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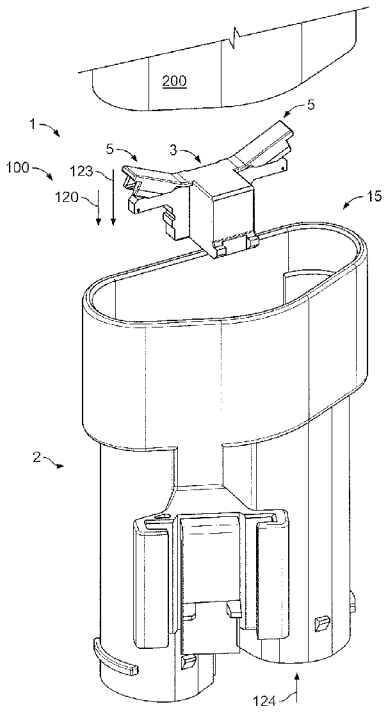


Fig. 1

(57) Abstract: Assembly (1) for an electrical connector (100), comprising a housing (2) with a first contact cavity (21) for a first contact element (11) and a second contact cavity (22) for a second contact element (12), and a locking element (3) adapted to be at least partially inserted into the housing (2), wherein the locking element (3) locks the first contact element (11) in the first contact cavity(21) and the second contact element (12) in the second contact cavity (22), when the locking element (3) is in a locking position (L) relative to the housing (2) and a securing flap (5) of the locking element (3) is in a securing position (S), the securing flap (5) blocking a movement ofthe locking element (3) out of the locking position (L) in the securing position (S).

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Assembly for an Electrical Connector

The invention relates to an assembly for an electrical connector.

The object of the invention is to provide an assembly that is easy to operate and by which two contact elements can be secured in their contact cavities.

The object is achieved by an assembly for an electrical connector comprising a housing with a first contact cavity for a first contact element and a second contact cavity for a second contact element, and a locking element adapted to be at least partially inserted into the housing, wherein the locking element locks the first contact element in the first contact cavity and the second contact element in the second contact cavity, when the locking element is in a locking position and a securing flap of the locking element is in a securing position, the securing flap blocking a movement of the locking element out of the locking position in the securing position.

Such a solution allows an easy and secure locking of the two contact elements in their respective contact cavities. In particular, the securing flap allows an easy operation.

The inventive solution can be improved by the following further improvements and advantageous embodiments, which are advantageous on their own and can be combined arbitrarily as desired.

The above solution can of course also be used when more than two contact elements are present. In the following, when reference is made to two contact elements, this relates to two or more or all of the contact elements.

The solution is particularly advantageous if the two contact elements are of different types, for example one with a small cross section and one with a big cross-section.

In order to allow an easy production, the securing flap can be integral with the rest of the locking element.

Advantageously, the locking element is separate from the housing. In another embodiment, the locking element can be connected to the housing for example by a belt-like or thread-like element so that it cannot be lost.

In a release position of the locking element relative to the housing in which the contact elements are not locked in the contact cavities by the locking element, a movement of the securing flap into the securing position can be blocked. This can make the operation safer, as the securing flap can not be transferred into the securing position when the locking element is in the release position. This can for example give a feedback to an operator or a machine that the locking element first has to be transferred into the locking position before the securing flap can be moved to the securing position. Such a solution can for example be achieved by stop faces on the securing flap and the housing which are opposite each other in the release position and which abut each other when one tries to move the securing flap into the securing position in the release position of the locking element. In the release position, at least one contact element can be movable in its contact cavity. Alternatively, in the release position, at least one contact elements can be locked in its contact cavity but not by the locking element. It can be locked for example by a primary lock like a latch or a lance in the housing that automatically engages the contact element when it is inserted and avoids a movements of the contact element until the locking element is moved into the locking position. The primary lock can also be a latch or lance on the contact element interacting with a corresponding counter element on the housing for example. The locking element and the securing flap thereof can then act as a secondary lock for the contact element.

In an advantageous embodiment, at least one contact element can be locked in its contact cavity by the locking element when the locking element is in a locking position relative to the housing and the securing flap is outside the securing position. By this, a locking of at least one contact element can for example be achieved when the locking element is being moved from the release position into the locking position. In particular, all contact elements can be blocked by such a movement.

In a further advantageous embodiment, at least one contact element can be locked in its contact cavity by the securing flap when the securing flap is in the

securing position and the locking element is in the locking position. In such a configuration, the locking can be achieved by moving the securing flap into the securing position. When the locking element is in a locking position but the securing flap is not in the securing position, at least one of the contact elements, preferably all elements can still not be locked by the locking element.

In another advantageous embodiment, one contact element is being locked in its contact cavity by the locking element when the locking element is being moved into the locking position and the other contact element is being locked by the locking element when the securing flap is being moved into the securing position.

In an embodiment that is particularly easy to operate, the locking path, along which the locking element is brought into the locking position, can be a translational locking path. The respective movement, for example starting at the release position, is thus a pure translational movement without a rotational component. In particular, the translational movement and the translational path can be linear or straight in order to further optimise operation.

When the locking path is translational, the securing flap can fix the position of the locking element along a translational locking path along which the locking element is brought into the locking position. This makes the design easier. For example, stop faces can be located on the housing and the locking element, in particular the securing flap of the locking element, the stop faces abutting each other when the locking element is in the locking position and the securing flap is in the securing position.

In an advantageous embodiment, the locking element comprises a base and a support protrusion protruding from the base perpendicular to a locking path along which the locking element is moved into the locking position, and the securing flap is at least partially located between the housing and the support protrusion when the securing flap is in the securing position and the locking element is in the locking position. For instance a securing part of the securing flap can be located between the housing and the support protrusion. Due to such a configuration, the operation can be simplified. For example, the securing flap, for example the securing part, can be moved between the housing and the support protrusion when it is moved into a securing position thereby blocking the locking

element in the locking position, for example through a direct contact or a direct force flow. Outside the securing position the securing flap does not necessarily have to be located between the housing and the support protrusion. Further, the support protrusion can be located between the housing and a contact cavity and/or a contact element when the securing flap is in the securing position and the locking element is in the locking position.

In a further advantageous embodiment, the securing flap is at least partially located between the support protrusion and a contact element when the securing flap is in the securing position and the locking element is in the locking position. Such a configuration helps to lock the contact element with the securing flap. For instance, a locking part of the securing flap can be located between the support protrusion and a contact element when the securing flap is in the securing position and the locking element is in the locking position. Additional intermediate elements can be located between the securing flap and the contact element.

Advantageously, the support protrusion is formed as a beam. This results in a good compromise between weight, stability and volume. The beam can for example, have a substantially constant cross section along a protrusion direction along which it protrudes or extends to allow a simple manufacturing. It can for example have a square cross section or a rectangular cross-section. In particular, the beam or the support protrusion can have parallel side faces which allow an easy sliding of the securing flap onto the support protrusion or beam.

In order to allow an easy operation, the securing flap can have a U-shaped cross-section. The plane of the cross section can in particular be perpendicular to an extension direction of the securing flap. The extension direction can in particular be the direction that points from a hinge to a free end of the securing flap. The U-shape of the securing flap has two legs and a connecting section connecting the two legs. In the securing position, one leg, for example the securing part, can be located on one side of the support protrusion of the locking element, and the other leg, for example the locking part, can be located on the other side of the support protrusion. The two sides can face in and counter to a locking direction. At a top side, a connection section can connect the two legs. The securing flap can thus be configured as a channel.

In the securing position the securing flap can take up the support protrusion to allow a safe operation and a space efficient design. In other words, the securing flap can surround or embrace the support protrusion.

In order to further secure the securing flap, the locking element can comprise a holding assembly for holding the securing flap in the securing position. Such a holding assembly can comprise pins or buttons on the securing flap and/or the support protrusion and a hole or a groove on another element.

In a further advantageous embodiment, parts of the holding assembly for holding the securing flap in the securing position are located on the housing.

To make operation safer, an insertion path along which the locking element is inserted into the housing can be perpendicular to the locking path along which the locking element is moved into the locking position. The paths can in particular intersect at the release position of the locking element relative to the housing. Due to this solution, two separate movements are necessary and the locking element can not be moved into the locking position unintentionally. Of course, an angle that is different from the 90° of the perpendicular solution but also different from the degrees of a parallel insertion can also be used to improve the security.

An operation can be safe and easy when the securing flap points to an outside. For example, a free end of the securing flap can be located at an outside and/or the hinge can be located at a center or a base.

In an advantageous embodiment, the securing flap extends in a direction that is perpendicular to a direction of a locking protrusion for securing a contact element. Thus, the locking protrusion is not moved when the securing flap is operated. The beam with which the securing flap engages can be perpendicular to the locking protrusion.

To allow an easy operation, the locking element can be adapted to be inserted into the housing along an insertion path which is parallel to the plugging direction, along which the connector is plugged to a counter connector. Thus, the locking

element can be inserted from the same side as the counter connector and the entire assembling process can be performed with access to one side of the connector only. The plugging direction can in particular be parallel to a contact element insertion direction along which a contact element is inserted into the housing.

The insertion path can run through or end in the plug face. A removal or an inadvertent loss of the blocking element can be avoided by this as the plug face is covered by the counter connector in a connected state.

In the final locking position the locking element can form at least partially an outer face of the plug face, for example in order to allow an easy access.

When an insertion of the counter connector into the connector is to be avoided if the securing flap is not in the securing position, the securing flap can protrude into a contact cavity of the connector when it is outside the securing position. The securing flap can then block an insertion of the counter element. In another embodiment, the securing flap is automatically pushed into the securing position when the counter connector is inserted.

An operation is improved when a flap securing path along which the securing flap is moved into the securing position is perpendicular to the locking path of the locking element and/or at least partially parallel to an insertion direction of the locking element, along which the locking element is inserted into the housing. Through this, the locking element cannot inadvertently be moved into or out of the locking position and/or the release position when the securing flap is moved, and/or the locking element is automatically pushed to the end of the insertion path when the securing flap is moved into the securing position.

In order to allow an operation by hand or by a machine, the securing flap can comprise a handling protrusion on a free end for operating the securing flap. The securing flap can then be moved into or out of the securing position. The free end can in particular be opposite a hinge at which the securing flap is hinged to the rest of the locking element.

For locking a multitude of contact elements, the locking element can comprise two or more securing flaps. The securing flaps can point in opposite directions. Two or more protrusions for the securing flaps can be present. If two securing elements are present, the locking element can have a T-shape with each of the securing flaps attached to one of the legs of the upper bar of the T.

In an advantageous embodiment, at least one contact element is locked by an engagement of a locking protrusion on the locking element with the contact element. In such a direct locking, the locking protrusion can protrude into a contact cavity for the contact element in the locking position. This design is simple and easy to produce.

In a further advantageous embodiment, at least one contact element is locked by blocking the movement of an intermediate element engaging the contact element. Such an indirect locking can be advantageous, for example as the intermediate element can automatically secure the contact element for example if the intermediate element is a latch, which is subsequently secured by the locking element.

In the following, the inventive solutions will be explained in more detail and with reference to the drawings. The features shown in the further developments and advantageous embodiments can be combined as desired and are advantageous on their own independent of each other.

In the figures:

Fig 1 shows a schematic perspective view of a first embodiment of an assembly for an electrical connector;

Figs 2A, 2B show the locking element in more detail with the securing flap outside the securing position;

Figs 3A, 3B show the locking element in more detail with the securing flap in the securing position;

Figs 4A to 4E	show different views of the assembly with the locking element in the release position and the securing flap outside the securing position;
Figs 5A to 5D	show different views of the assembly with the locking element in the locking position and the securing flap in the securing position;
Figs 6A to 6C	show different steps of the locking process;
Figs 7A and 7C	show another embodiment of an assembly;
Figs 8A to 8C	show the assembly of Figs 7A to 7C in a locking position;
Figs 9A to 9C	show a further embodiment of an assembly;
Figs 1OA to 1OC	show the assembly of Figs 9A to 9C in the locking position;
Fig 11	shows a locking element of the assembly of Figs 9A to 1OC;
Figs 12, 13	show a further embodiment of an electrical assembly;
Figs 14A to 14C	show a further embodiment of an assembly;
Figs 15A to 15C	show the assembly of Figs 14A to 14C in the locking position;
Figs 16	shows a locking element of the assembly of Figs 14A to 15C;
Figs 17A, 178	show contact elements for an electrical assembly;
Figs 18A to 18C	show a further embodiment of an electrical assembly;
Figs 19A to 19C	show the assembly of Figs 18A to 18C in the locking position;
Fig 20	shows the locking element of the assembly of Figs 18A to 19C;

Figs 21A to 21C show a further assembly;

Figs 22A to 22C show the assembly of Figs 21A to 21C in a different cross section plane;

Fig 23 shows the locking element of the assembly of Figs 21A to 22C;

Fig 24 shows a schematic top view of a housing for an electrical assembly;

Figs 25A, 25B show cross-sectional views of two contact cavities of the housing of Fig 24;

Fig 26 shows the locking element of the embodiment of Figs 1 to 6B during a moulding step of the production;

Fig. 27 shows the step of moving a securing flap out of the securing position with a tool .n Figs 1 to 6E, an assembly **1** for an electrical connector 100 is shown.

The assembly 1 comprises a housing 2 which has first contact cavities 21 for a first type of contact elements 11 and second contact cavities 22 for a second type of contact elements 12, and a locking element 3 for locking the contact elements 11, 12 in the contact cavities 21, 22, when the locking element 3 is in a locking position L and the securing flap 5 of the locking element 3 is in a securing position S.

The securing flap 5 also blocks a movement of the locking element 3 out of the locking position when it is in the securing position S.

In Figs 2A and 2B, details of the locking element 3 are shown, wherein the securing flap 5 is outside the securing position S.

Two securing flaps 5 protrude in opposing directions each along a flap extension direction 126 away from a base 31 of the locking element 3. The securing flaps 5 are integral with the rest of the locking element 3 and hinged to the rest via a

hinge 33.

From the base 31, two support protrusions 32 protrude perpendicular to a locking direction 122 along which the locking element 3 can be moved from the release portion R into the locking position L when the locking element 3 is located in the housing 2. The securing flaps 5 have a U-shaped cross-section and take up the support protrusions 32 when the securing flap 5 is in the securing position S.

The U comprises a first leg 34 in the form of a locking part 53 and a second leg 36 in the form of a securing part 55. The two legs 34, 36 are connected by a connection section 54 at a top side.

Further, the locking element 3 comprise holding assemblies 37 comprising pins 137 on the support protrusions 32 and grooves 138 on the securing flaps 5. The holding assemblies 37 serve to hold the securing flaps 5 in the securing positions S.

Each securing flap 5 further comprises a handling protrusion 58 at a free end 57 of the securing flap 5 for handling the securing flap 5 for example by hand or by a machine.

In Figs 3A and 3B, the locking element 3 is shown with the securing flap 5 in the securing position S. The securing flaps 5 have been moved in a securing direction 125 along a flap securing path 135. During this process, the securing flaps 5 rotate around the hinges 33.

In Figs 4A to 4E, the assembly 1 is shown in a release position R of the locking element 3 relative to the housing 2. The securing flaps 5 are outside the securing positions S and cannot be moved into the securing position S as stop faces 59 on the securing flap 5 abut or lie against stop faces 29 on the housing 2. None of the contact elements 11, 12 is yet locked in its contact cavity 21, 22 by the locking element 3.The contact elements 11, 12 can be removed. For one kind of contact element 12, however, it would be necessary for removing to move back a latch 24 which protrudes into a recess 111 in the contact element 12 and thus holds the contact element 12 in its contact cavity 22 automatically after an insertion of the contact element 12 into the contact cavity 22.

In Figs 5A to 5D, the locking element 3 is in the locking position L and the securing flaps 5 are in the securing position S. Both types of contact elements 11, 12 are locked in their corresponding contact cavities 21, 22 by the locking element 3. The first type of contact elements 11 are directly locked by the locking element 3, see for example Fig 5D. The second type of contact elements are locked indirectly via an intermediate element 23, namely the latch 24, see for example Fig 5C, in which, however the second contact element 12 is not depicted. The second type of contact elements 22 is held by latch 24 which is in turn blocked by the securing flap 5. The latch 24 thus acts as a primary lock and the locking element 3 acts as a secondary lock. A locking part 53 of the U-shaped cross-section is located behind the intermediate element 23 and prevents a movement of the intermediate element 23. At the opposite side of the support protrusion 32, a securing part 55 of the U-shaped cross-section is located between the support protrusion 32 and the housing 2. In other embodiments, which are not shown here, the latch 24 can be moved into engagement with the contact element 12 by the locking element 3. In such a case, the latch 24 does not automatically lock the contact element 12 when it is inserted into its cavity 22.

Further, primary locks can be present on the contact elements 11,12 to at least hold the contact elements 11, 12 in the contact cavities 21, 22 before the locking element 3 is inserted. Such primary locks can for example be lances or elastically deflectable arms on the contact elements 11, 12 that automatically engage with corresponding counter elements in the contact cavities 21, 22. In the present example, for example the first contact element 11 has a lance 40 (see Fig. 178) protruding from a side of the contact element 11.

In the locking position L of the locking element 3, the locking element 3 is flush with an outside 1G of the plug face 15, the outside 1G being a part that is accessible for a counter connector 200.

In Figs 6A to 6E, the steps of the insertion and locking process are shown.

In Fig 6A, the locking element 3 is still outside the housing 2 and about to be inserted into the housing 2 along an insertion path 132 which is translational and basically linear along an insertion direction 123. In Fig 6A, the securing flap 5 of the locking element 3 is in the securing position S. This can be

advantageous as the risk that the securing flap 5 gets damaged during transport is minimized thereby. In order to be able to insert the locking element 3 into the housing 2, the securing flap 5, however, has to be moved out of the securing position S, for example into the position shown in Fig.1.

The insertion direction 123 is parallel to the plugging direction 120 along which the counter connector 200 (shown in phantom lines in Fig 1) is inserted into the connector 100.

In Fig 68, the locking element 3 has been inserted into the housing. However, the securing flaps 5 are still outside the securing position S. The locking element 3 is in a release position R, in which the contact elements 11, 12 can be inserted into the housing 2, in particular into the contact cavities 21, 22.

When the contact elements 11, 12 have been inserted along a contact element insertion direction 124 into the contact cavities 21, 22, see Fig 6C, the locking element 3 is moved from the release position R into the locking position L, see Fig 60. The direction of the locking path 130 is perpendicular to the direction of the insertion path 132 and avoids an unintentional transfer of the locking element 3 to the locking position L. In this locking position L, the locking element 3 already secures one type of contact elements 11. The other type of contact elements 12 is not yet locked by the locking element 3 and could still be moved or, as shown, can be locked in the contact cavity 22 by a primary lock like a latch, a deflectable arm or a locking lance.

In this case, the locking path 130 is embodied as a longitudinal locking path 131. In other cases, the locking path can be different and for example comprise rotational sections.

In the last step, the securing flaps 5 are moved along a flap securing path 135 into the securing position S. Now, the locking element 3 locks both types of contact elements 11, 12.

In Fig 7A to 8C, a different assembly 1 is depicted. As before and as in all of the following examples, the locking element 3 locks two types of contact elements 11, 12 in their contact cavities 21, 22 in the housing 2.

Similar to the first embodiment, the locking element 3 is inserted into a housing 2 and is then in a release position R in which the contact elements 11, 12 can be inserted. Subsequently, the locking element 3 is moved into a locking position L by a linear movement perpendicular to the insertion direction. Finally, a single securing flap 5 is moved into a securing position S in which it is held by a holding assembly 37. The securing flap 5 again prevents a movement of the locking element 3 out of the locking position L when the securing flap 5 is in the securing position S. A movement of the securing flap 5 into the securing position S is prevented when the locking element 3 is in the locking release position R.

In the embodiment of Fig 9A to 11, the locking element 3 is again moved into a locking position L in which both types of contact elements 11, 12 are locked. However, in this embodiment, the locking element 3 is only secured in the locking position L when securing projections 201 of the counter connector 200 block the movement of the locking element 3.

In the embodiment of Figs 12 and 13, the locking element 3 is inserted into the housing 2 and then moved perpendicular to the insertion direction to a locking position L.

A further embodiment of an assembly 1 is shown in Figs 14A to 16 in which the locking element 3 is moved only along a linear path into the locking position L in which both types of contact elements 11, 12 are locked in their contact cavities 21, 22.

Fig 17A shows a contact element 12. It can in particular be seen that the contact element 12 has a recess 111 at a side for a locking by the latch 24.

Fig 17B shows a contact element 11. A lance 40 protrudes from a side to hold the contact element 11 in its contact cavity 21 before the locking by the locking element 3 starts.

A further embodiment of an assembly 1 is shown in Figs 18 to 20. In this embodiment, the locking element 3 is first inserted and then moved horizontally, perpendicular to the insertion direction, into the locking position L.

Another embodiment is shown in Figs 21A to 23. The locking element 3 is in this embodiment inserted and locked through a single movement along a single direction. A latch on the blocking element locks the first contact element 11, while a part of the locking element 3 blocks the movement of the latch 24 which locks the second contact element 12.

In Figs 24, 25A, and 25B, the general design of a housing 2 is shown. Two different contact cavities 21, 22 can be seen. In a prior art solution, a first locking element has to be inserted along a first direction behind a latch 24 next to the second contact element contact cavity 22 and a further locking element has to be moved along a second direction for a locking in the first contact cavity 21.

In Fig 26, the production of a locking element 3 according to the first embodiment is shown. It can in particular be seen that the locking element 3 can be produced by injection moulding with a moulding tool 205 creating a mold cavity 203. The tool 205 comprises two movable parts 204 which are moved to an outside for removing the blocking element 3 from the mold cavity 203.In Fig. 27, it is shown how the securing flap 5 can be moved out of the securing position S. In the depicted case, a special tool 210 is used for this. The tool 210 is curved and has a pointed tip for grabbing the handling section 58 of the securing flap 5.

REFERENCENUMERALS

1	assembly
2	housing
3	locking element
5	securing flap
11	first contact element
12	second contact element
15	plug face
16	outside of the plug face
21	first contact cavity
22	second contact cavity
23	intermediate element
24	latch
29	stop face on housing
31	base
32	support protrusion
33	hinge
34	first leg
35	centre
36	second leg
37	holding assembly
38	locking protrusion
40	lance
53	locking part
54	connection section
55	securing part
57	free end
56	extension direction of securing flap
58	handling protrusion
59	stop face on securing flap
100	electrical connector
105	outside
111	recess

120	plugging direction
122	locking direction
123	insertion direction
124	contact element insertion direction
125	securing direction
126	flap extension direction
130	locking path
131	translational locking path
132	insertion path
135	flap securing path
137	pin
138	groove
200	counter connector
201	securing projection
203	mold cavity
204	movable part
205	moulding tool
210	tool
L	locking position
R	release position
S	securing position

CLAIMS

1. Assembly (1) for an electrical connector (100), comprising a housing (2) with a first contact cavity (21) for a first contact element (11) and a second contact cavity (22) for a second contact element (12), and a locking element (3) adapted to be at least partiallyinserted into the housing (2), wherein the locking element (3) locks the first contact element (11) in the first contact cavity (21) and the second contact element (12) in the second contact cavity (22), when the locking element (3) is in a locking position (L) relative to the housing (2) and a securing flap (5) of the locking element (3) is in a securing position (S), the securing flap (5) blocking a movement of the locking element (3) out of the locking position (L) in the securing position (S).

2. Assembly (1) according to claim 1, wherein in a release position (R) of the locking element (3) relative to the housing (2) in which the contact elements (11, 12) are not locked in the contact cavities (21, 22) by the locking element (3), a movement of the securing flap (5) into the securing position (S) is blocked.

3. Assembly (1) according to claim 1 or 2, wherein at least one contact element (11, 12) is locked in its contact cavity (21, 22) by the locking element (3), when the locking element (3) is in the locking position **(L)** and the securing flap (5) is outside the securing position (S).

4. Assembly (1) according to one of claims 1 to 3, wherein at least one contact element (11, 12) is locked in its contact cavity (21, 22) by the securing flap (5) when the securing flap (5) is in the securing position (S) and the locking element (3) is in the locking position (L).

5. Assembly (1) according to one of claims 1 to 4, wherein the securing flap (5) fixes the position of the locking element (3) along a translational locking path (130, 131) along which the locking element (3) is brought into the locking position (L).

6. Assembly (1) according to one of claims 1 to 5, wherein the locking element (3) comprises a base (31) and a support protrusion (32) protruding

from the base (31) perpendicular to a locking path (130) along which the locking element (3) is moved into the locking position (L), and wherein the securing flap (5) is at least partially located between the housing (2) and the support protrusion (32) when the securing flap (5) is in the securing position (S) and the locking element (3) is in the locking position (L).

7. Assembly (1) according to one of claim 5, wherein the securing flap (5) is at least partially located between the support protrusion (32) and a contact element (11, 12) when the securing flap (5) is in the securing position (S) and the locking element (3) is in the locking position (L).

8. Assembly (1) according to one of claims 1 to 7, wherein the securing flap (5) has a U- shaped cross-section.

9 .Assembly (1) according to one of claims 5 to 8, wherein in the securing position (S) the securing flap (5) takes up the support protrusion (32).

10. Assembly (1) according to one of claims 1 to 9, wherein the locking element (3) comprises a holding assembly (37) for holding the securing flap (5) in the securing position (S).

11. Assembly (1) according to one of claims 1 to 10, wherein an insertion path (132) along which the locking element (3) is inserted into the housing (2) is perpendicular to the locking path (130) along which the locking element (3) is moved into the locking position (L).

12. Assembly (1) according to one of claims 1 to 11, wherein the securing flap (5) points to an outside (105).

13. Assembly (1) according to one of claims 1 to 12, wherein the securing flap (5) extends in a direction (126) that is perpendicular to a locking protrusion (38) of the locking element(3) for securing a contact element (11, 12).

14. Assembly (1) according to one of claims 1 to 13, wherein the locking element (3) is adapted to be inserted into the housing (2) along a plugging direction (120), along which the connector (100) is plugged to a counter connector (200).

15. Assembly (1) according to one of claims 1 to 14, wherein a flap securing path (135) along which the securing flap (5) is moved into the securing position (S) is perpendicular to the locking path (130) of the locking element (3) and/or at least partially parallel to an insertion direction (123) of the locking element (3).

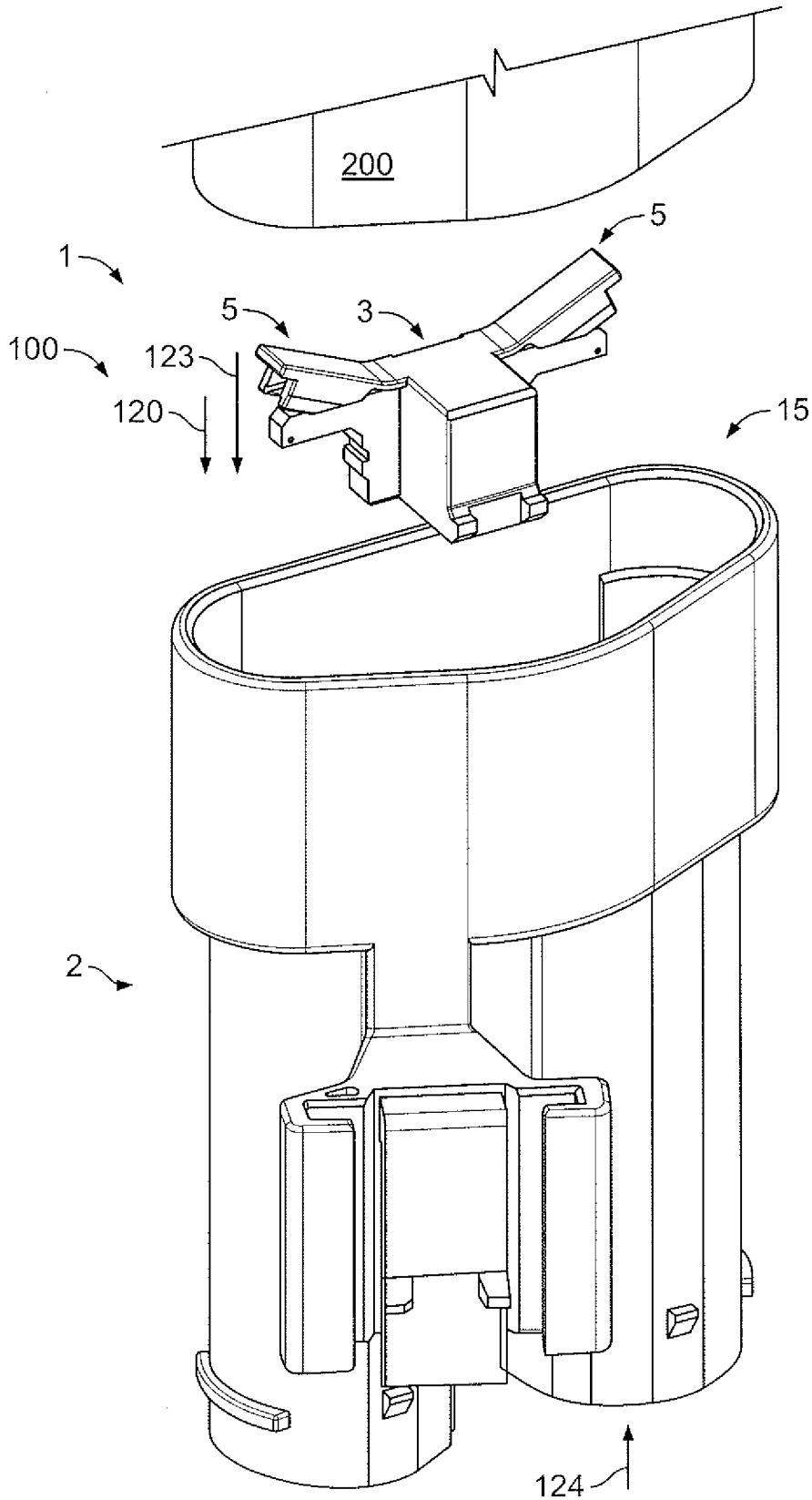


Fig. 1

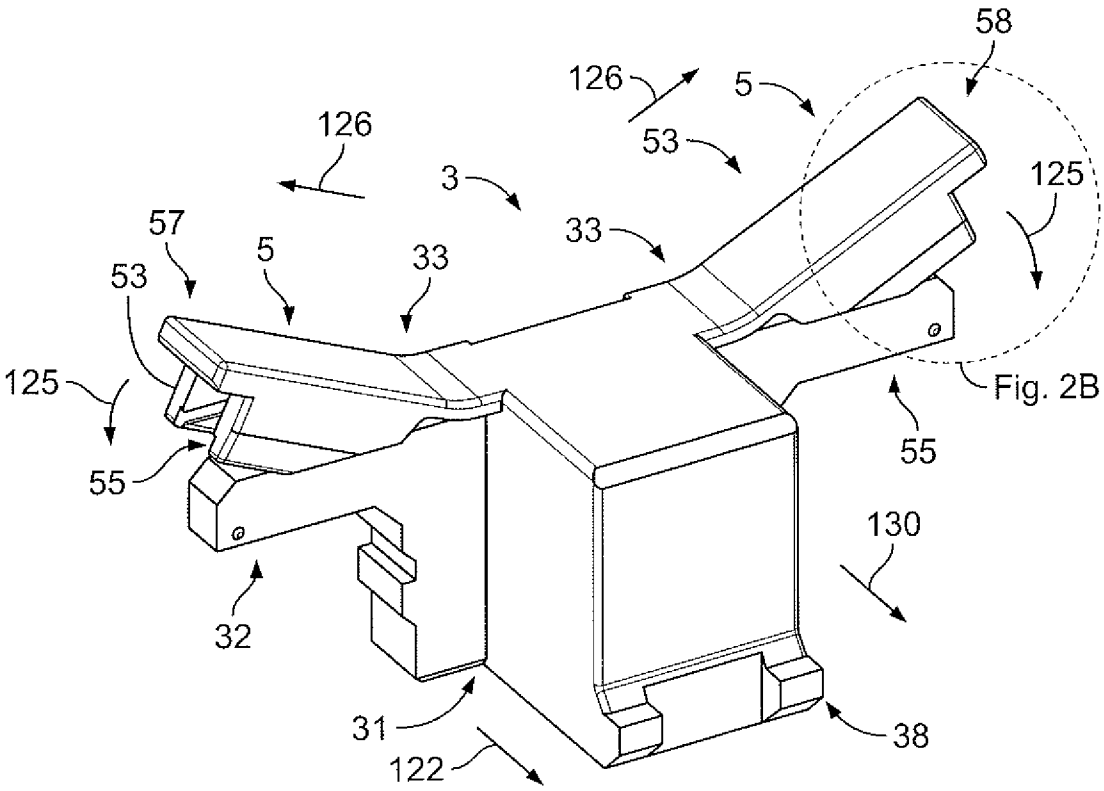

58
126
5
53
126
3
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57
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53
125
Fig. 2B
55
55
130
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31
38
122

Fig. 2A

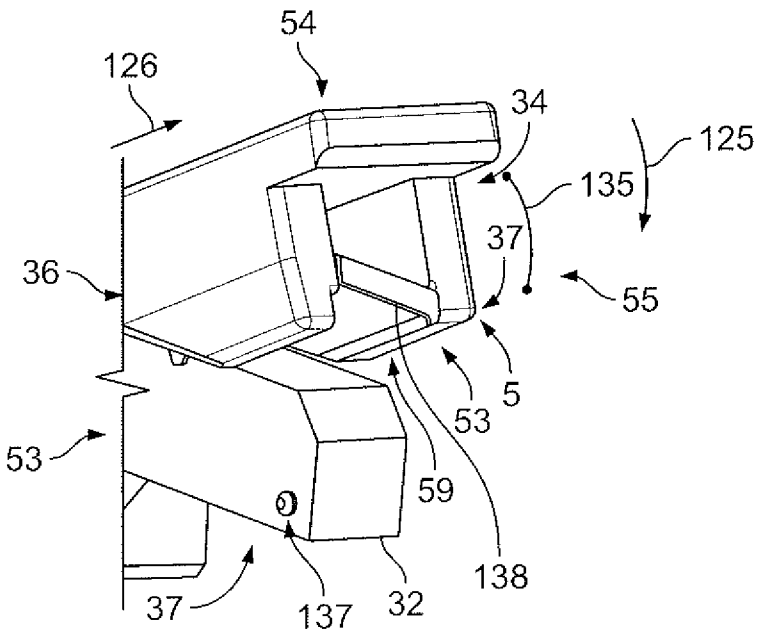

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32

Fig. 2B

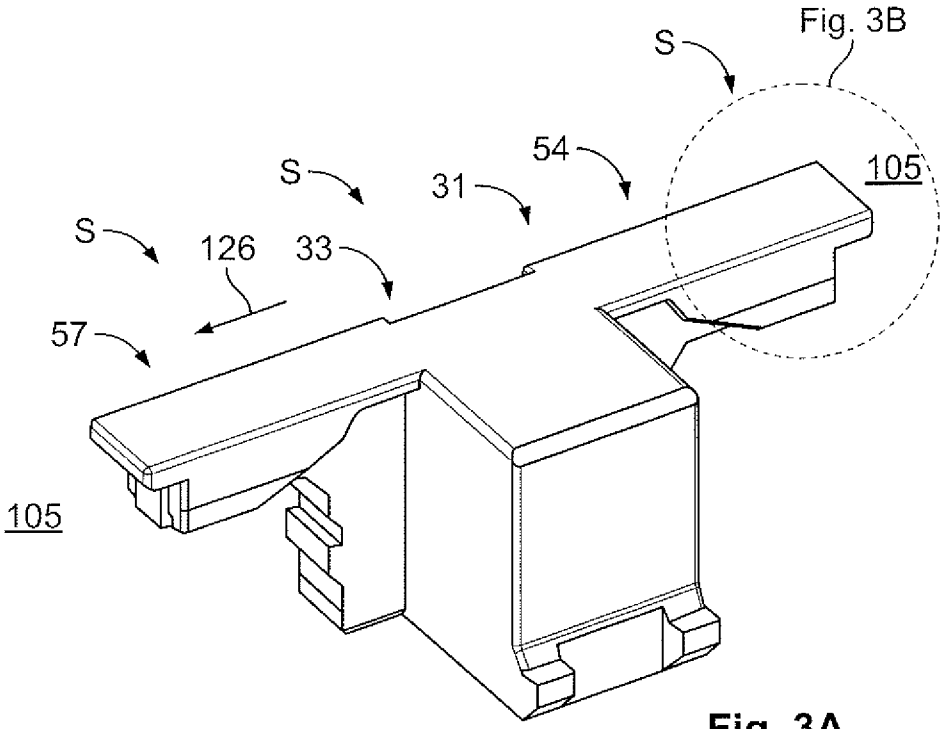


Fig. 3A

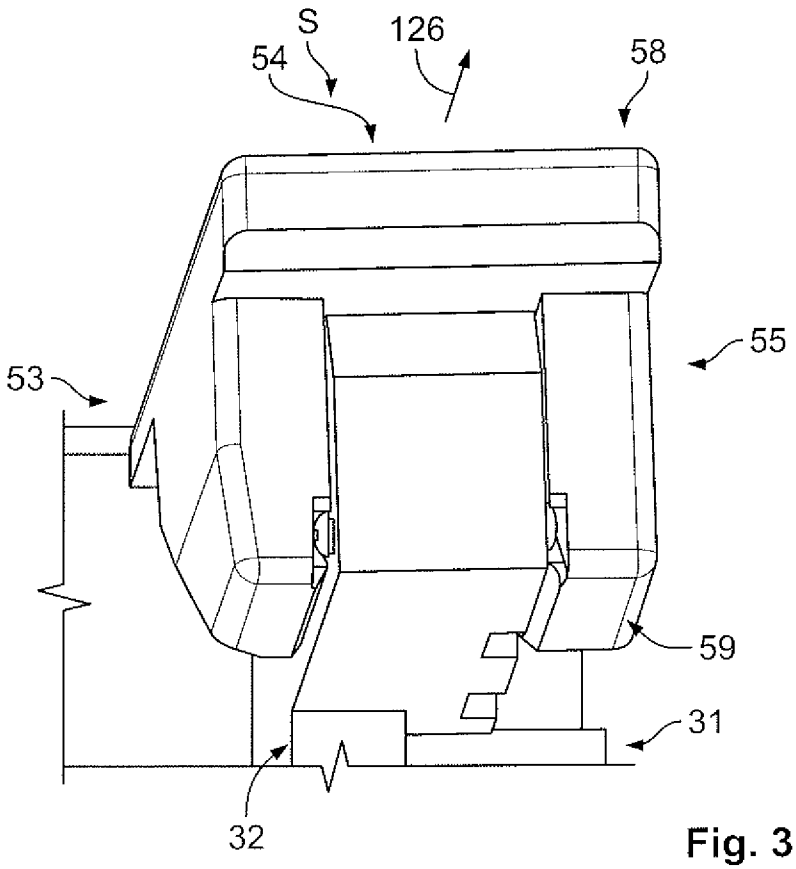


Fig. 3B

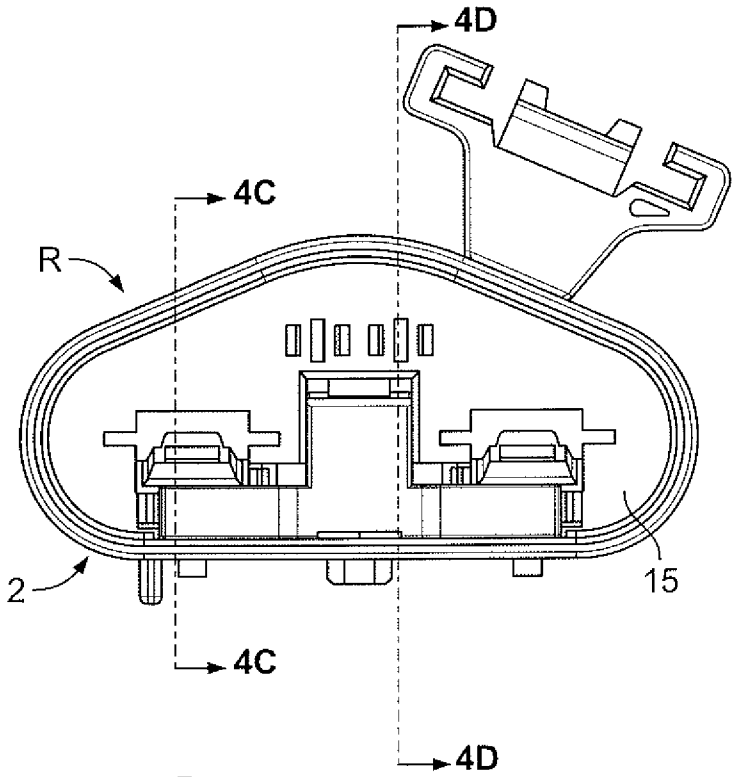


Fig. 4A

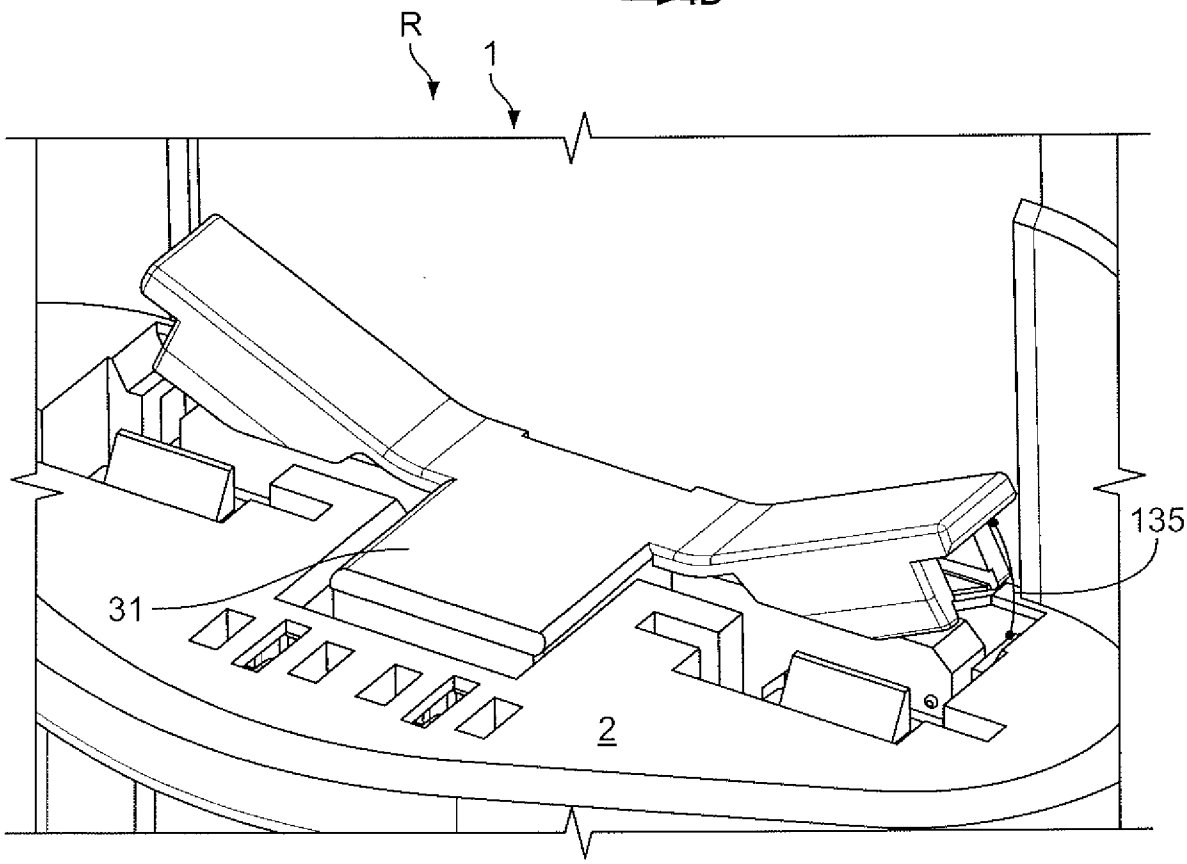


Fig. 4B

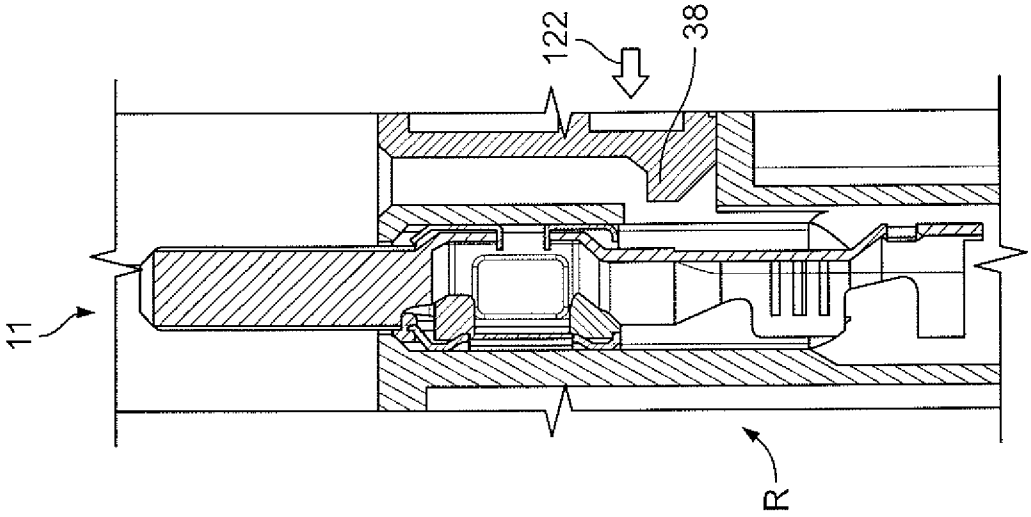


Fig. 4D

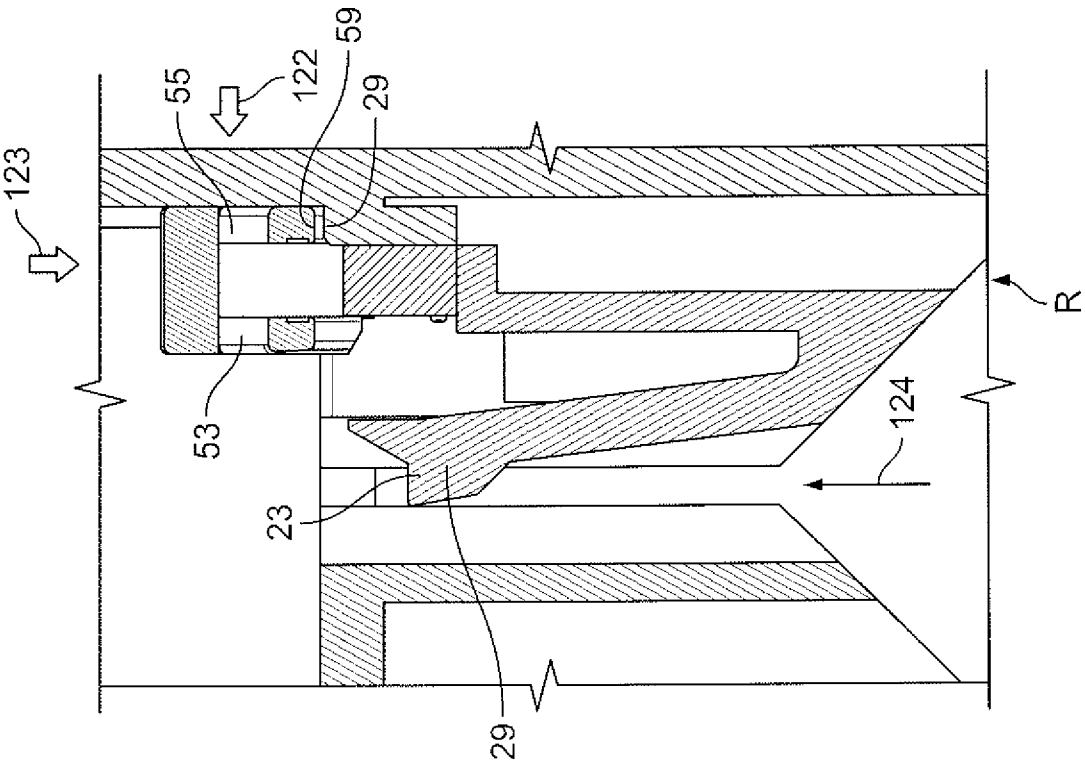


Fig. 4C

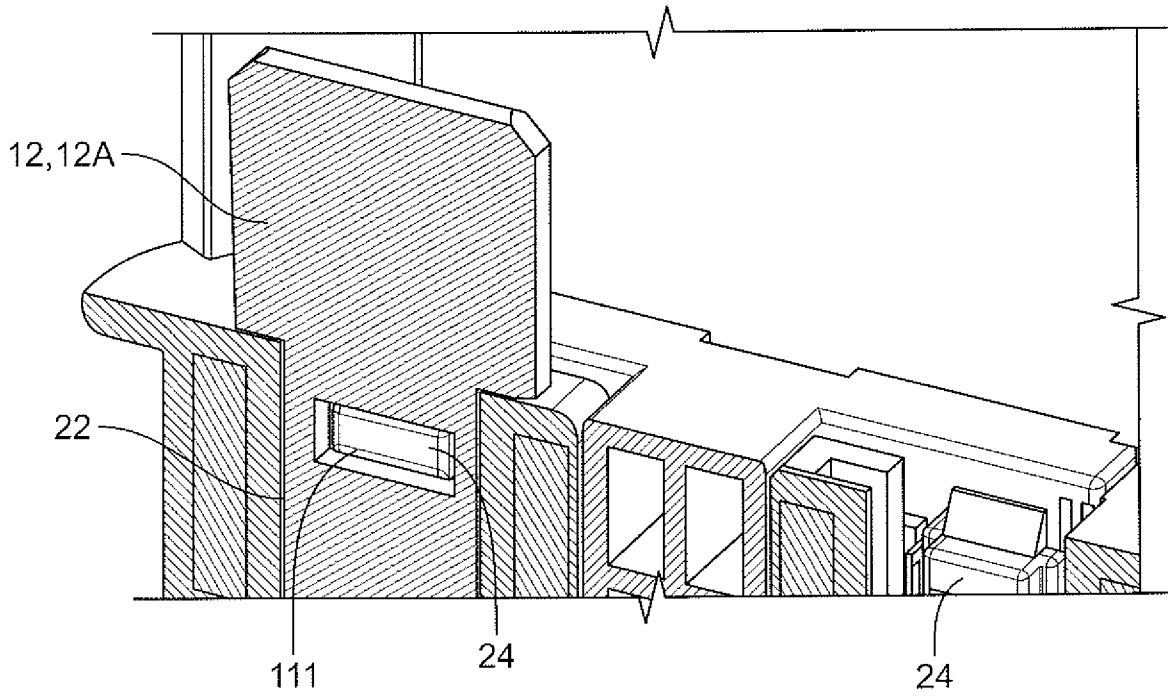


Fig. 4E

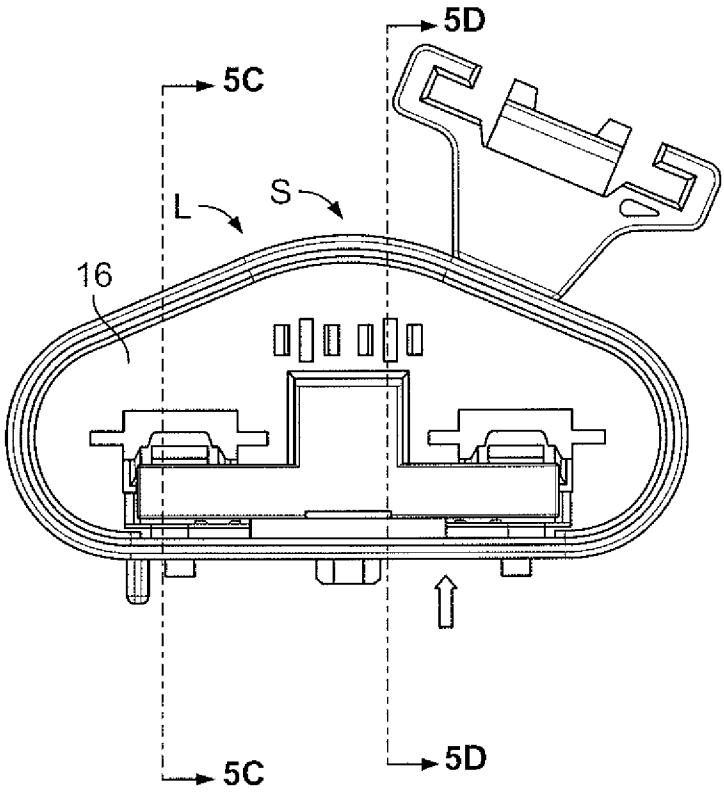


Fig. 5A

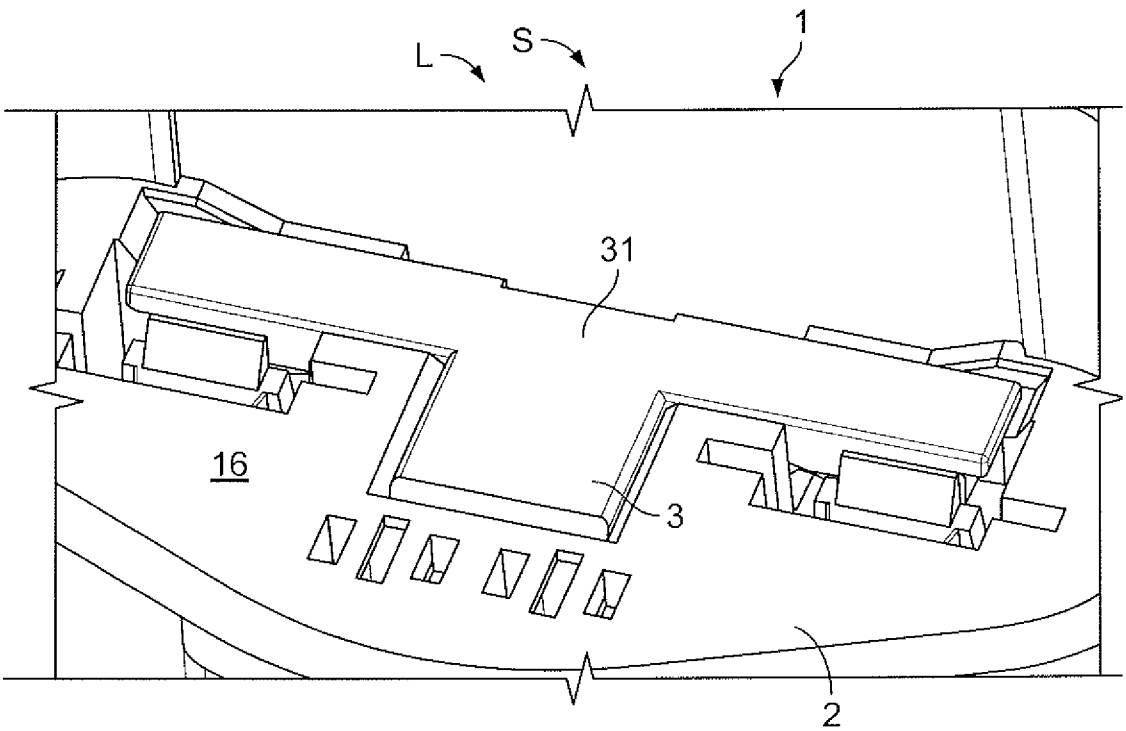


Fig. 5B

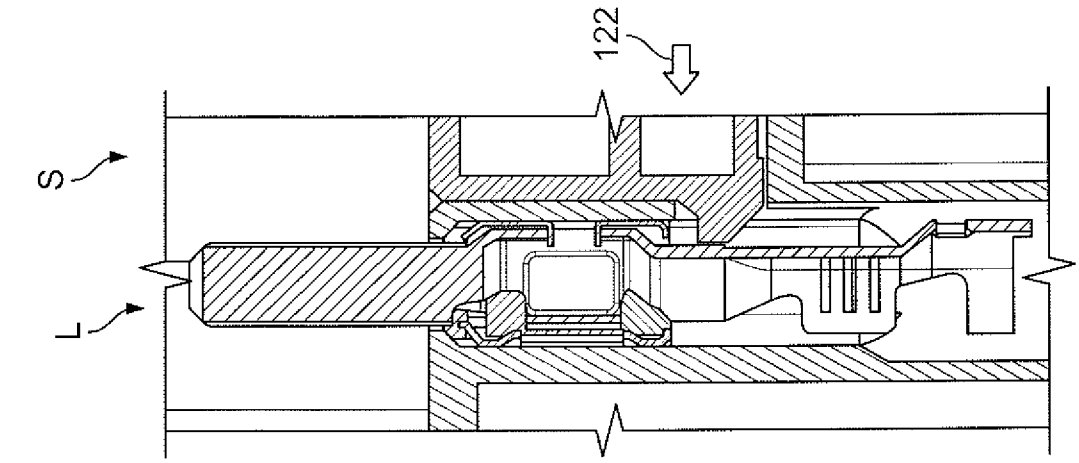


Fig. 5D

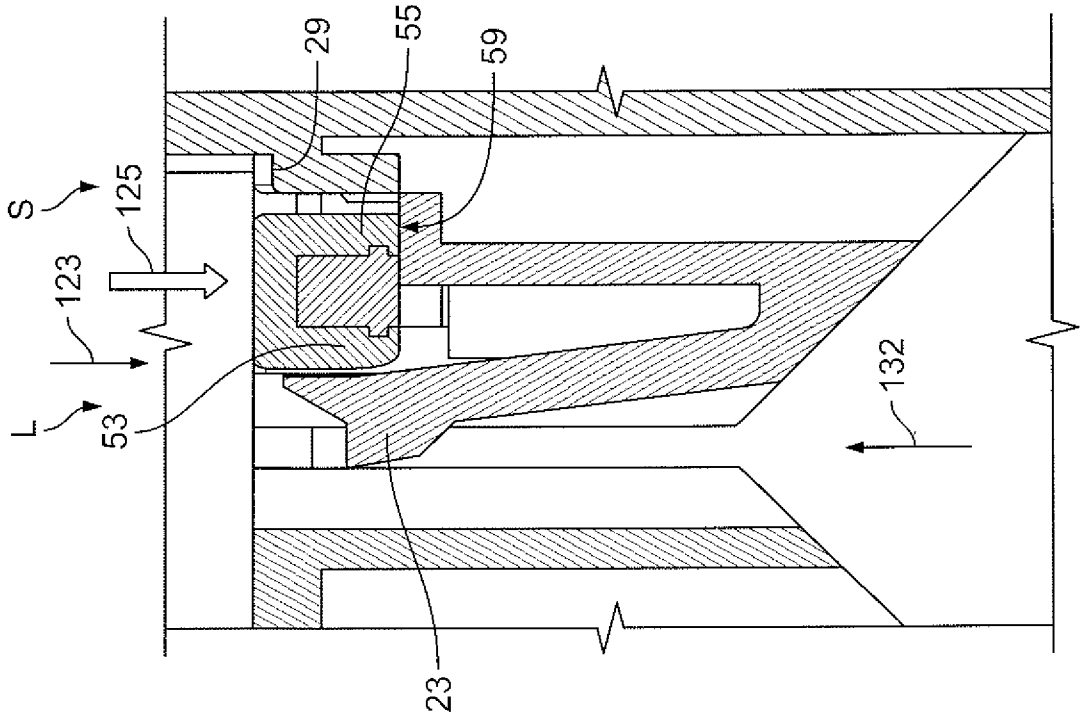


Fig. 5C

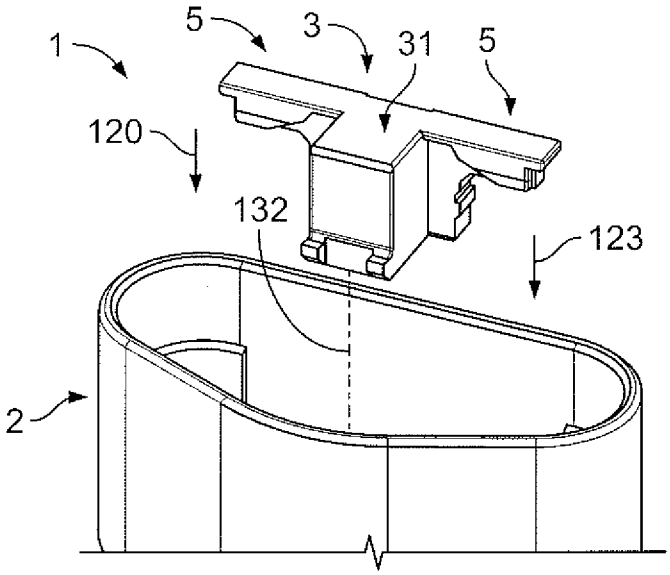


Fig. 6A

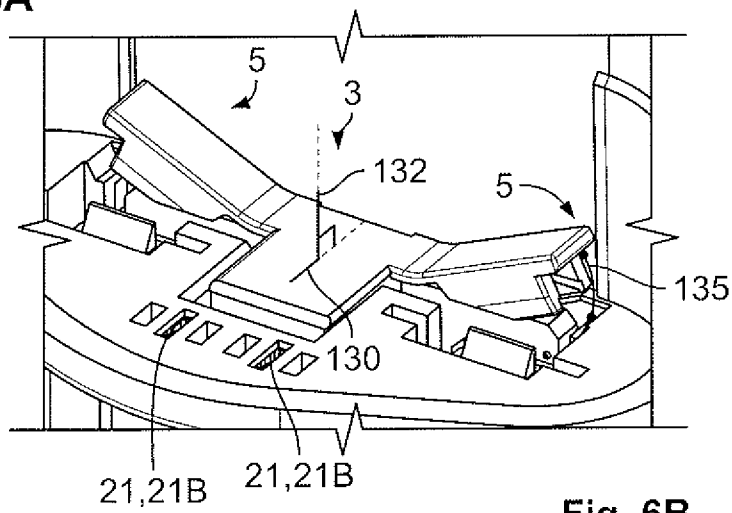


Fig. 6B

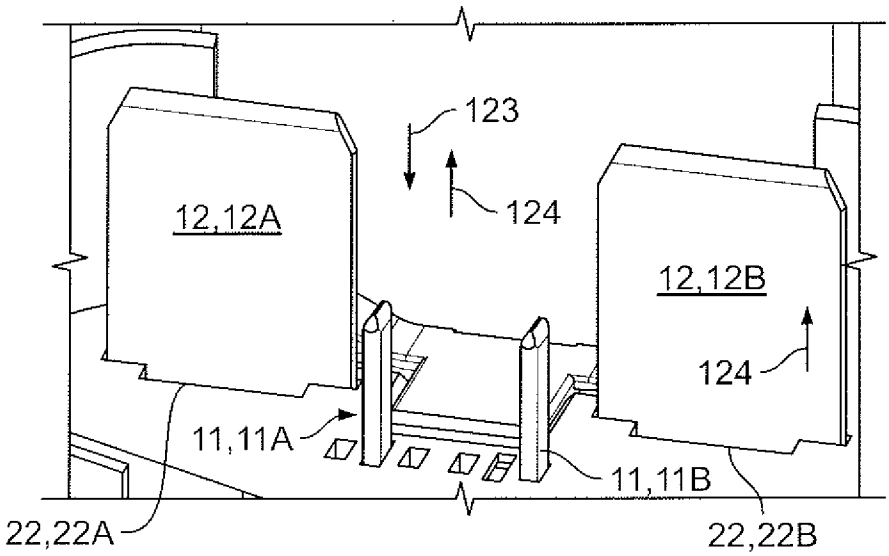


Fig. 6C

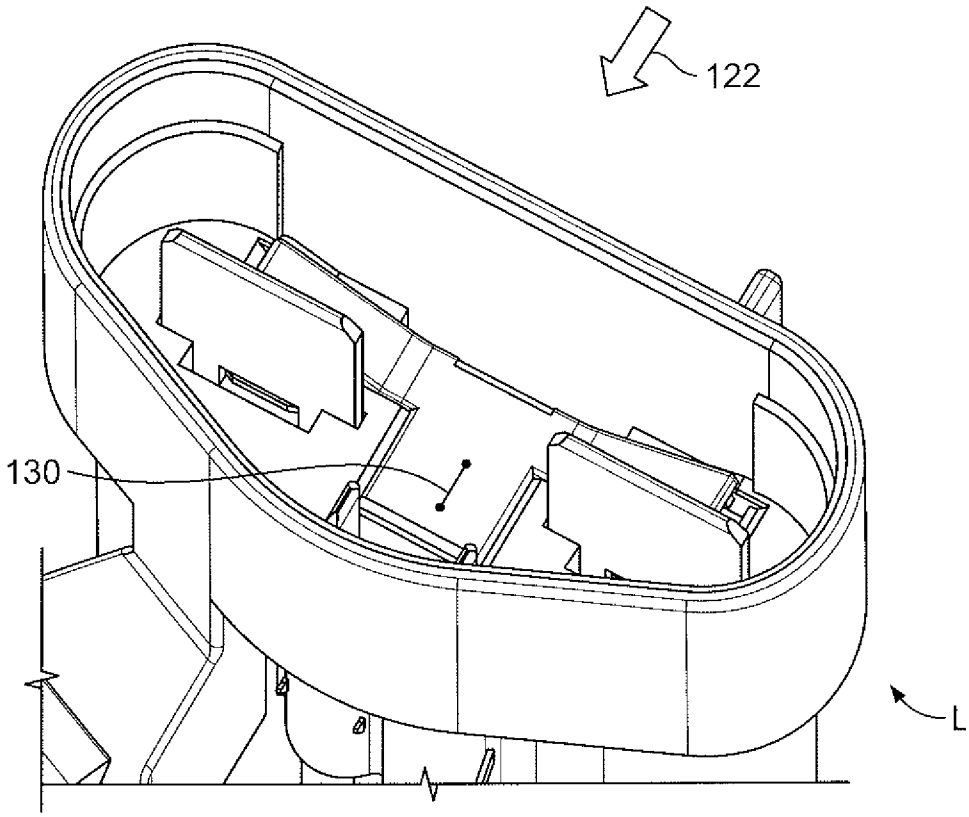


Fig. 6D

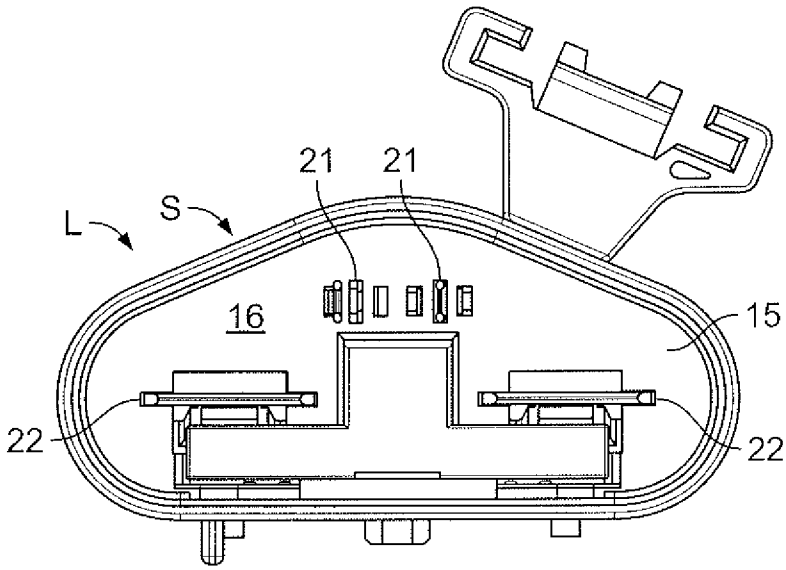


Fig. 6E

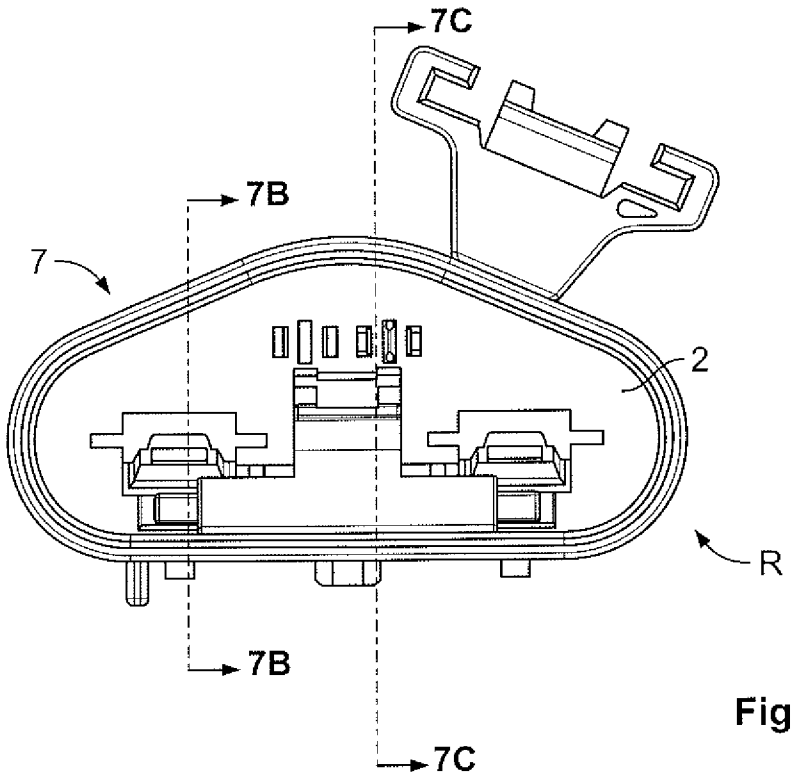


Fig. 7A

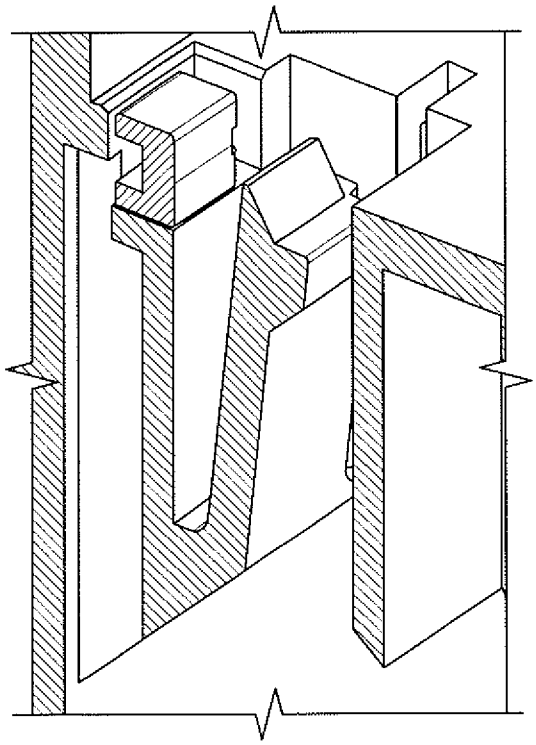


Fig. 7B

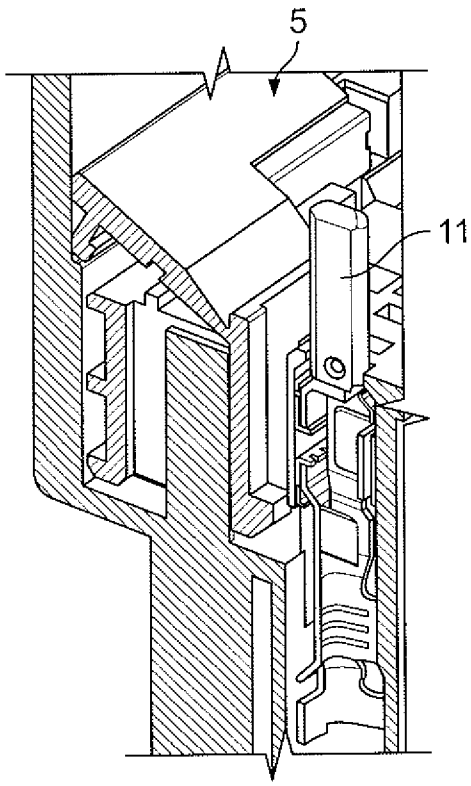


Fig. 7C

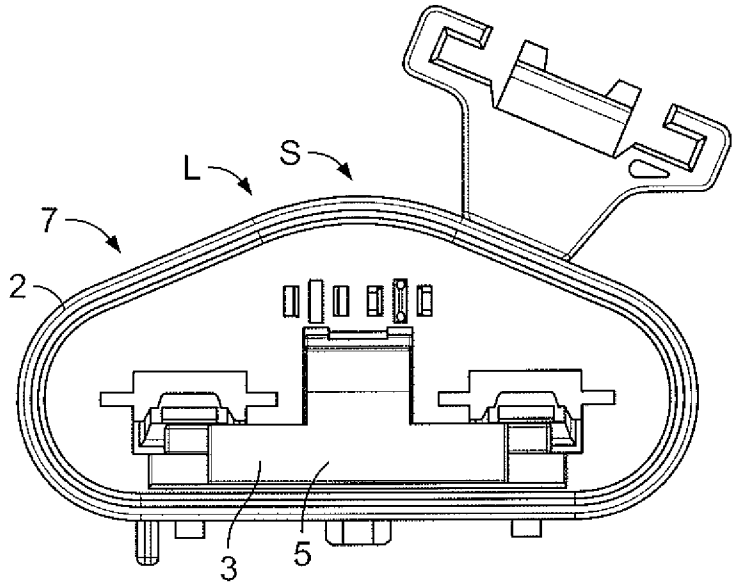


Fig. 8A

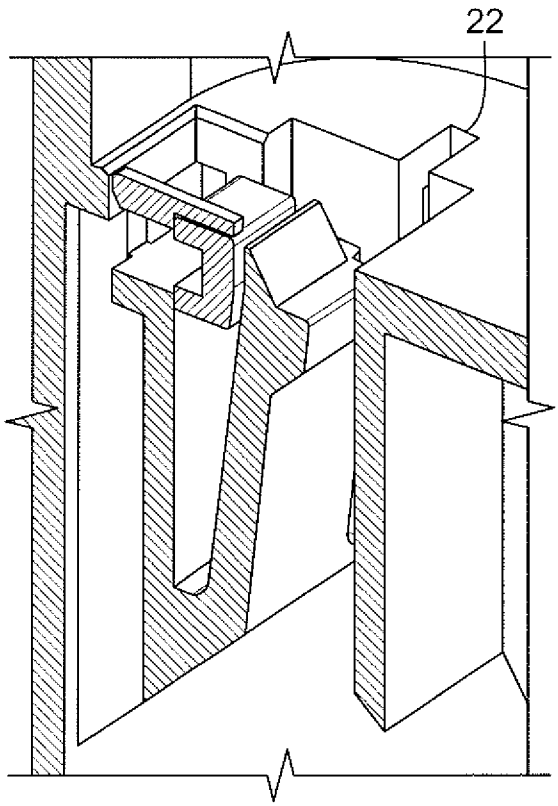


Fig. 8B

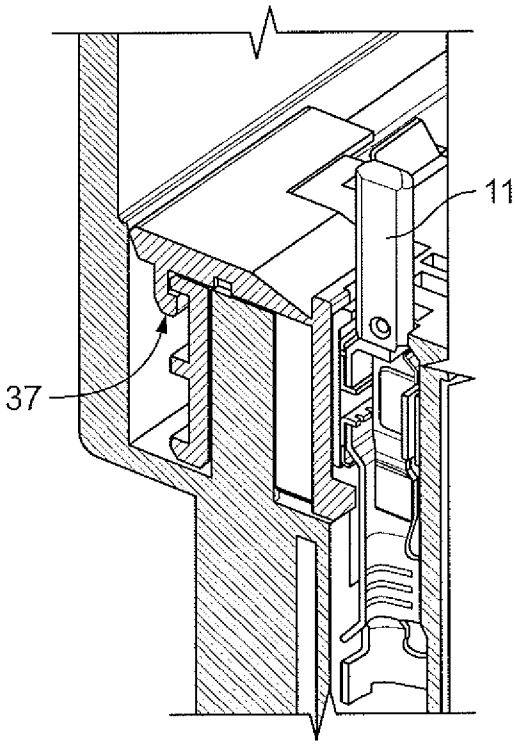


Fig. 8C

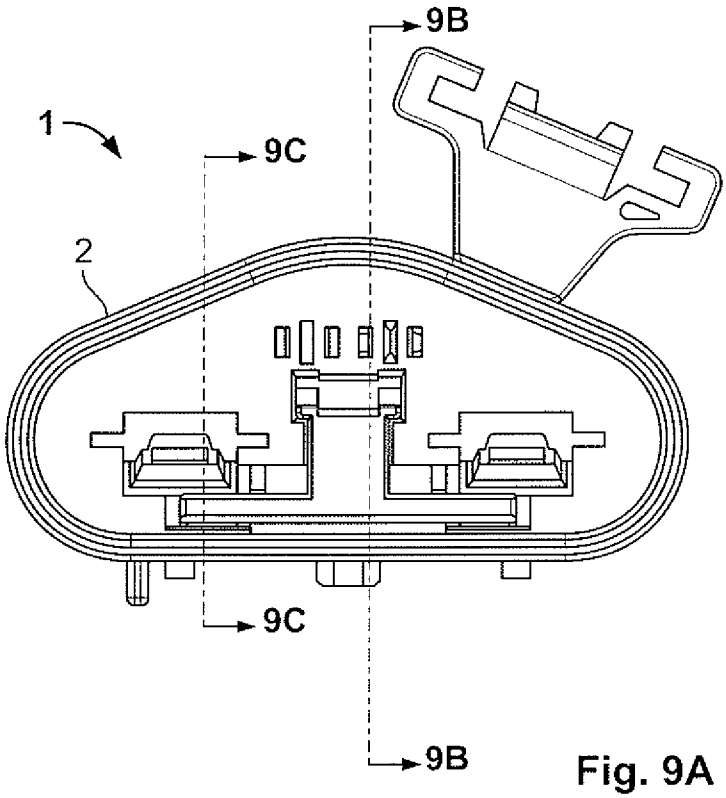


Fig. 9A

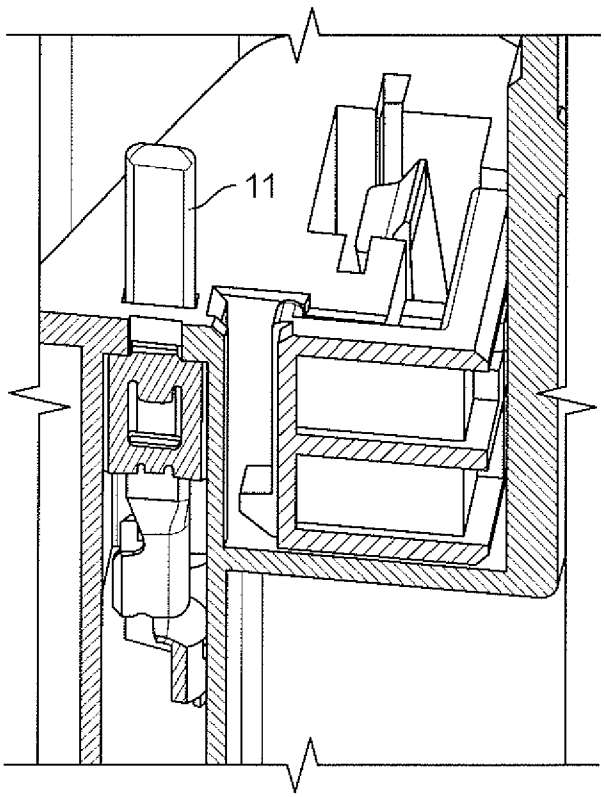


Fig. 9B

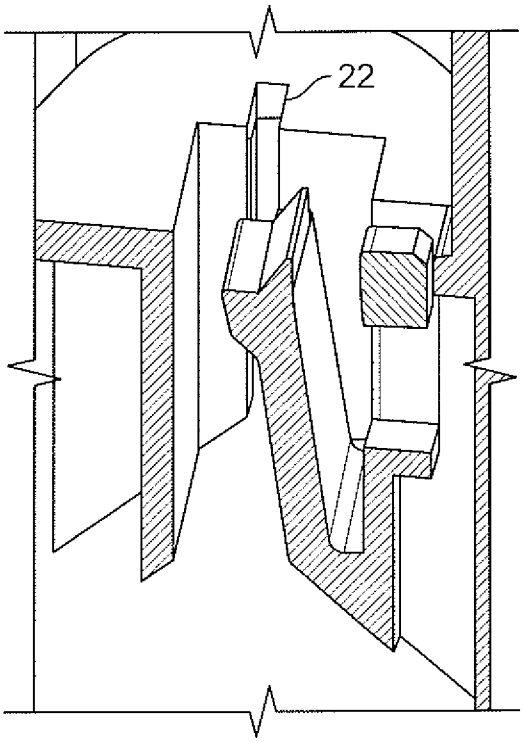


Fig. 9C

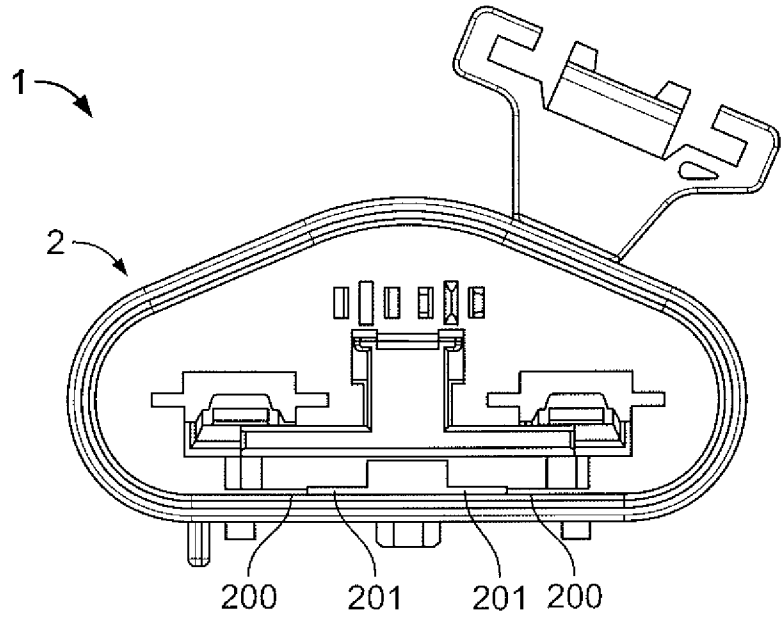


Fig. 10A

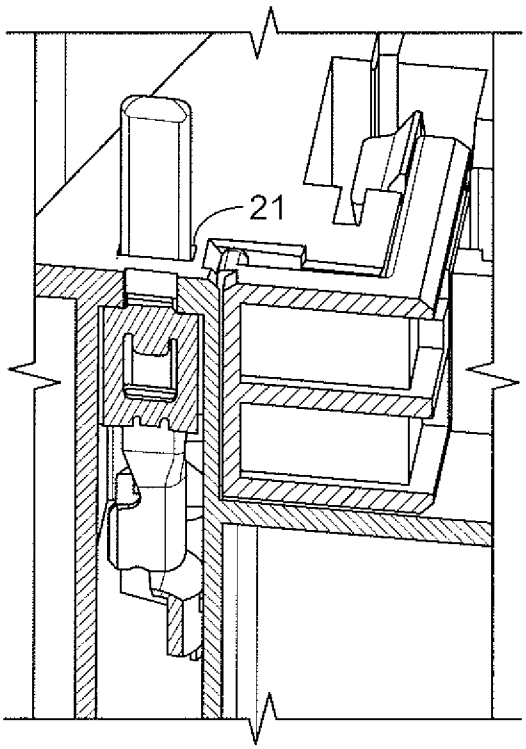


Fig. 10B

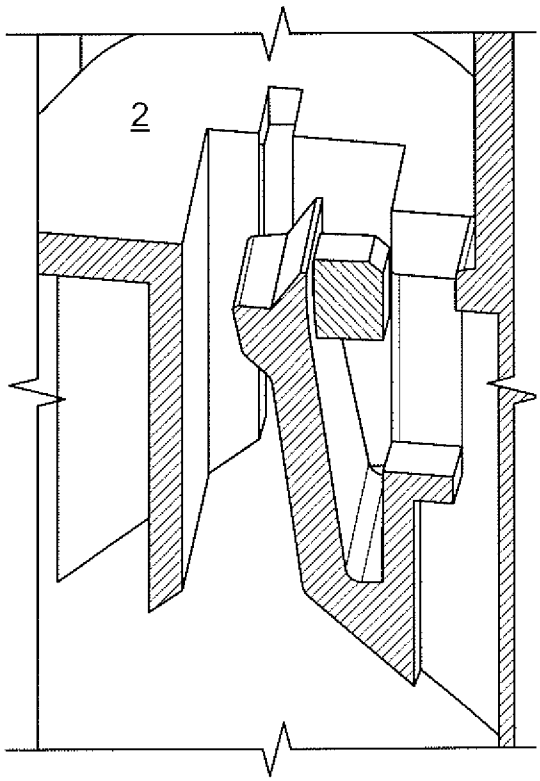


Fig. 10C

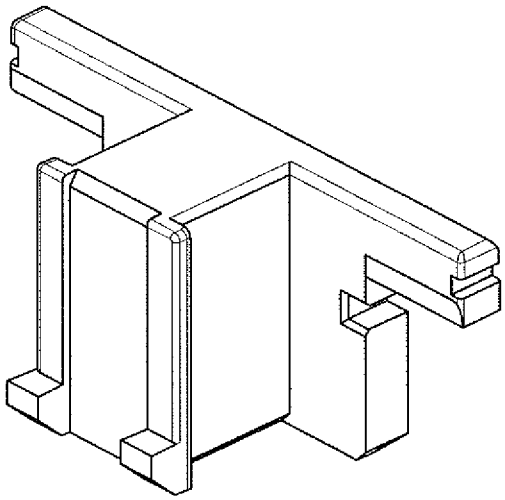


Fig. 11

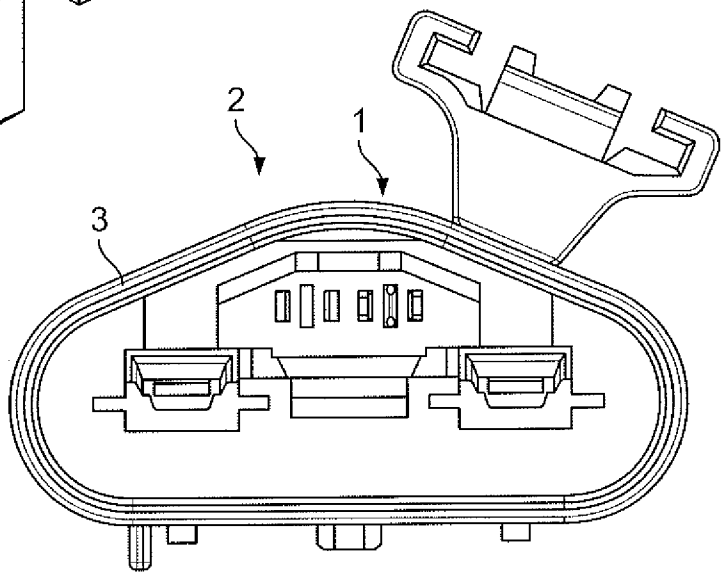


Fig. 12

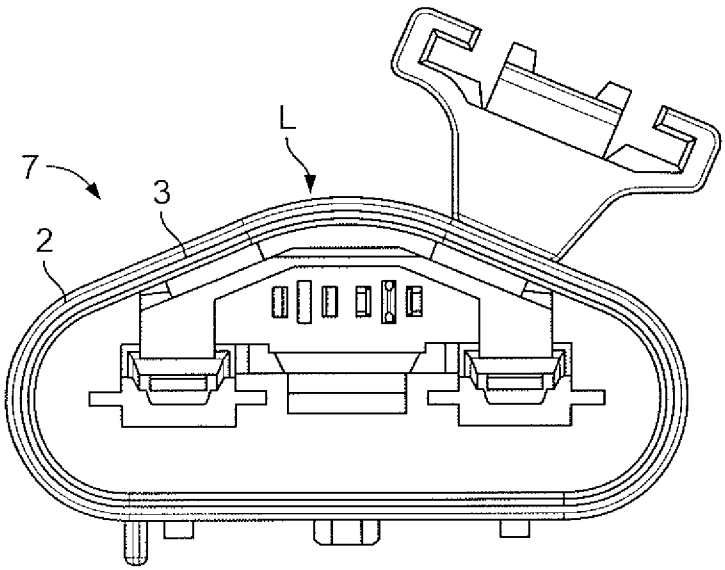


Fig. 13

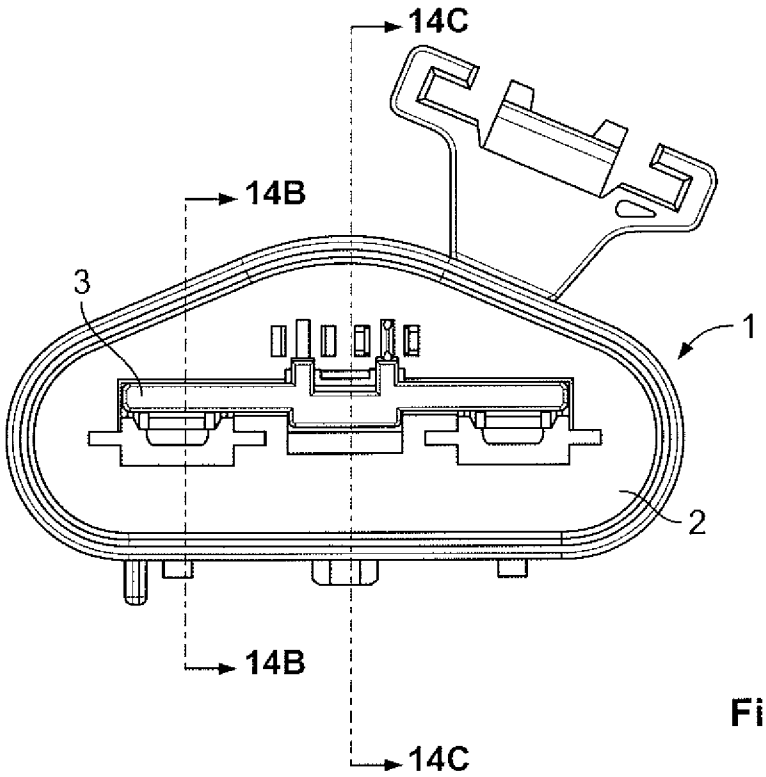


Fig. 14A

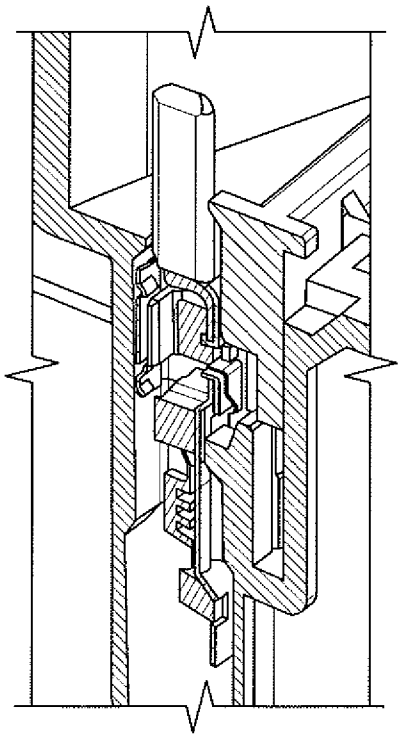


Fig. 14B

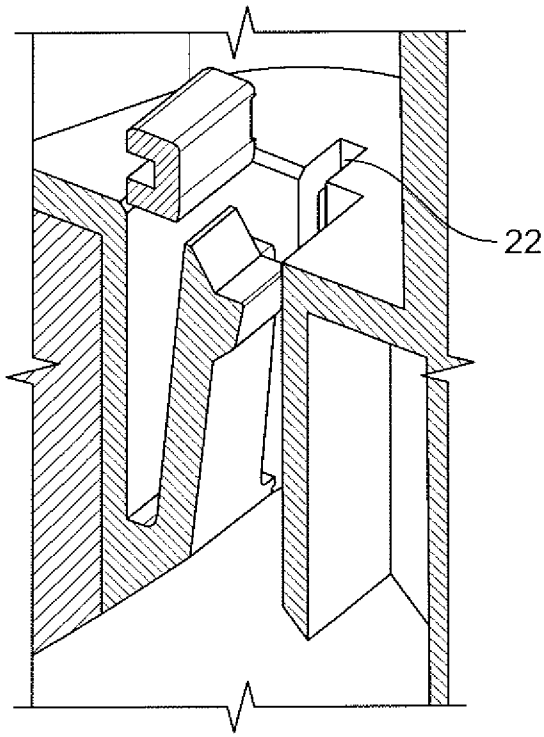


Fig. 14C

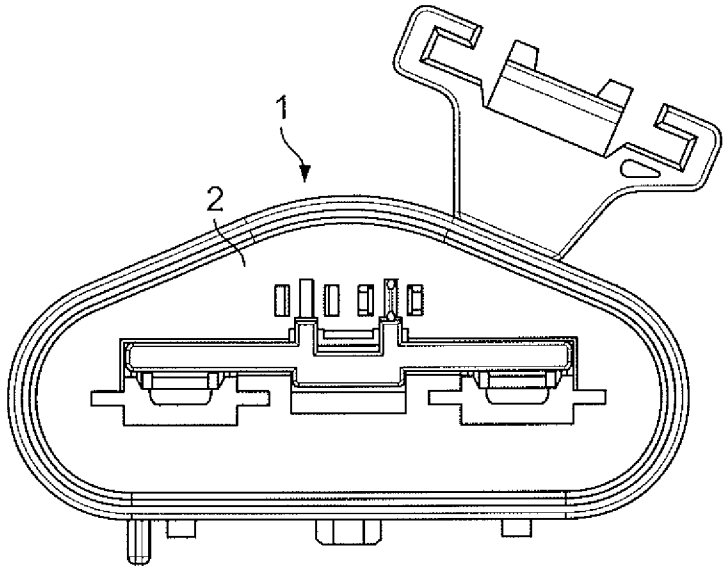


Fig. 15A

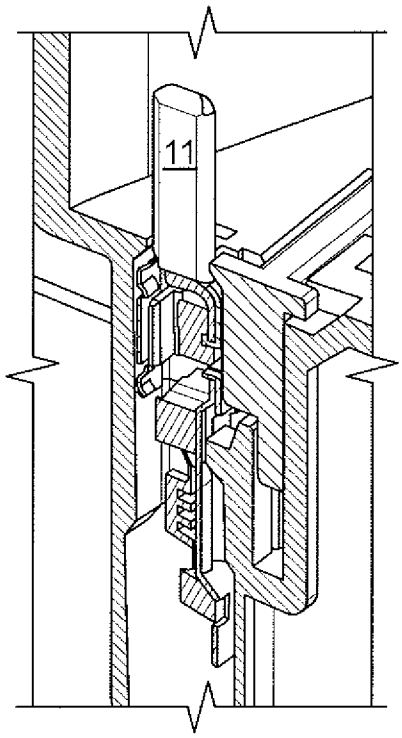


Fig. 15B

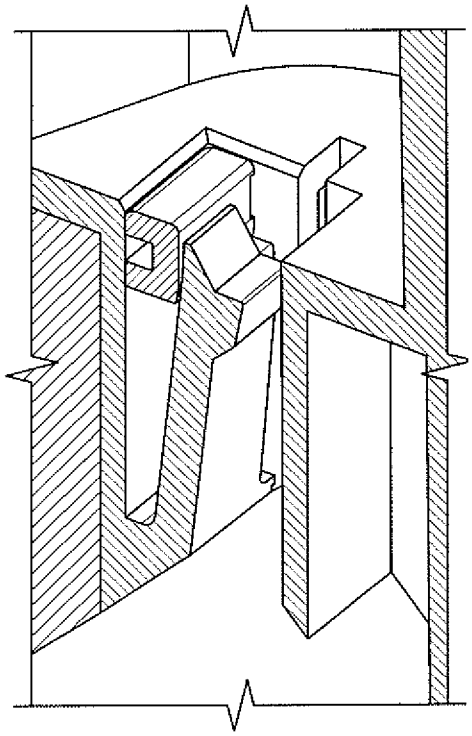


Fig. 15C

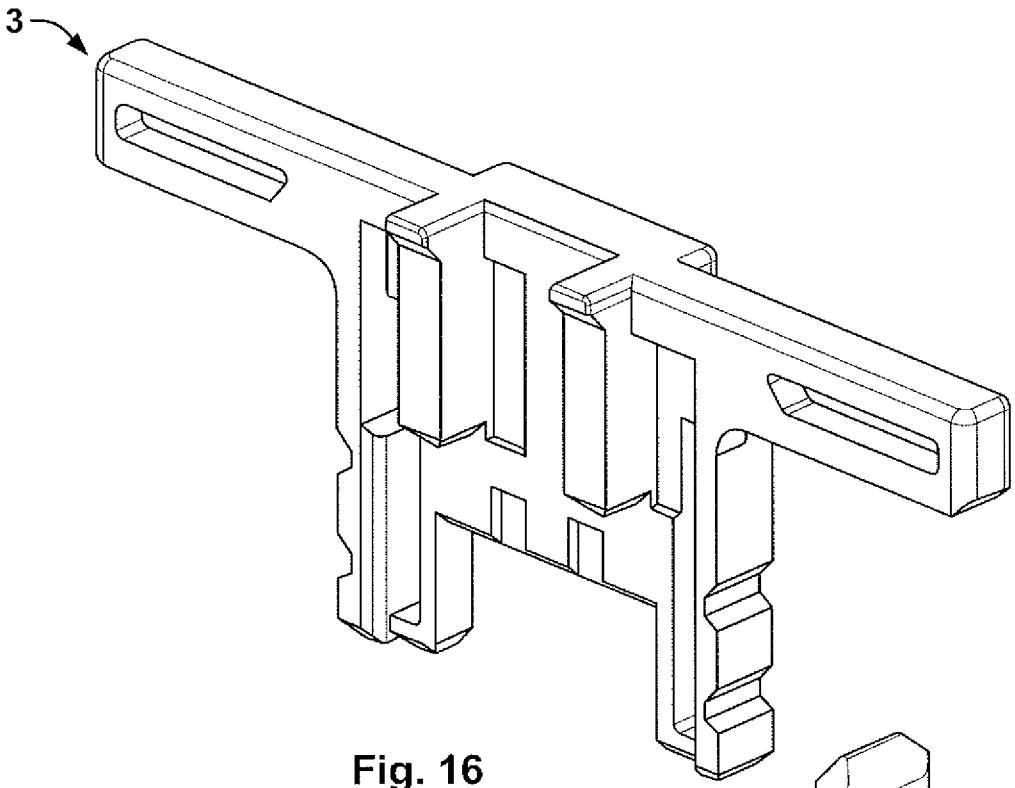


Fig. 16

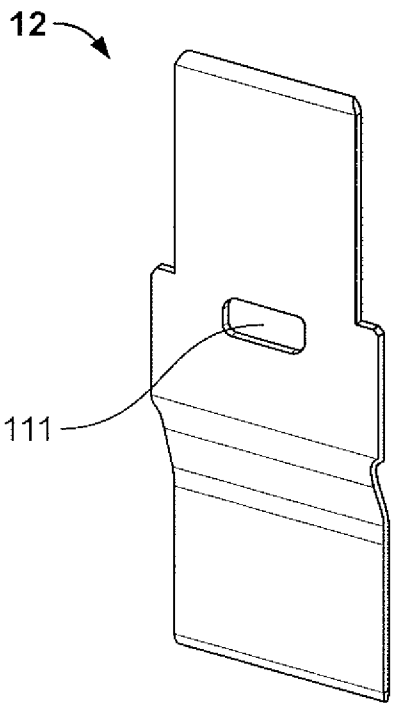


Fig. 17A

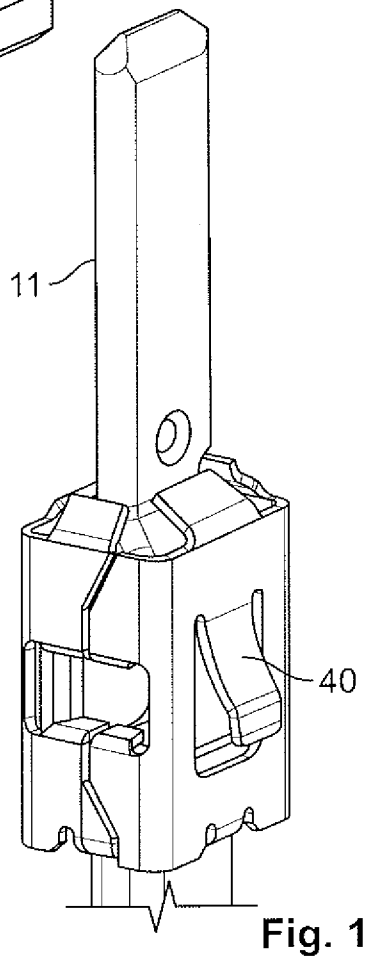


Fig. 17B

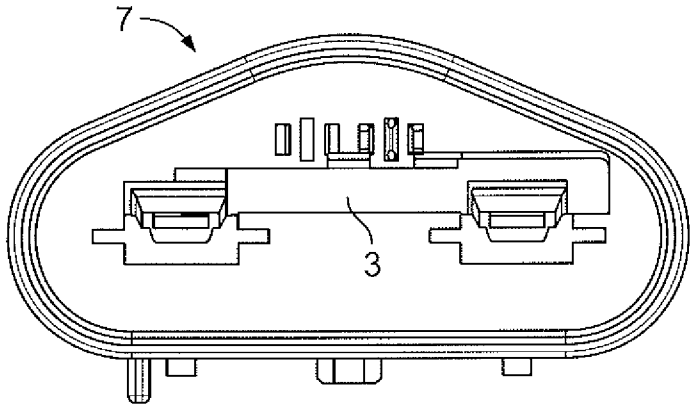


Fig. 18A

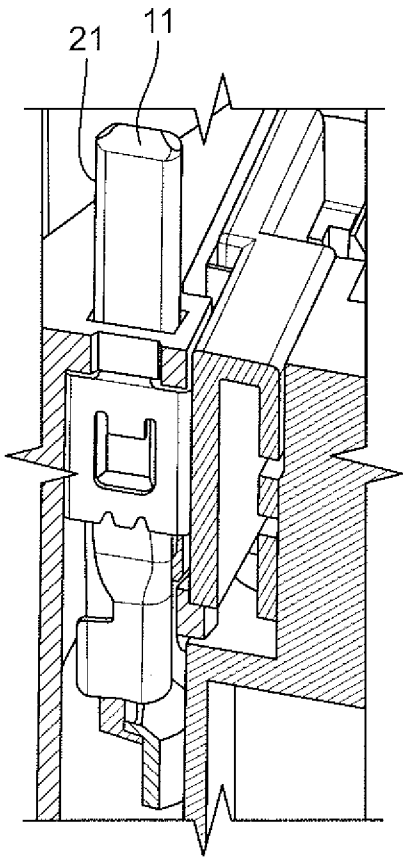


Fig. 18B

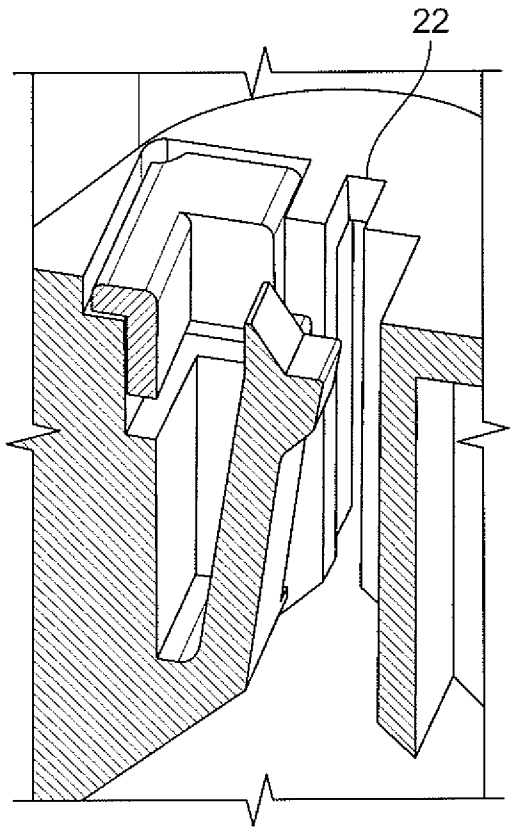


Fig. 18C

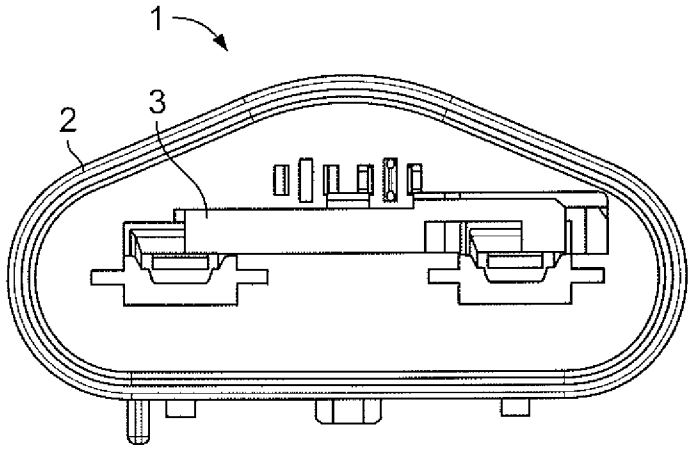


Fig. 19A

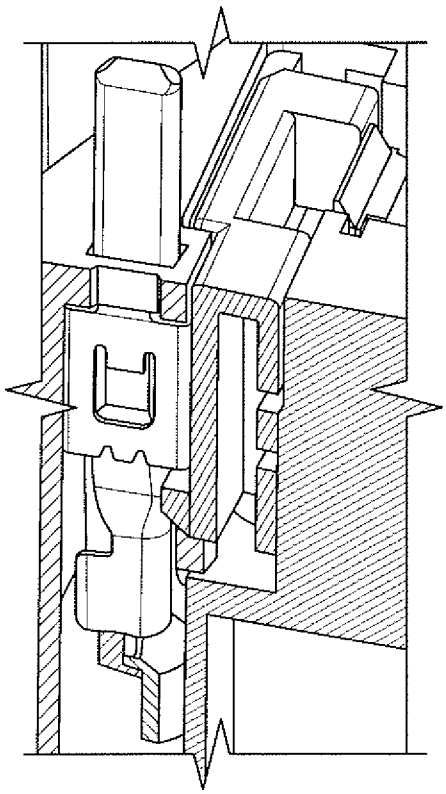


Fig. 19B

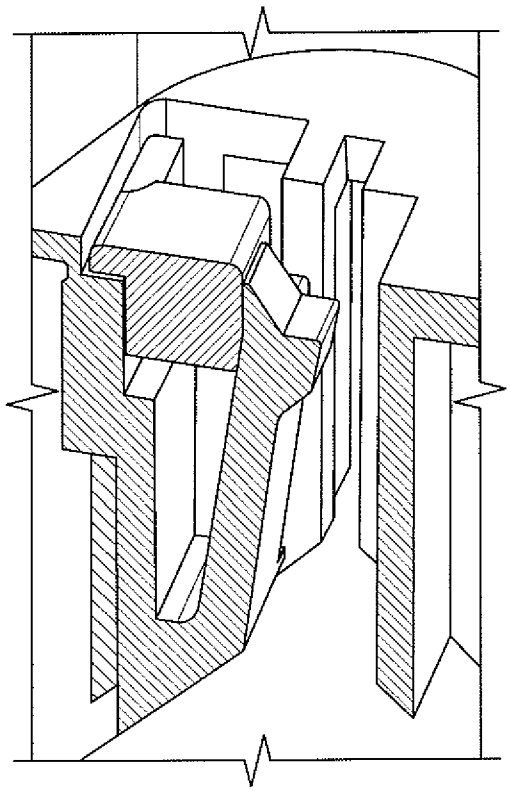


Fig. 19C

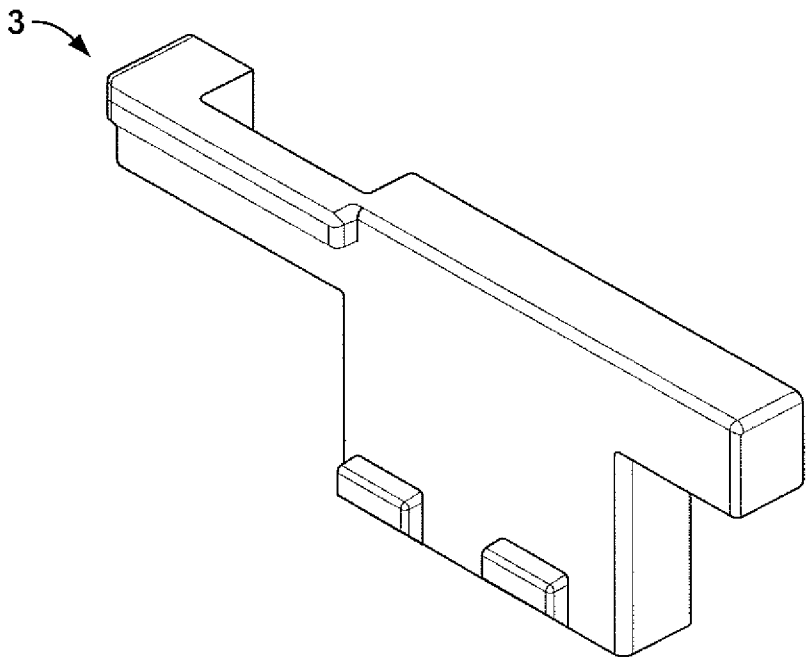


Fig. 20

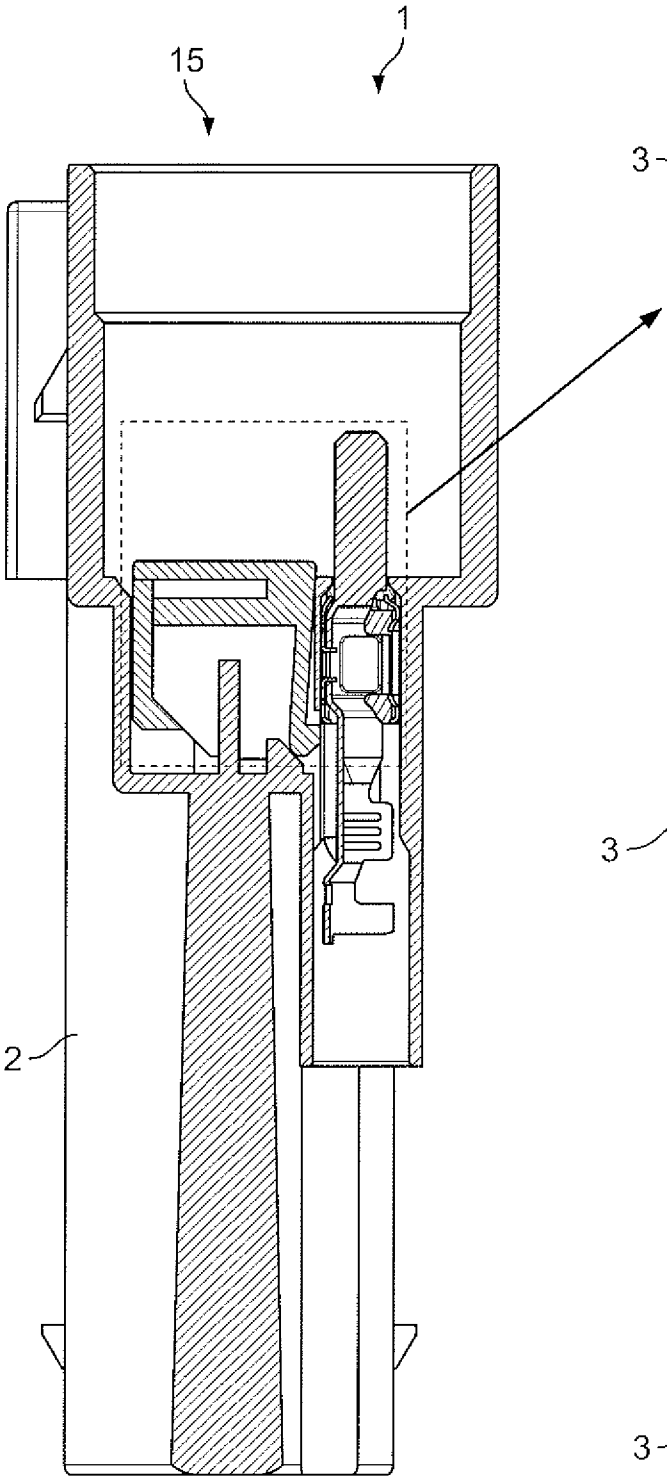


Fig. 21A

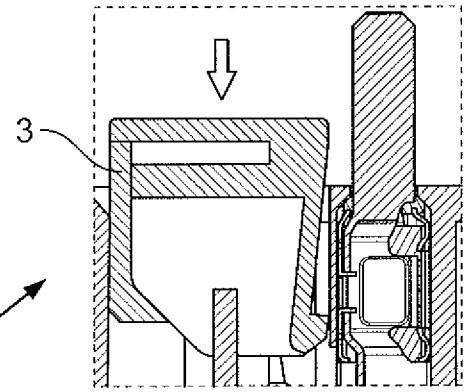


Fig. 21B

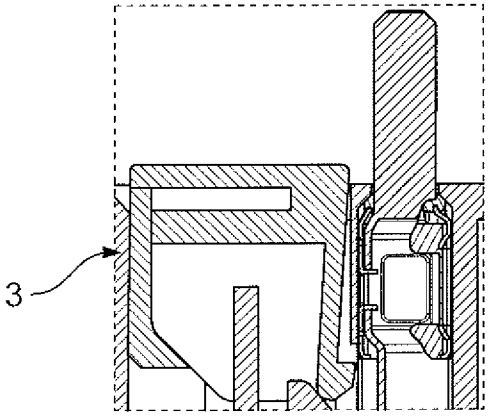


Fig. 21C

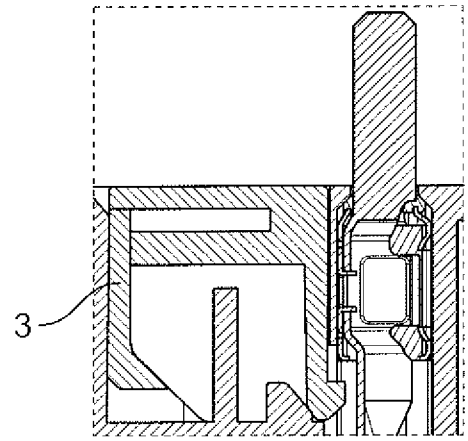


Fig. 21D

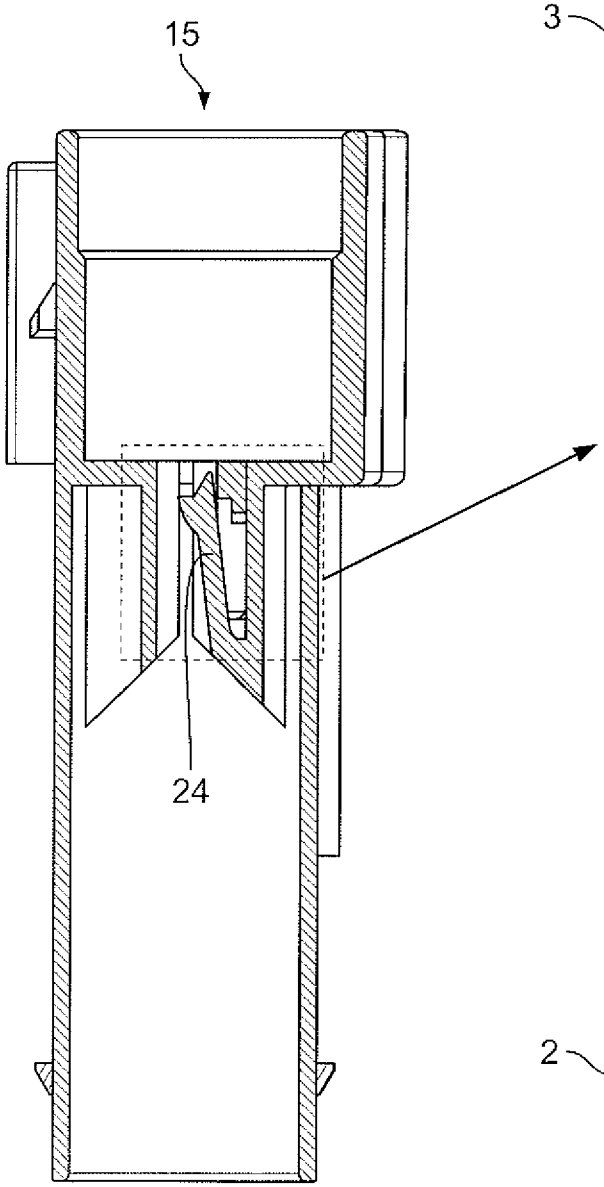


Fig. 22A

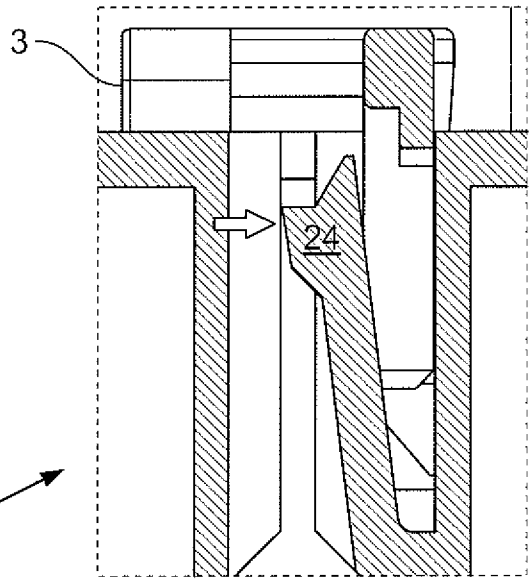


Fig. 22B

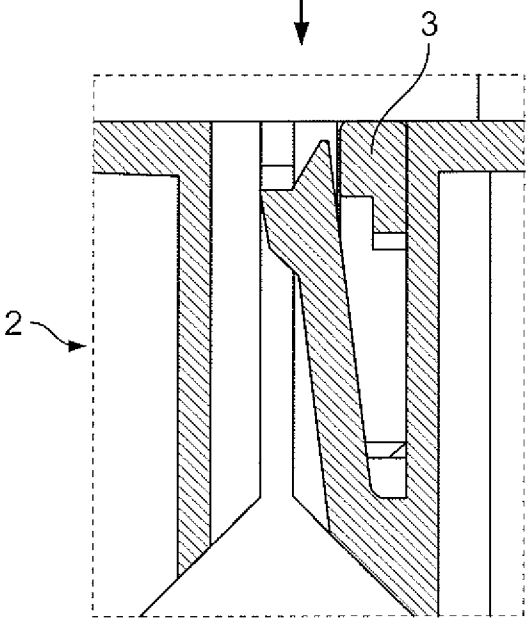


Fig. 22C

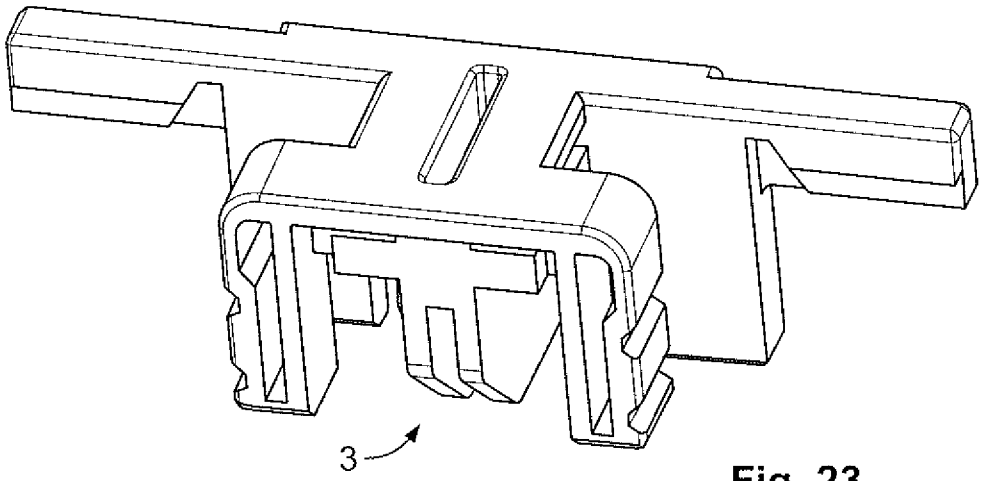


Fig. 23

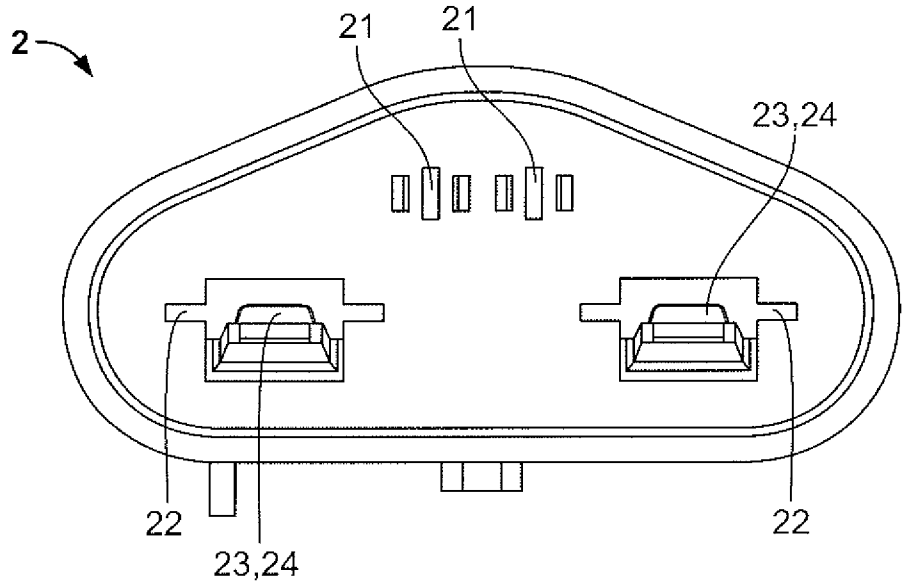


Fig. 24

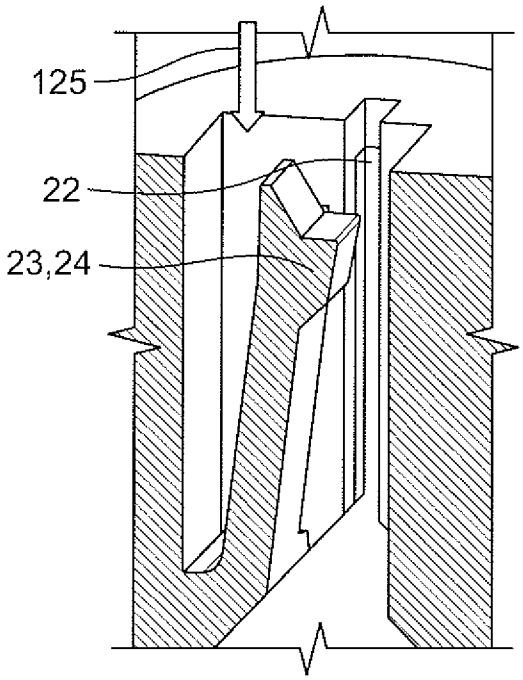


Fig. 25A

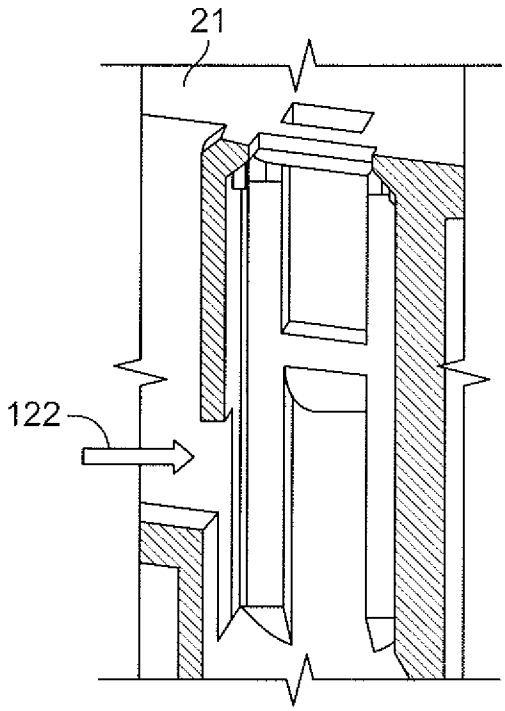


Fig. 25B

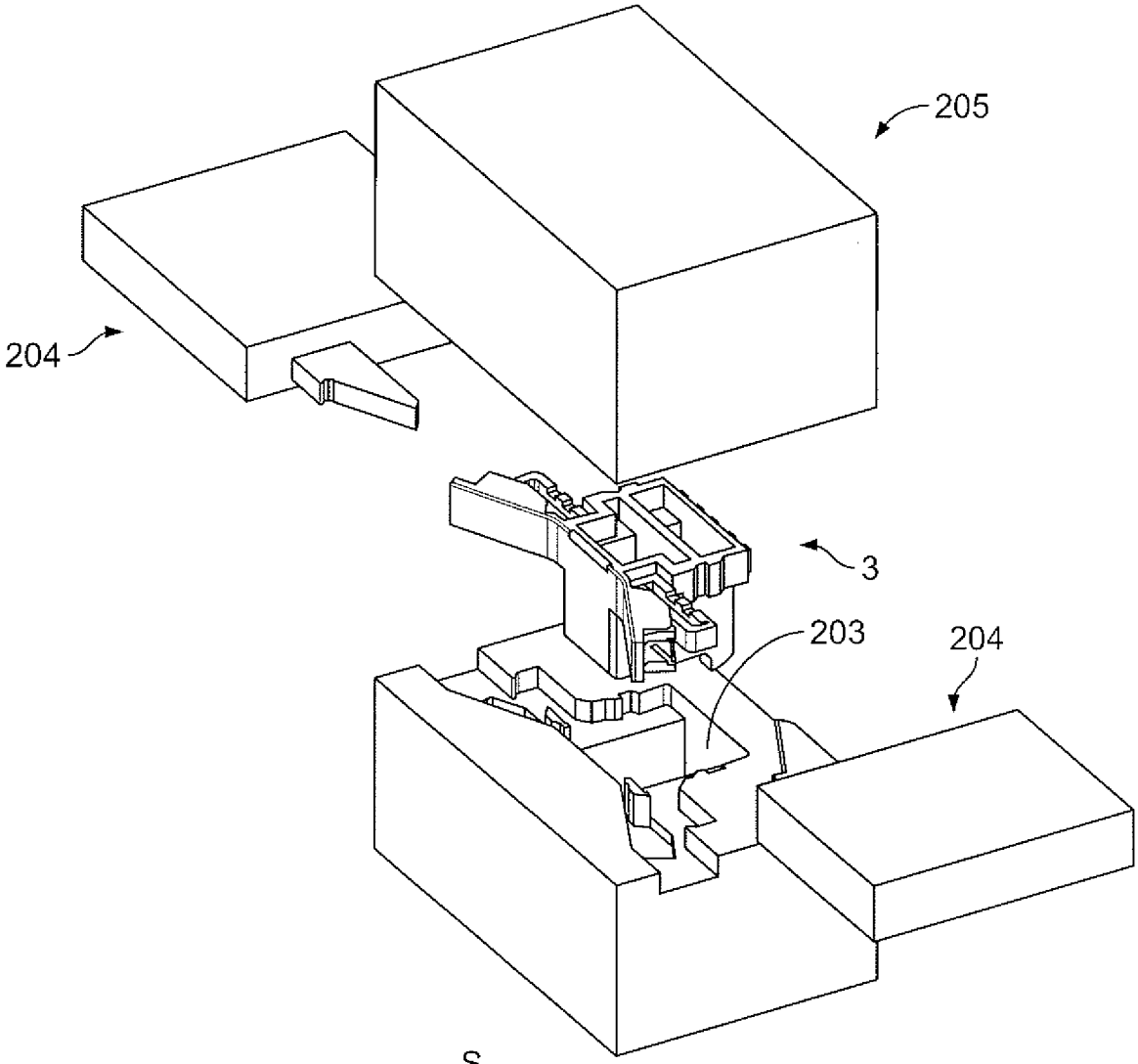


Fig. 26

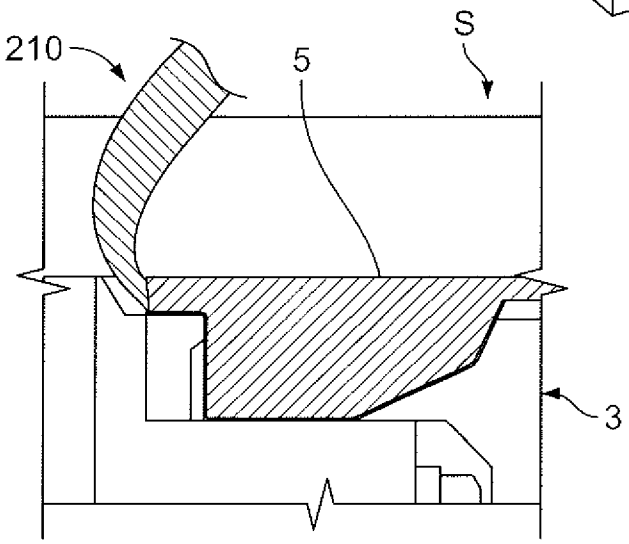


Fig. 27

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/058122

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01R13/436
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2009/311896 A1 (MYER JOHN MARK [US] ET AL) 17 December 2009 (2009-12-17) paragraphs [0039] - [0051]; figures 4-7	1-3,5,8, 10,12 11
X	US 2008/070441 A1 (CHAZOTTES FREDERIC [FR] ET AL) 20 March 2008 (2008-03-20) paragraphs [0019] - [0048]; figures 1,3,6	1-3,5, 10,12, 14,15
X	US 2009/186523 A1 (CAMPBELL JEFFREY S [US] ET AL) 23 July 2009 (2009-07-23) paragraph [0039]; figures 12-15	1,4,10, 13,14
Y A	DE 197 06 992 A1 (WHITAKER CORP [US]) 27 August 1998 (1998-08-27) paragraphs [0007] - [0010], [0031] - [0033]; figures 5-9	11 1-10, 12-15

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

☒ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

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

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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
4 May 2018	24/05/2018

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Gélébart, Yves

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2018/058122

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