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(54) 2-gang socket-outlet

(57) The invention relates to a 2-gang socket-outlet, comprising a body (3) of insulating material, a mounting plate (2), having the body (3) attached thereto, metallic terminal units (4), including first connectors (4.1) fitting for contact with the prongs of electric plugs and second connectors (4.2) intended for contact with electric wires, and a housing section (1), constituting a cover or a case which conceals an interior (5) of the socket-outlet. The socket-outlet interior (5) comprises at least the body (3) and the terminal units (4) and usually also a child protector. The body (3) is fitted with a separate insulating element (6, 8) for covering the terminal units (4) along with the connectors (4.1, 4.2) thereof, such that, once installed, the socket-outlet interior (5) is screen-protected without the housing section (1). This enables manufacturing simple housing sections (1) in diverse materials, colours and shapes, which include neither child protectors nor other technology.

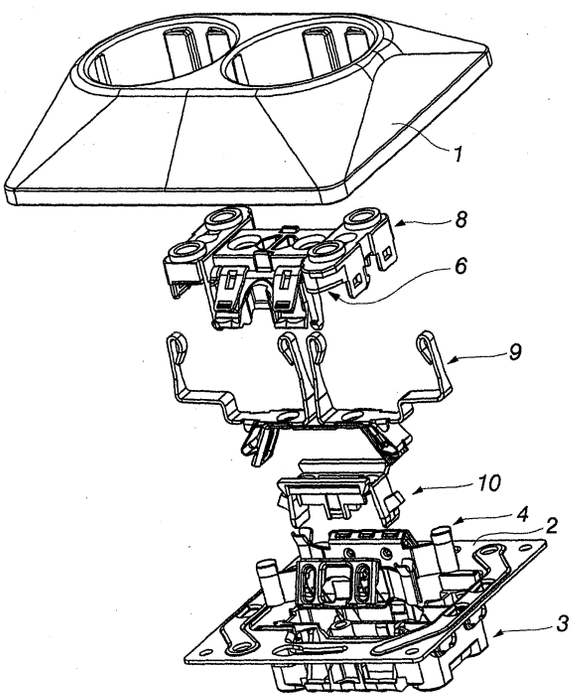

Fig. 5

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Description

[0001] The invention relates to a 2-gang socket-outlet, comprising a body of insulating material, a mounting plate, having the body attached thereto, metallic terminal units, including first connectors fitting for contact with the prongs of electric plugs and second connectors intended for contact with electric wires, and a housing section, constituting a cover or a case which conceals an interior of the socket-outlet, the socket-outlet interior comprising at least the body and the terminal units.

[0002] In prior known socket-outlets, the housing section forms a segment of the shroud. Child protectors are generally also attached to the housing section. This sets its specific limitations to the modifiability of a housing section in terms of materials and shapes. Safety aspects must also be considered when interchanging housing sections. Live socket-outlets may also exist at a working site (against regulations) due to various stages of construction and electrical installation processes. This may result in so-called passing contact electric shocks from exposed first connectors.

[0003] It is an object of the invention to provide 2-gang socket-outlet, wherein the removal of a housing section does not eliminate protection against contact.

[0004] This object is accomplished on the basis of characterizing features set forth in the appended claim 1. Dependent claims disclose preferred implementations and structural solutions of the invention.

[0005] The invention will now be described in more detail by way of exemplary embodiments with reference to the accompanying drawings, in which:

Fig. 1 shows a socket-outlet for concealed installation, provided with a full housing plate 1,

Fig. 2 shows the socket-outlet of fig. 1 in a view from below,

Fig. 3 shows the socket-outlet of figs. 1 and 2, the housing plate 1 being separated from an interior 5,

Fig. 4 shows the same as fig. 3, but in a view from below the socket-outlet,

Fig. 5 shows the same socket-outlet in an assembly view, the interior components being depicted apart from each other.

Fig. 5a shows the socket-outlet of fig. 5 at the intermediate stage of assembly.

Fig. 6 shows the same as fig. 5, but in a view diagonally from below.

Fig. 7 shows the interior 5 attached to a mounting plate 2, in a view from below.

Fig. 7a shows the assembly of fig. 7 in a diagonal front view.

Fig. 8 shows the interior 5 used in the embodiment of figs. 1-7 in its application to a surface-mounted socket-outlet, including a housing section 1 for the surface-mounted socket-outlet and a bottom 2' functioning as a mounting plate, to which the interior 5 is attached by screw fastening and/or snap-on connection,

Fig. 9 shows the same as fig. 8, but with the interior 5 attached to the bottom 2,

Fig. 10 shows the same as fig. 9, but in a view diagonally from the bottom side. Openings in the bottom can be open, or closed as in the other end to provide an insulation against a foundation.

Fig. 11 shows in a view diagonally from the front a socket-outlet body 3, along with its disengagement member 10 which nevertheless cannot be installed in place until terminal units 4 are mounted to the body 3,

Fig. 11a shows the body 3, along with its disengagement member 10 as the terminal units 4 are mounted in place,

Fig. 12 shows the same as fig. 11 from a slightly different angle of view, and with the disengagement member 10 out of its position,

Fig. 12a shows otherwise the same as fig. 12, but with the terminal units 4 added on,

Fig. 13 shows the same as fig. 12, but with the disengagement member 10 pressed in place,

Fig. 14 shows the body of figs. 11-13 in a view diagonally from the bottom side,

Fig. 14a shows the body of fig. 14 from a slightly different angle of view, along

with its disengagement member 10,

Fig. 15 shows a terminal unit for the socket-outlet, two of those being installed in parallel spaced from each other in receptacles 3.4 of the body 3,

Figs. 16 and 17 show the terminal unit of fig. 15 from different angles of view,

Fig. 18 shows a connector spring 4.3 included in the terminal unit of figs. 15-17,

Fig. 19 shows an earth terminal unit 9, having earth conductors 11 connected thereto,

Fig. 19a shows the earth terminal unit of fig. 19 from a different angle of view,

Fig. 20 shows a cradle guard 9.1 for the earth terminal unit of fig. 19,

Fig. 21 shows a connector spring 9.2 for the earth terminal unit of fig. 19,

Fig. 22 shows a grounding bridge 9.3 for the earth terminal unit of fig. 19,

Figs. 23 and 24 show a child protection element for the socket-outlet diagonally from the front and the back,

Fig. 25 shows the child protection element of figs. 23 and 24 in an assembly view, and

Fig. 25a shows the same as fig. 25 in a view from the opposite direction.

[0006] The main components in a 2-gang socket-outlet of the invention are a housing section 1, a mounting plate 2, a body 3 of insulating material, which is attached to the mounting plate 2, metallic terminal units 4, an earth terminal unit 9, an insulator 6, which in the present embodiment constitutes at the same time a part of a child protection element, child protectors 7 and a cover 8 for the child protector, as well as a disengagement member 10.

[0007] Aside from the housing section 1, the above components make up an interior 5 assembled for a single package, which houses all technical features of the socket-outlet and which interior 5, once installed, is screen-protected without the housing section 1. Thus, the housing section 1 is replaceable, e.g. for reasons of appearance (colour, shape, surface quality, etc.), or capable of creating diverse product variations (product for concealed installation, surface-mounted product, etc.).

[0008] Each of the above-mentioned main components or elements will now be described in more detail as follows.

[0009] The body 3 illustrated in figs. 11-14 is provided with two elongated recesses 3.4 with expanded ends for receiving subsequently described terminal units 4, such that the terminal units 4 and an earth terminal unit 9 to be placed therebetween are spaced and electrically insulated from each other. The body 3 has its bottom side edges provided with holes 3.1 for bringing electric wires diagonally from below to connectors. By virtue of the conical expansion of the body's inclined holes 3.1 and 3.9 and the inclination of other surfaces as well, it will be possible to use a simple mould without expensive side draw pins. Preferred inclination angles at the components' mating surfaces enable installation of the components directly from above. The body 3 has its sides provided with lugs 3.2 for fastening screws and/or engagement claws. The body 3 is provided with vertical, open-topped channels or recesses 3.3 for receiving clamping brackets 8.3 (Fig. 24) of a child protector's cover. In the middle of the body 3, between the spaces 3.4, is a disengagement member 10, having its ends 10.2 in the form of a flexible tongue provided with cogs 10.1 extending into spaces 3.5 present at the ends of the body, which receive the earth terminal unit's 9 cable connectors 9.4, 9.6 (Fig. 19). Thus, by bending the tongues 10.2 from the bottom side (Fig. 14), tabs 9.5 present at the ends of a connector spring 9.4 are forced by the cogs 10.1 through openings 9.8 (Fig. 19), thus enabling the disengagement of wires 11. Fig. 11a visualises the disengagement member's 10 extended skirts 10.3, which are positioned between the earth terminal unit and other terminals 4 and improve electrical separation therebetween.

[0010] The terminal unit 4 depicted in figs. 15-18 comprises first connectors 4.1, fitting for contact with the prongs of electric plugs, and second connectors 4.2 intended for contact with electric wires. The terminal unit 4 consists of two elements, namely a connector spring 4.3 and a single plate member, constituting a terminal body and having a deflection 4.7 of 180° for providing connectors 4.1 between the deflected plate sections. A number of additional deflections 4.8 are used for providing connectors 4.2 for electric wires and a closed circle which is locked by engagements 4.10. The connectors 4.2 are configured as spring connectors by fitting the unit 4 with a connector spring 4.3, which has four pieces of deflected spring connectors 4.4. The ends thereof are provided with tabs 4.5 to be placed behind openings present in the connectors 4.2. These tabs or claws 4.5 can be actuated by cogs or protrusions 8.1 present at the ends of the flexible tongues 8.5 of a child protector's cover 8, visualised in figs. 24 and 25, for opening the spring connectors 4.2, 4.4. The connectors 4.2 are secured in a desired angular position between a deflected member 4.9 (Fig. 15) and the engagement lug 4.10. The connector spring 4.3 is fastened to the terminal body by

riveting through its apertures 4.6 with rivets made by drawing from the terminal body.

[0011] The earth terminal unit 9 shown in fig. 19 consists of three different (four in total) elements, which are depicted in figs. 20-22. Two pieces of cradle guards 9.1 of fig. 20 are attached to each other by means of a grounding bridge 9.3 of fig. 22, which are riveted to the guards 9.1 by rivets 9.7 drawn from the very material of the cradle guard and therebetween is secured a connector spring 9.2 which, together with angularly deflected ends 9.6 of the grounding bridge 9.3, constitutes self-clamping spring connectors 9.4, 9.6 for earth conductors 11 which can be inserted in the connectors diagonally from below the socket by way of holes 3.9 (Fig. 14) present in the gable edge of the body's 3 bottom. Support lugs 9.9 deflected from the guard 9.1 support a deflected connector end of the spring 9.2.

[0012] Figs. 23-25 illustrate a child protection element, including an insulator 6 visualised in figs. 25 and 25a. This insulator 6, together with a cover 8 of the child protector, conceals the terminal units 4 and 9 along with the connectors thereof, such that, once installed, the socket-outlet's interior 5 is screen-protected without the housing section 1. In addition, the side of the insulator 6 to be set against the body 3 is provided with ribs 6.5 for improving electrical separation between the terminal units 4 and the earth terminal unit 9. On top of the insulator 6 are spring-loaded child protectors 7 and the child protector's cover 8 provided with receptacles 8.2 for the child protectors 7. The child protector 7 has its aperture 7.2 fitted with a spring 7.1, which bears against a tab 8.4 emerging from the cover 8 and present in the aperture 7.2. The child protectors 7 operate on a conventional seesaw principle and are only able to move against the force of the spring 7.1 when the prongs of an electric plug function through the socket holes simultaneously and in a balanced fashion on the child protector's 7 inclined surfaces.

[0013] The cogs 8.1 present at the ends of the cover's 8 flexible tongues 8.5 engage in slots 6.1 present in the insulator's 6 inclined side extensions 6.2, through which the cogs 8.1 are pressable against tabs 4.5 of the terminals' 4 connector springs, as described above in connection with the connector spring of fig. 15. The claws of the insulator's 6 vertical protrusions 6.6 engage in recesses 8.6 present in the cover's 8 side edges to secure the child protection element for a single component used in final assembly. In the process of final assembly, the vertical brackets 8.3 (4 pieces in total) guide the assembly work by penetrating into the body's 3 vertical channels 3.3. The insulator 6 is provided with recesses 6.3 for the passage of the brackets 8.3. Together with end claws 8.7 (4 pieces in total), the brackets 8.3 also clamp the interior 5 for a single assembly. Figs. 11 and 12 illustrate bosses 3.7 at the body's 3 gables to engage with the claws 8.7. The insulator 6 and the cover 8 are also provided with holes for the passage of the housing section's 1 fastening screws 13, such that these screws can engage with the threads thereof in the bores of the body's 3 sleeves 3.6 (Fig. 12). Screen-protected insulation can be provided also without a child protector by means of an insulating element corresponding to the cover 8 or substituting for the cover 8 and the insulator 6.

[0014] The insulator 6 and the child protector's cover 8 are of course provided with through-holes for the prongs of an electric plug and the cradle guards 9.1.

[0015] The child protector's cover 8 is provided with collar-like bosses 12, encircling the through-holes for the prongs of an electric plug and extending into the holes of the housing section 1. Thus, the material used for the housing section 1 need not satisfy such electrotechnical standards which are required of a material in contact with or supporting live metal components. This also works in favour of the objective of the invention that various replaceable housing sections 1 can be used for creating diverse product variations, in which the interior 5 remains the same.

Claims

1. A 2-gang socket-outlet, comprising a body (3) of insulating material, a mounting plate (2), having the body (3) attached thereto, metallic terminal units (4), including first connectors (4.1) fitting for contact with the prongs of electric plugs and second connectors (4.2) intended for contact with electric wires, and a housing section (1), constituting a cover or a case which conceals an interior (5) of the socket-outlet, the socket-outlet interior (5) comprising at least the body (3) and the terminal units (4), **characterized in that** the body (3) is fitted with a separate insulating element (6, 8) for covering the terminal units (4) along with the connectors (4.1, 4.2) thereof, such that, once installed, the socket-outlet interior (5) is screen-protected without the housing section (1).

2. A socket-outlet as set forth in claim 1, **characterized in that** the insulating element (6) includes an insulator (6) on top of the body (3), on top of which are spring-loaded child protectors (7, 7.1) and a cover (8) for the child protector, the body (3), the terminal units (4), the insulator (6), and the child protectors (7, 7.1) along with the covers (8) thereof constituting the interior (5) assembled as a single package, which houses all technical features of the socket-outlet.

3. A socket-outlet as set forth in claim 2, **characterized in that** the child protector's cover (8), mountable on top of the body (3) included in the interior (5), is provided with flexible tongues (8.5) and lugs (8.1) included therein, which extend through slots (6.1) of the insulator (6) and by which the second connectors (4.2) are disengageable, and that the

child protector's cover (8) is provided with receptacles (8.2) for the child protectors (7, 7.1).

4. A socket-outlet as set forth in any of claims 1-3, **characterized in that** the body (3) and the insulating element (6, 8) are designed with receptacles for the terminal units (4) and an earth terminal unit (9) for clamping the terminal units (4) and the earth terminal unit (9) in place.

5. A socket-outlet as set forth in any of claims 2-4, **characterized in that** the insulator (6) is fitted between the body (3) and the child protector's cover (8), and that the child protector's cover (8) is attached to the body (3) with mounting brackets (8.3), which engage in fastening channels or recesses (3.3) included in the body (3) and thereby clamp the interior (5) for a single unit.

6. A socket-outlet as set forth in any of claims 1-5, **characterized in that** each terminal unit (4) consists of two components, namely a connector spring (4.3) and a single plate element, which has a 180° deflection (4.7) for constituting the first connectors (4.1) and a closed circle provided by several deflections (4.8) for constituting the second connectors (4.2) together with the connector spring (4.3) fixed to the terminal unit (4), such that conductors to be connected can be brought to the second connectors (4.2) diagonally from below the socket.

7. A socket-outlet as set forth in claim 6, **characterized in that** the body (3) has the edges of its bottom side provided with diagonally inward openings (3.1), the second connectors (4.2) placing themselves as extensions thereof upon inserting the terminal units (4) in the receptacles (3.4) of the body (3).

8. A socket-outlet as set forth in any of claims 4-7, **characterized in that** the earth terminal unit (9) consists of two cradle guards (9.1) and a grounding bridge (9.3) for connecting the cradle guards to each other, as well as a connector spring (9.2) fixed between the cradle guards and the grounding bridge for constituting, together with the grounding bridge's (9.3) angularly deflected ends (9.6), self-clamping connectors (9.4, 9.6) for earth conductors (11) which can be inserted in the connectors (9.4, 9.6) diagonally from below the socket.

9. A socket-outlet as set forth in any of claims 4-8, **characterized in that** the body (3) is provided with a disengagement member (10) for earth conductors, having its ends provided with claws (10.1) for pushing tabs (9.5) at the connector springs' (9.2) ends for disengaging the earth conductors (11).

10. A socket-outlet as set forth in any of claims 2-9, **characterized in that** the child protector's cover (8) is provided with sleeves (12), encircling through-holes for the prongs of an electric plug and extending to matching holes in the housing section (1) for providing around the live plug prong a collar sufficient in terms of safety in electricity.

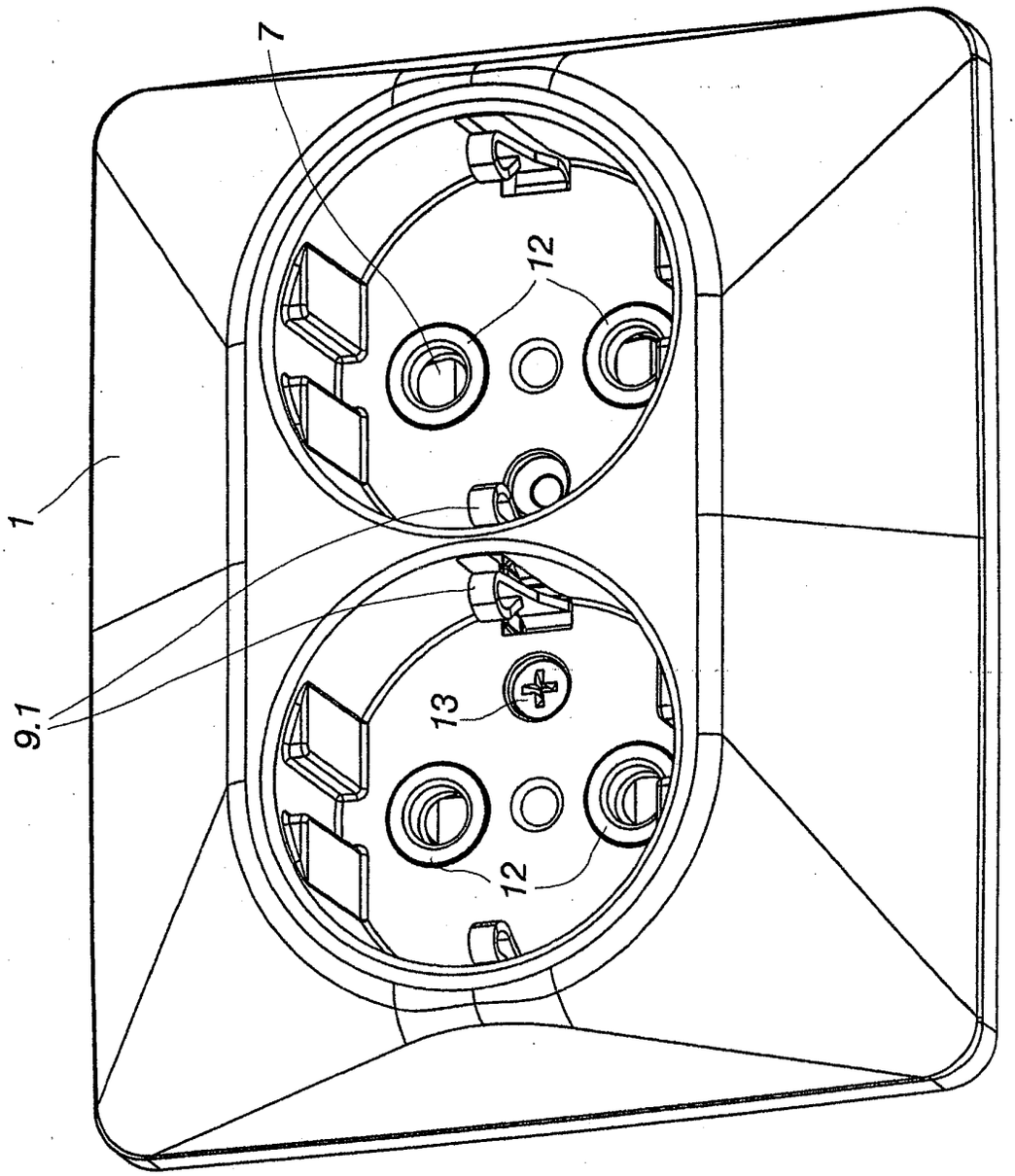

Fig. 1

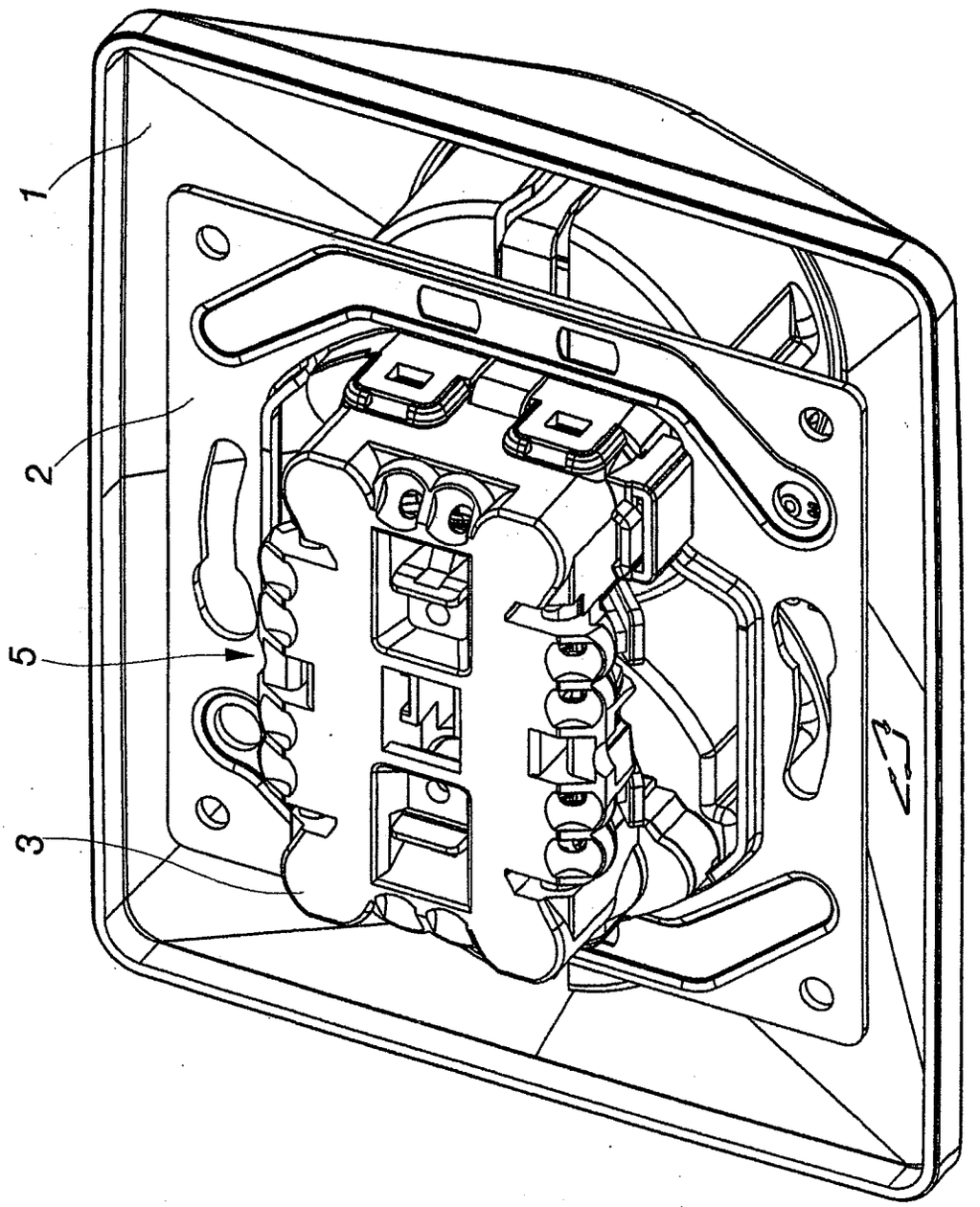

Fig. 2

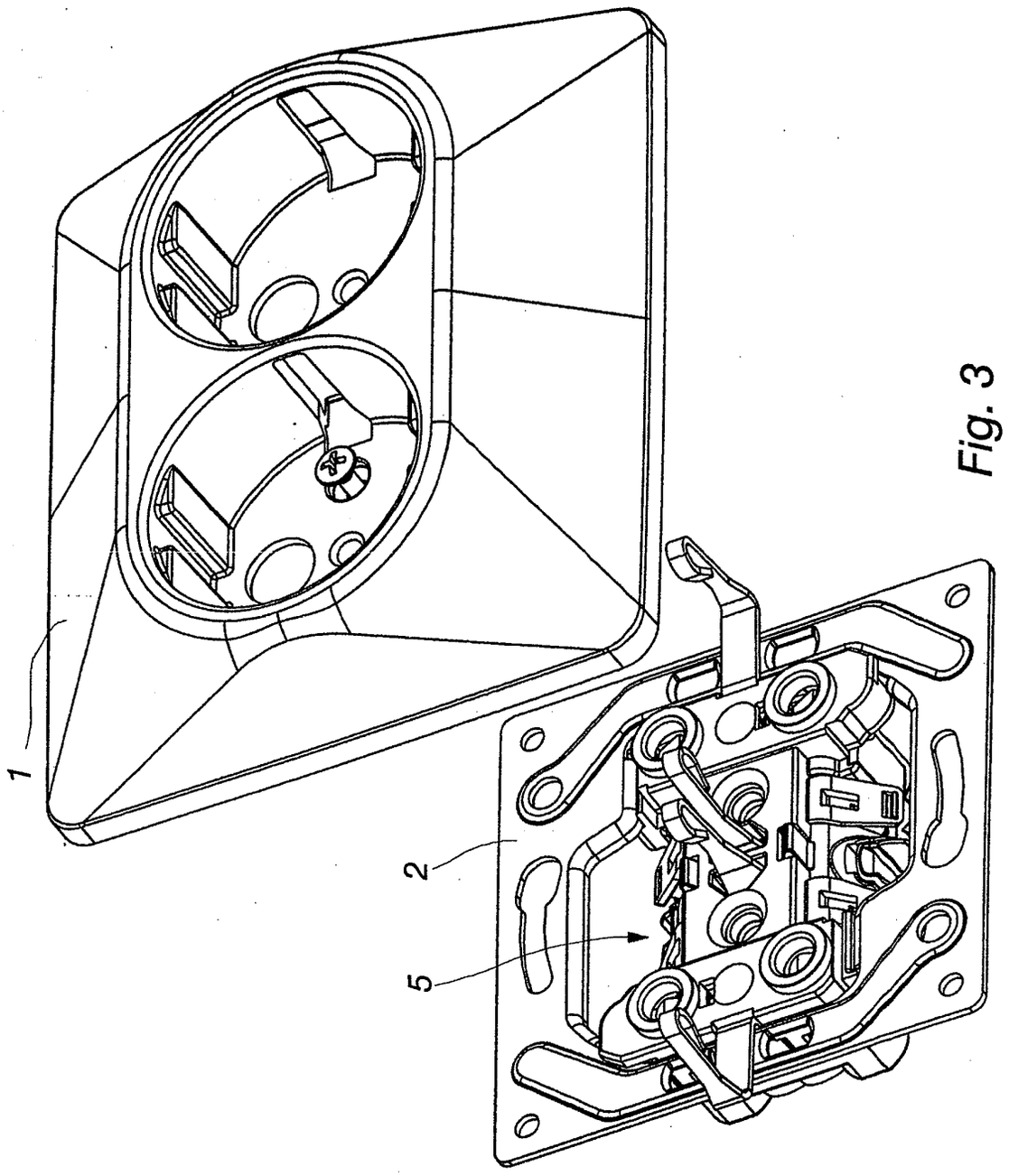

Fig. 3

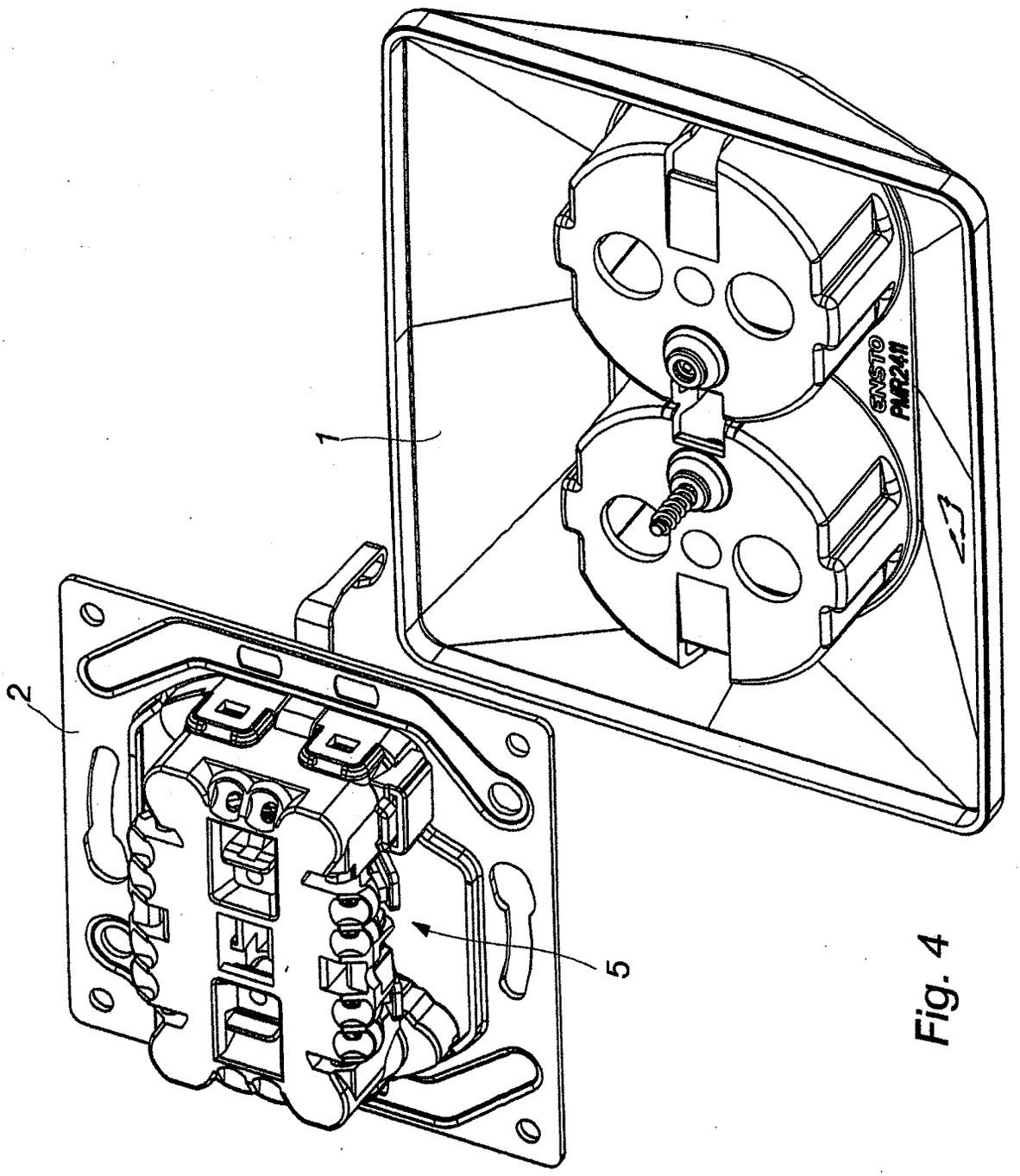

Fig. 4

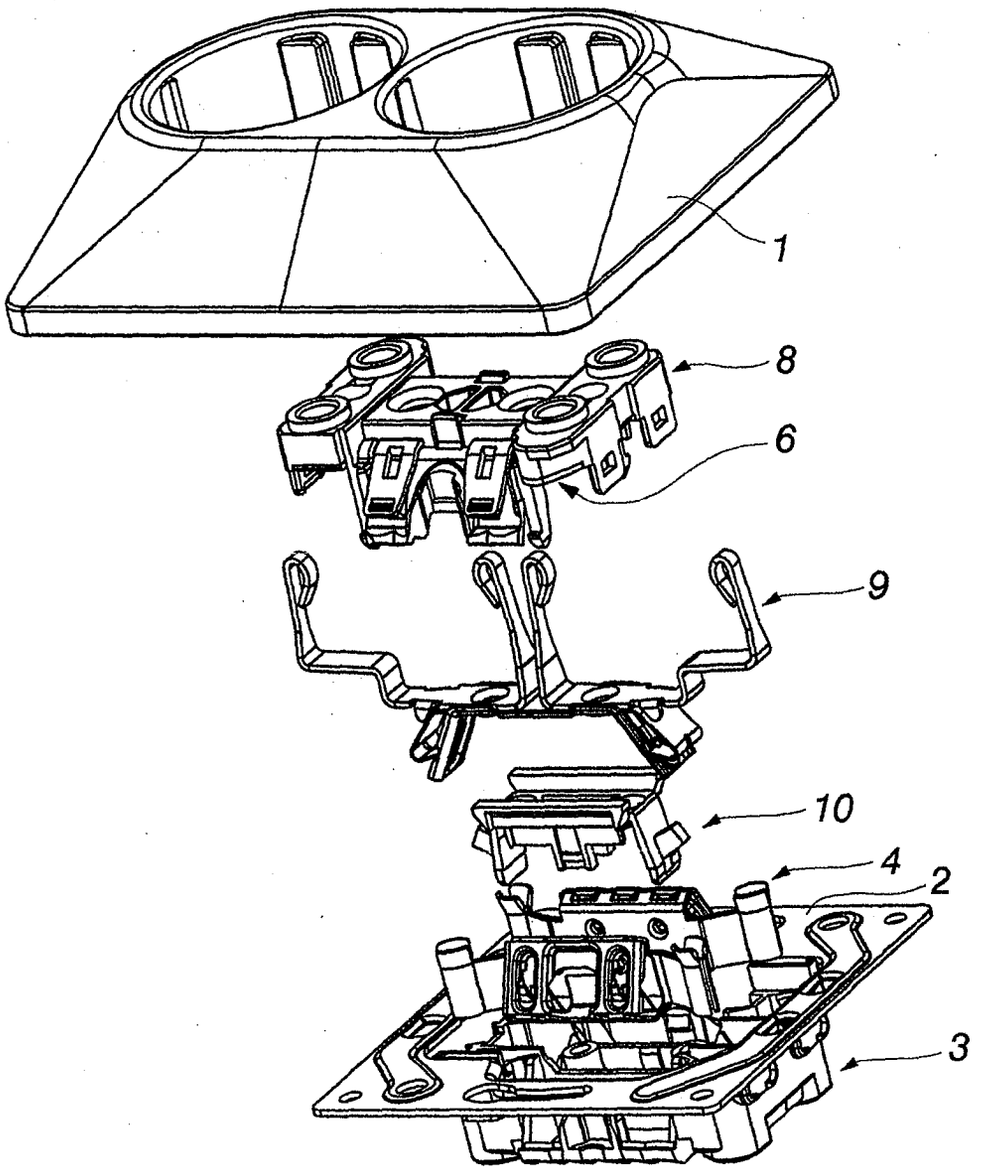

Fig. 5

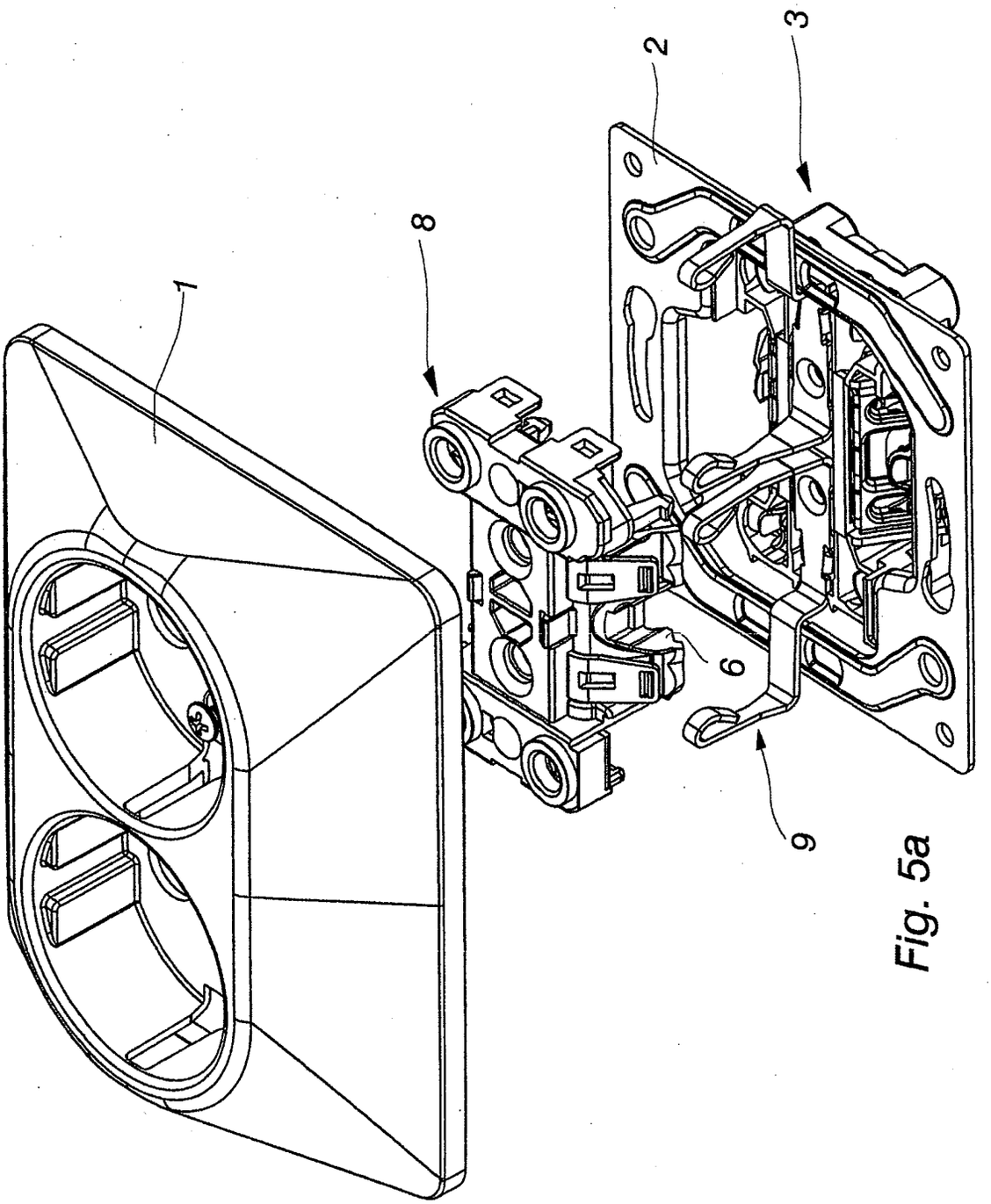

Fig. 5a

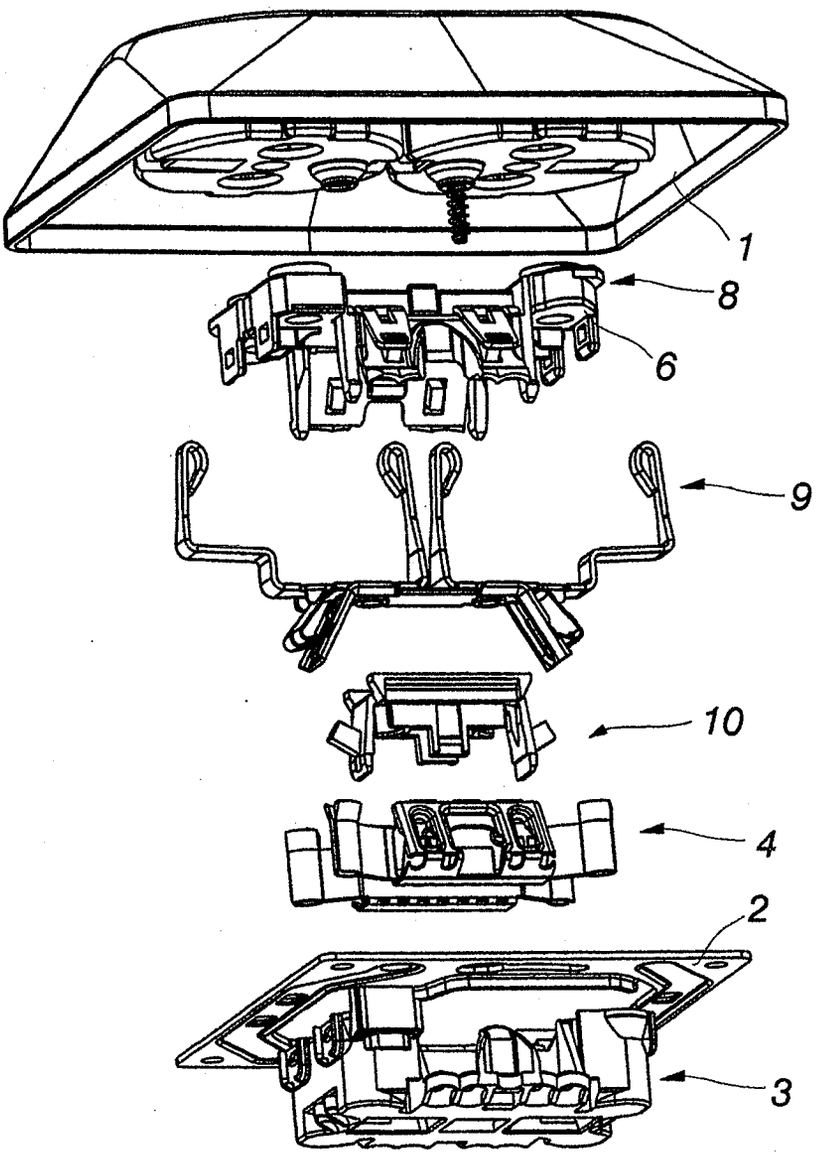

Fig. 6

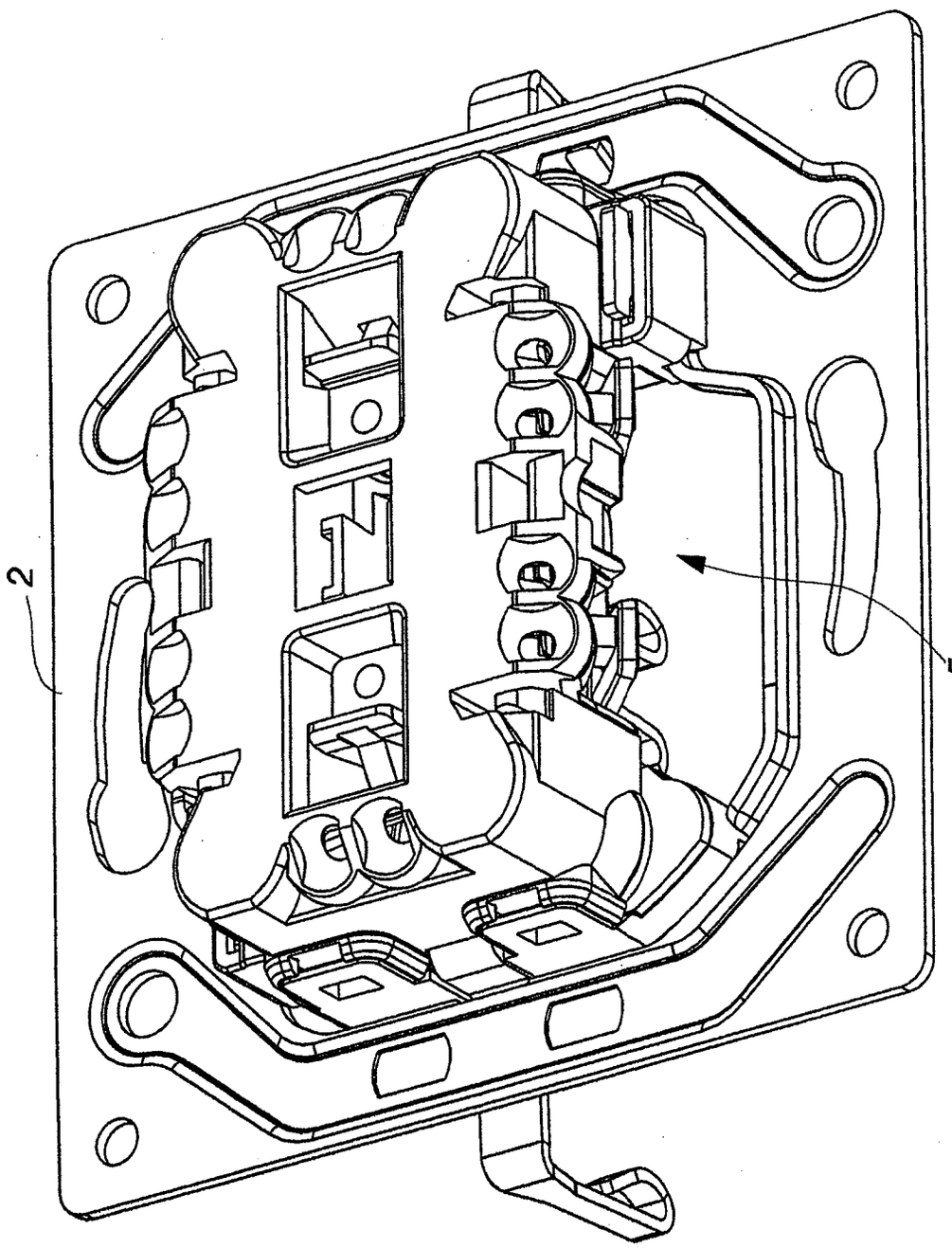

Fig. 7

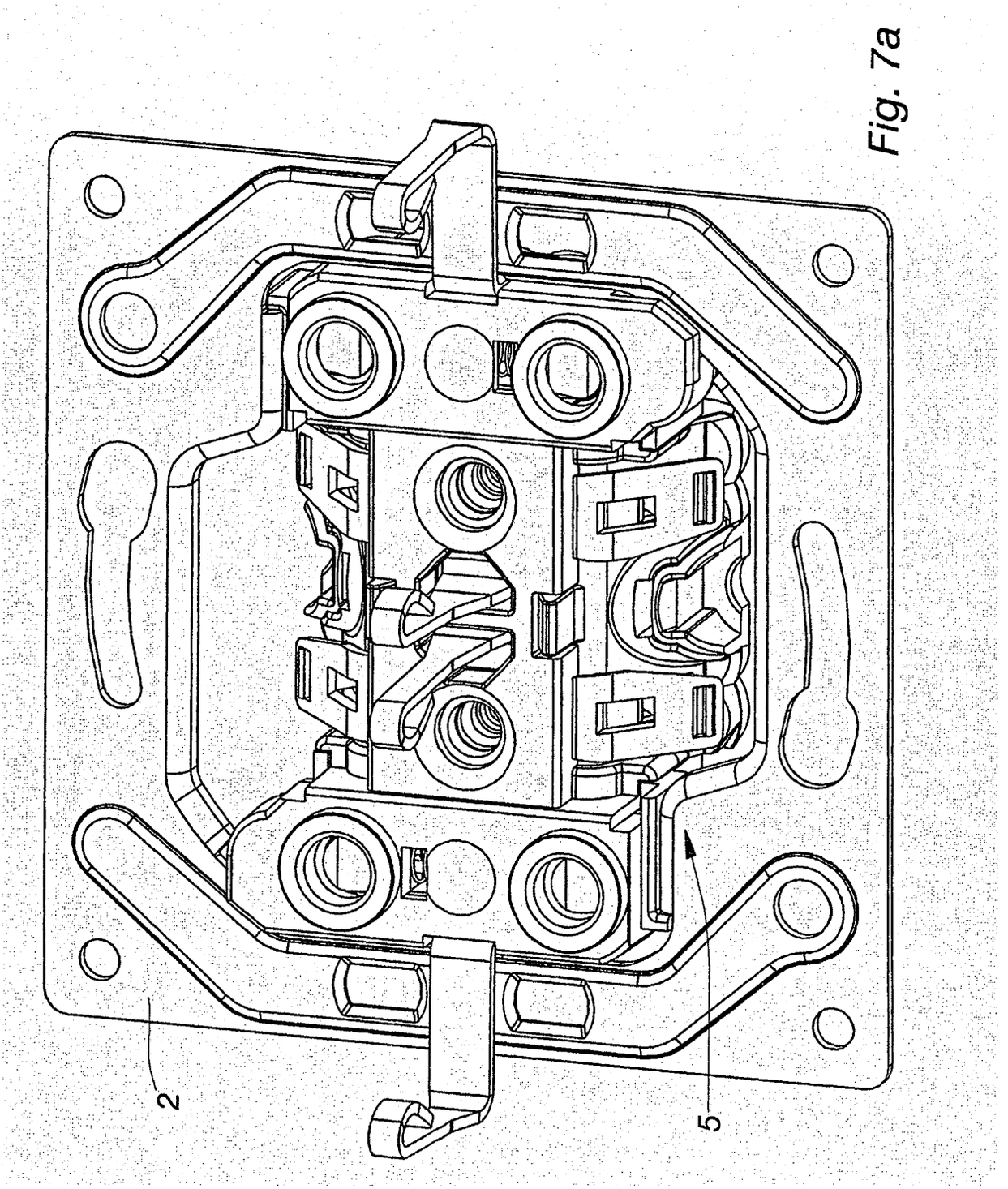

Fig. 7a

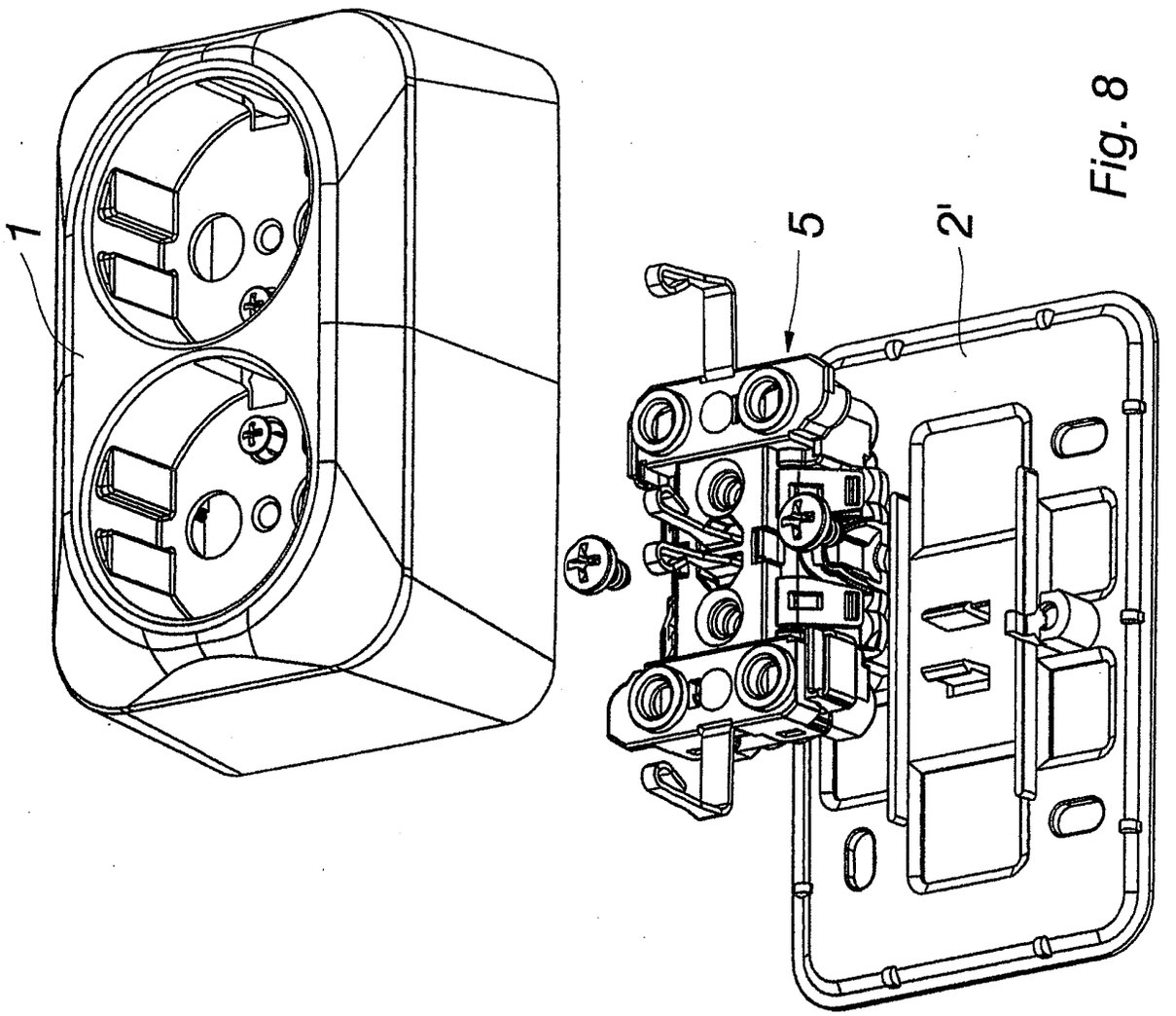

Fig. 8

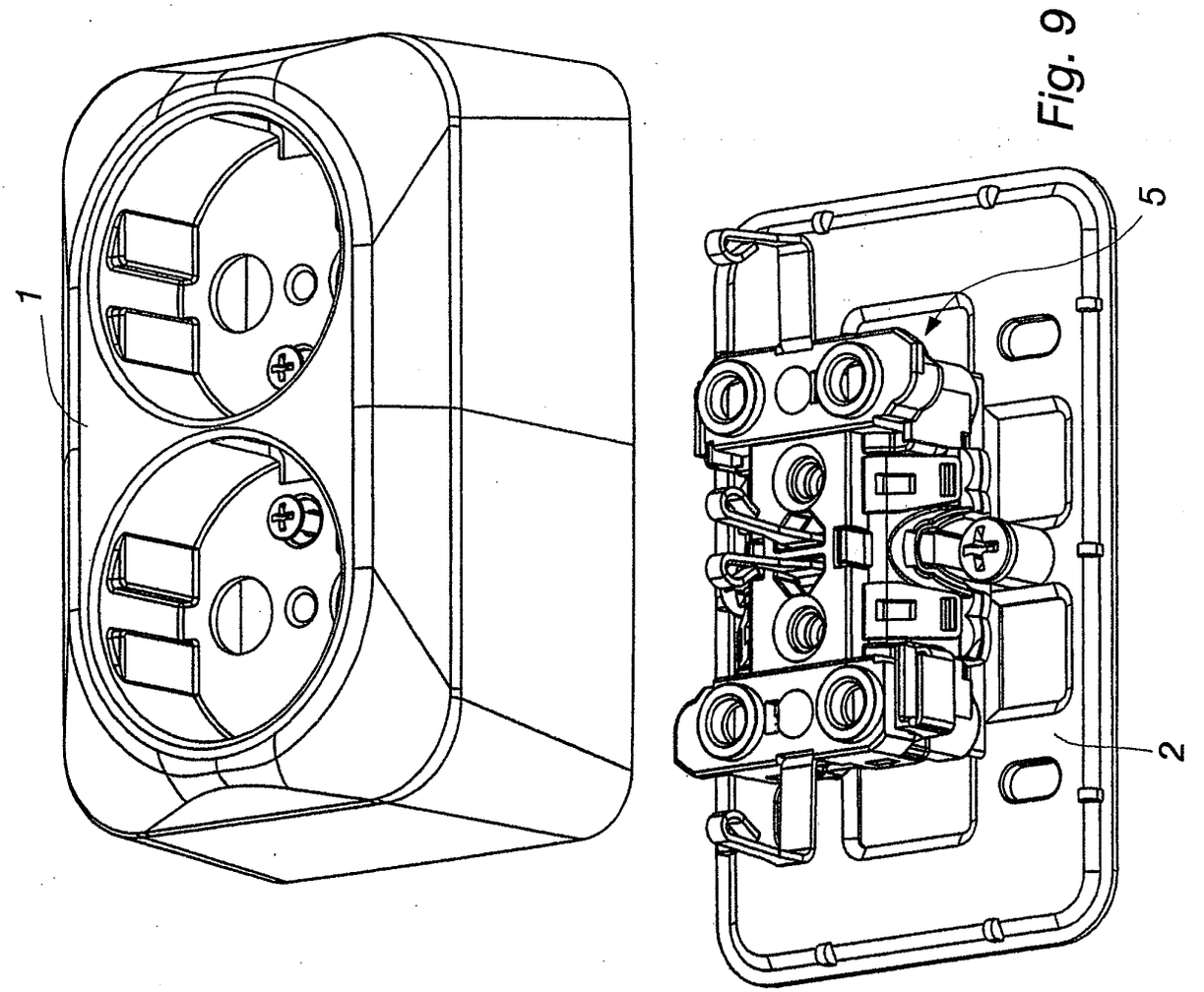

Fig. 9

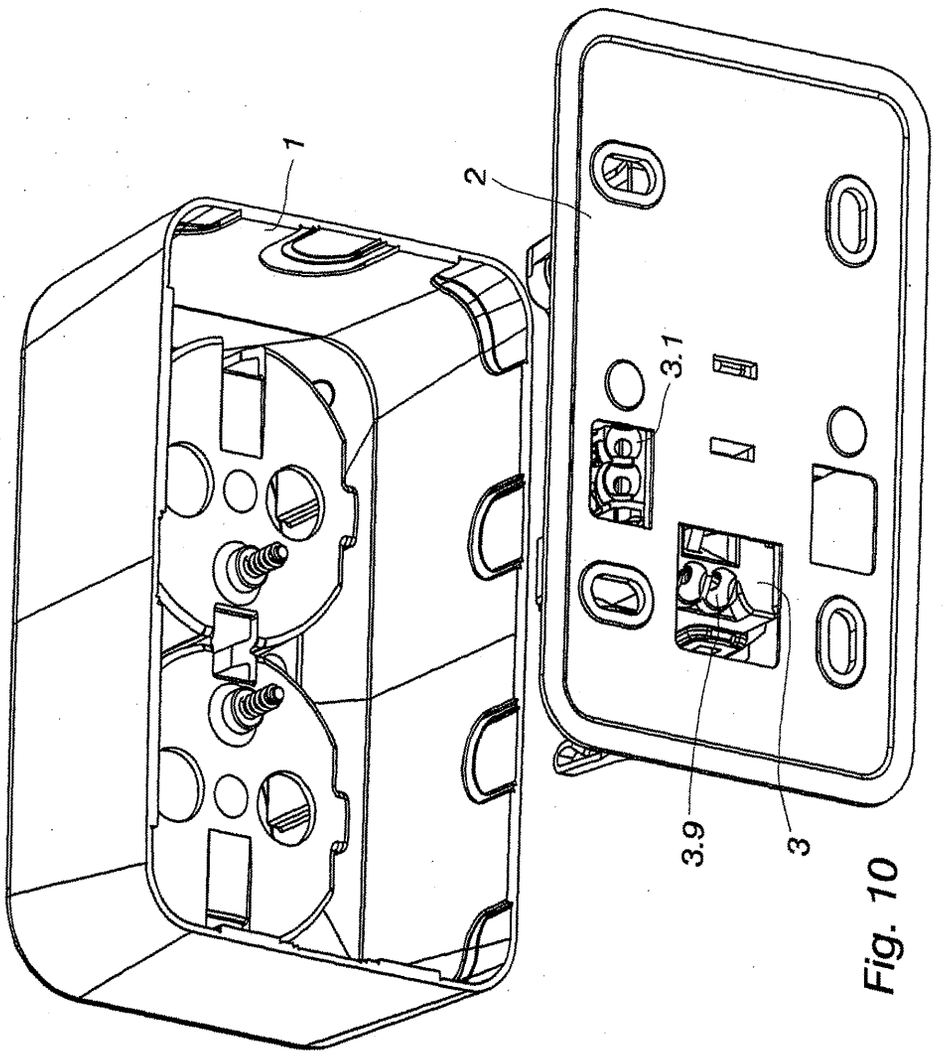

Fig. 10

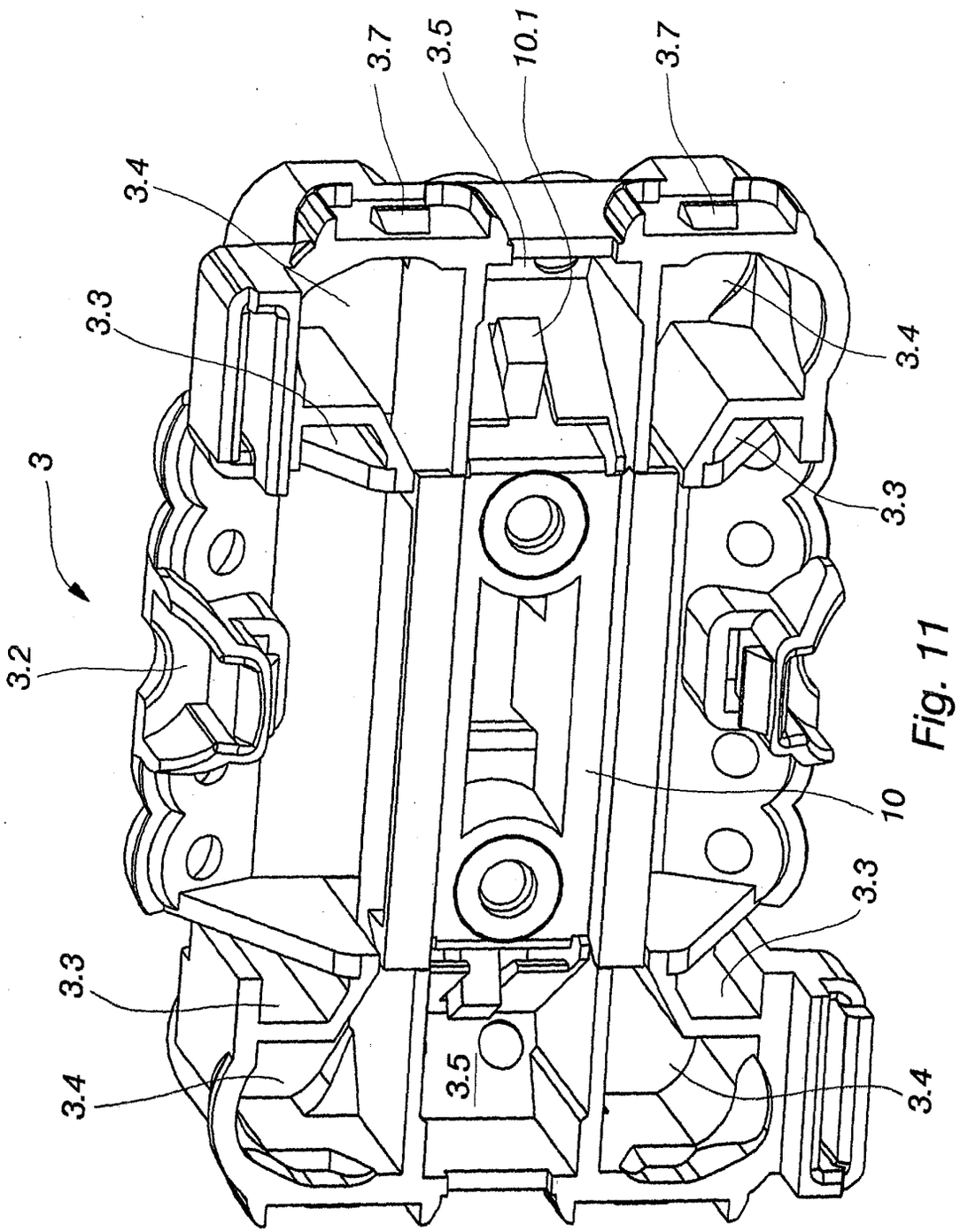

Fig. 11

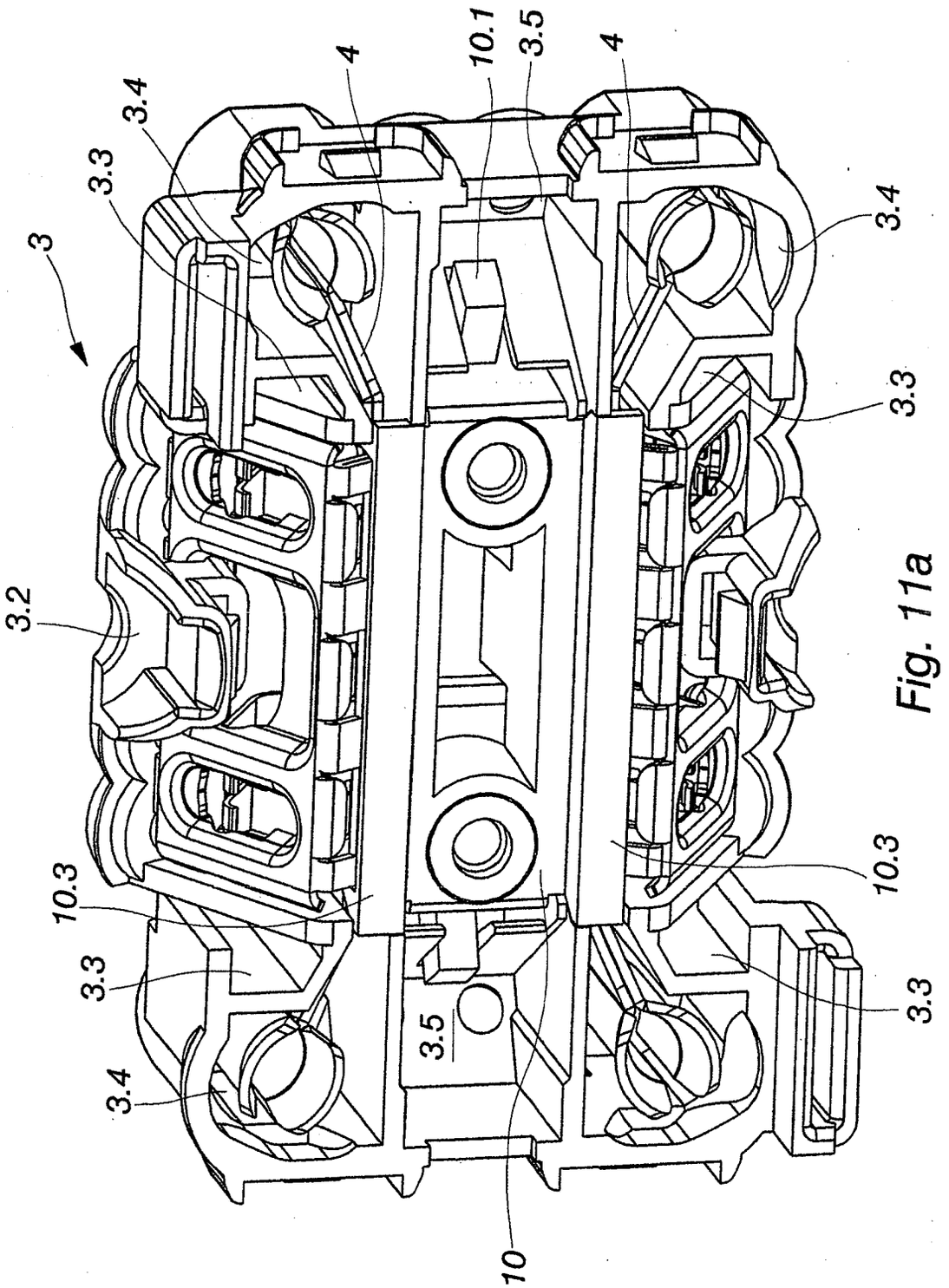

Fig. 11a

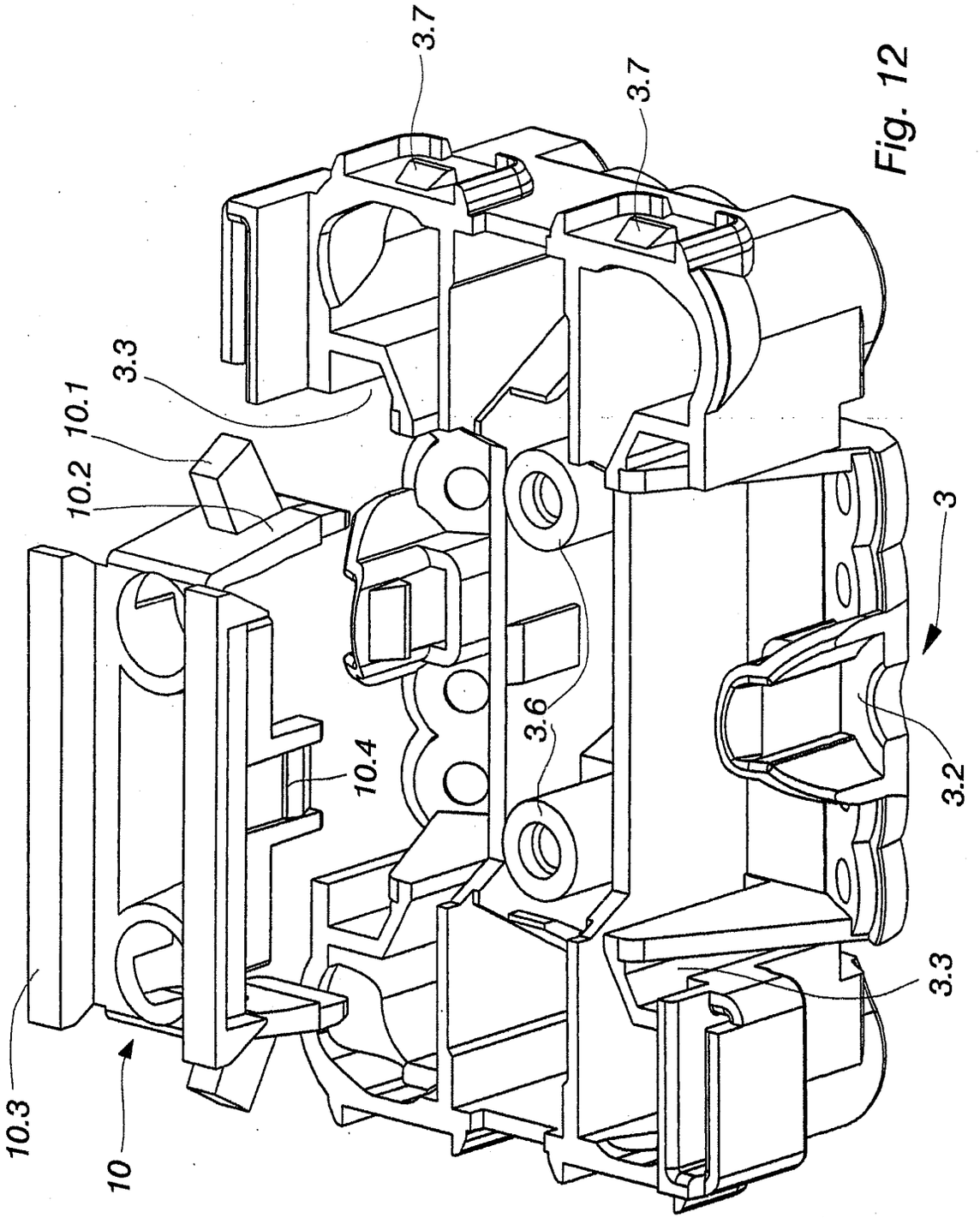

Fig. 12

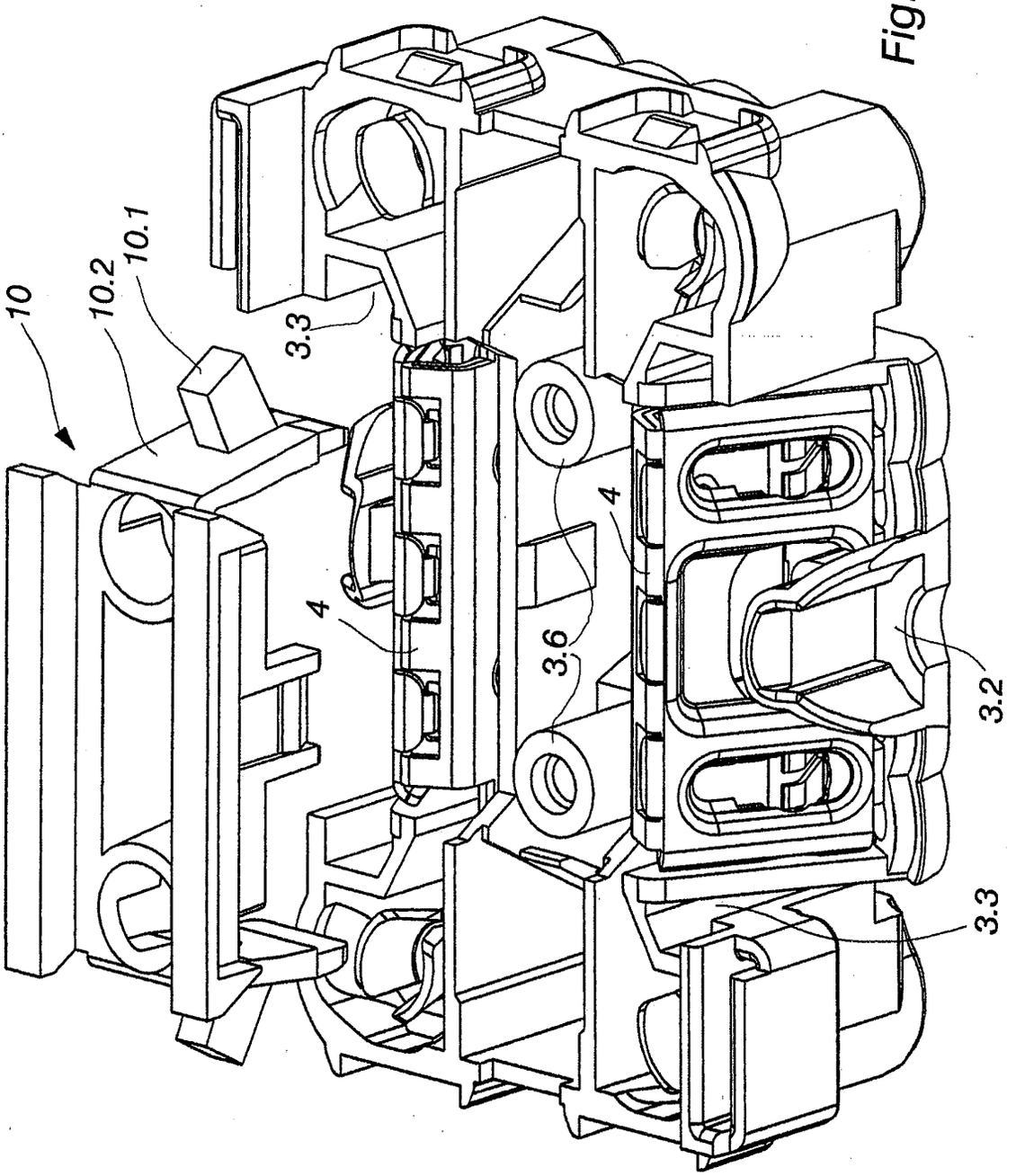

Fig. 12a

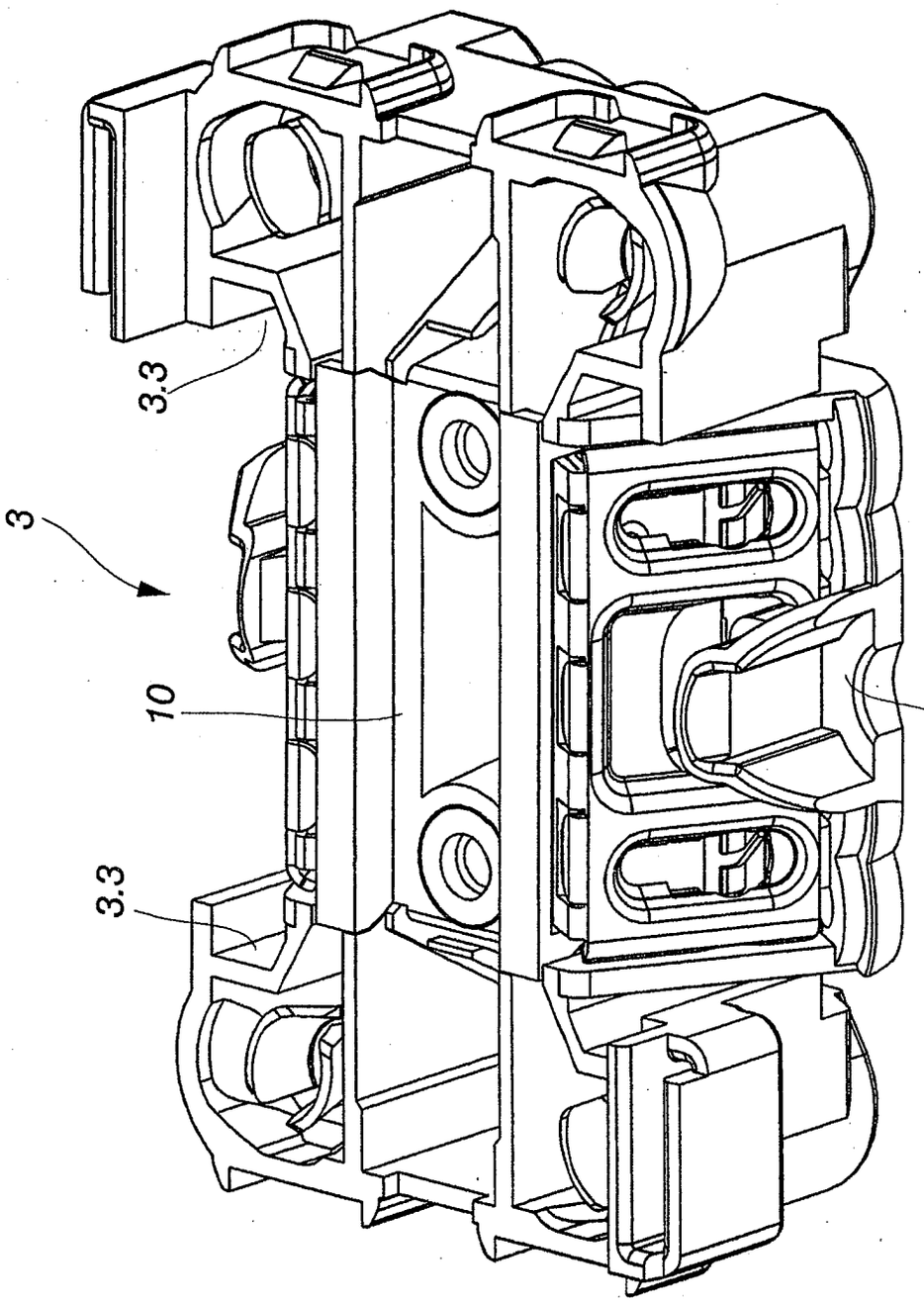

Fig. 13

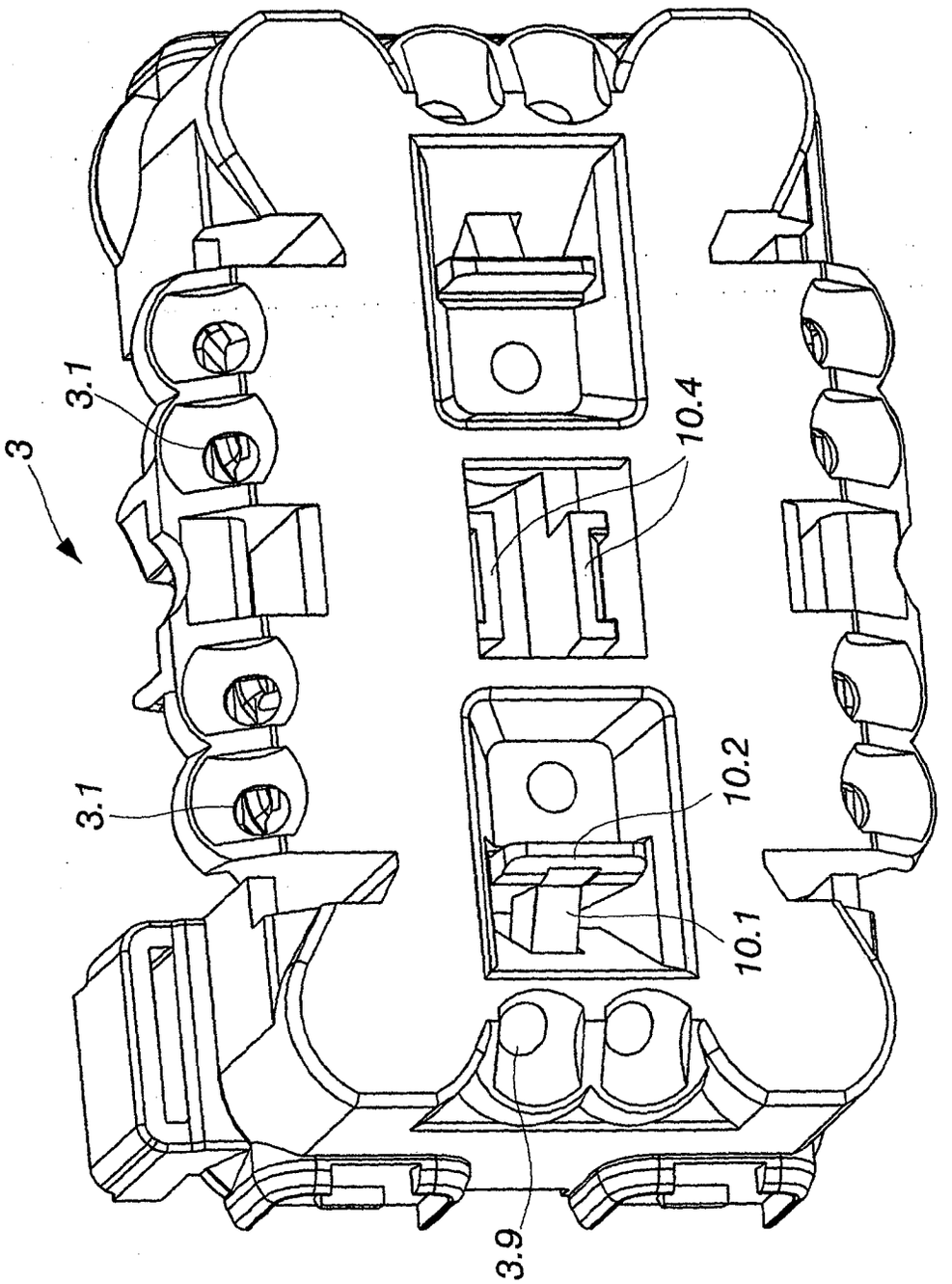

Fig. 14

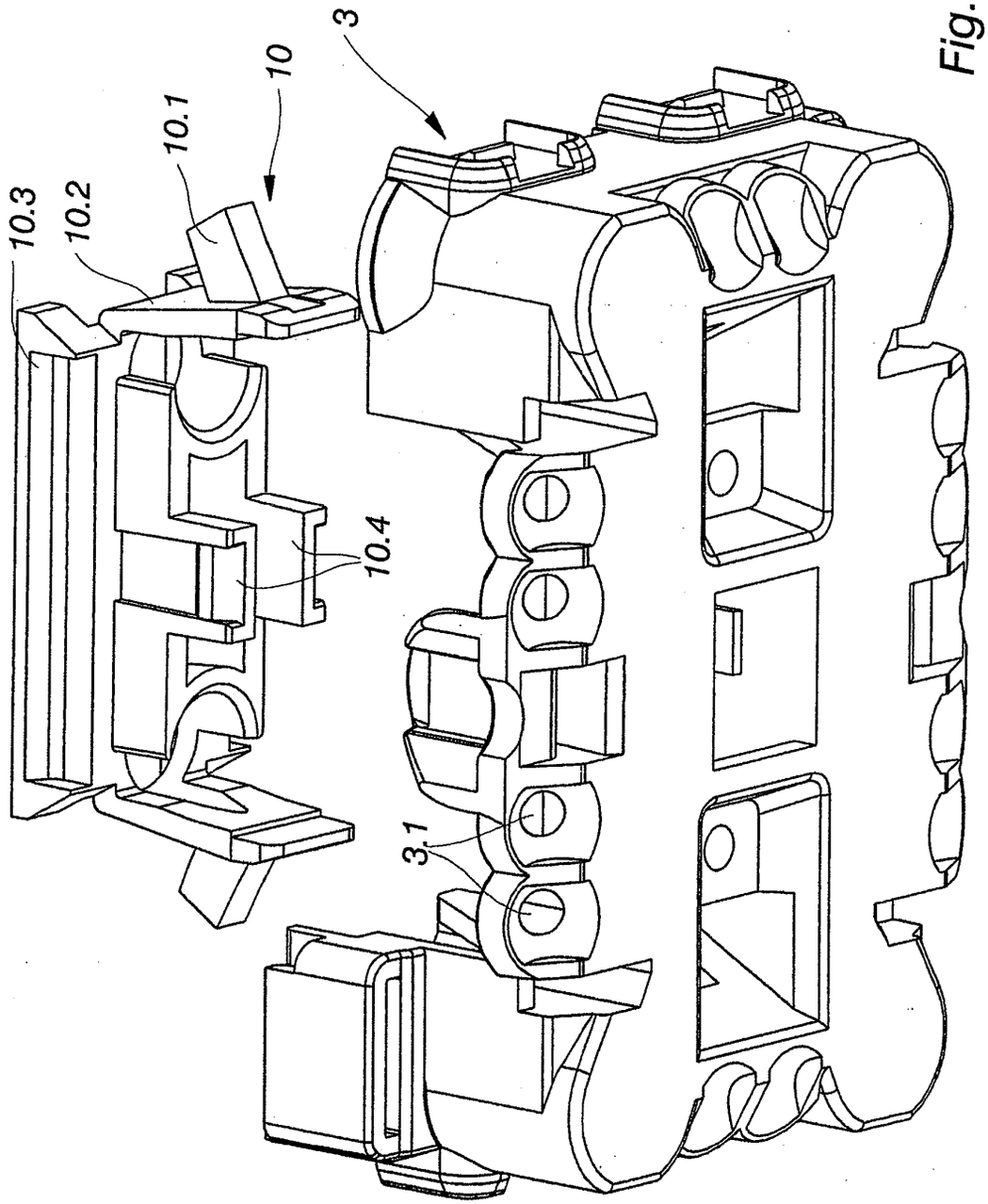

Fig. 14a

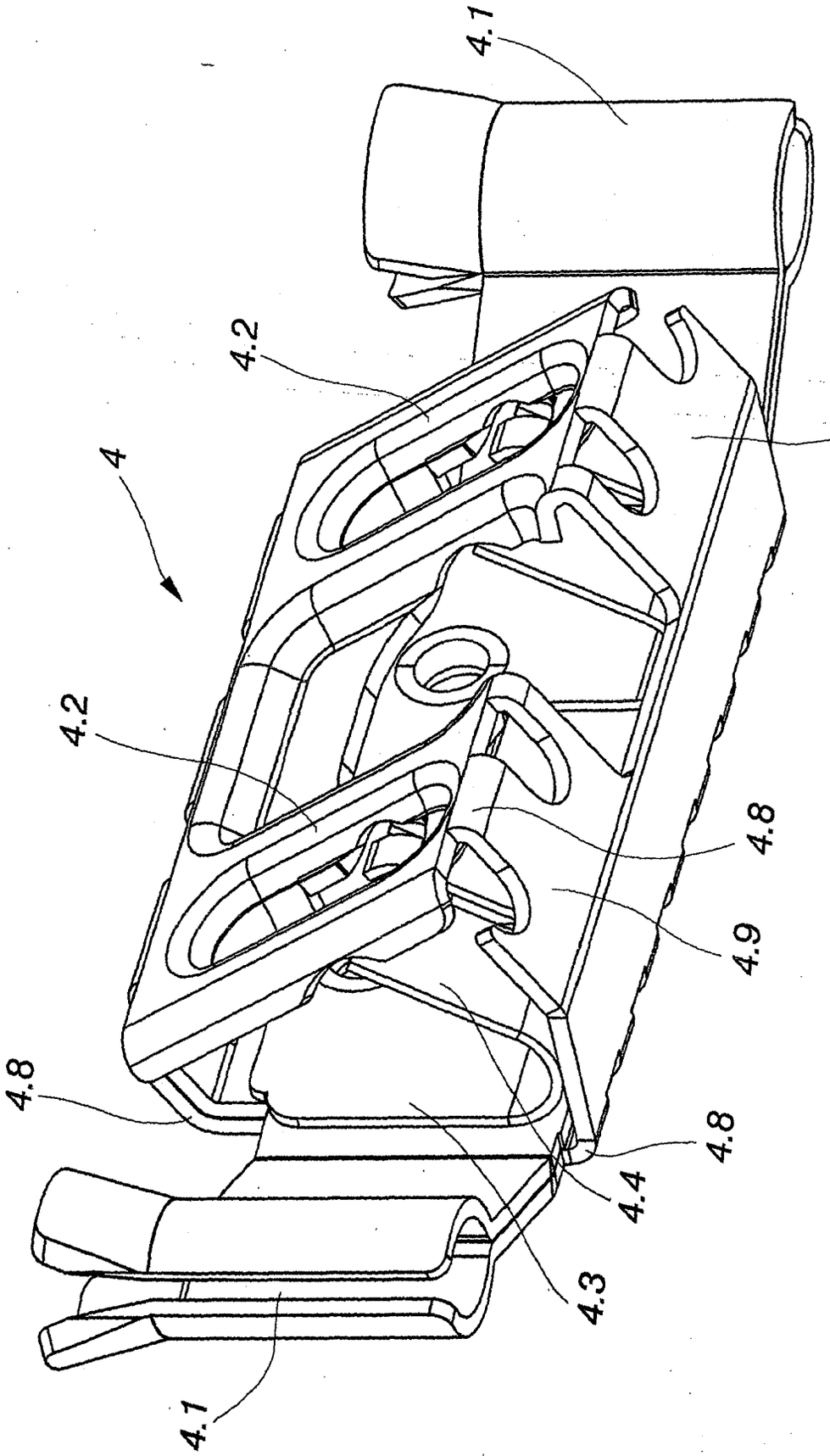

Fig. 15

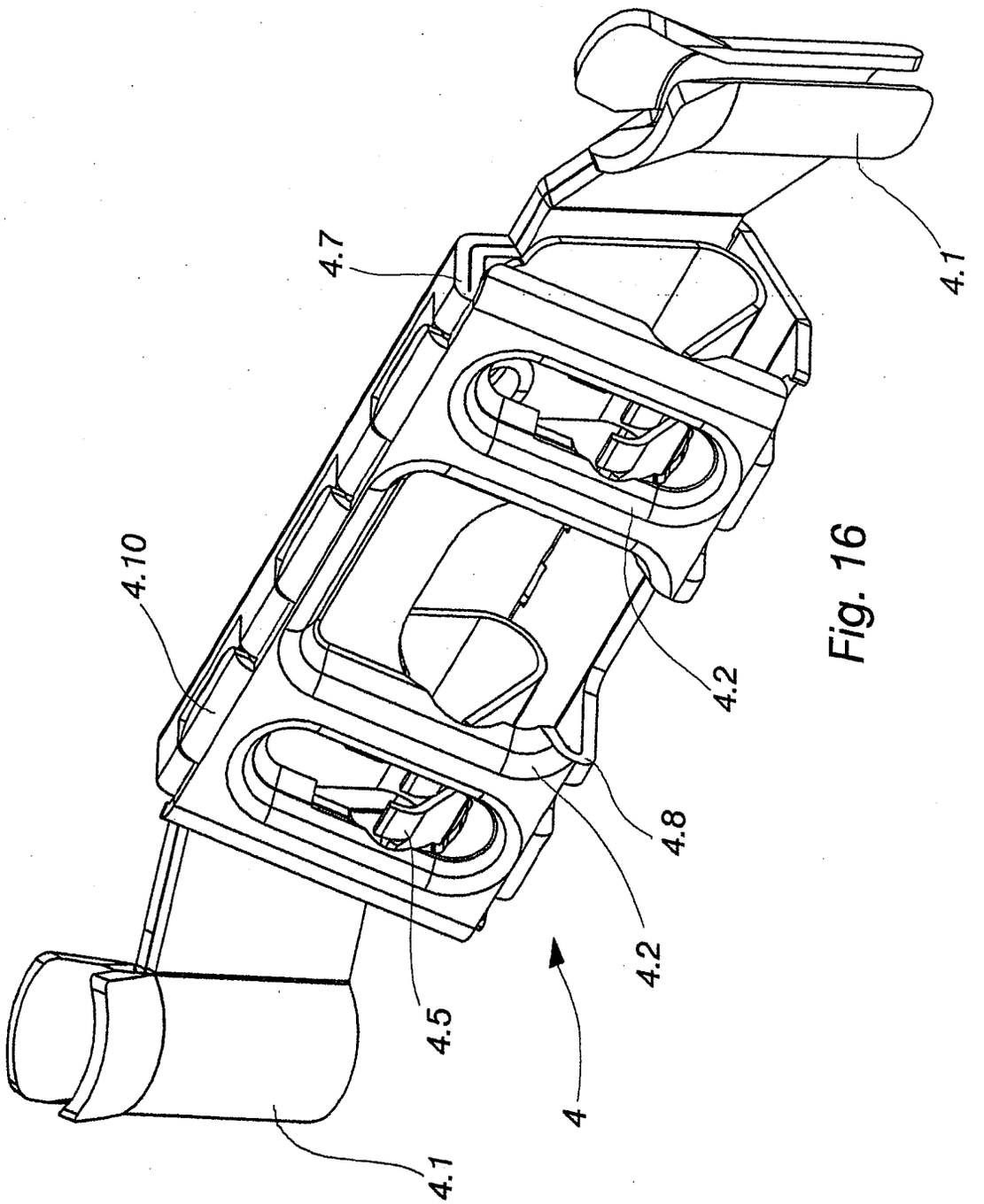

Fig. 16

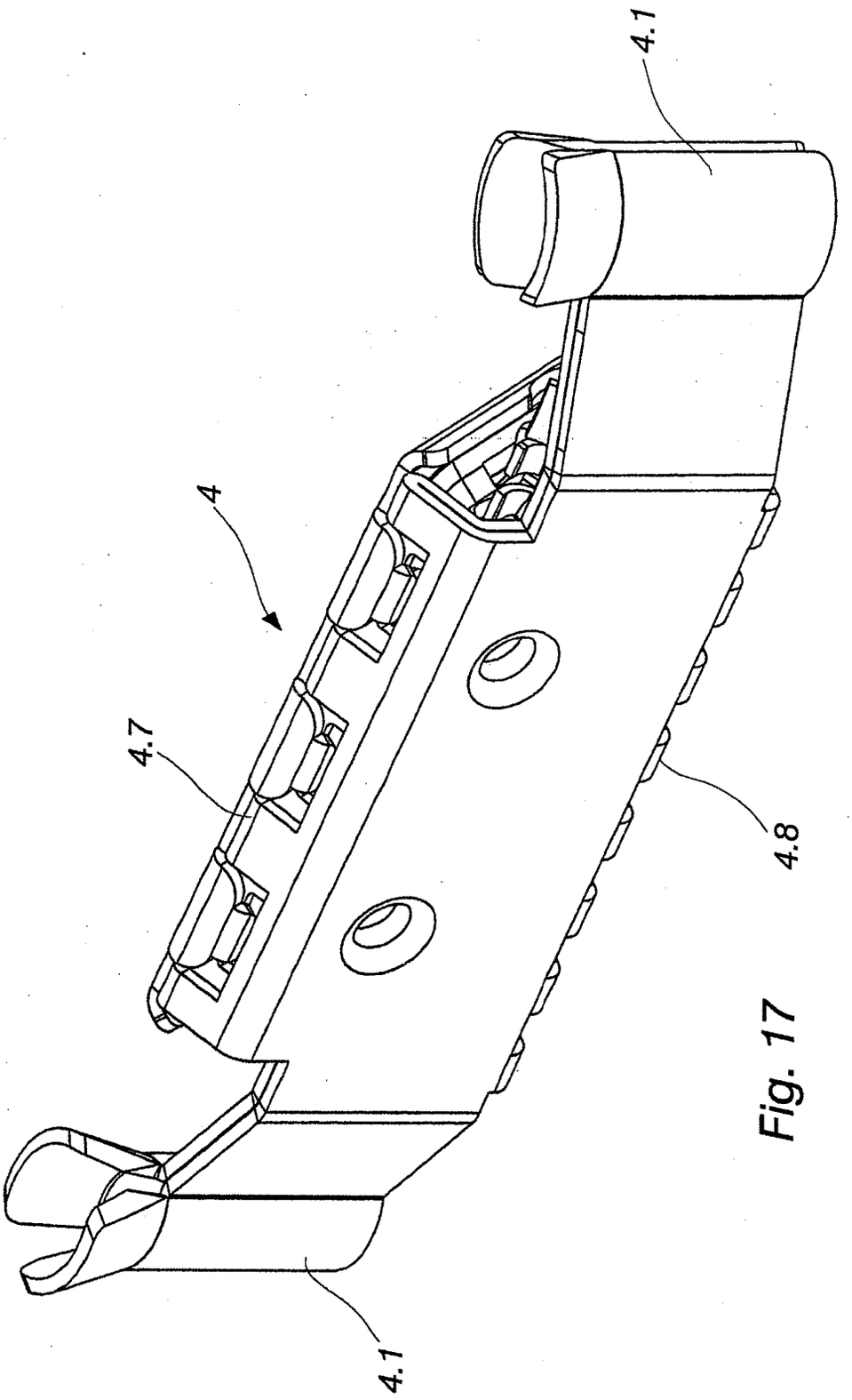

Fig. 17

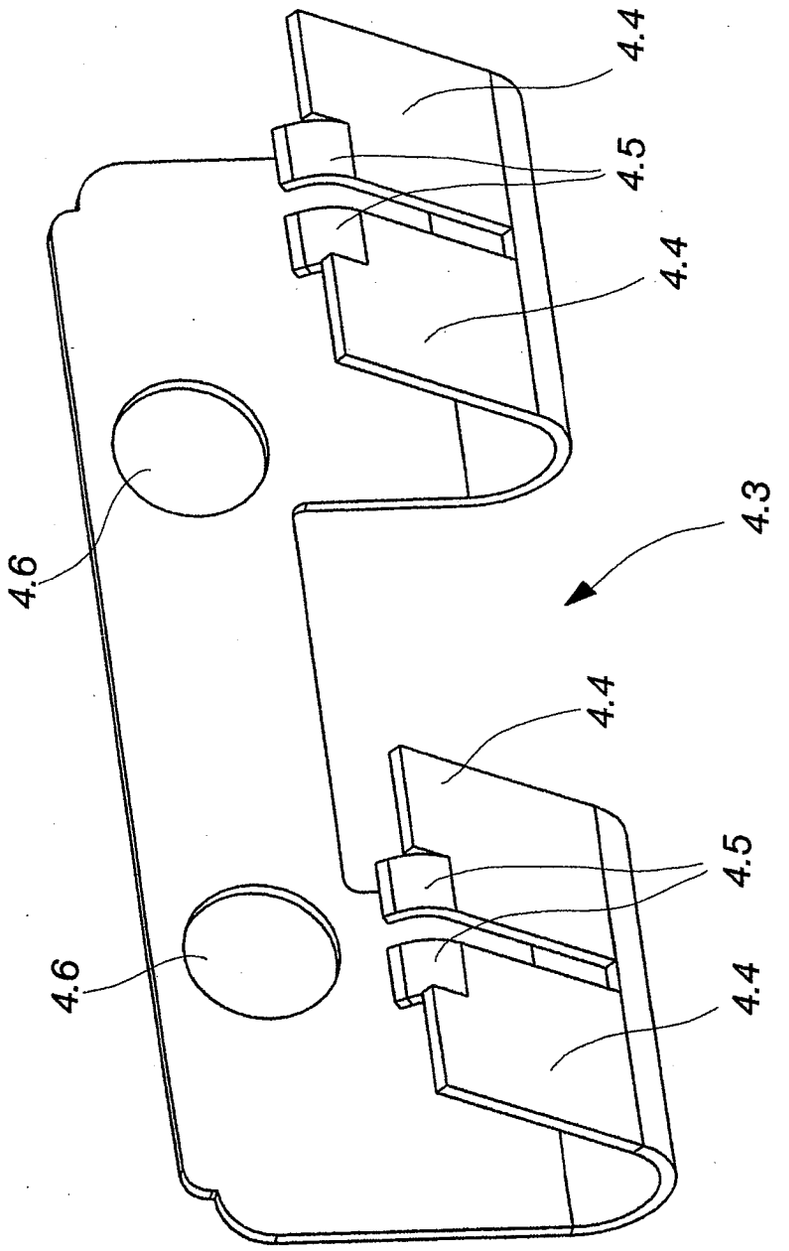

Fig. 18

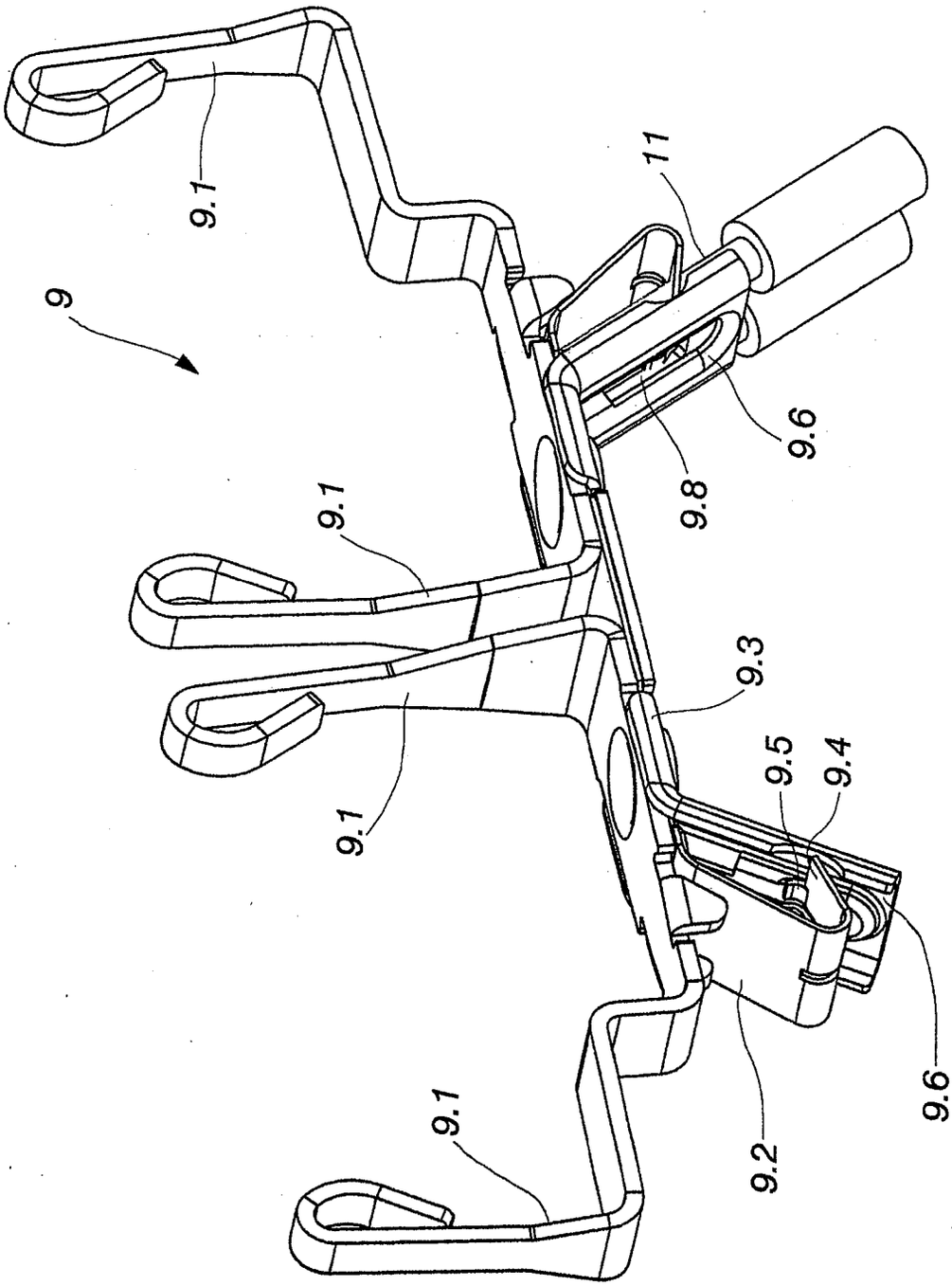

Fig. 19

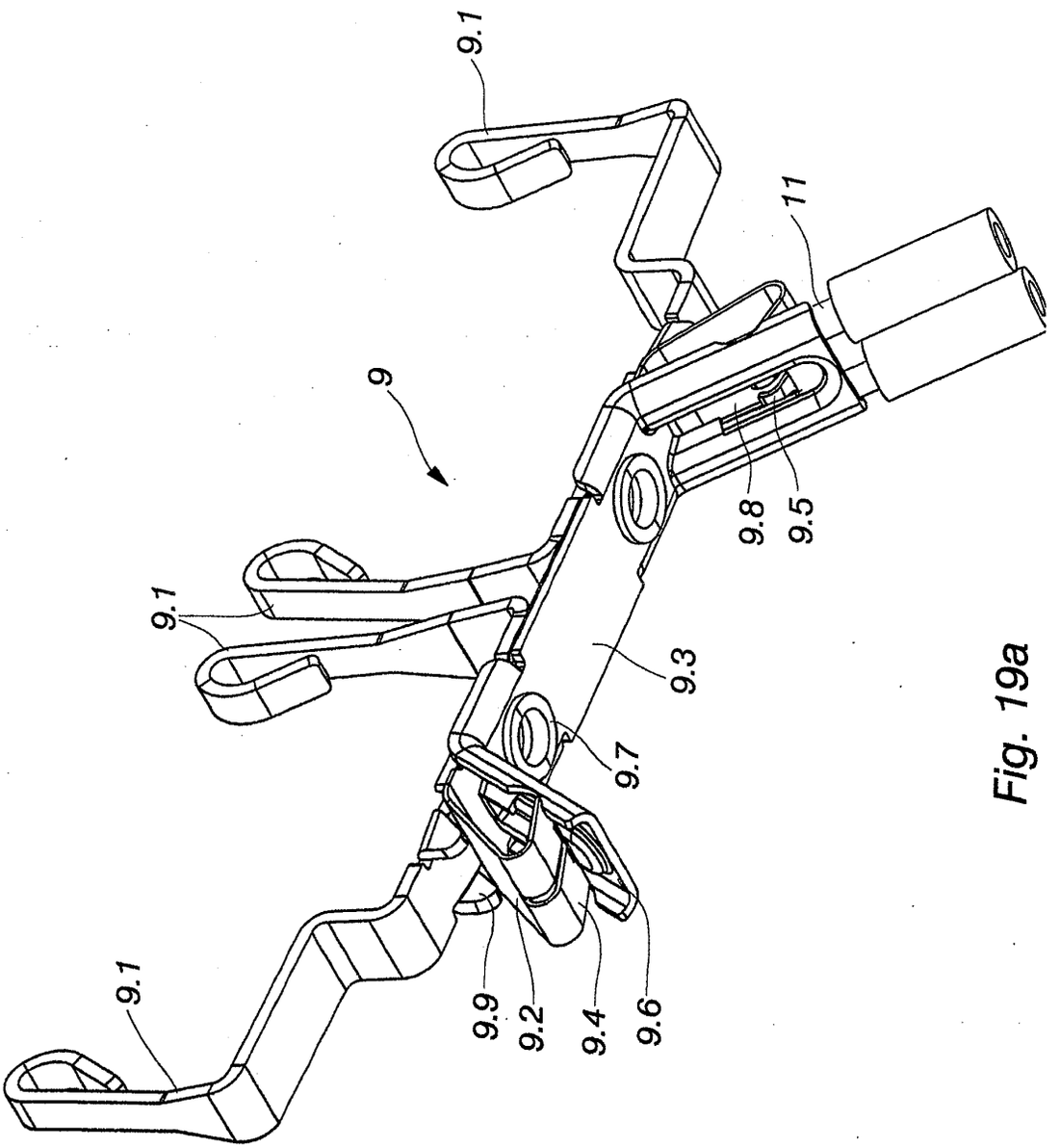

Fig. 19a

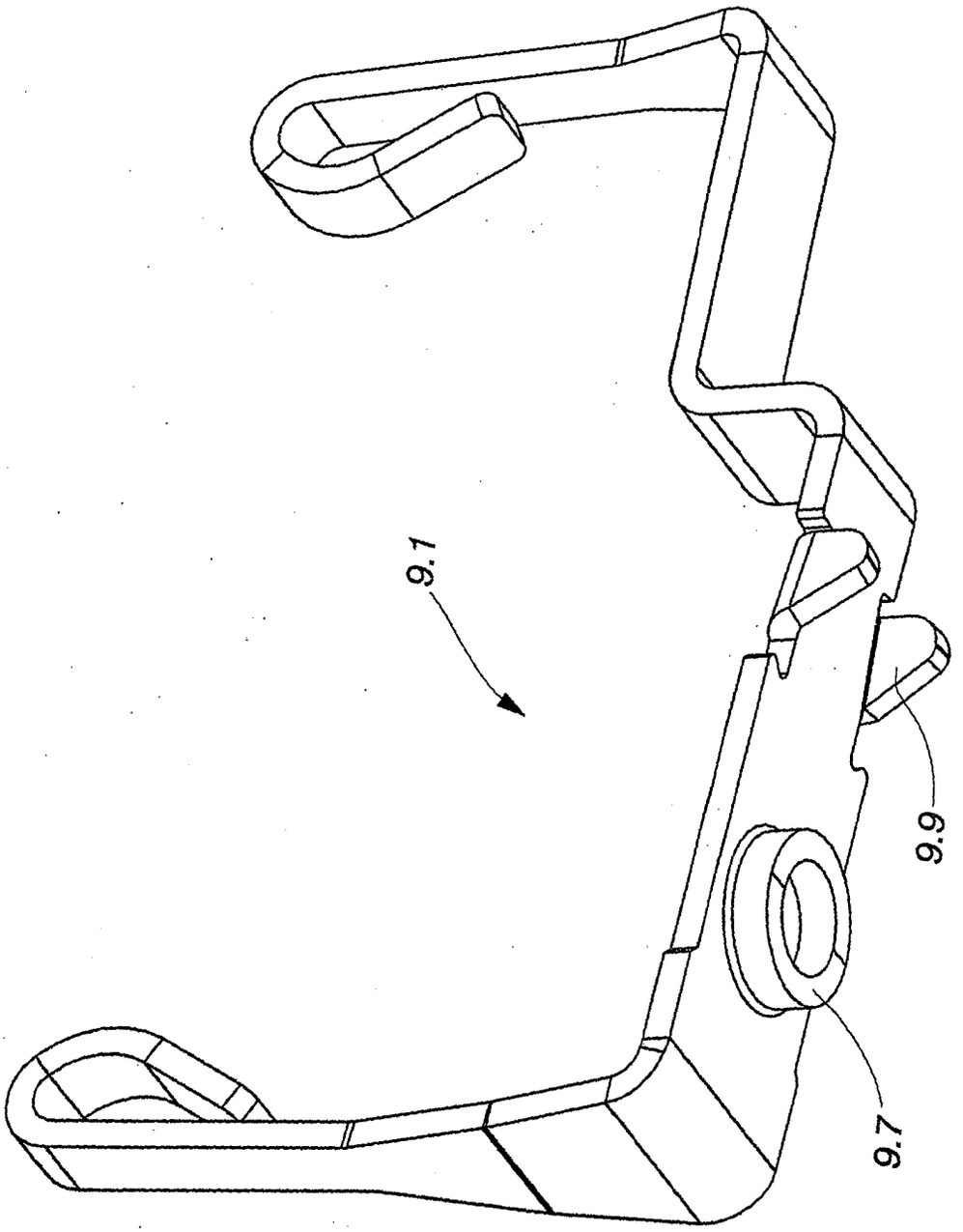

Fig. 20

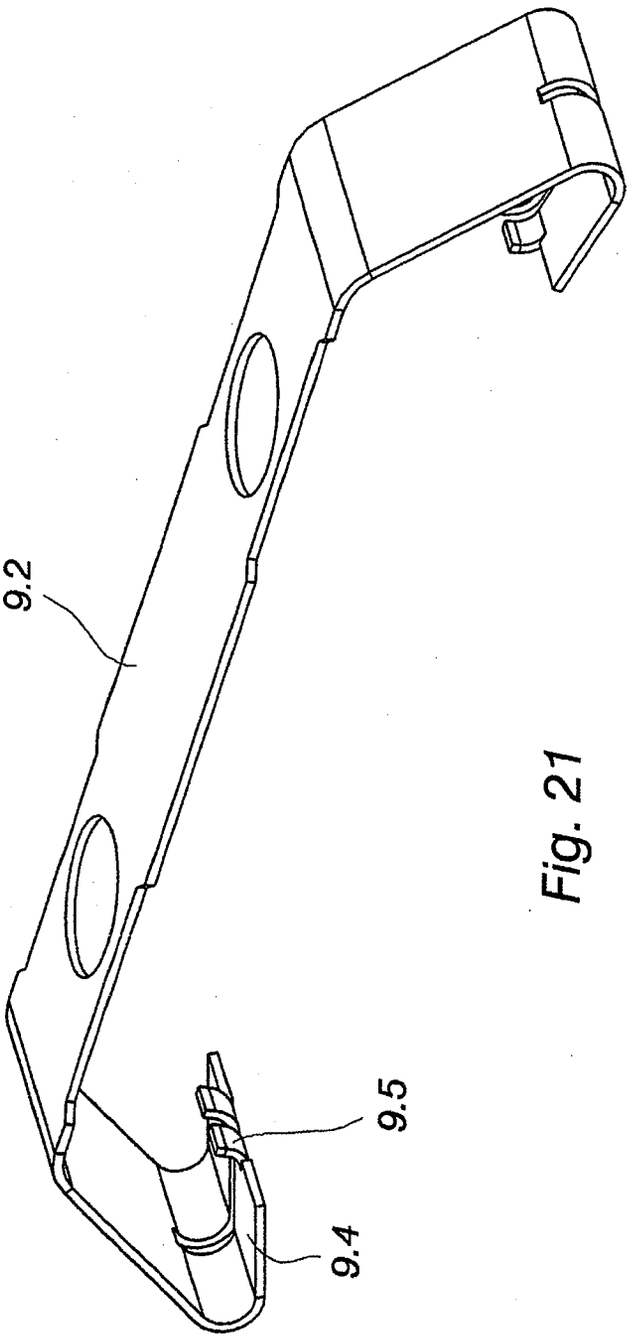

Fig. 21

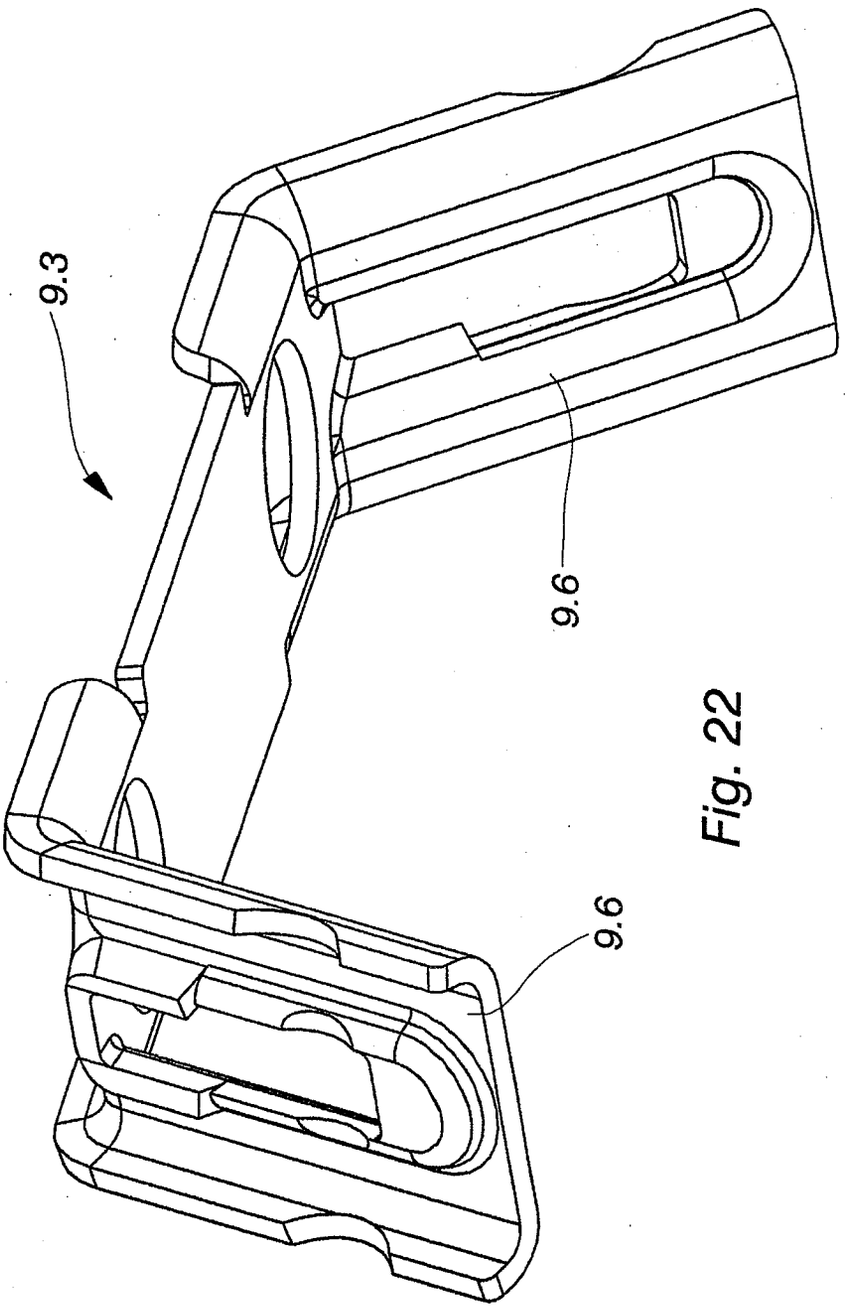

Fig. 22

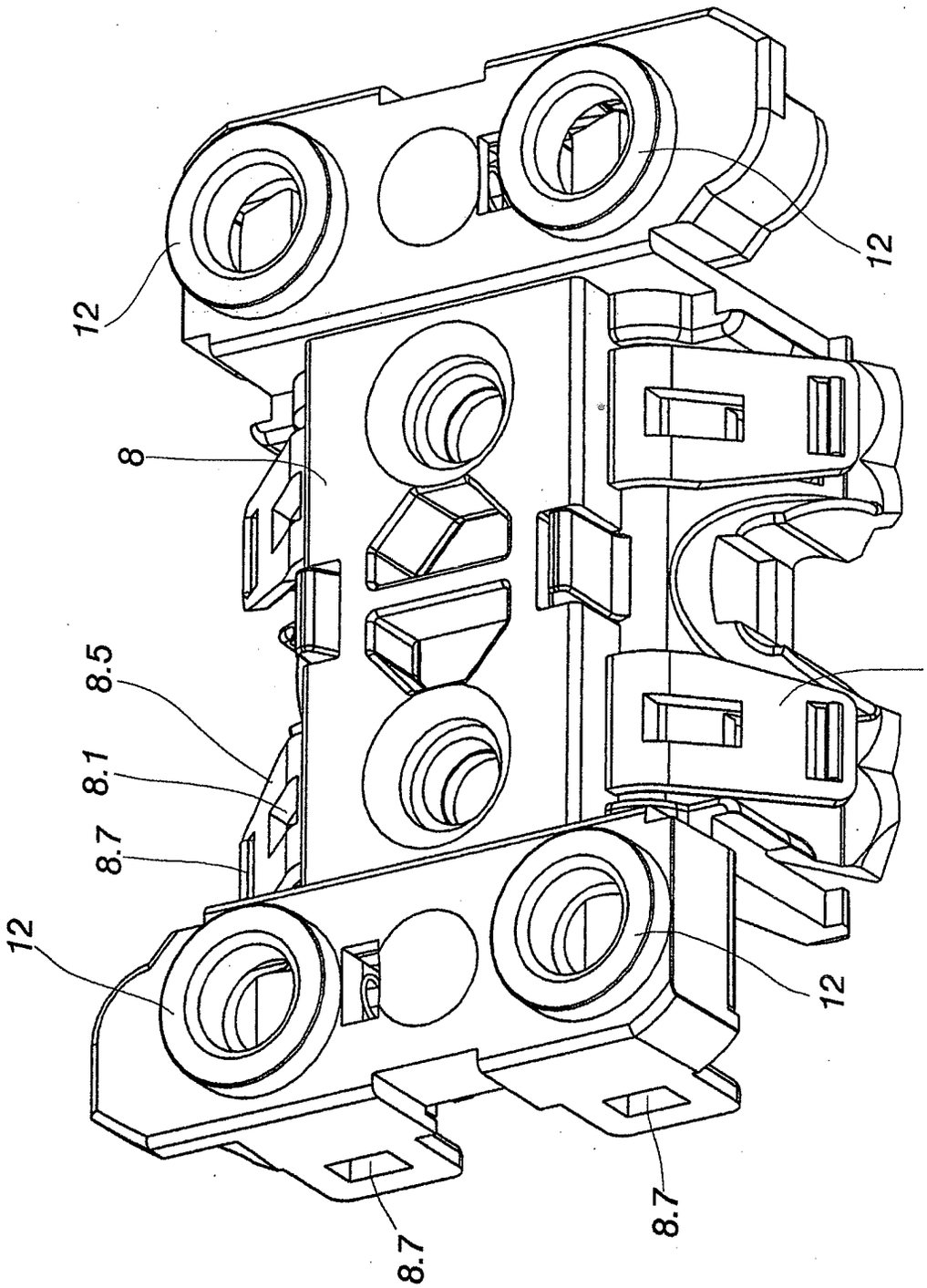

Fig. 23

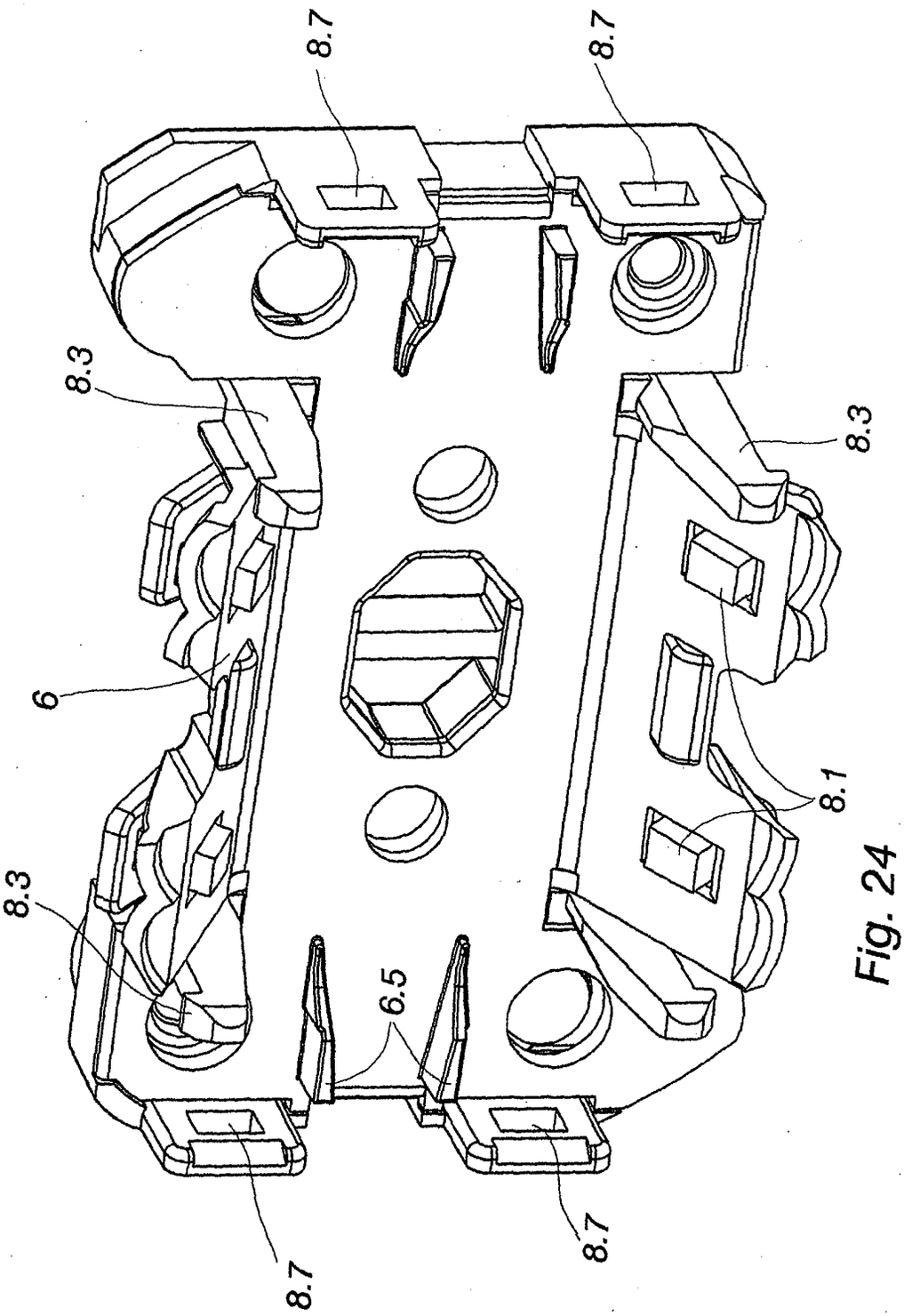

Fig. 24

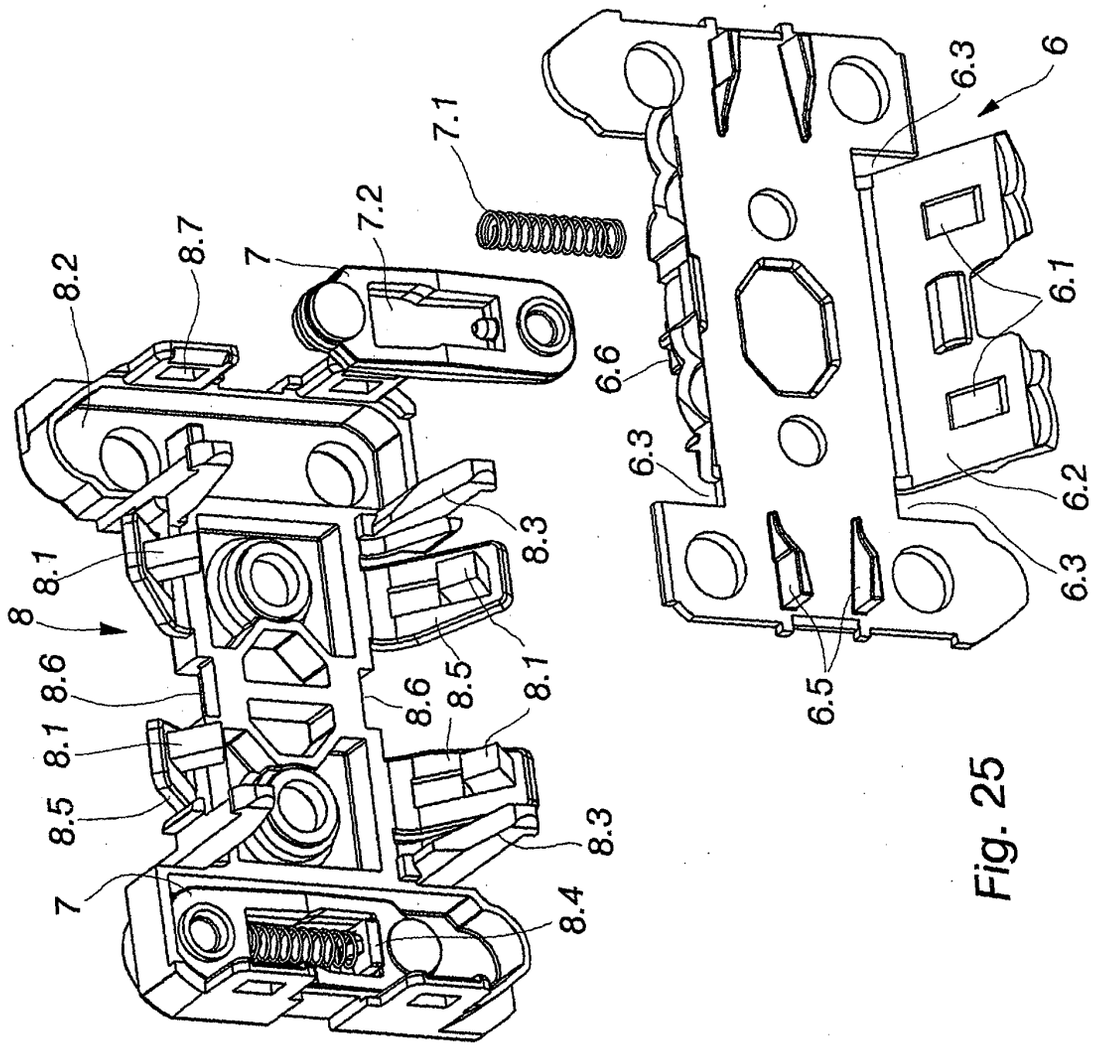

Fig. 25

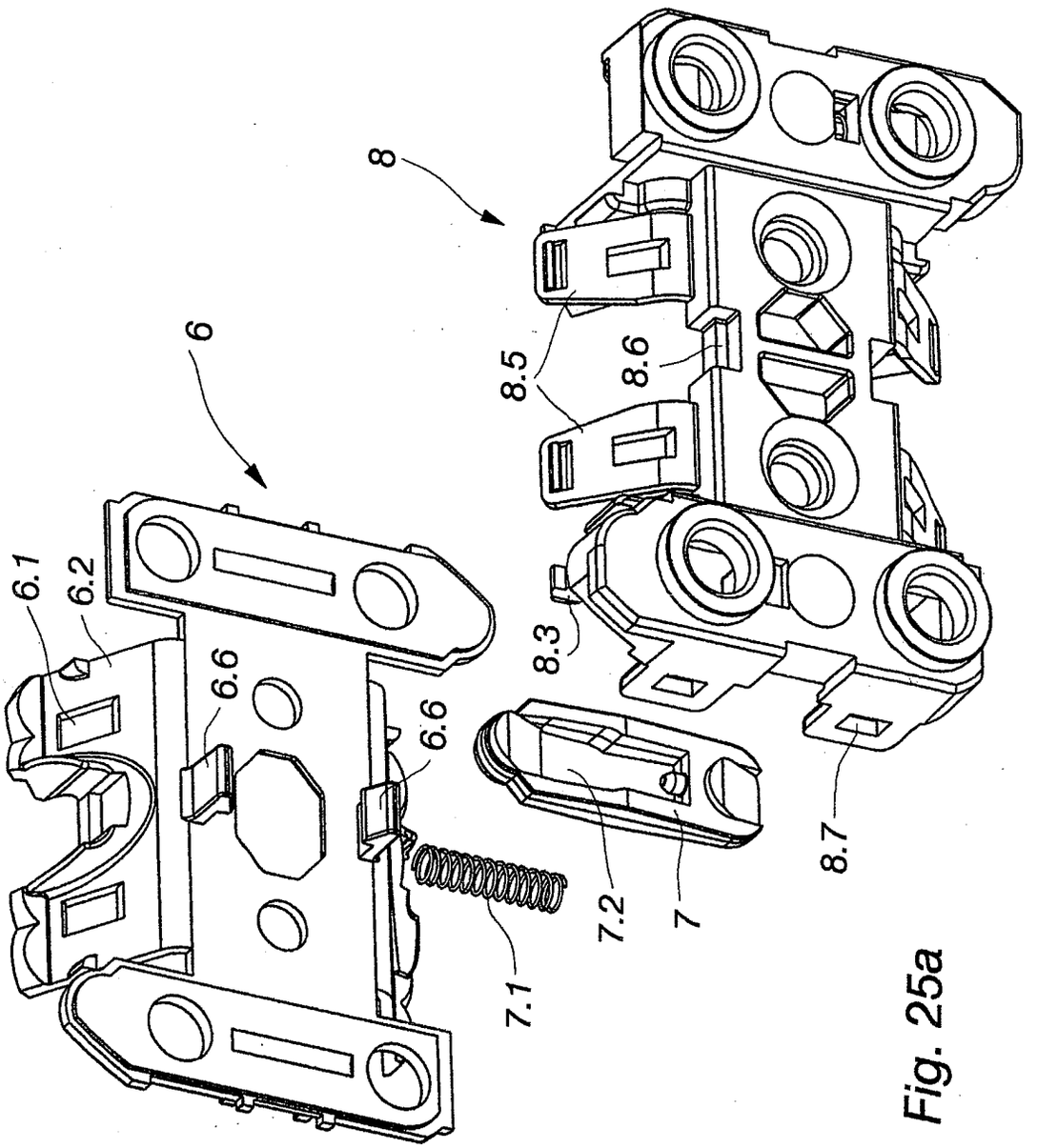

Fig. 25a

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Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 July 2004	Bertin, M

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