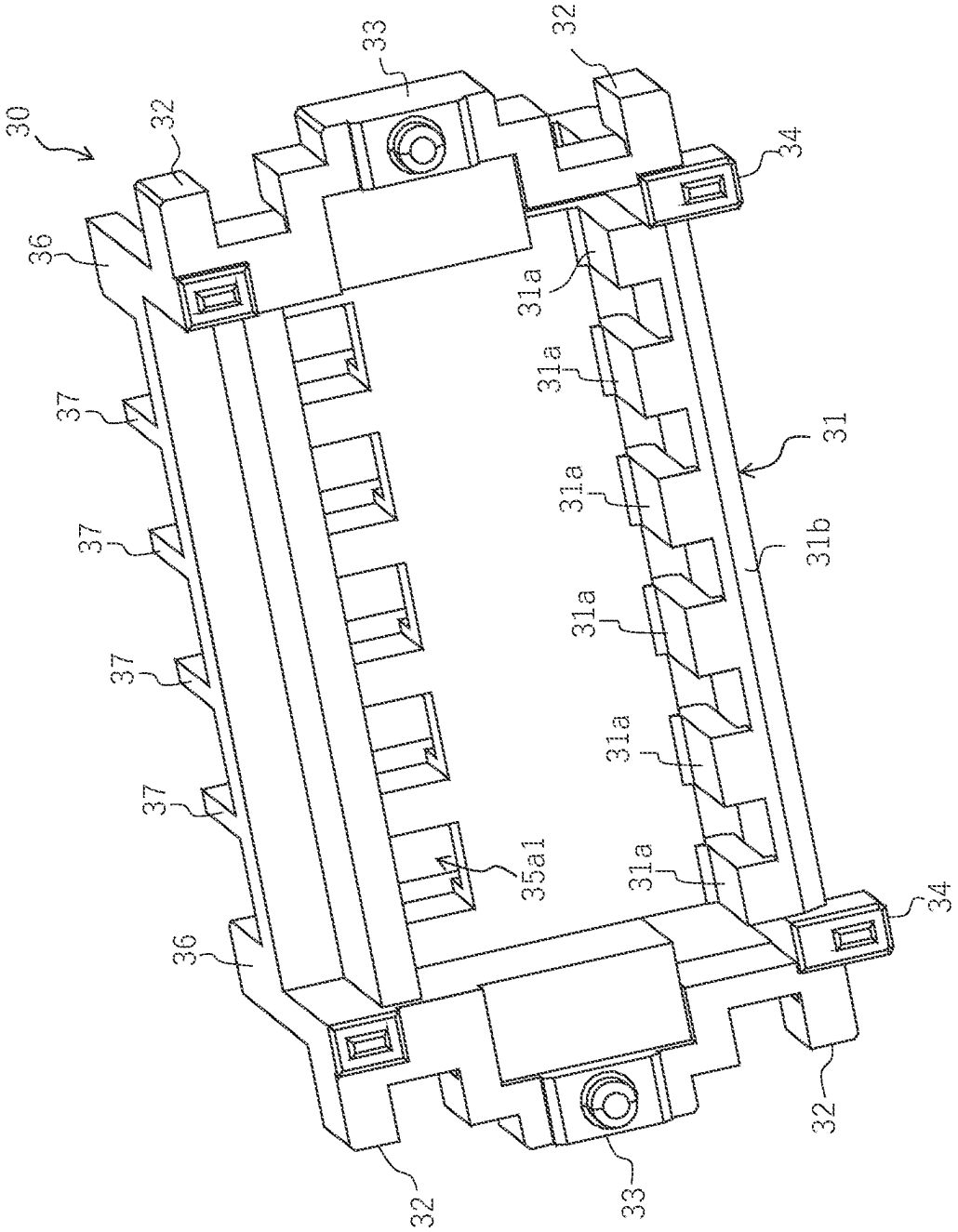
37a
38b
38
36a
36
32
33c
33b
33
50
32
33a
50
32
33c
33
32
50
Y
Z
X

FIG.8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31a
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31a
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31a
34
36
32
33
32

FIG.9

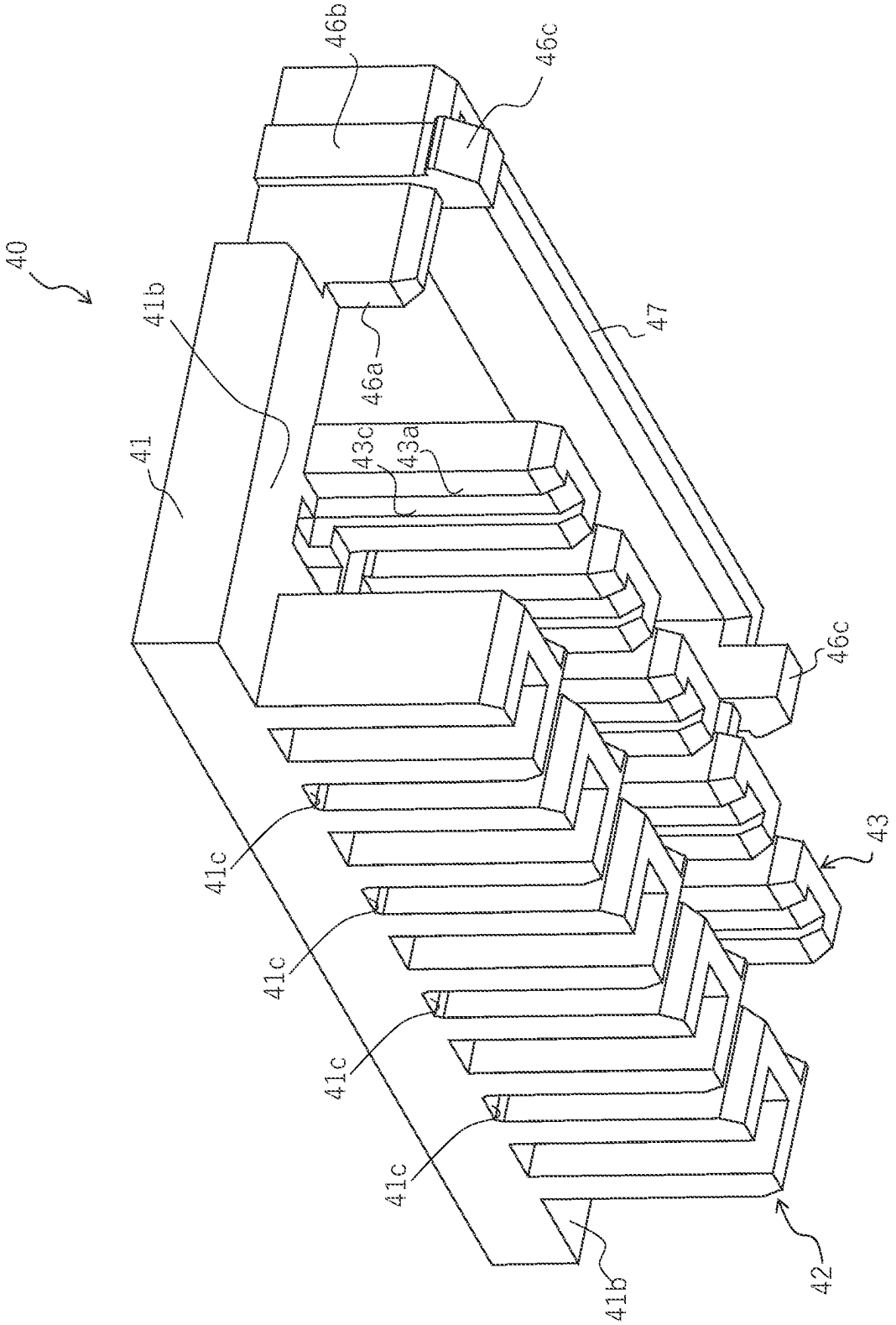


FIG.10

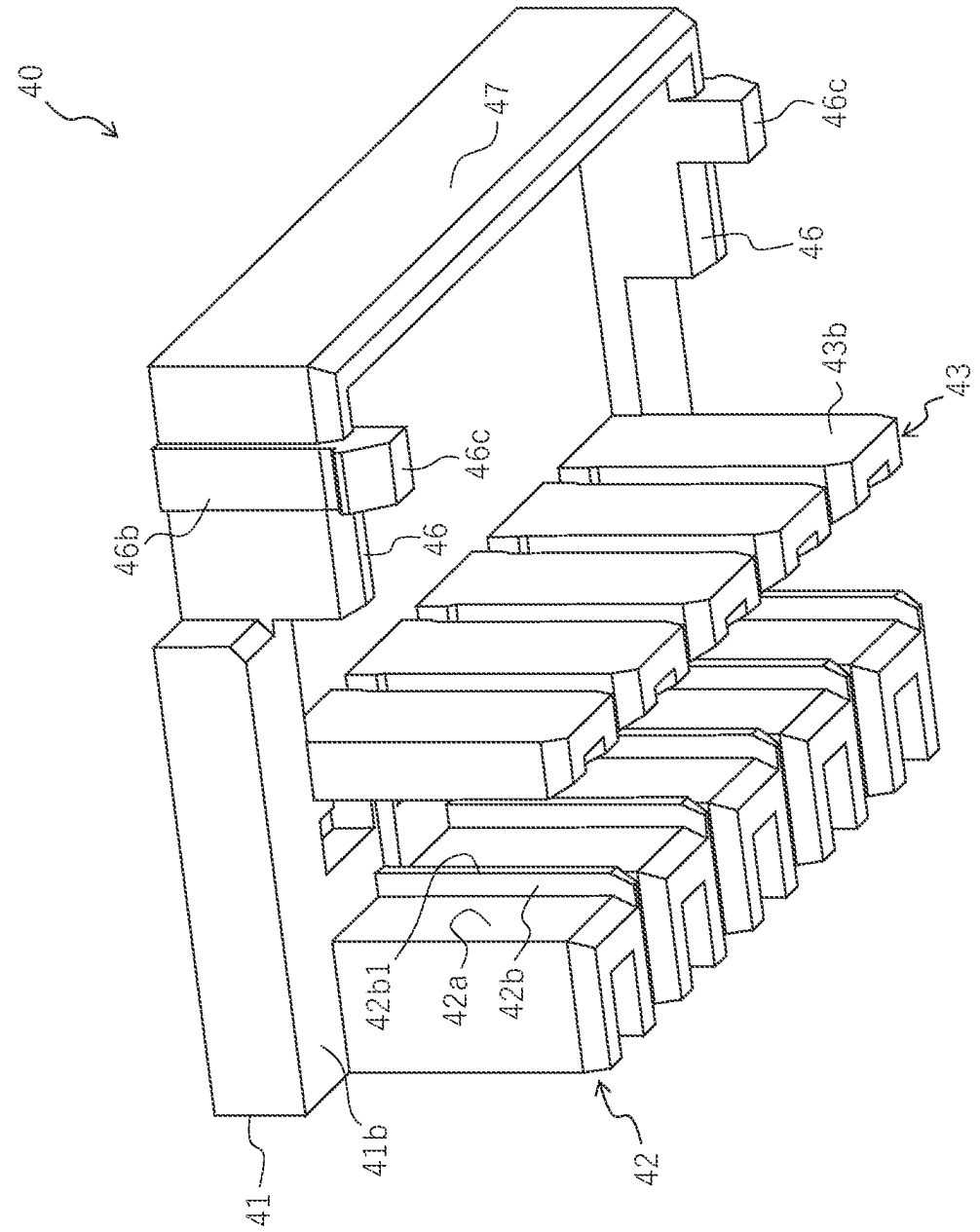
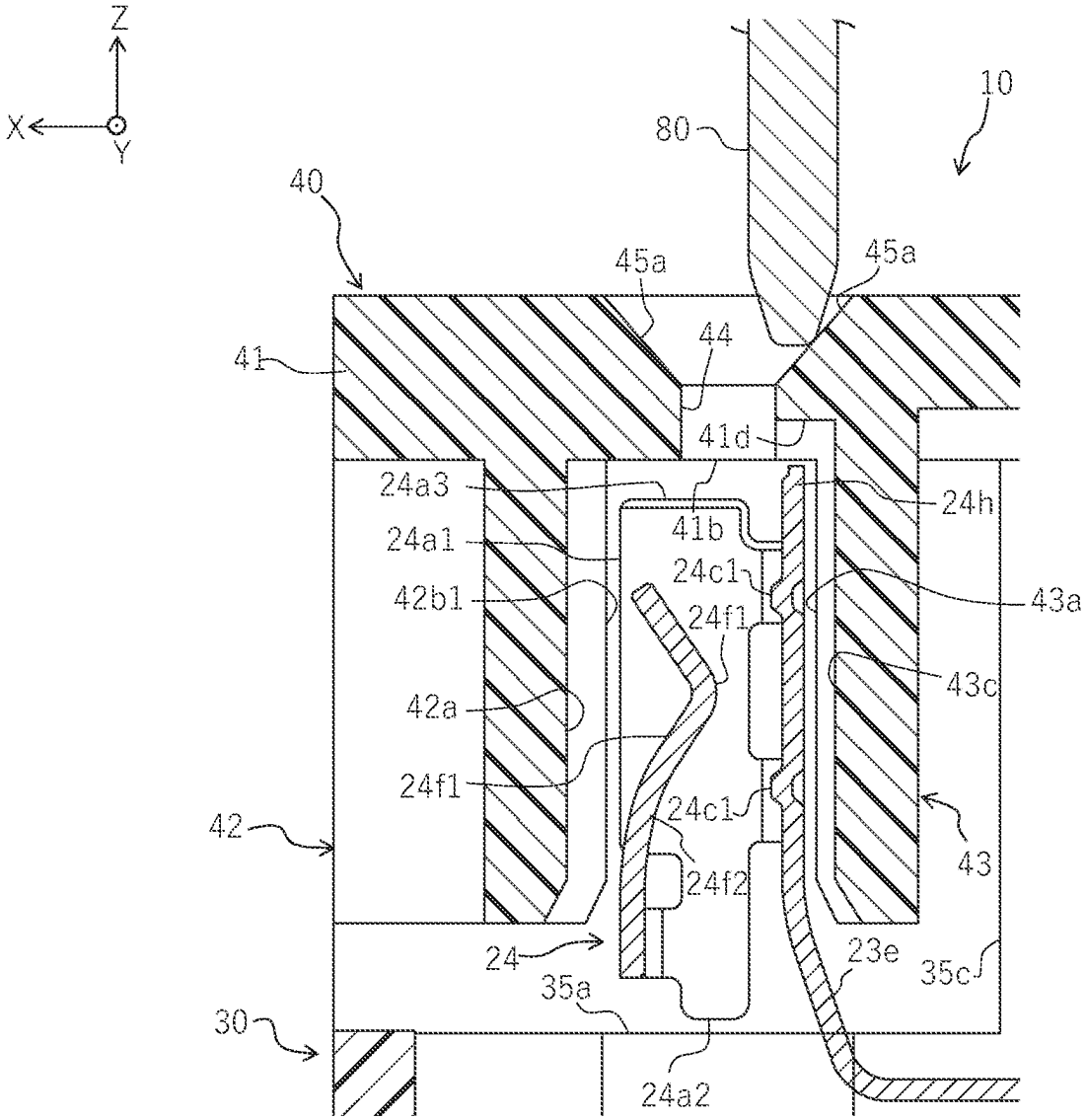


FIG.11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X
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80
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24f1
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35a
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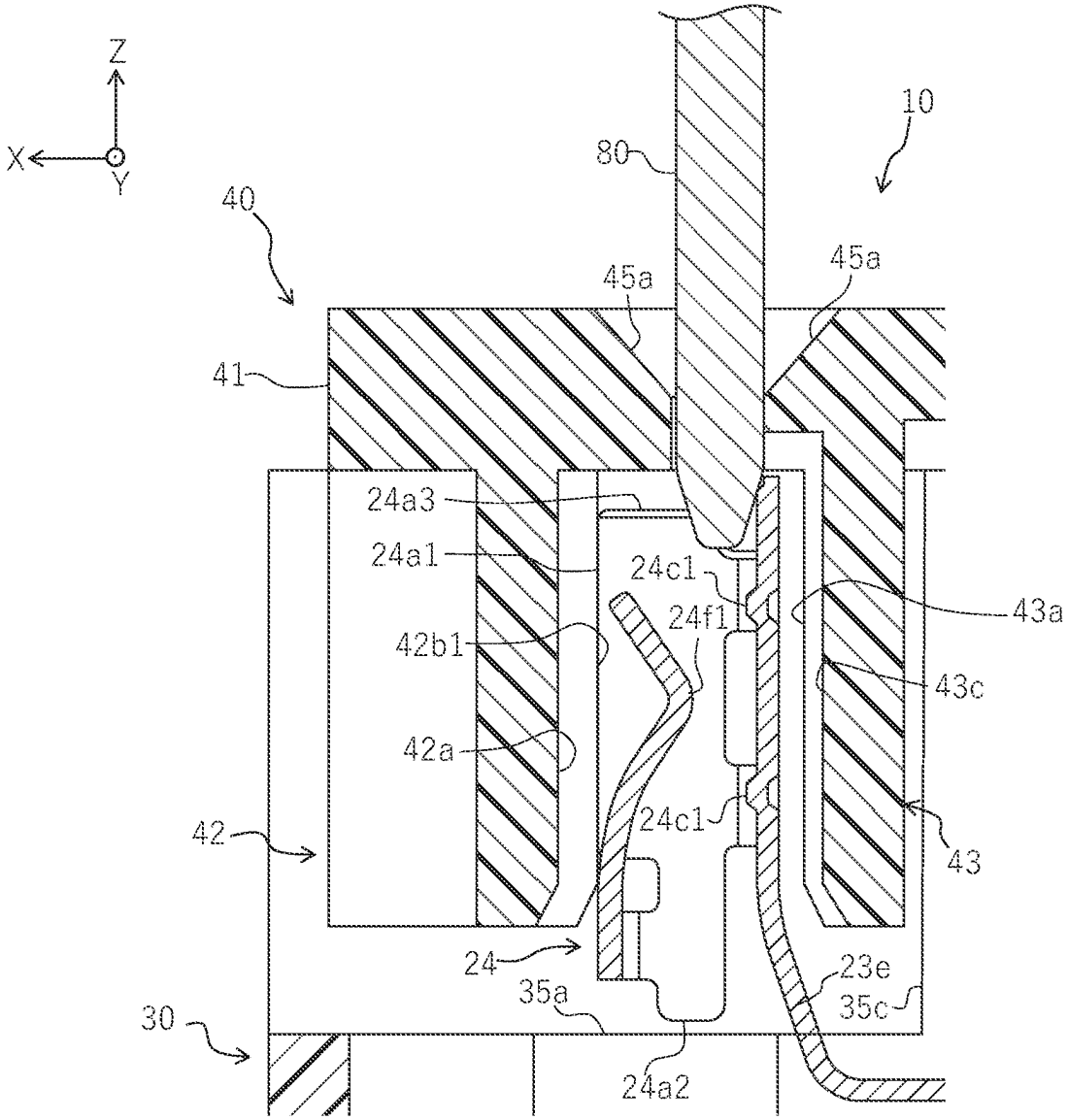
24a2

FIG.12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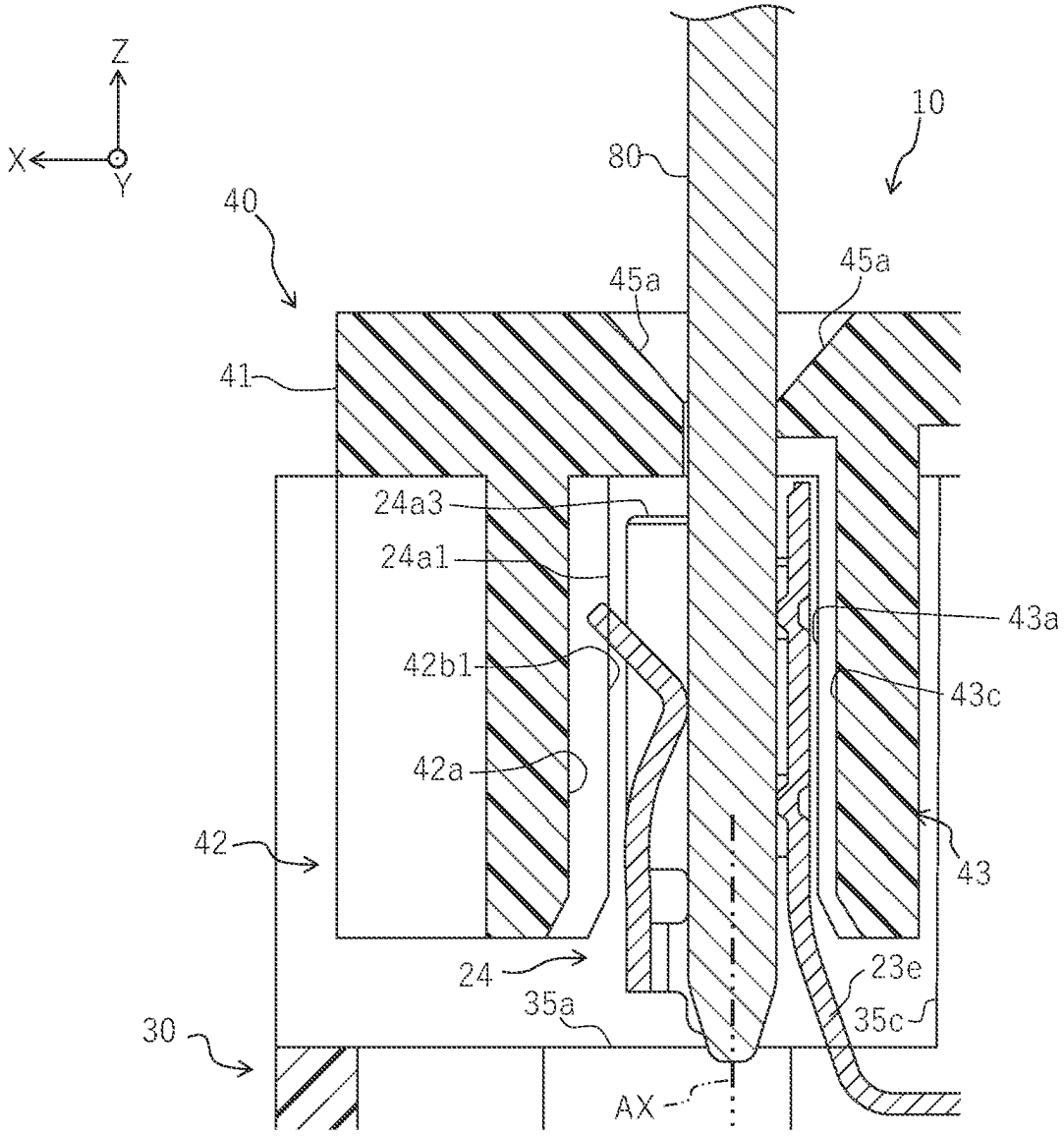
23e
35a
35c
30
24a2

FIG.13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43c
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43
24
23e
35a
35c
30
AX

CONNECTOR

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to Japanese Patent Application No. 2021-137632 filed, on Aug. 25, 2021, the disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND

Technical Field

The present disclosure relates to a connector.

Related Art

A connector as described in Japanese Patent Application Laid-Open (JP-A) No. 2017-98160 is known. The connector includes a movable housing that is displaceable with respect to an attachment object, and a terminal that electrically connects the attachment object and a connection object. The terminal has a displacement portion in which a contact portion in contact with the connection object is formed. The displacement portion is configured to be integrally displaced with the movable housing by being fixed to the movable housing.

In such a connector, when the connector is connected to the connection object, the movable housing and the displacement portion can be displaced in accordance with a positional deviation of the connection object.

SUMMARY OF THE INVENTION

However, in a case where the connector as described above is used under a vibration environment such as an automobile, for example, when the movable housing and the displacement portion are displaced by an inertial force, the contact portion formed in the displacement portion may repeatedly slide with respect to the connection object, or an elastically deformable intermediate deformation portion connected to the displacement portion may be repeatedly elastically deformed even if the contact portion does not slide. Such repeated sliding and elastic deformation may cause wear of the contact portion and breakage of the intermediate deformation portion.

In particular, when the frequency of a vibration of an engine of an automobile, a vibration from a road surface, or the like coincides with the resonance frequency of the displacement portion of the connector in a state of being connected to the connection object, the displacement portion will vibrate violently together with the connection object, so that the risk of the wear or the breakage described above increases. Therefore, in recent years, it is required to increase the resonance frequency of the displacement portion of the connector in the state of being connected to the connection object so that the frequency (natural frequency) of the displacement portion of the connector does not coincide with the frequency of the vibration of the engine of the automobile, the vibration from the road surface, or the like.

However, in the connector as described above, since the displacement portion of the terminal is fixed to the movable housing, when the displacement portion is displaced, the movable housing is also displaced integrally with the displacement portion. Therefore, the mass of a portion that is integrally displaced when the displacement portion is displaced is large. Therefore, the inertial force acting on the portion integrally displaced tends to increase, and the resonance frequency tends to decrease. As a result, it has not been possible to sufficiently meet the above requirement.

An object of the present disclosure is to provide a connector including a movable housing, the connector being capable of suppressing repeated sliding and the like between a contact portion and a connection object.

In the present disclosure, when a structure and/or a shape of an object are described, an X direction, a Y direction, and a Z direction, which are directional concepts based on the object and are mutually perpendicular, are used.

A connector according to a first aspect is a connector that is attachable to an attachment object, the connector including: a movable housing that is displaceable with respect to the attachment object in an X direction, which is a direction perpendicular to a connection direction of a connection object to the connector; and a terminal configured to electrically connect the attachment object and the connection object, in which the terminal includes a displacement portion that is formed with a contact portion configured to contact the connection object and that is displaceable with respect to the attachment object in the X direction, and the displacement portion is displaceable with respect to the movable housing.

In the above aspect, the connector includes the movable housing that is displaceable with respect to the attachment object in the X direction, which is a direction perpendicular to the connection direction, and the terminal configured to electrically connect the attachment object and the connection object. The terminal includes the displacement portion that is displaceable with respect to the attachment object in the X direction. The displacement portion is formed with the contact portion configured to contact the connection object.

As described above, since both the movable housing and the displacement portion can be displaced with respect to the attachment object in the X direction, the movable housing and the displacement portion can be displaced in accordance with a positional deviation of the connection object in the X direction when the connector and the connection object are connected.

Furthermore, in the above aspect, the displacement portion is displaceable with respect to the movable housing.

Therefore, unlike the above-described prior art (technique in which when the displacement portion is displaced, the movable housing is also displaced integrally with the displacement portion), the mass of the portion that is integrally displaced when the displacement portion is displaced is small. As a result, repeated sliding and the like (including repeated elastic deformation of an intermediate deformation portion when the terminal has the intermediate deformation portion) between the contact portion and the connection object can be suppressed.

A connector according to a second aspect is the connector according to the first aspect, in which the movable housing includes a movable-side limiting portion, and the movable-side limiting portion is configured such that when the movable housing is displaced in the X direction, the movable-side limiting portion abuts on the displacement portion, so that a position of the displacement portion in the X direction with respect to the movable housing is limited to a predetermined range.

Since the displacement portion is displaceable with respect to the movable housing, when the movable housing

is displaced with respect to the attachment object, the displacement portion is displaced with respect to the movable housing.

Here, in the above aspect, the movable housing has the movable-side limiting portion. The movable-side limiting portion is configured such that when the movable housing is displaced in the X direction, the movable-side limiting portion abuts on the displacement portion, so that the position of the displacement portion in the X direction with respect to the movable housing is limited to a predetermined range.

Therefore, for example, by displacing the movable housing in accordance with the positional deviation of the connection object in the X direction prior to the contact between the connection object and the terminal, the displacement portion can be displaced in accordance with the positional deviation of the connection object in the X direction in advance prior to the contact between the connection object and the terminal. As a result, the distance of the positional deviation possible to be coped with can be increased as compared with an aspect in which the positional deviation of the connection object is coped with only by the structure of the terminal.

A connector according to a third aspect is the connector according to the first or second aspect, in which the movable housing is not displaceable with respect to the attachment object in a Y direction, which is a direction perpendicular to both the connection direction and the X direction.

In the above aspect, the movable housing is not displaceable with respect to the attachment object in the Y direction. Therefore, it is not necessary to provide a structure for displacing the movable housing in the Y direction, and as a result, for example, the connector can be downsized in the Y direction.

A connector according to a fourth aspect is the connector according to the third aspect that further includes a fixed housing configured to be fixed to the attachment object, in which the fixed housing includes a fixed-side limiting portion, and the fixed-side limiting portion is configured such that when the displacement portion is displaced in the Y direction, the fixed-side limiting portion abuts on the displacement portion, so that a position of the displacement portion in the Y direction with respect to the fixed housing is limited to a predetermined range.

In the above aspect, the connector includes the fixed housing configured to be fixed to the attachment object, and the fixed housing has the fixed-side limiting portion. That is, the position of the displacement portion in the Y direction with respect to the fixed housing is limited to a predetermined range by the fixed-side limiting portion of the fixed housing.

Therefore, in the manufacturing process of the connector, since the position of the displacement portion with respect to the fixed housing is determined to some extent before the movable housing is assembled to the fixed housing, assembling of the movable housing is facilitated.

A connector according to a fifth aspect is the connector according to any one of the first to fourth aspects, in which the contact portion is configured to contact the connection object so as to sandwich the connection object in the X direction.

In the above aspect, the contact portion is configured to contact the connection object so as to sandwich the connection object in the X direction. Therefore, the displacement portion can easily follow the positional deviation of the connection object in the X direction.

A connector according to a sixth aspect is the connector according to any one of the first to fifth aspects, in which the displacement portion includes: an elastic deformation portion that elastically deforms when the connection object is connected; and a deformation limiting portion that limits a deformation amount of the elastic deformation portion by abutting on the elastic deformation portion.

In the above aspect, the displacement portion includes the elastic deformation portion that elastically deforms when the connection object is connected. Therefore, the contact portion can be elastically brought into contact with the connection object.

However, since the displacement portion can be displaced with respect to the movable housing, it is difficult to limit the deformation of the elastic deformation portion by the movable housing.

Therefore, the displacement portion further includes a deformation limiting portion that limits the deformation amount of the elastic deformation portion by abutting on the elastic deformation portion. Therefore, excessive deformation of the displacement portion is limited by the deformation limiting portion, and the elastic deformation portion is prevented from being plastically deformed.

A connector according to a seventh aspect is the connector according to any one of the first to sixth aspects, in which the displacement portion includes: a first side plate and a second side plate both facing each other in the Y direction with plate thickness directions thereof oriented in the Y direction: a connecting plate that connects the first side plate and the second side plate in the Y direction with a plate thickness direction thereof oriented in the X direction, the connecting plate being in contact with the connection object from one side in the X direction: a contact piece base portion that extends from the first side plate toward the second side plate; and a contact piece that extends from the contact piece base portion and that elastically contacts the connection object from another side in the X direction, and in which a limiting hole is formed in the second side plate, and a distal end of the contact piece base portion is disposed in the limiting hole, so that a deformation amount of the contact piece base portion is limited.

In the above aspect, the limiting hole is formed in the second side plate, and the distal end of the contact piece base portion is disposed in the limiting hole, so that the deformation amount of the contact piece base portion is limited. As a result, the deformation limiting portion that limits the deformation amount of the elastic deformation portion including the contact piece base portion and the contact piece is realized with a simple configuration.

A connector according to an eighth aspect is the connector according to the first aspect, in which the movable housing includes a movable-side limiting portion, in which the movable-side limiting portion is configured such that when the movable housing is displaced in the X direction, the movable-side limiting portion abuts on the displacement portion, so that a position of the displacement portion in the X direction with respect to the movable housing is limited to a predetermined range, in which the displacement portion includes: a first side plate and a second side plate both facing each other in the Y direction with plate thickness directions thereof oriented in the Y direction: a connecting plate that connects the first side plate and the second side plate in the Y direction with a plate thickness direction thereof oriented in the X direction, the connecting plate being in contact with the connection object from one side in the X direction: a contact piece base portion that extends from the first side plate toward the second side plate; and a contact piece that

extends from the contact piece base portion and that elastically contacts the connection object from another side in the X direction, in which both an end on the other side in the X direction of the first side plate and an end on the other side in the X direction of the second side plate are configured to be able to abut on the movable-side limiting portion, and in which the end on the other side in the X direction of the first side plate is located further toward the one side in the X direction than the end on the other side in the X direction of the second side plate.

In the above aspect, when the contact piece base portion extends from the first side plate and the contact piece extends from the contact piece base portion, the end on the other side in the X direction of the first side plate is located further toward the one side in the X direction than the end on the other side in the X direction of the second side plate. Therefore, when the displacement portion is produced by cutting and bending the plate material, the width dimension of the contact piece can be increased.

Further, both the end on another side in the X direction of the first side plate and the end on another side in the X direction of the second side plate are configured to be able to abut on the movable-side limiting portion. Therefore, the movable-side limited portion abuts on the displacement portion, so that the posture of the displacement portion is prevented from being collapsed.

A connector according to a ninth aspect is the connector according to any one of the first to eighth aspects, in which the terminal includes an avoidance portion extending from the displacement portion and extending in a direction away from a connection axis of the connection object.

In a mode in which a portion of the terminal extending from the displacement portion extends, for example, parallel to the connection axis of the connection object, the portion may collide with the distal end of the connection object.

Therefore, in the above aspect, the terminal includes the avoidance portion extending from the displacement portion and extending in a direction away from the connection axis of the connection object. Therefore, the collision as described above is prevented.

A connector according to a tenth aspect is the connector according to any one of the first to ninth aspects, in which the movable housing is supported by being in contact with the attachment object or a support member that is not displaced with respect to the attachment object.

In the first aspect, since the displacement portion is displaceable with respect to the movable housing, the movable housing cannot be appropriately supported by the displacement portion.

Therefore, in the above aspect, the movable housing is supported by being in contact with the attachment object or the support member that is not displaced with respect to the attachment object. Therefore, the movable housing can be appropriately supported.

In the embodiment described later, the support member is a fixed housing, but the support member is not limited to the fixed housing. The support member may be, for example, a portion of the terminal that is not displaced with respect to the attachment object.

A connector according to an eleventh aspect is the connector according to any one of the first to ninth aspects, in which the movable housing is supported by being in contact with a support member that is not displaced with respect to the attachment object, and one of the movable housing or the support member clamps another of the movable housing or the support member.

In the above aspect, one of the movable housing or the support member clamps another of the movable housing or the support member. Therefore, the movable housing is prevented from rattling with respect to the support member. When the rattling of the movable housing is prevented, for example, the following situation can be prevented: the movable housing collides with the connection object or the terminal in a rattling connection state, and as a result, the contact point between the terminal and the connection object is scraped due to being slid.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a connector;

FIG. **2** is a perspective view of the connector as viewed from another direction;

FIG. **3** is a top view of the connector:

FIG. **4** is a cross-sectional view taken along line **4-4** in FIG. **3**:

FIG. **5** is a cross-sectional view of a terminal:

FIG. **6** is a perspective view of the terminal;

FIG. **7** is a perspective view of the connector in which a movable housing and one of a plurality of terminals are omitted;

FIG. **8** is a perspective view of a fixed housing as viewed from below:

FIG. **9** is a perspective view of the movable housing as viewed from a front side:

FIG. **10** is a perspective view of the movable housing as viewed from a rear side;

FIG. **11** is a cross-sectional view illustrating a state at the moment when a connection object whose position is deviated comes into contact with the movable housing:

FIG. **12** is a cross-sectional view illustrating a state at the moment when the connection object whose position is deviated comes into contact with the terminal; and

FIG. **13** is a cross-sectional view illustrating a state after connection is completed.

DETAILED DESCRIPTION OF THE INVENTION

Hereinafter, a connector **10** according to an embodiment of the present disclosure will be described.

For convenience of description, an X direction illustrated in each drawing may be referred to as a front-rear direction, a Y direction illustrated in each drawing may be referred to as a width direction (left-right direction), and a Z direction illustrated in each drawing may be referred to as a vertical direction. The terms indicating these directions are directional concepts based on the connector **10**, and thus do not limit installation direction, posture, and the like at the time of using the connector **10**.

FIGS. **1** to **4** illustrate the connector **10**. The connector **10** includes a plurality of (five) terminals **20**, a fixed housing **30**, a movable housing **40**, and a plurality of attachment fittings **50**.

As illustrated in FIG. **4**, the connector **10** is configured to be attachable to a board **90** as an "attachment object". In the present embodiment, the connector **10** is attached to the board **90** by soldering the plurality of terminals **20** and the plurality of attachment fittings **50** to the board **90**.

The connector **10** is configured such that a mating terminal **80** (see FIGS. **11** to **13**) as a "connection object" can be connected thereto. In the present embodiment, a plurality of (five) mating terminals **80** can be connected. The mating terminal **80** can be connected from above. That is, connec-

tion direction of the mating terminal **80** with respect to the connector **10** is a downward direction (−Z direction).

(Terminal **20**)

FIGS. **5** and **6** illustrate the terminal **20**. The terminal **20** is formed of a conductive material and electrically connects the board **90** and the mating terminal **80**.

The terminal **20** includes a board connecting portion **21**, a held portion **22**, an intermediate deformation portion **23**, and a displacement portion **24** in this order.

The board connecting portion **21** is a portion to be connected to the board **90**. The board connecting portion **21** is surface-mounted on the board **90** by soldering.

The held portion **22** is a portion held by the fixed housing **30**. The held portion **22** is held by a terminal holding portion **31** of the fixed housing **30** by being press-fitted into the fixed housing **30**. The held portion **22** is press-fitted into the fixed housing **30** from above. The held portion **22** has a plate thickness direction oriented in the front-rear direction.

The intermediate deformation portion **23** is a portion that is located between the held portion **22** and the displacement portion **24** and that is formed to be easily elastically deformed.

The displacement portion **24** is a portion that can be displaced with respect to the board connecting portion **21** and the held portion **22**. Displacement of the displacement portion **24** is realized by deformation of the intermediate deformation portion **23**. In the displacement portion **24**, contact portions **24***c***1** and **24***f***1** that come into contact with the mating terminal **80** are formed.

The intermediate deformation portion **23** includes an upward direction portion **23***a*, a first forward direction portion **23***b*, a downward direction portion **23***c*, a second forward direction portion **23***d*, and an inclined direction portion **23***e* (an avoidance portion) in this order.

The upward direction portion **23***a* linearly extends upward from the held portion **22**. The upward direction portion **23***a* is located at the same position as the held portion **22** in the front-rear direction.

The first forward direction portion **23***b* extends linearly in the forward direction from a curved portion formed on an upper side of the upward direction portion **23***a*. The first forward direction portion **23***b* is located above a bead **24***c***1** on the lower side described later.

The downward direction portion **23***c* linearly extends downward from a curved portion formed on a front side of the first forward direction portion **23***b*.

The second forward direction portion **23***d* extends linearly in the forward direction from a curved portion formed on a lower side of the downward direction portion **23***c*.

The inclined direction portion **23***e* linearly extends from a curved portion formed on a front side of the second forward direction portion **23***d* in an oblique direction of the forward direction and the upward direction. An angle formed by the direction in which the inclined direction portion **23***e* extends and the vertical direction is less than 45 degrees. A lower end of the inclined direction portion **23***e* is positioned below a lower end of the displacement portion **24**, and an upper end of the inclined direction portion **23***e* is located above the lower end of the displacement portion **24**.

The intermediate deformation portion **23** is formed by bending a plate material in the plate thickness direction. The plate thickness direction of the intermediate deformation portion **23** is directed in a direction perpendicular to the Y direction (a direction in a ZX plane) in the entire range.

As described above, in the intermediate deformation portion **23** of the present embodiment, a portion connecting the upward direction portion **23***a* and the downward direction portion **23***c* is configured by the first forward direction portion **23***b* and a pair of curved portions in front of and behind the first forward direction portion **23***b*. According to such a configuration, stress generated in the intermediate deformation portion **23** can be dispersed, as compared with a mode in which the portion connecting the upward direction portion **23***a* and the downward direction portion **23***c* is curved so as to draw a semicircular shape in a side view.

The displacement portion **24** includes a first side plate **24***a*, a second side plate **24***b*, and a connecting plate **24***c*.

The first side plate **24***a* and the second side plate **24***b* face each other in the width direction with the plate thickness direction oriented in the width direction.

The connecting plate **24***c* has a plate thickness direction oriented in the front-rear direction, and connects rear ends of the first side plate **24***a* and the second side plate **24***b* in the width direction. A lower end of the connecting plate **24***c* is connected to the intermediate deformation portion **23**. Beads **24***c***1** extending in the width direction and protruding in the forward direction are formed at two locations on the connecting plate **24***c*. The bead **24***cl* functions as a first contact portion **24***c***1** that comes into contact with the mating terminal **80** from one side in the X direction (−X direction side in the present embodiment).

A curved portion formed between the first side plate **24***a* and the connecting plate **24***c* has a through hole **24***d* formed in the middle thereof in the vertical direction, and a curved portion formed between the second side plate **24***b* and the connecting plate **24***c* also has a through hole **24***d* formed in the middle thereof in the vertical direction. Since the rigidity is reduced by forming these through holes **24***d*, the curved portions can be formed with relatively small force.

The displacement portion **24** includes a contact piece base portion **24***e* and a contact piece **24***f*.

The contact piece base portion **24***e* extends from the first side plate **24***a* and extends in the width direction toward the second side plate **24***b*. A distal end of the contact piece base portion **24***e* is disposed in a limiting hole **24***g* formed in the second side plate **24***b*. In the free state, the contact piece base portion **24***e* extends substantially parallel to the Y direction toward the distal end side; and more specifically, the contact piece base portion **24***e* extends in a direction inclined slightly closer to the side of the connecting plate **24***c* (−X direction side), with respect to the Y direction.

The contact piece **24***f* extends upward from the contact piece base portion **24***e*. The contact piece **24***f* includes a mountain-shaped contact portion **24***f***1** on a distal end side and an elastic support portion **24***f***2** that supports the mountain-shaped contact portion **24***f***1**. The mountain-shaped contact portion **24***f***1** is formed by being bent in a mountain shape so as to protrude toward the mating terminal **80**. The vertex of the mountain-shaped contact portion **24***f***1** is located between the two beads **24***c***1** of the connecting plate **24***c* in the vertical direction. The width dimension of the elastic support portion **24***f***2** is smaller than the width dimension of the mountain-shaped contact portion **24***f***1**. The terminal **20** is configured to be in contact with the mating terminal **80** at three points which are the two beads **24***c***1** as the first contact portion **24***c***1** of the connecting plate **24***c* and the mountain-shaped contact portion **24***f***1** as a second contact portion.

Further, the two beads **24***c***1** of the connecting plate **24***c* as the first contact portion **24***c***1** and the mountain-shaped contact portion **24***f***1** as the second contact portion are formed such that the width dimensions thereof are larger than the width dimension of the mating terminal **80**. As a result, the displacement portion **24** is configured such that

the mating terminal **80** and the contact portions **24***c***1** and **24***f***1** appropriately come into contact with each other even if the position of the mating terminal **80** in the Y direction is deviated.

The first side plate **24***a* has a front end edge **24***a***1** extending in the vertical direction. The front end edge **24***a***1** of the first side plate **24***a* abuts on the movable housing **40** when the displacement portion **24** is displaced in the forward direction with respect to the movable housing **40**.

The first side plate **24***a* has smaller front-rear dimension in a lower portion thereof than in an upper portion thereof. The contact piece base portion **24***e* extends from a front end edge of the lower portion of the first side plate **24***a* via the curved portion. The above-described front end edge **24***a***1** is a front end edge of the upper portion of the first side plate **24***a*. The length (vertical length) of the front end edge **24***a***1** exceeds 50% of the vertical dimension of the first side plate **24***a*.

The second side plate **24***b* has a front end edge **24***b***1** extending in the vertical direction. The front end edge **24***b***1** of the second side plate **24***b* abuts on the movable housing **40** when the displacement portion **24** is displaced in the forward direction with respect to the movable housing **40**.

Unlike the first side plate **24***a*, the second side plate **24***b* has a constant front-rear dimension over the vertical direction. The front end edge **24***b***1** of the second side plate **24***b* is formed from a lower end to the upper end of the second side plate **24***b*.

The front end edge **24***b***1** of the second side plate **24***b* is located in front of the front end edge **24***a***1** of the first side plate **24***a*.

The first side plate **24***a* has a lower end edge **24***a***2** extending in the front-rear direction. The lower end edge **24***a***2** of the first side plate **24***a* abuts on the fixed housing **30** when the displacement portion **24** is displaced in the downward direction with respect to the fixed housing **30**.

The second side plate **24***b* has a lower end edge **24***b***2** extending in the front-rear direction. The lower end edge **24***b***2** of the second side plate **24***b* abuts on the fixed housing **30** when the displacement portion **24** is displaced in the downward direction with respect to the fixed housing **30**.

The lower end edge **24***a***2** of the first side plate **24***a* and the lower end edge **24***b***2** of the second side plate **24***b* are formed at the same position in the vertical direction. The lower end edge **24***a***2** of the first side plate **24***a* and the lower end edge **24***b***2** of the second side plate **24***b* are located below the upper end of the inclined direction portion **23***e* of the intermediate deformation portion **23** and above the lower end of the inclined direction portion **23***e*.

The first side plate **24***a* has an upper end edge **24***a***3** extending in the front-rear direction. The upper end edge **24***a***3** of the first side plate **24***a* abuts on a lower surface **41***b* (see FIG. **11**) of a top wall **41** of the movable housing **40** when the displacement portion **24** is displaced in the upward direction with respect to the movable housing **40**.

The second side plate **24***b* has an upper end edge **24***b***3** extending in the front-rear direction. The upper end edge **24***b***3** of the second side plate **24***b* abuts on the lower surface **41***b* of the top wall **41** of the movable housing **40** when the displacement portion **24** is displaced in the upward direction with respect to the movable housing **40**.

The upper end edge **24***a***3** of the first side plate **24***a* and the upper end edge **24***b***3** of the second side plate **24***b* are formed at the same position in the vertical direction.

A carrier cutting portion **24***h* protrudes upward from the upper end of the connecting plate **24***c*. The carrier cutting portion **24***h* is a connection portion between the terminal **20** and a carrier in a case where the terminal **20** is formed by performing a forward feed processing. An upper end of the carrier cutting portion **24***h* is located above the upper end edge **24***a***3** of the first side plate **24***a* and the upper end edge **24***b***3** of the second side plate **24***b*. A recessed portion **41***d* (see FIG. **11**) recessed upward is formed on the upper side of a position where the carrier cutting portion **24***h* is disposed in the movable housing **40**. As a result, even when the displacement portion **24** is displaced in the upward direction, the carrier cutting portion **24***h* does not abut on the movable housing **40**.

(Fixed Housing **30**)

The fixed housing **30** is integrally formed of an insulator such as synthetic resin.

The fixed housing **30** is fixed to the board **90** and is not displaced with respect to the board **90**. Specifically, the fixed housing **30** is attached to the board **90** via the plurality of terminals **20** and the plurality of attachment fittings **50**.

The fixed housing **30** includes the terminal holding portion **31** that holds the held portion **22** of the terminal **20**.

As illustrated in FIG. **8**, the terminal holding portion **31** has a plurality of (six) press-fitted walls **31***a*. The plurality of press-fitted walls **31***a* are arranged side by side in a terminal arrangement direction (Y direction). The held portion **22** of the terminal **20** is press-fitted between the adjacent press-fitted walls **31***a*.

The terminal holding portion **31** has a connecting wall **31***b*. The connecting wall **31***b* connects the plurality of press-fitted walls **31***a* in the terminal arrangement direction. The connecting wall **31***b* is formed on an outer side in the front-rear direction (in the present embodiment, on the rear side or −X direction side) with respect to the plurality of press-fitted walls **31***a*.

A direction in which the terminal **20** is assembled to the fixed housing **30** is the downward direction. Therefore, when the held portion **22** of the terminal **20** is press-fitted between the press-fitted walls **31***a* of the fixed housing **30**, the board connecting portion **21** of the terminal **20** will interfere with the connecting wall **31***b*. Therefore, in the present embodiment, at the stage where the terminal **20** is assembled to the fixed housing **30**, the board connecting portion **21** of the terminal **20** is not formed, and a portion to be the board connecting portion **21** extends straight downward from the held portion **22**. After the held portion **22** of the terminal **20** is press-fitted between the press-fitted walls **31***a* of the fixed housing **30**, the portion to be the board connecting portion **21** is bent to complete the terminal **20**.

The fixed housing **30** includes attachment fitting holding portions **32** that hold the attachment fittings **50**.

The attachment fitting holding portions **32** are formed at outer positions in the width direction of the fixed housing **30**. The total number of the attachment fitting holding portions **32** is four. Two of the four attachment fitting holding portions **32** are formed on the front side with respect to the center position in the front-rear direction of the fixed housing **30**, and the other two are formed on the rear side with respect to the center position in the front-rear direction of the fixed housing **30**.

The fixed housing **30** has a reinforcing portion **33** formed between the front attachment fitting holding portion **32** and the rear attachment fitting holding portion **32**. A positioning boss **33***a* is formed on a lower surface side of the reinforcing portion **33**. As illustrated in FIG. **3**, a side surface **33***b* of the reinforcing portion **33** is located on an outer side in the width direction with respect to the distal end (an outer end in the width direction) of a tail portion of the attachment fitting **50**.

On an upper surface of the reinforcing portion **33**, a recessed portion **33***c* recessed downward is formed.

The fixed housing **30** has tail protection portions **34**. A pair of tail protection portions **34** are formed. As illustrated in FIG. **3**, the plurality of board connecting portions **21** included respectively in the plurality of terminals **20** are disposed between the pair of tail protection portions **34**.

As illustrated in FIG. **7**, the fixed housing **30** has arrangement spaces **35** in which the displacement portion **24** of the terminal **20** and movable-side limiting portions **42** and **43** to be described later are arranged. A plurality of (five) arrangement spaces **35** are formed in accordance with the number of terminals **20**.

The arrangement space **35** is formed by an arrangement bottom surface **35***a*, a pair of arrangement side surfaces **35***b*, and an arrangement rear surface **35***c*.

The arrangement bottom surface **35***a* is configured such that the displacement portion **24** displaced in the downward direction abuts on it. Specifically, the arrangement bottom surface **35***a* is configured such that the lower ends **24***a***2** and **24***b***2** of both of the pair of side plates (the first side plate **24***a* and the second side plate **24***b*) of the displacement portion **24** displaced in the downward direction simultaneously abut on the arrangement bottom surface **35***a*. When the mating terminal **80** is connected to the connector **10**, the displacement portion **24** receives a downward force from the mating terminal **80** and is displaced in the downward direction to abut on the arrangement bottom surface **35***a* (not illustrated). Consequently, the displacement portion **24** is not further displaced in the downward direction, and the mating terminal **80** is connected to the displacement portion **24**. The arrangement bottom surface **35***a* is a plane whose normal direction is directed upward.

Incidentally, in a state where the connector **10** and the mating terminal **80** are connected, the displacement portion **24** is basically not in contact with the arrangement bottom surface **35***a*.

There is a case where the mating terminal **80** is temporarily displaced in the downward direction with respect to the connector **10** due to some cause (vertical vibration of the mating terminal **80** or the like). When the mating terminal **80** is temporarily displaced in the downward direction with respect to the connector **10**, the insertion of the mating terminal **80** into the displacement portion **24** of the terminal **20** becomes deeper. Then, when the temporary downward displacement of the mating terminal **80** is released and returns to the normal position, the displacement portion **24** is displaced in the upward direction together with the mating terminal **80**. In a state immediately after the mating terminal **80** is connected to the connector **10**, there is a possibility that the displacement portion **24** is in contact with the arrangement bottom surface **35***a*. However, due to the above phenomenon, in the connection state, the displacement portion **24** is basically not in contact with the arrangement bottom surface **35***a*.

The arrangement side surface **35***b* is configured such that the displacement portion **24** displaced in the width direction abuts on it. Specifically, the arrangement side surface **35***b* is configured such that the outer side surfaces in the width direction of the pair of side plates (the first side plate **24***a* and the second side plate **24***b*) of the displacement portion **24** displaced in the width direction abut on the arrangement side surface **35***b*. The arrangement side surface **35***b* is a plane whose normal direction is directed in the width direction. The displacement portion **24** is not in contact with the arrangement side surface **35***b* in a normal connection state.

The plurality of arrangement side surfaces **35***b* and the plurality of arrangement rear surfaces **35***c* forming the plurality of arrangement spaces **35** are configured by a pair of side walls **36** and a plurality of (four) partition walls **37** of the fixed housing **30**.

The top wall **41** of the movable housing **40** is in contact with an upper surface **36***a* of the side wall **36**.

Each of the plurality of partition walls **37** is disposed between adjacent ones of a plurality of displacement portions **24**. Each of the plurality of partition walls **37** has the same structure.

An upper surface **37***a* of the partition wall **37** has the same height as the upper surface **36***a* of the side wall **36**. A guide protruding portion **37***b* protruding upward is formed from the upper surface **37***a* of the partition wall **37**.

Of the upper surface **37***a* of the partition wall **37**, a portion located on the front side of the guide protruding portion **37***b* is in contact with the top wall **41** of the movable housing **40**.

A confirming hole **35***a***1** is formed in the arrangement bottom surface **35***a*. The confirming hole **35***a***1** is a hole for making the displacement portion **24** of the terminal **20** visible from the lower side of the connector **10**. By confirming the displacement portion **24** through the confirming hole **35***al*, the connection state between the displacement portion **24** and the connection object **80** can be confirmed. The confirming hole **35***a***1** is formed in such a size that it is possible to confirm the connection state between the displacement portion **24** and the connection object **80** even in a state where the displacement portion **24** is displaced to a displaceable limit position.

The fixed housing **30** has a housing front abutting portion on which the movable housing **40** abuts when the movable housing **40** is displaced in the forward direction. As a result, the moving range of the movable housing **40** in the forward direction with respect to the fixed housing **30** is limited. In the present embodiment, the pair of side walls **36** functions as the housing front abutting portion.

The fixed housing **30** has a housing rear abutting portion on which the movable housing **40** abuts when the movable housing **40** is displaced in the backward direction. As a result, the moving range of the movable housing in the backward direction with respect to the fixed housing **30** is limited. In the present embodiment, the pair of side walls **36** and the plurality of partition walls **37** function as the housing rear abutting portion. Specifically, the arrangement rear surface **35***c* formed on the pair of side walls **36** and the plurality of partition walls **37** functions as the housing rear abutting portion. The arrangement rear surface **35***c* abuts on a second abutting wall **43** of the movable housing **40**.

The fixed housing **30** has a pair of clamping portions **38**. The pair of clamping portions **38** are portions that clamp the movable housing **40**.

The pair of clamping portions **38** is configured such that a distance between the pair of clamping portions **38** can be slightly increased. Specifically, each of the pair of clamping portions **38** is formed in a cantilever shape extending in the upward direction. The clamping portion **38** clamps the movable housing **40** on its distal end side (free end side).

A through hole **38***a* penetrating the clamping portion **38** in the width direction is formed in the clamping portion **38**. As a result, the clamping portion **38** is easily deformed, and a locked portion **46***c* of the movable housing **40** described later can be locked.

An inclined guide surface **38***b* is formed in the clamping portion **38**. As a result, the movable housing **40** easily enters between the pair of clamping portions **38**.

(Movable Housing **40**)

The movable housing **40** is integrally formed of an insulator such as synthetic resin.

The movable housing **40** has a top wall **41** constituting an upper portion of the movable housing **40**.

The movable housing **40** has a plurality of insertion ports **44** into which the mating terminal **80** is inserted. Since the mating terminal **80** and the terminal **20** come into contact with each other inside the insertion port **44**, dustproofness is secured. The insertion port **44** penetrates the top wall **41** in the vertical direction.

As illustrated in FIG. **3**, the insertion port **44** has a rectangular shape with the X direction as the short side direction and the Y direction as the long side direction when viewed from the Z direction which is the connection direction. The dimension of the insertion port **44** in the X direction is slightly larger than the dimension of the mating terminal **80** in the X direction, for example, is from 1.05 to 1.15 times the dimension of the mating terminal **80** (see FIG. **13**). The dimension of the insertion port **44** in the Y direction is twice or more the dimension of the mating terminal **80** in the Y direction. Note that the cross-sectional shape of the mating terminal **80** is a square.

As a result, the insertion port **44** has a dimension with a small margin with respect to the mating terminal **80** in the direction in which the movable housing **40** can be displaced (X direction), and has a dimension with a large margin with respect to the mating terminal **80** in the direction in which the movable housing **40** cannot be displaced (Y direction).

The movable housing **40** has inclined surfaces **45***a* and **45***b*. The inclined surfaces **45***a* and **45***b* are formed corresponding to the plurality of insertion ports **44**, respectively.

The inclined surfaces **45***a* and **45***b* have an X-direction inclined surface **45***a* and a Y-direction inclined surface **45***b*.

The X-direction inclined surfaces **45***a* are formed on both sides, i.e., the +X direction side and the −X direction side, of the insertion port **44**. The X-direction inclined surface **45***a* is a plane whose normal direction is directed in the +Z direction inclined toward the X direction. For example, as illustrated in FIG. **11**, when the mating terminal **80** is to be inserted in a state in which its position is deviated in the −X direction with respect to the insertion port **44**, the distal end of the mating terminal **80** abuts on the X-direction inclined surface **45***a* on the −X direction side of the insertion port **44**. When the insertion is continued as it is, the movable housing **40** receives a force in the −X direction from the mating terminal **80** via the X-direction inclined surface **45***a*. By this force, the movable housing **40** is displaced in the −X direction. That is, the X-direction inclined surface **45***a* functions to eliminate a positional deviation in the X direction between the movable housing **40** and the mating terminal **80**.

The Y-direction inclined surface **45***b* is an inclined surface for facilitating removal of the metal mold for forming the insertion port **44** at the time of resin molding of the movable housing **40**. The dimension of the Y-direction inclined surface **45***b* in the Y direction is smaller than the dimension of the X-direction inclined surface **45***a* in the X direction, and is specifically 0.4 times or less the dimension of the X-direction inclined surface **45***a* in the X direction.

The inclined surfaces **45***a* and **45***b* are formed so as to connect an upper surface **41***a* of the top wall **41** and an upper end of the insertion port **44**.

The movable housing **40** has upward direction contact surfaces **41***b* and **41***c* (see FIG. **9**) that are in contact with the fixed housing **30** from above.

The upward direction contact surfaces **41***b* and **41***c* are planes whose normal direction is directed downward. The upward direction contact surfaces **41***b* and **41***c* are a lower surface of the top wall **41**. The upward direction contact surfaces **41***b* and **41***c* include a pair of first upward direction contact surfaces **41***b* located on the outer side in the width direction with respect to a plurality of first abutting walls **42** and a plurality of second abutting walls **43**, and a plurality of (four) second upward direction contact surfaces **41***c* located between the adjacent first abutting walls **42**. The first upward direction contact surface **41***b* is in contact with the upper surfaces **36***a* of the pair of side walls **36** of the fixed housing **30**. The second upward direction contact surface **41***c* is in contact with the upper surface **37***a* of the partition wall **37** of the fixed housing **30**. The upper surfaces **36***a* of the pair of side walls **36** and the upper surfaces **37***a* of the plurality of partition walls **37** are in contact with the movable housing **40**, so that the posture of the movable housing **40** with respect to the fixed housing **30** is stabilized.

The movable housing **40** includes movable-side limiting portions **42** and **43**. The movable-side limiting portions **42** and **43** are configured such that when the movable housing **40** is displaced in the X direction, the movable-side limiting portions **42** and **43** abut on the displacement portion **24**, so that the position of the displacement portion **24** in the X direction with respect to the movable housing **40** is limited to a predetermined range. As a result, when the movable housing **40** is displaced in the front-rear direction, the displacement portion **24** follows the movable housing **40** to some extent.

The movable-side limiting portions **42** and **43** include a plurality of first abutting walls **42** and a plurality of second abutting walls **43**.

Each of the plurality of second abutting walls **43** is located behind each of the plurality of first abutting walls **42**. The displacement portion **24** is disposed behind the first abutting wall **42** and in front of the second abutting wall **43**. The displacement portion **24** can be displaced to a certain extent in the front-rear direction between the first abutting wall **42** and the second abutting wall **43**.

As illustrated in FIG. **10**, the first abutting wall **42** has a general rear surface **42***a*. The general rear surface **42***a* of the first abutting wall **42** is a plane whose normal direction is directed in the backward direction. The general rear surface **42***a* of the first abutting wall **42** is configured to be able to abut on the second side plate **24***b* of the displacement portion **24**. As illustrated in FIG. **11**, the general rear surface **42***a* faces the contact piece **24***f* in the front-rear direction.

The first abutting wall **42** has a protruding rear surface **42***b***1**. The protruding rear surface **42***b***1** is configured to be able to abut on the first side plate **24***a* of the displacement portion **24**. The protruding rear surface **42***b***1** is a plane whose normal direction is directed in the backward direction. The protruding rear surface **42***b***1** is located on the rear side with respect to the general rear surface **42***a*. The gap between the protruding rear surface **42***b***1** and the first side plate **24***a* of the displacement portion **24** in the front-rear direction is the same as the gap between the general rear surface **42***a* and the second side plate **24***b* of the displacement portion **24** in the front-rear direction.

The first abutting wall **42** is formed with a protruding portion **42***b* protruding backward from the general rear surface **42***a*. The protruding portion **42***b* is formed at the right end of the first abutting wall **42**. The protruding portion **42***b* is formed from the upper end to the lower end of the first abutting wall **42**. The protruding rear surface **42***b***1** is formed on the protruding portion **42***b*.

As illustrated in FIG. **9**, the second abutting wall **43** has a front surface **43***a*. The front surface **43***a* of the second abutting wall **43** is configured to be able to abut on the connecting plate **24***c* of the displacement portion **24**.

A groove **43***c* extending vertically at the center in the width direction of the front surface **43***a* is formed on the front surface **43***a* side of the second abutting wall **43**. The groove **43***c* functions as a retraction space for burrs when burrs remain in the carrier cutting portion **24***h*. That is, when the burrs and (the front surface **43***a* of the second abutting wall **43** of) the movable housing **40** come into contact with each other at the time of assembling the movable housing **40**, there is a possibility that cutting residue is generated from the movable housing **40**, but the generation of the cutting residue is prevented by the groove **43***c*. The upper side of the groove **43***c* is connected to the recessed portion **41***d*.

As illustrated in FIG. **10**, the second abutting wall **43** has a rear surface **43***b*. The rear surface **43***b* of the second abutting wall **43** abuts on the arrangement rear surface **35***c* of the fixed housing **30** when the movable housing **40** is displaced in the backward direction. As a result, the moving range of the movable housing **40** in the backward direction with respect to the fixed housing **30** is limited.

The movable housing **40** has a pair of side walls **46**. The pair of side walls **46** are walls protruding to lower side than the lower surface **41***b* of the top wall **41**, and are formed on both outer sides in the width direction of the rear portion of the movable housing **40**. A front surface **46***a* (see FIG. **9**) of the side wall **46** abuts on the side wall **36** of the fixed housing **30** when the movable housing **40** is displaced in the forward direction. As a result, the moving range of the movable housing **40** in the forward direction with respect to the fixed housing **30** is limited.

The movable housing **40** has a rear wall **47**. The rear wall **47** connects rear ends of the pair of side walls **46** in the width direction.

The movable housing **40** includes a pair of clamped portions **46***b*. The pair of clamped portions **46***b* are portions clamped from the outside in the width direction by the clamping portion **38** of the fixed housing **30**.

The clamped portion **46***b* protrudes outward in the width direction with respect to the side wall **46**. The clamped portion **46***b* is located at an intermediate portion in the front-rear direction of the side wall **46** and is formed over the entire side wall **46** in the vertical direction.

The movable housing **40** has a pair of locked portions **46***c*. The pair of locked portions **46***c* are portions locked to the clamping portion **38** of the fixed housing **30**. As a result, the movable housing **40** is prevented from being detached from the fixed housing **30** in the upward direction.

The locked portion **46***c* is formed below the clamped portion **46***b* and protrudes outward in the width direction with respect to the clamped portion **46***b*. The locked portion **46***c* is formed with an inclined surface for making it easy to push the pair of locked portions **46***c* into the pair of clamping portions **38** of the fixed housing **30**.

(Operation at the Time of Connection)

Next, the operation of the connector **10** when the mating terminal **80** is connected will be described.

As illustrated in FIG. **11**, when connection is performed in a state where the mating terminal **80** is displaced in the −X direction, the distal end of the mating terminal **80** abuts on the X-direction inclined surface **45***a* of the movable housing **40**. As a result, the movable housing **40** is displaced in a direction in which the positional deviation is resolved (−X direction).

When the displacement amount of the movable housing **40** is large to some extent, the movable-side limiting portions **42** and **43** (specifically, the first abutting wall **42**) of the movable housing displaced in the −X direction come into contact with the displacement portion **24** of the terminal **20**, so that the displacement portion **24** is displaced in the same direction (−X direction). As a result, the displacement portion **24** remains within a position range (a position range with respect to the movable housing **40**) connectable to the mating terminal **80** inserted from the insertion port **44**.

FIG. **12** illustrates a state at the moment when the displacement of the movable housing **40** is completed and the mating terminal **80** comes into contact with the displacement portion **24** of the terminal **20**. In this state, the displacement portion **24** is in contact with the first abutting wall **42** of the movable housing **40**.

When the connection is further advanced, the displacement portion **24** is separated from the first abutting wall **42** of the movable housing **40** by the mating terminal **80** being connected. Then, the displacement portion **24** comes into a state of not contacting either the first abutting wall **42** or the second abutting wall **43** of the movable housing **40**, and the connection work is completed (see FIG. **13**).

As described above, the structure of the connector **10** such as the insertion port **44** and the movable-side limiting portions **42** and **43** is determined such that the displacement portion **24** does not abuts on the movable-side limiting portions **42** and **43** of the movable housing **40** at the time point the connection work is completed.

Note that, although the case of the positional deviation in the −X direction has been described above, a similar operation occurs in the case of the positional deviation in the +X direction.

<Functional Effects>

Next, functional effects of the present embodiment will be described.

In the present embodiment, as illustrated in FIG. **4**, the connector **10** includes the movable housing **40** that is displaceable with respect to the attachment object **90** in the X direction, which is a direction perpendicular to the connection direction, and a terminal **20** configured to electrically connect the attachment object **90** and the connection object **80**. The terminal **20** includes the displacement portion **24** that is displaceable in the X direction with respect to the attachment object **90**. The contact portions **24***c***1** and **24***f***1** configured to contact the connection object **80** are formed in the displacement portion **24**.

As described above, since both the movable housing **40** and the displacement portion **24** can be displaced in the X direction with respect to the attachment object **90**, when the connector **10** and the connection object **80** are connected, the movable housing **40** and the displacement portion **24** can be displaced in accordance with the positional deviation of the connection object **80** in the X direction.

Furthermore, in the present embodiment, the displacement portion **24** is displaceable with respect to the movable housing **40**.

Therefore, unlike the prior art (technique in which when the displacement portion is displaced, the movable housing is also displaced integrally with the displacement portion), the mass of the portion that is integrally displaced when the displacement portion **24** is displaced is small. As a result, the inertial force acting on the integrally displaced portion can be reduced. In addition, it is possible to increase the resonance frequency of the displacement portion **24** of the connector **10** in a state of being connected to the connection object **80**, and it is easy to make the frequency (natural

frequency) of the displacement portion **24** of the connector **10** not coincide with the frequency of a vibration of an engine of an automobile, a vibration from the road surface, or the like. As a result, wear of the contact portions **24***c***1** and **24***f***1** and breakage of the intermediate deformation portion **23** can be prevented.

However, since the displacement portion **24** can be displaced with respect to the movable housing **40**, when the movable housing **40** is displaced with respect to the attachment object **90**, the displacement portion **24** is displaced with respect to the movable housing **40**.

Here, in the present embodiment, the movable housing **40** includes the movable-side limiting portions **42** and **43**. The movable-side limiting portions **42** and **43** are configured such that when the movable housing **40** is displaced in the X direction, the movable-side limiting portions **42** and **43** abut the displacement portion **24**, so that the position of the displacement portion **24** in the X direction with respect to the movable housing **40** is limited to a predetermined range.

Therefore, for example, by displacing the movable housing **40** in accordance with the positional deviation of the connection object **80** in the X direction prior to the contact between the connection object **80** and the terminal **20** (see FIG. **12**), the displacement portion **24** can be displaced in accordance with the positional deviation of the connection object **80** in the X direction in advance prior to the contact between the connection object **80** and the terminal **20**. As a result, the distance of the positional deviation possible to be coped with can be increased as compared with an aspect in which the positional deviation of the connection object **80** is coped with only by the structure of the terminal **20**.

Further, in the present embodiment, the movable housing **40** is not displaceable in the Y direction which is the arrangement direction of the plurality of displacement portions **24**. Therefore, it is not necessary to provide a structure for displacing the movable housing **40** in the Y direction, and as a result, for example, the connector **10** can be downsized in the Y direction.

Further, in the present embodiment, the dimension of the insertion port **44** in the Y direction is twice or more the dimension of the mating terminal **80** in the Y direction. Therefore, even if the position of the mating terminal **80** in the Y direction is deviated, the mating terminal **80** can enter the insertion port **44**. Furthermore, in the present embodiment, the displacement portion **24** is configured such that the mating terminal **80** and the contact portions **24***c***1** and **24***f***1** appropriately come into contact with each other even if the position of the mating terminal **80** in the Y direction is deviated. Therefore, the displacement portion **24** can cope with the positional deviation of the mating terminal **80** in the Y direction without being displaced in the Y direction.

As described above, the positional deviation of the mating terminal **80** in the Y direction is coped with by the insertion port **44** having a large dimension in the Y direction and the displacement portion **24** having a large dimension in the Y direction.

Since the displacement portion **24** can cope with the positional deviation in the Y direction without being displaced in the Y direction, the intermediate deformation portion **23** that displaces the displacement portion **24** in the Y direction is less likely to be deformed.

If the intermediate deformation portion **23** does not need to be deformed to absorb the positional deviation in the Y direction, stress generated by such deformation (i.e., deformation necessary for displacement of the displacement portion **24** in the Y direction) becomes small, so that elastic deformation amount (i.e., displacement amount of the displacement portion) in the X direction of the intermediate deformation portion **23** at the time of connection work and elastic deformation amount (i.e., displacement amount of the displacement portion) in the Z direction of the intermediate deformation portion **23** after connection can be set large.

Furthermore, in the present embodiment, the plate thickness direction of the intermediate deformation portion **23** is directed in a direction (a direction in the ZX plane) perpendicular to the direction in which the movable housing **40** cannot be displaced (the Y direction) in the entire range. Therefore, the deformation of the intermediate deformation portion **23** is mainly deformation in the plate thickness direction, and breakage of the intermediate deformation portion **23** is prevented.

In the present embodiment, the connector **10** includes the fixed housing **30** configured to be fixed to the attachment object **90**, and the fixed housing **30** has the fixed-side limiting portions **36** and **37** (the side walls **36** and the partition walls **37** of fixed housing **30**). That is, the position of the displacement portion **24** in the Y direction with respect to the fixed housing **30** is limited to a predetermined range by the fixed-side limiting portions **36** and **37** of the fixed housing **30**.

Therefore, in the manufacturing process of the connector **10**, since the position of the displacement portion **24** with respect to the fixed housing **30** is determined to some extent before the movable housing **40** is assembled to the fixed housing **30**, assembling of the movable housing **40** is facilitated.

Further, in the present embodiment, the contact portions **24***c***1** and **24***f***1** are configured to contact the connection object **80** so as to sandwich the connection object **80** in the X direction. Therefore, the displacement portion **24** can easily follow the positional deviation of the connection object **80** in the X direction.

Further, in the present embodiment, the displacement portion **24** includes the elastic deformation portions **24***e* and **24***f* (the contact piece base portion **24***e*, and the contact piece **24***f*) that are elastically deformed when the connection object **80** is connected. Therefore, the contact portion **24***f***1** can be elastically brought into contact with the connection object **80**.

However, since the displacement portion **24** can be displaced with respect to the movable housing **40**, it is difficult to limit the deformation of the elastic deformation portions **24***e* and **24***f* by the movable housing **40**.

Therefore, the displacement portion **24** further includes a deformation limiting portion **24***g* that limits the deformation amount of the elastic deformation portions **24***e* and **24***f* by abutting on the elastic deformation portions **24***e* and **24***f* when the elastic deformation portions **24***e* and **24***f* are deformed. Therefore, excessive deformation of the elastic deformation portions **24***e* and **24***f* is limited by the deformation limiting portion **24***g*, and the elastic deformation portions **24***e* and **24***f* are prevented from being plastically deformed. Further, since excessive deformation of the elastic deformation portions **24***e* and **24***f* (in particular, the contact piece base portion **24***e*) is limited by the deformation limiting portion **24***g*, a decrease in contact pressure with respect to the connection object **80** is prevented, so that the contact pressure is stabilized.

Further, in the present embodiment, the limiting hole **24***g* is formed in the second side plate **24***b*, and the distal end of the contact piece base portion **24***e* is disposed in the limiting hole **24***g*, so that the deformation amount of the contact piece base portion **24***e* is limited. As a result, the deforma-

tion limiting portion **24***g* that limits the deformation amount of the elastic deformation portions **24***e* and **24***f* is realized with a simple configuration.

Further, in the present embodiment, as illustrated in FIG. **6**, when the contact piece base portion **24***e* extends from the first side plate **24***a* and the contact piece **24***f* extends from the contact piece base portion **24***e*, the end **24***a***1** on the other side in the X direction of the first side plate **24***a* is located on the one side in the X direction with respect to the end **24***b***1** on the other side in the X direction of the second side plate **24***b*. Therefore, when the displacement portion **24** is produced by cutting and bending a plate material, the width dimension of the contact piece **24***f* can be increased.

Further, both the end **24***a***1** on the other side in the X direction of the first side plate **24***a* and the end **24***b***1** on the other side in the X direction of the second side plate **24***b* are configured to be able to abut on the movable-side limiting portions **42** and **43** (specifically, the first abutting wall **42**). Therefore, the movable-side limiting portions **42** and **43** abut on the displacement portion **24**, so that the posture of the displacement portion **24** is prevented from being collapsed.

However, in a mode in which a portion of the terminal **20** extending from the displacement portion **24** extends, for example, parallel to the connection axis AX (see FIG. **13**) of the connection object **80**, when the displacement portion **24** is displaced, the portion may collide with the distal end of the connection object **80**.

Therefore, in the present embodiment, the terminal **20** includes the avoidance portion **23***e* (the inclined direction portion **23***e*) extending from the displacement portion **24** and extending in a direction away from the connection axis AX of the connection object **80**. Therefore, the collision as described above is prevented.

Note that the structure of the avoidance portion extending in the direction away from the connection axis AX of the connection object **80** is not limited to the structure of the avoidance portion **23***e* of the present embodiment (the structure extending in the oblique direction downward and backward from the displacement portion **24**). For example, the avoidance portion may have a structure that once extends backward from the displacement portion **24** and then extends downward via a curved portion (i.e., a structure that forms a so-called crank shape together with the second forward direction portion **23***d*).

Further, in the present embodiment, since the displacement portion **24** can be displaced with respect to the movable housing **40**, the movable housing **40** cannot be appropriately supported by the displacement portion **24**.

Therefore, in the present embodiment, the movable housing **40** is supported by coming into contact with a support member **30** (the fixed housing **30**) that is not displaced with respect to the attachment object **90**. Therefore, the movable housing **40** can be appropriately supported.

Further, in the present embodiment, the support member **30** (the fixed housing **30**) is in a state of clamping the movable housing **40** by the pair of clamping portions **38**. Therefore, the movable housing **40** is prevented from rattling with respect to the support member **30**.

Note that one of the pair of clamping portions **38** may elastically press and contact the movable housing **40**, and the other may receive the pressed movable housing **40**. Also, the pair of clamping portions may be formed in the movable housing, and the movable housing may clamp a support member (for example, the fixed housing).

[Supplementary Explanation]

Although it is obvious that the present disclosure is not limited to the above embodiments, the following supplements will be made for the sake of clarity.

In the above embodiment, an example in which the movable housing **40** includes a structure (X-direction inclined surface **45***a*) that displaces the movable housing in accordance with the positional deviation of the connection object **80** has been described. However, the movable housing of the present disclosure is not limited thereto, and may not include the above-described structure.

Further, in the above embodiment, an example in which the connector **10** includes the fixed housing **30** has been described, but the connector of the present disclosure is not limited thereto.

Further, in the above embodiment, an example has been described in which the movable housing **40** is displaceable in the X direction, which is one direction among the directions perpendicular to the connection direction, and is not displaceable in the Y direction among the directions perpendicular to the connection direction: however, the movable housing of the present disclosure is not limited thereto. The movable housing of the present disclosure may be displaceable in both the X direction and the Y direction. In such case, the movable housing may have a movable-side limiting portion with respect to the Y direction. The movable-side limiting portion with respect to the Y direction means a portion configured such that when the movable housing is displaced in the Y direction, the movable-side limiting portion abuts on the displacement portion, so that the position of the displacement portion in the Y direction with respect to the movable housing is limited to a predetermined range.

Further, in the above embodiment, an example has been described in which the direction in which the movable housing **40** can be displaced (X direction) among the directions perpendicular to the connection direction is a direction perpendicular to the terminal arrangement direction, and the direction in which the movable housing **40** cannot be displaced (Y direction) among the directions perpendicular to the connection direction is the terminal arrangement direction: however, the present disclosure is not limited thereto. The direction in which the movable housing **40** can be displaced (X direction) among the directions perpendicular to the connection direction may be the terminal arrangement direction, and the direction in which the movable housing **40** can not be displaced (Y direction) among the directions perpendicular to the connection direction may be the direction perpendicular to the terminal arrangement direction. In other words, in the above embodiment, the example in which the "X direction" is a direction perpendicular to the terminal arrangement direction has been described: however, the "X direction" of the present disclosure may be the terminal arrangement direction.

In the above embodiment, an example in which the connector **10** includes the plurality of attachment fittings **50** has been described: however, the connector of the present disclosure is not limited thereto, and may not include an attachment fitting.

In the above embodiment, the connector **10** in which the connection object **80** is connected from the upper side (+Z direction) with respect to the mounting surface of the board **90** as the attachment object has been described: however, the connector of the present disclosure is not limited thereto, and the connection object may be connected from a direction parallel to the mounting surface of the board, or the connection object may be connected from the lower side with respect to the mounting surface of the board.

In the above embodiment, the example in which the movable housing **40** includes the movable-side limiting portions **42** and **43** has been described: however, the movable housing of the present disclosure is not limited thereto, and may not include the movable-side limiting portion.

Note that, even when the movable housing does not have the movable-side limiting portion, being displaceable of the movable housing has, for example, the following beneficial effects. To be specific, since the movable housing in which the insertion port is formed can be displaced, it is possible to cope with the positional deviation of the connection object without impairing dustproof property by increasing the insertion port.

In the above embodiment, the example has been described in which one terminal **20** electrically connecting the attachment object and the connection object is formed of one member integrally formed of a conductive material: however, the terminal of the present disclosure is not limited thereto, and may be configured by combining two or more members. In such case, the terminal may not have the intermediate deformation portion.

In the above embodiment, the terminal **20** in which the displacement of the displacement portion **24** is realized by the intermediate deformation portion **23** being deformed has been described: however, the terminal of the present disclosure is not limited thereto. For example, when the terminal is configured by combining two or more members, the displacement of the displacement portion can be realized even if the terminal does not have the intermediate deformation portion.

In the above embodiment, the example (That is, an example in which "one side in the X direction" of the seventh aspect is the −X direction) in which the connecting plate **24***c* connects the rear ends of the first side plate **24***a* and the second side plate **24***b* has been described: however, the connecting plate of the present disclosure is not limited thereto, and may be a connecting plate that connects the front ends of the first side plate and the second side plate. That is, the "one side in the X direction" may be the +X direction.

Even in the above case, the avoidance portion may extend from the connecting plate of the displacement portion as in the above embodiment. The structure of the avoidance portion in such case is, for example, a structure extending in an oblique direction of the downward direction (−Z direction) and the forward direction (one side in the X direction which is the +X direction).

In the above embodiment, it has been described that the displacement portion **24** is basically not in contact with the arrangement bottom surface **35***a* in the state where the connector **10** and the mating terminal **80** are connected. However, the displacement portion **24** may be in contact with the arrangement bottom surface **35***a* in the state where the connector **10** and the mating terminal **80** are connected. This is because even in such a state, an effect of suppressing repeated sliding and the like between the contact portion and the connection object can be obtained to a certain extent.

REFERENCE SIGNS LIST

10 connector
20 terminal
21 board connecting portion
22 held portion
23 intermediate deformation portion
23*e* inclined direction portion (avoidance portion)
24 displacement portion
24*a* first side plate
24*a***1** front end edge (end on the other side in the X direction of the first side plate)
24*b* second side plate
24*b***1** front end edge (end on the other side in the X direction of the second side plate)
24*c* connecting plate
24*c***1** bead (contact portion)
24*e* contact piece base portion (elastic deformation portion)
24*f* contact piece (elastic deformation portion)
24*f***1** mountain-shaped contact portion (contact portion)
24*g* limiting hole (deformation limiting portion)
30 fixed housing (support member)
36 side wall (fixed-side limiting portion)
37 partition wall (fixed-side limiting portion)
38 clamping portion
40 movable housing
42 first abutting wall (movable-side limiting portion)
43 second abutting wall (movable-side limiting portion)
44 insertion port
45*a* X-direction inclined surface
46*b* clamped portion
80 mating terminal (connection object)
90 board (attachment object)

What is claimed is:

1. A connector that is attachable to an attachment object, the connector comprising:
- a movable housing that is displaceable with respect to the attachment object in an X direction, which is a direction perpendicular to a connection direction of a connection object to the connector; and
- a terminal configured to electrically connect the attachment object and the connection object,
- wherein the terminal includes a displacement portion that is formed with a contact portion configured to contact the connection object and that is displaceable with respect to the attachment object in the X direction, and
- wherein the displacement portion is displaceable with respect to the movable housing,
- wherein the movable housing is not displaceable with respect to the attachment object in a Y direction, which is a direction perpendicular to both the connection direction and the X direction.

2. The connector according to claim **1**, further comprising:
- a fixed housing configured to be fixed to the attachment object,
- wherein the fixed housing includes a fixed-side limiting portion, and
- wherein the fixed-side limiting portion is configured such that when the displacement portion is displaced in the Y direction, the fixed-side limiting portion abuts on the displacement portion, so that a position of the displacement portion in the Y direction with respect to the fixed housing is limited to a predetermined range.

3. The connector according to claim **1**,
- wherein the contact portion is configured to contact the connection object so as to sandwich the connection object in the X direction.

4. A connector that is attachable to an attachment object, the connector comprising:
- a movable housing that is displaceable with respect to the attachment object in an X direction, which is a direction perpendicular to a connection direction of a connection object to the connector; and

a terminal configured to electrically connect the attachment object and the connection object,

wherein the terminal includes a displacement portion that is formed with a contact portion configured to contact the connection object and that is displaceable with respect to the attachment object in the X direction, and

wherein the displacement portion is displaceable with respect to the movable housing,

wherein the displacement portion includes:

an elastic deformation portion that elastically deforms when the connection object is connected; and

a deformation limiting portion that limits a deformation amount of the elastic deformation portion by abutting on the elastic deformation portion.

5. A connector that is attachable to an attachment object, the connector comprising:

a movable housing that is displaceable with respect to the attachment object in an X direction, which is a direction perpendicular to a connection direction of a connection object to the connector; and

a terminal configured to electrically connect the attachment object and the connection object,

wherein the terminal includes a displacement portion that is formed with a contact portion configured to contact the connection object and that is displaceable with respect to the attachment object in the X direction, and

wherein the displacement portion is displaceable with respect to the movable housing,

wherein the displacement portion includes:

a first side plate and a second side plate both facing each other in a Y direction with plate thickness directions thereof oriented in the Y direction;

a connecting plate that connects the first side plate and the second side plate in the Y direction with a plate thickness direction thereof oriented in the X direction, the connecting plate being in contact with the connection object from one side in the X direction;

a contact piece base portion that extends from the first side plate toward the second side plate; and

a contact piece that extends from the contact piece base portion and that elastically contacts the connection object from another side in the X direction, and

wherein a limiting hole is formed in the second side plate, and a distal end of the contact piece base portion is disposed in the limiting hole, so that a deformation amount of the contact piece base portion is limited.

6. A connector that is attachable to an attachment object, the connector comprising:

a movable housing that is displaceable with respect to the attachment object in an X direction, which is a direction perpendicular to a connection direction of a connection object to the connector; and

a terminal configured to electrically connect the attachment object and the connection object,

wherein the terminal includes a displacement portion that is formed with a contact portion configured to contact the connection object and that is displaceable with respect to the attachment object in the X direction, and

wherein the displacement portion is displaceable with respect to the movable housing,

wherein the movable housing includes a movable-side limiting portion,

wherein the movable-side limiting portion is configured such that, when the movable housing is displaced in the X direction, the movable-side limiting portion abuts on the displacement portion, so that a position of the displacement portion in the X direction with respect to the movable housing is limited to a predetermined range,

wherein the displacement portion includes:

a first side plate and a second side plate both facing each other in a Y direction with plate thickness directions thereof oriented in the Y direction;

a connecting plate that connects the first side plate and the second side plate in the Y direction with a plate thickness direction thereof oriented in the X direction, the connecting plate being in contact with the connection object from one side in the X direction;

a contact piece base portion that extends from the first side plate toward the second side plate; and

a contact piece that extends from the contact piece base portion and that elastically contacts the connection object from another side in the X direction,

wherein both an end on the other side in the X direction of the first side plate and an end on the other side in the X direction of the second side plate are configured to be able to abut on the movable-side limiting portion, and

wherein the end on the other side in the X direction of the first side plate is located further toward the one side in the X direction than the end on the other side in the X direction of the second side plate.

7. A connector that is attachable to an attachment object, the connector comprising:

a movable housing that is displaceable with respect to the attachment object in an X direction, which is a direction perpendicular to a connection direction of a connection object to the connector; and

a terminal configured to electrically connect the attachment object and the connection object,

wherein the terminal includes a displacement portion that is formed with a contact portion configured to contact the connection object and that is displaceable with respect to the attachment object in the X direction,

wherein the displacement portion is displaceable with respect to the movable housing,

wherein the terminal includes an avoidance portion extending from the displacement portion and extending in a direction away from a connection axis of the connection object,

wherein the displacement portion includes a connecting plate having a plate thickness direction oriented in the X direction,

wherein a lower end of the connecting plate, which is on a side of the attachment object in the connection direction, is connected to the avoidance portion, and

wherein an upper end of the avoidance portion is located above a lower end of the displacement portion.

8. The connector according to claim **1**,

wherein the movable housing is supported by being in contact with the attachment object or a support member that is not displaced with respect to the attachment object.

9. The connector according to claim **1**,

wherein the movable housing is supported by being in contact with a support member that is not displaced with respect to the attachment object, and

wherein one of the movable housing or the support member clamps another of the movable housing or the support member.

* * * * *