(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 458 217 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
06.11.2024 Bulletin 2024/45

(21) Application number: **24172002.8**

(22) Date of filing: **23.04.2024**

(51) International Patent Classification (IPC):
A47C 7/46 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A47C 7/462

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

(30) Priority: **05.05.2023 IT 202300008922**
30.01.2024 IT 202400001725

(71) Applicant: **Ivars S.p.A.**
25078 Vestone (BS) (IT)

(72) Inventor: **EBENESTELLI, Carlo**
25078 Vestone BS (IT)

(74) Representative: **Modiano, Micaela Nadia et al**
Modiano & Partners
Via Meravigli, 16
20123 Milano (IT)

(54) ADJUSTMENT DEVICE FOR A LUMBAR SUPPORT OF A BACKREST OF A CHAIR OR THE LIKE

(57) An adjustment device for a lumbar support (10) of a backrest (11) of a chair and the like, the backrest (11) comprising a supporting body (2) and at least one lumbar support (10) which is movable, with respect to the supporting body (2), along an adjustment direction (100) which is substantially horizontal and substantially perpendicular to the plane defined by the backrest (11), characterized in that it comprises an actuation element (12) which is movable, with respect to the supporting body (2), along a movement trajectory (101) which lies on a plane that is substantially perpendicular to the adjustment direction (100), between a first position and at least one second position and vice versa, kinematic connection means (20) being provided which act between the actuation element (12) and the lumbar support (10), the kinematic connection means (20) being configured to determine, as a result of the movement of the actuation element (12) between the first position and the at least one second position, a movement of the lumbar support (10) along the adjustment direction (100), the actuation element (12) comprising at least one element (13) which is movable by the user along the movement trajectory (101), the kinematic connection means (20) comprising at least one slider body (21) which is mounted so that it can slide along a guide (22) defined on the supporting body (2) and extending along a substantially vertical direction, the adjustment device (1) comprising, along the extension of the guide (22), a plurality of stop elements (23) which can be selectively engaged by at least one engagement body (24) supported by the slider body (21) in order to define respective locking positions of the slider body (21) along the guide (22) and, consequently, respective positions of the lumbar support (10) along the adjustment direction (100) with respect to the backrest (11).

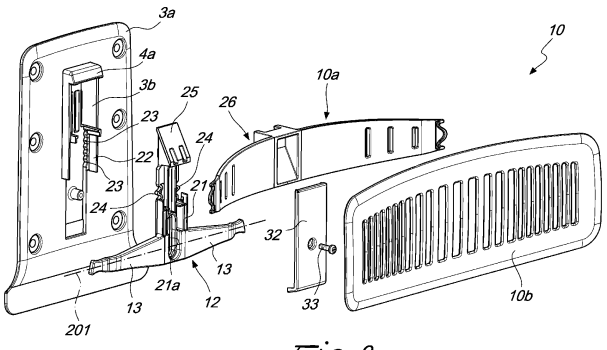

Fig. 9

EP 4 458 217 A1

Description

[0001] The present invention relates to an adjustment device for a lumbar support of a backrest of a chair and the like. More specifically, the invention relates to a device for adjusting the depth of the lumbar support of the backrest of a chair by means of an integrated mechanism.

[0002] As is known, chairs, for example office chairs, have backrests with lumbar supports, the position of which can be adjusted along a horizontal direction of approach/distancing with respect to the seat.

[0003] In this regard, on the market there are a great many systems of various different types which can offer such adjustment.

[0004] By way of example, devices are known for adjusting lumbar support systems made of plastic which make it possible to perform a depth adjustment using a complex screw-and-nut system, which are actuated manually by way of a rotating knob.

[0005] Such solutions are not very intuitive during normal use and they generate high costs for the equipment used to produce the necessary plastic injection molds.

[0006] The aim of the present invention is to provide an adjustment device for a lumbar support of the backrest of a chair and the like, which is made of a reduced number of components.

[0007] Within this aim, an object of the present invention is to provide an adjustment device for a lumbar support of a backrest of a chair and the like, which has a high simplicity of construction and in use is extremely intuitive.

[0008] Another object of the present invention is to provide an adjustment device for a lumbar support of the backrest of a chair and the like, which makes it possible to increase or decrease the compression of the lumbar region of the back by way of a tensioning system acting directly on the mesh or on the padded panel of the backrest of the chair.

[0009] Another object of the present invention is to provide an adjustment device for a lumbar support of the backrest of a chair and the like that is highly reliable, easily and practically implemented and at low cost.

[0010] A further object is to make available an adjustment device for a lumbar support of the backrest of a chair that is extremely reliable in its operation, and wherein there is no risk of accidental movements.

[0011] This aim and these and other objects which will become better apparent hereinafter are achieved by an adjustment device for a lumbar support of the backrest of a chair and the like, according to claim 1, optionally provided with one or more of the characteristics of the dependent claims.

[0012] Further characteristics and advantages of the invention will become better apparent from the description of a preferred, but not exclusive, embodiment of the device according to the present invention, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

Figure 1 is a perspective view of a backrest of a chair fitted with a device according to the present invention with the lumbar support in a first position;

Figure 2 is a view similar to the preceding view with the lumbar support in a second position;

Figure 3 is a front elevation view of the backrest with the lumbar support in the first position;

Figure 4 is a view similar to the preceding view with the lumbar support in the second position;

Figure 5 is a cross-sectional view of the backrest with the lumbar support in the first position, taken along the plane of arrangement identified by the line V-V of Figure 3;

Figure 6 is a cross-sectional view of the backrest with the lumbar support in the second position, taken along the plane of arrangement identified by the line VI-VI of Figure 4;

Figure 7 is a cross-sectional view of the backrest with the lumbar support in the first position, taken along the plane of arrangement identified by the line VII-VII of Figure 3;

Figure 8 is a cross-sectional view of the backrest with the lumbar support in the second position, taken along the plane of arrangement identified by the line VIII-VIII of Figure 4;

Figure 9 is an exploded view of the adjustment device according to the invention;

Figure 10 is a front elevation view of a portion of the adjustment device;

Figures 11 to 17 are cross-sectional views of another embodiment of the adjustment device, in the sequence of lifting the actuation element and, as a consequence, of moving the lumbar support along the adjustment direction;

Figure 18 is a perspective view of a portion of the adjustment device in which, for greater clarity, part of the closure housing and of the kinematic connection means has been omitted;

Figures 19 and 20 are enlarged-scale views of a region of Figure 18 with the means for locking the engagement body respectively in an inactive position and in an engaged position;

Figure 21 is a perspective view of another embodiment of the actuation element.

[0013] With reference to the figures, the device according to the present invention, generally designated by the reference number 1, comprises an adjustment device 1 for a lumbar support 10 of a backrest 11 of a chair and the like.

[0014] The backrest 11 comprises a supporting body 2 and at least one lumbar support 10, which is movable, with respect to the supporting body 2, along an adjustment direction 100 which is substantially horizontal and substantially perpendicular to the plane defined by the backrest 11.

[0015] In particular, the lumbar support 10 can be moved on command toward and away from the seat (not

shown) that is associated with the backrest 11.

[0016] According to the present invention, the adjustment device 1 comprises an actuation element 12, which is movable, with respect to the supporting body 2, along a movement trajectory 101.

[0017] Specifically, the movement trajectory 101 lies on a plane that is substantially perpendicular to the adjustment direction 100, between a first position and at least one second position and vice versa.

[0018] Kinematic connection means 20 are also provided which act between the actuation element 12 and the lumbar support 10.

[0019] The kinematic connection means 20 are configured to determine, as a result of the movement of the actuation element 12 between the first position and the at least one second position, a movement of the lumbar support 10 along the adjustment direction 100.

[0020] Advantageously, the actuation element 12 comprises at least one elongated element 13, which is movable by the user along the movement trajectory 101.

[0021] The kinematic connection means 20 comprise at least one slider body 21, which is mounted so that it can slide along a guide 22 defined on the supporting body 2 and extending along a substantially vertical direction.

[0022] The adjustment device 1 comprises, along the extension of the guide 22, a plurality of stop elements 23 which can be selectively engaged by at least one engagement body 24 supported by the slider body 21 in order to define respective locking positions of the slider body 21 along the guide 22 and, consequently, respective positions of the lumbar support 10 along the adjustment direction 100 with respect to the backrest 11.

[0023] With reference to the embodiment shown in Figures 1 to 10, along the guide 22 there are first and at least second stop elements 23 which cooperate with respective engagement bodies 24 defined on the slider body 21 for the corresponding locking of the slider body 21 with respect to the guide 22 at the first and at the at least one second position of the actuation element 12.

[0024] With reference to the embodiment shown in Figures 11 to 20, each one of the stop elements 23 comprises at least one lower abutment surface 23a which is adapted to be selectively engaged by a striking surface 24a which is defined on a respective engagement body 24.

[0025] Specifically, the upward-directed angle, indicated with the letter α, defined between the lower abutment surface 23a and the movement trajectory 101, is greater than or equal to 90° so as to oppose and block the downward movement of the respective engagement body 24 and therefore of the slider body 21.

[0026] Basically, the lower abutment surface 24a is perpendicular to the movement direction, or inclined upward (again with respect to the movement direction 101) in the direction of the engagement body 24.

[0027] Conveniently, the kinematic connection means 20 comprise at least one wedge-shaped body 25, which is integral with the slider body 21 and is arranged facing an abutment 26 which is integral with at least one portion 10a of the lumbar support 10.

[0028] The movement of the wedge-shaped body 25 along the respective guide 22 is adapted to produce a movement of the lumbar support 10 along the adjustment direction 100.

[0029] Preferably, the lumbar support 10 is associated with coupling means adapted to keep the abutment 26 resting against the wedge-shaped body 25.

[0030] For the purposes of example, the coupling means comprise an elongated body, shaped like a strip, which provides the portion 10a (located at the rear) of the lumbar support 10 and is arranged with its longitudinal extension transversely to the extension of the guide 22.

[0031] The free ends of the elongated body are coupled to respective coupling seats defined at a front portion 10b of the lumbar support 10.

[0032] The elongated body 10a is elastically flexible about an axis parallel to the guide 22, in order to produce a pushing action toward the wedge-shaped body 25.

[0033] The adjustment device 1 comprises, along the guide 22, a plurality of stop elements 23 which can be selectively engaged by respective engagement bodies 24 in order to define respective locking positions of the slider body 21 along the guide 22 and, consequently, respective positions of the lumbar support 10 along the adjustment direction 100 with respect to the backrest 11.

[0034] With reference to the embodiment shown in the figures, the at least one elongated body 13 is integral with the slider body 21 and extends along a direction of extension 201 that is substantially perpendicular with respect to the extension of the guide 22.

[0035] Conveniently, the movement trajectory of the elongated body or bodies 13 comprises a substantially straight trajectory which extends along the vertical direction.

[0036] Preferably, the adjustment device 1 has two elongated bodies 13, arranged on opposite sides with respect to the direction of extension of the slider body 21 so as to allow the user to intervene both with the right hand and, optionally, with the left hand.

[0037] As illustrated in the embodiment of Figure 21, the elongated body or bodies 13 can extend along a vertical direction, and therefore substantially parallel to the movement direction 101.

[0038] Conveniently, the movement trajectory 101 of the actuation element 12 is substantially parallel to the direction of extension of the guide 22.

[0039] Alternatively, it is possible for the elongated body 13 to be supported so that it can rotate by the supporting body 2: in this case, the kinematic connection means 20 must be configured to convert the rotary motion of the elongated body 13 to a translation motion of the slider body 21 along the guide 22.

[0040] The adjustment device 1 is provided, between the supporting body 2 and the elongated body 10a, with sliding guides 4a which extend along a direction that is substantially parallel to the adjustment direction 100.

[0041] With reference to Figures 9 and 10, the supporting body 2 comprises a plate 3a which has a groove 3b which defines the guide 22 for the slider body 21.

[0042] The slider body 21 in turn defines a slot 21a which extends parallel to the direction of extension of the guide 22.

[0043] A closure housing 3c is also provided, which can be detachably associated with the plate 3a on the opposite side with respect to the slider body 21.

[0044] Between the plate 3a and the closure housing 3c a guide pin 3d is provided which passes through the slot 21a.

[0045] With reference to the embodiment shown in Figures 9 and 10, respective elongated elements are arranged on opposite sides with respect to the guide 22, and each one defines the plurality of stop elements 23.

[0046] The elongated elements are loaded elastically toward the slider body 21 in order to keep the engagement body 24 locked in the respective stop element 23, in each one of the above-mentioned positions.

[0047] With reference to the embodiment shown in Figures 11 to 17, the stop elements 23 are defined by teeth 31 which are directed upward and are defined at a respective toothing 30.

[0048] In this case, the at least one engagement body 24 is supported by an interconnection component 40, which defines the slider body 21, and is associated with elastic loading means 41 in order to selectively engage, in sequence, during the movement of the slider body 21 upward along the movement trajectory 102, with the above-mentioned stop elements 23.

[0049] Advantageously, in contrast with the action of the elastic loading means 41, means are provided for locking the engagement body 24 in an inactive position.

[0050] In this inactive position, shown in the cross-section of Figure 17, the engagement body 24 is kept, with respect to the toothing 30, in such a position as not to interfere with the toothing 30, so as to allow the downward movement of the slider body 21.

[0051] In particular, at the upper end 30a of the toothing 30, first guide means 50 are configured to bring, following the movement of the slider body 21 upward, the engagement body 24 to the inactive position, in so doing making a coupling portion 42 of the interconnection body 40 integral with a respective locking element 43 defined on the slider body 21.

[0052] For the purposes of example, the coupling portion 42 comprises a through slit that passes through a portion of the interconnection body 40, while the locking element 43 comprises a projection that interferes with, and optionally engages by snap action with, the slit.

[0053] At the lower end 30b of the toothing 30, second guide means 51 are provided, which are configured to disengage, following the movement downward of the slider body 21, the coupling portion 42 from the respective locking element 43.

[0054] With reference to the embodiment shown in Figures 11 to 17, the engagement body 24 is mounted so that it can rotate, with respect to the interconnection component 40, about an oscillation axis 200.

[0055] In this case, the elastic loading means 41 are associated with the interconnection component 40 in order to rotate the engagement body 24 toward the toothing 30 about the oscillation axis 200.

[0056] The elastic loading means can comprise an elastically deformable appendage of the interconnection body 40, with a pusher portion designed to press against a sliding surface defined on the supporting body so as to generate, on the remaining part of the interconnection body 40, a rotational torque (anticlockwise) about the oscillation axis 200 which tends to push the engagement body toward the toothing 30.

[0057] Basically, when the slider body is pushed upward along the movement trajectory 101 so that the engagement body 24 is brought above the upper stop element 23, a portion of the engagement body 24 intercepts the first guide means 50 which force, in contrast with the action of the elastic loading means 50, the rotation (clockwise) about the oscillation axis so as to bring the slit to lock onto the projection.

[0058] In this manner, the slider body 11 will be able to move freely downward along the movement trajectory 101 because the engagement body 24 is kept spaced apart from the toothing 30 until it reaches the lower end of the toothing 30.

[0059] Once this position is reached, the interconnection component 40 supported by the slider body 21 intercepts the second guide means 51, which exert a rotational torque (anticlockwise) about the oscillation axis 200 which is such as to produce the decoupling between the projection and the slit.

[0060] The operation of the adjustment device according to the present invention is as follows.

[0061] The user, by raising and lowering the elongated element 13, moves the slider body 21 upward and downward along the guide 22.

[0062] By virtue of the presence of the stop elements 23, arranged on opposite sides with respect to the guide 22, the user can lock the position of the elongated element 13 (and as a consequence of the slider body 21) in a plurality of positions, as many as there are stop elements 23 placed along the guide 22.

[0063] The controlled up and down movement of the slider body 21 produces a movement, along a vertical direction, of the wedge-shaped body 25.

[0064] By virtue of the coupling between the wedge-shaped body 25 and the abutment 26, the up and down movement of the slider body 21 is converted to a movement forward and backward, along the adjustment direction (horizontal) 100 of the lumbar support 10.

[0065] By virtue of the presence of the coupling means, and in particular of the portion 10a of the lumbar support 10, the abutment 26 always stays resting against the wedge-shaped body 25, so as to always ensure a transfer of the lifting and lowering movement to a horizontal movement of the lumbar support 10 along the adjustment di-

rection.

[0066] The particular shape structure of the stop elements 23, and specifically the fact that the lower abutment surface 23a forms an upward-directed angle that is greater than or equal to 90° with the vertical, enables an extremely stable support, preventing a pressure applied by the user against the lumbar support 10 from producing a disengagement between the engagement body 24 and the respective stop element 23 and the consequent lowering of the slider body 21.

[0067] The device thus described is conveniently made of plastic material, therefore without the use of sheet metal and springs, and is made of a limited number of component elements.

[0068] In practice it has been found that the adjustment device for the lumbar support of the backrest of a chair according to the present invention fully achieves the set aim and objects, in that it is made of a reduced number of components and it is made of plastic material, to the advantage of simplicity of construction and reliability of operation, as well as of reduction of noise during operation of the device.

[0069] The device thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0070] Moreover, all the details may be substituted by other, technically equivalent elements.

[0071] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to the requirements and to the state of the art.

[0072] The disclosures in Italian Patent Applications no. 102023000008922 and no. 102024000001725 from which this application claims priority are incorporated herein by reference.

[0073] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An adjustment device (1) for a lumbar support (10) of a backrest (11) of a chair and the like, said backrest (11) comprising a supporting body (2) and at least one lumbar support (10) which is movable, with respect to said supporting body (2), along an adjustment direction (100) which is substantially horizontal and substantially perpendicular to the plane defined by said backrest (11), **characterized in that** it comprises an actuation element (12) which is movable, with respect to said supporting body (2), along a movement trajectory (101) which lies on a plane that is substantially perpendicular to said adjustment direction (100), between a first position and at least one second position and vice versa, kinematic connection means (20) being provided which act between said actuation element (12) and said lumbar support (10), said kinematic connection means (20) being configured to determine, as a result of the movement of said actuation element (12) between said first position and said at least one second position, a movement of said lumbar support (10) along said adjustment direction (100), said actuation element (12) comprising at least one element (13) which is movable by the user along said movement trajectory (101), said kinematic connection means (20) comprising at least one slider body (21) which is mounted so that it can slide along a guide (22) defined on said supporting body (2) and extending along a substantially vertical direction, said adjustment device (1) comprising, along the extension of said guide (22), a plurality of stop elements (23) which can be selectively engaged by at least one engagement body (24) supported by said slider body (21) in order to define respective locking positions of said slider body (21) along said guide (22) and, consequently, respective positions of said lumbar support (10) along said adjustment direction (100) with respect to said backrest (11).

2. The adjustment device (1) according to claim 1, **characterized in that** each one of said stop elements (23) comprises at least one lower abutment surface (23a) which is adapted to be selectively engaged by a striking surface (24a) which is defined on a respective engagement body (24), the upward-directed angle (α) defined between said lower abutment surface (23a) and said movement trajectory (101) being greater than or equal to 90° so as to oppose and block the downward movement of said respective engagement body (24).

3. The adjustment device (1) according to claim 2, **characterized in that** said kinematic connection means (20) comprise at least one wedge-shaped body (25) which is integral with said slider body (21) and is arranged so as to face an abutment (26) which is integral with at least one portion (10a) of said lumbar support (10), the movement of said wedge-shaped body (25) along the respective guide (22) being adapted to produce a movement of said lumbar support (10) along said adjustment direction (100).

4. The adjustment device (1) according to one or more of the preceding claims, **characterized in that** said lumbar support (10) is associated with coupling means adapted to keep said abutment (26) resting against said wedge-shaped body (25).

5. The adjustment device (1) according to one or more of the preceding claims, **characterized in that** said

coupling means comprise an elongated body which provides a portion (10a) of said lumbar support (10) and is arranged with its longitudinal extension transversely to the extension of said guide (22), the free ends of said elongated body being coupled to respective coupling seats defined at a front portion (10b) of said lumbar support (10), said elongated body being elastically flexible around an axis which is parallel to said guide (22) in order to produce a pushing action toward said wedge-shaped body (25).

6. The adjustment device (1) according to one or more of the preceding claims, **characterized in that** said stop elements (23) are defined by teeth (31) which are directed upward and are defined at a respective toothing (30).

7. The adjustment device (1) according to one or more of the preceding claims, **characterized in that** said at least one engagement body (24) is supported by an interconnection component (40) and is associated with elastic loading means (41) in order to selectively engage, in sequence, during the movement of said slider body (21) upward along said movement trajectory (102), with said stop elements (23).

8. The adjustment device (1) according to one or more of the preceding claims, **characterized in that** it comprises, in contrast with the action of said elastic loading means (41), means for locking said engagement body (24) in an inactive position wherein said engagement body (24) does not interfere with said toothing (30) so as to allow the downward movement of said slider body (21).

9. The adjustment device (1) according to one or more of the preceding claims, **characterized in that** it comprises, at the upper end (30a) of said toothing (30), first guide means (50) which are configured to bring, following the movement of said slider body (21) upward, said engagement body (24) to said inactive position, in so doing making a coupling portion (42) of said interconnection body (40) integral with a respective locking element (43) defined on said slider body (21), there being, at the lower end (30b) of said toothing (30), second guide means (51) which are configured to disengage, following the movement downward of said slider body (21), said coupling portion (42) from said locking element (43).

10. The adjustment device (1) according to one or more of the preceding claims, **characterized in that** said engagement body (24) can rotate, with respect to said interconnection component (40), about an oscillation axis (200), said elastic loading means (41) being associated with said interconnection component (40) in order to rotate said engagement body (24) toward said toothing (30) about said oscillation axis (200).

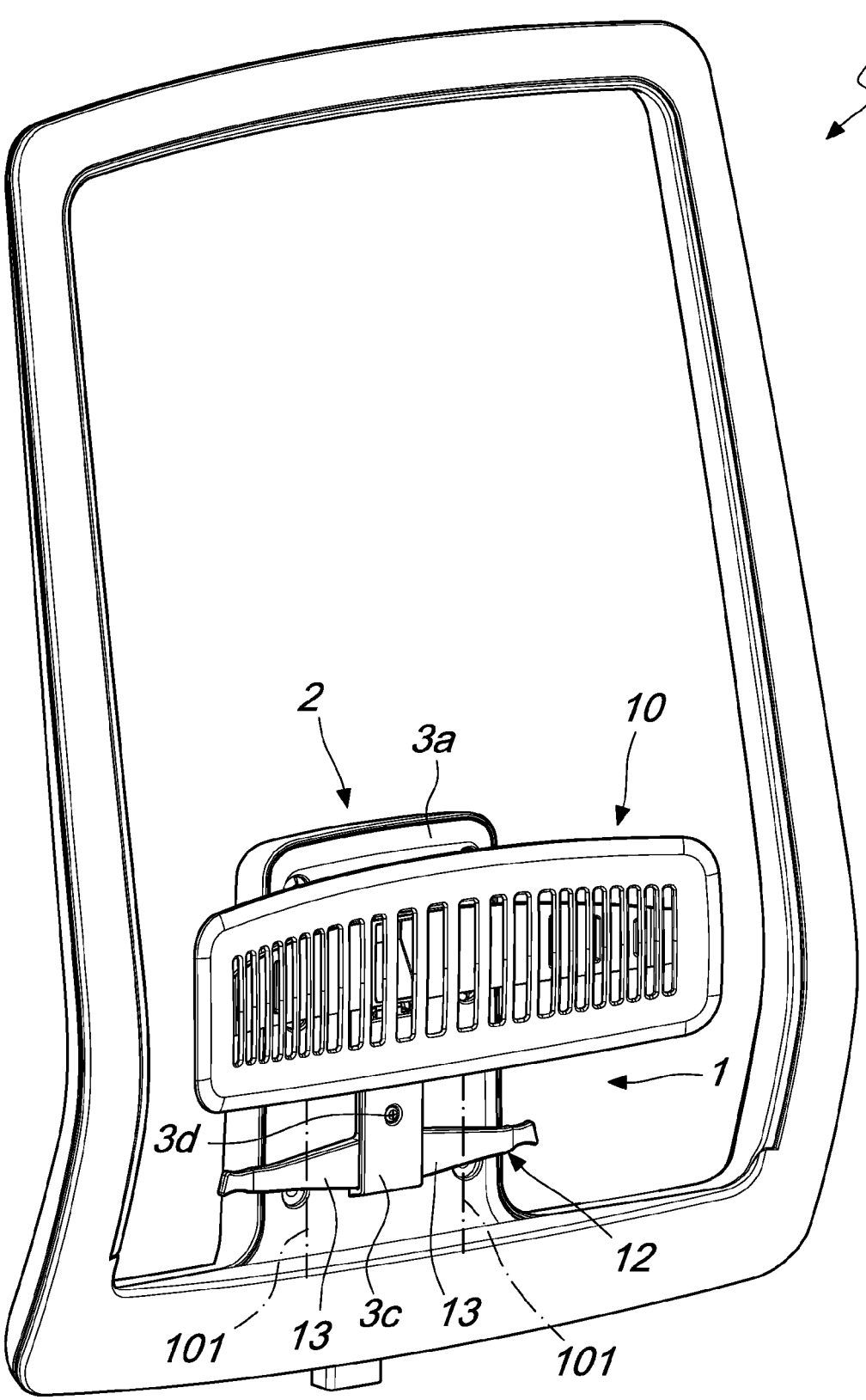

Fig. 1

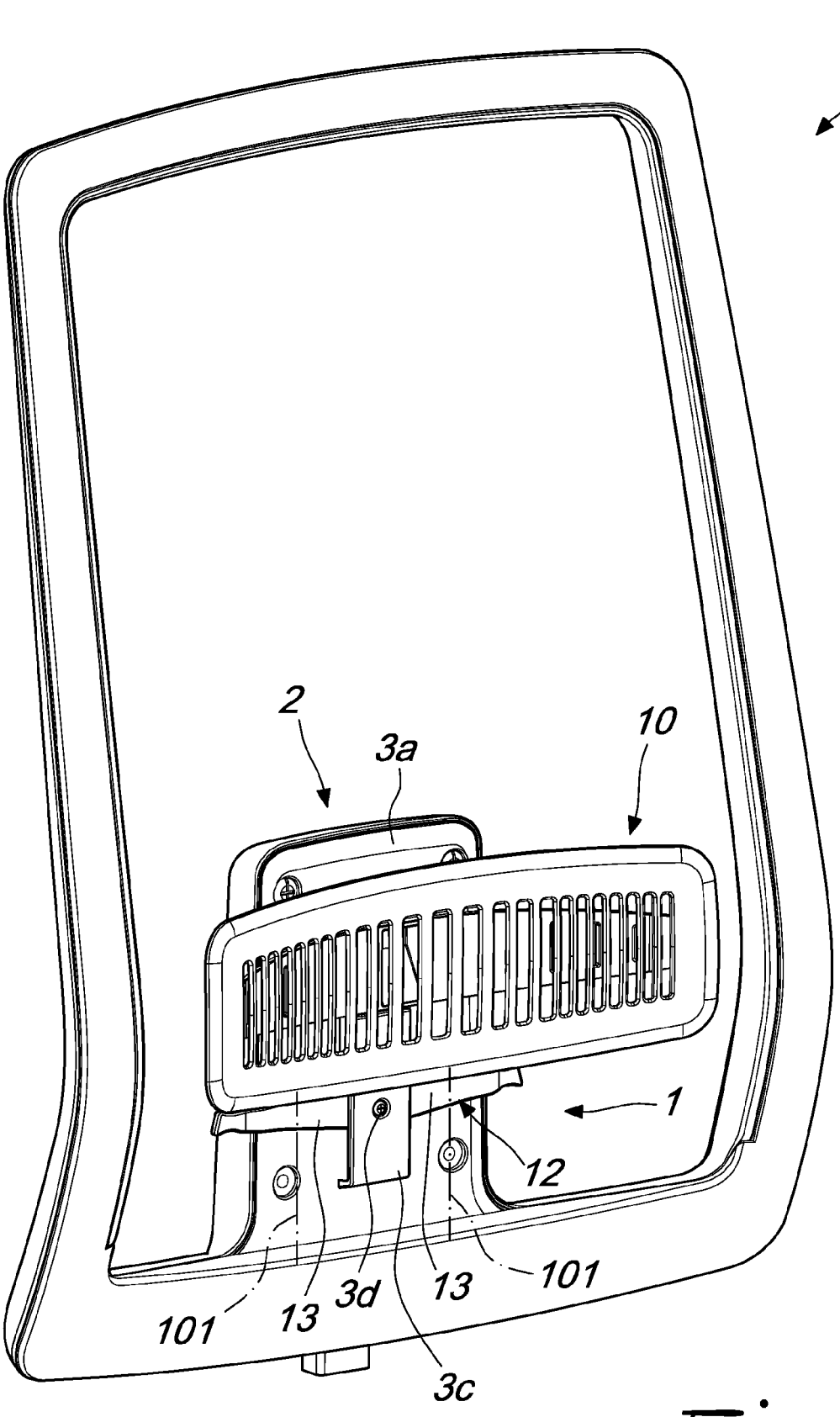

Fig. 2

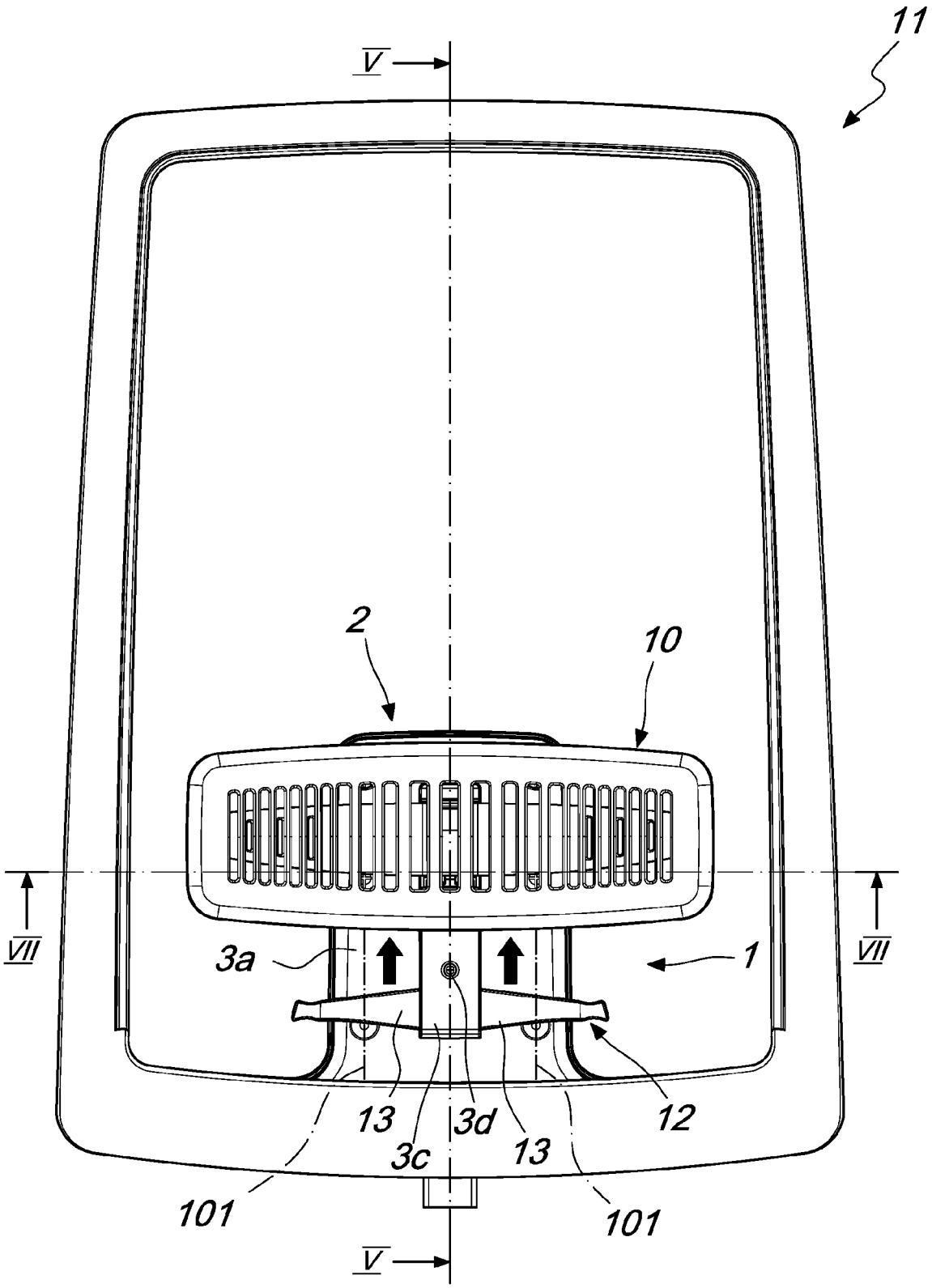

Fig. 3

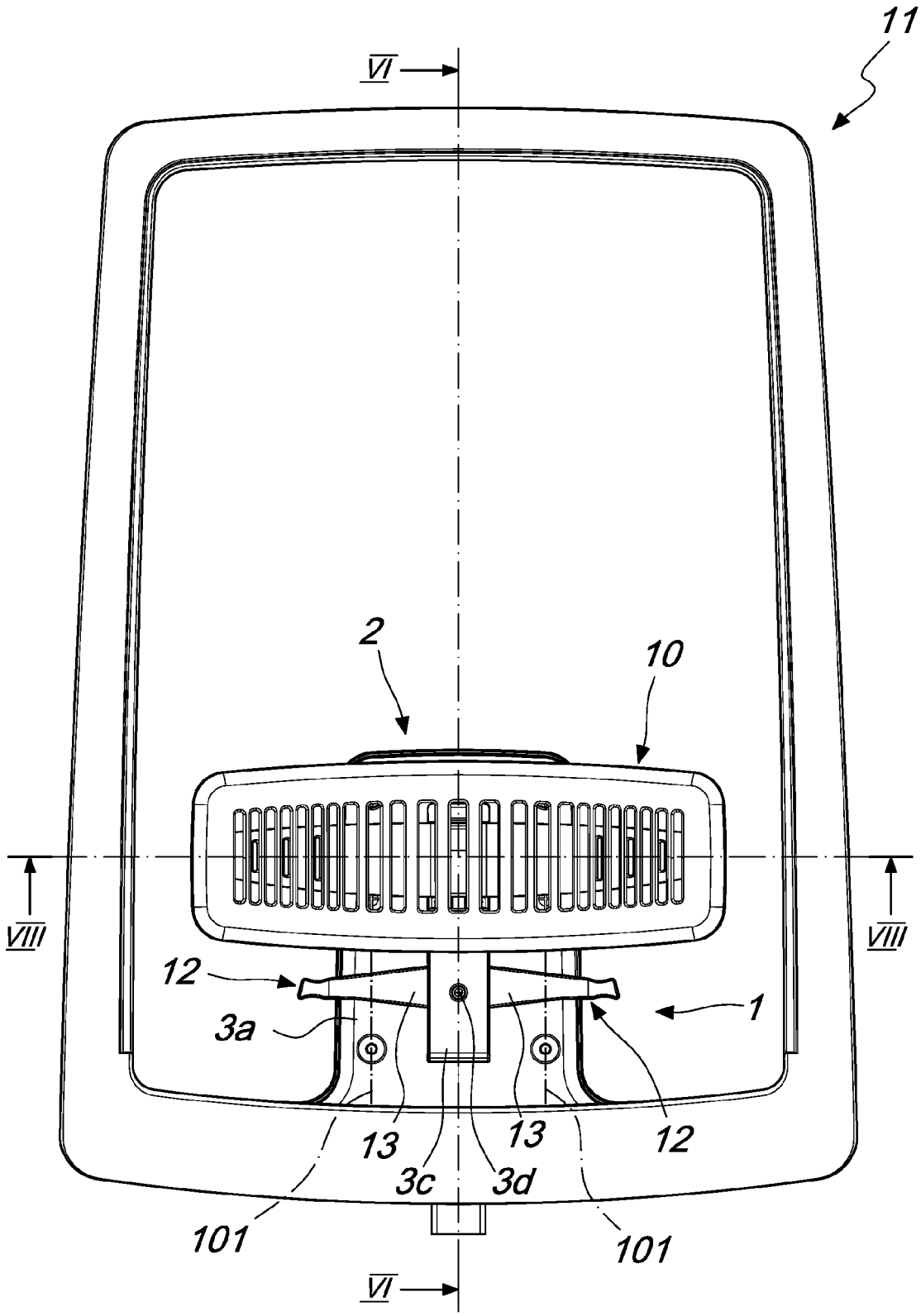

Fig. 4

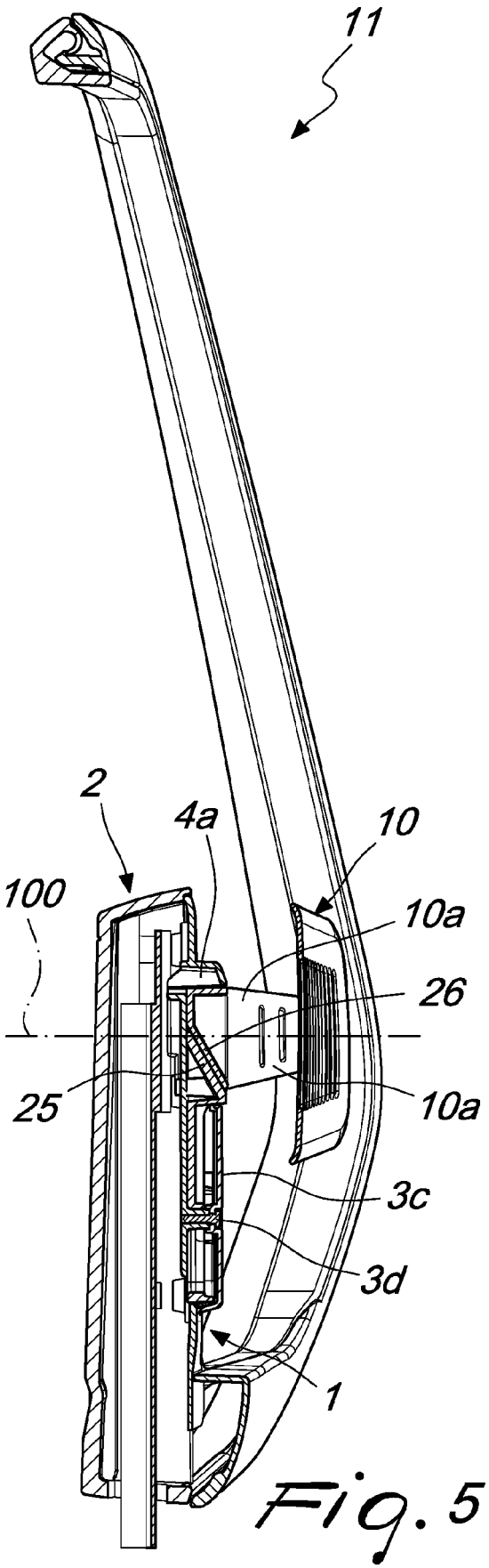
11
2
4a
10
100
10a
26
25
10a
3c
3d
1

Fig. 5

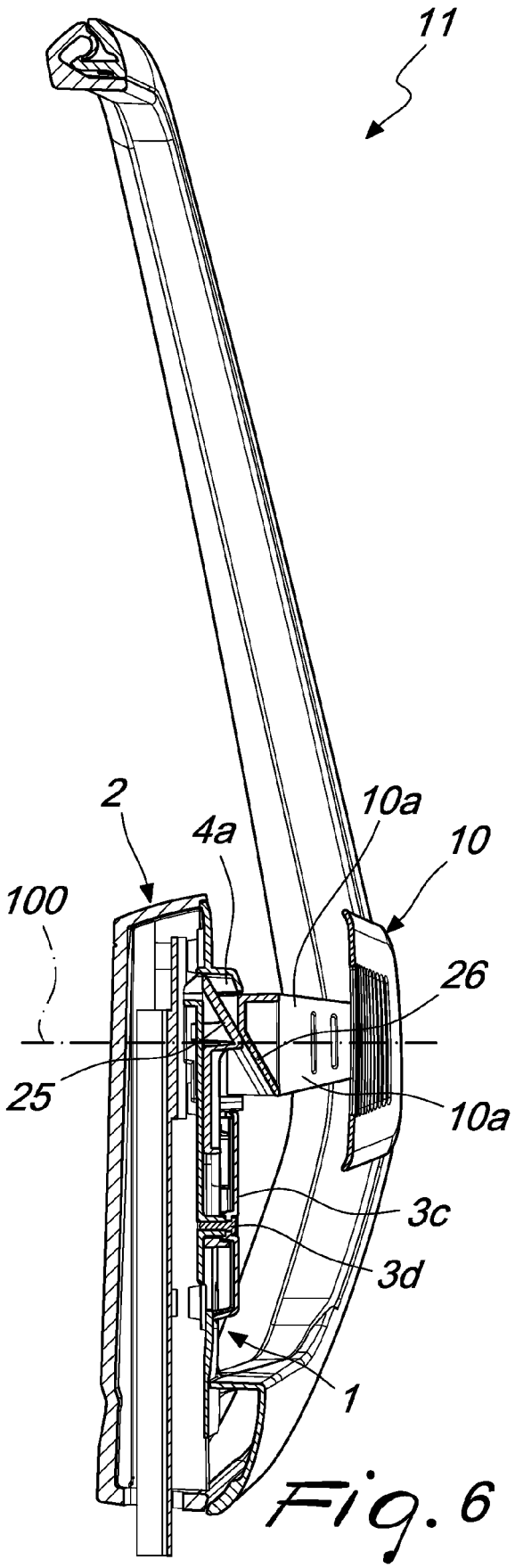
11
2
4a
10a
10
100
26
25
10a
3c
3d
1

Fig. 6

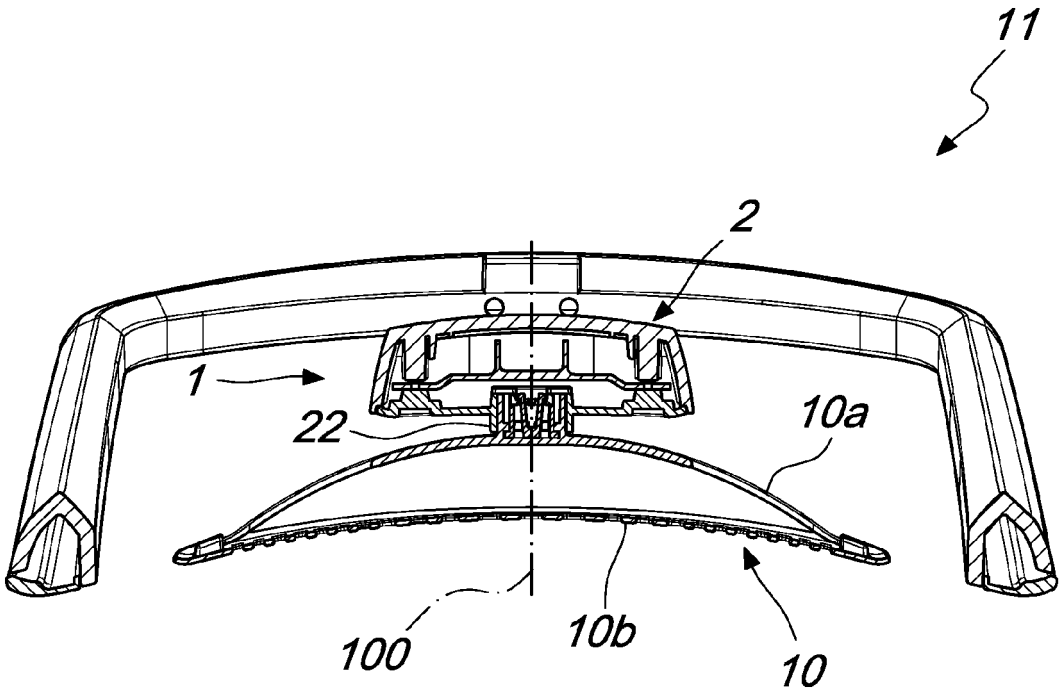

Fig. 7

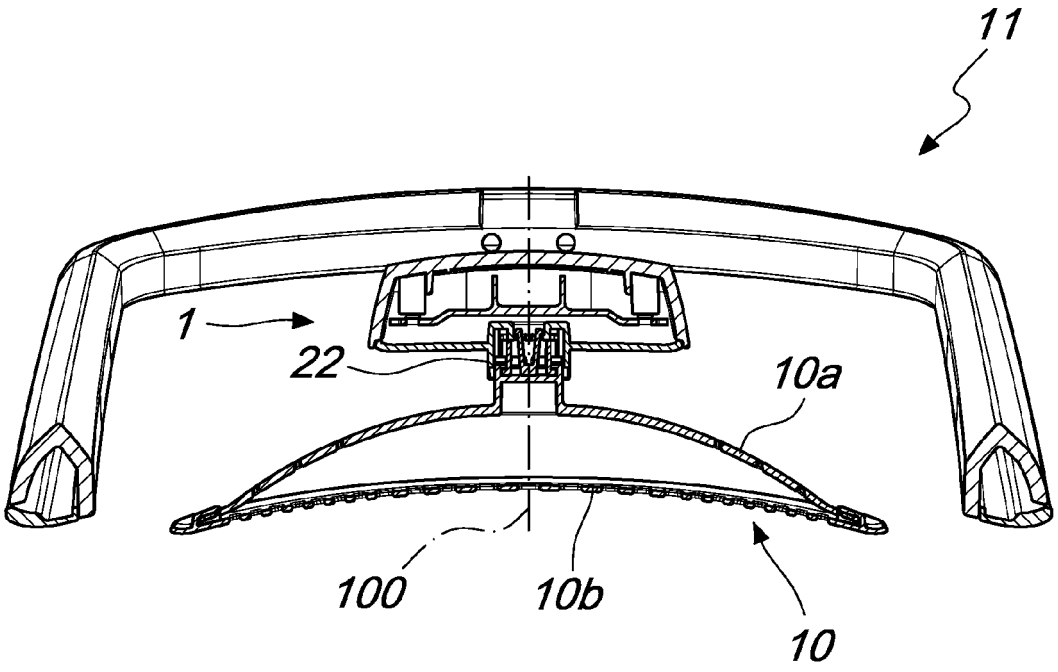

Fig. 8

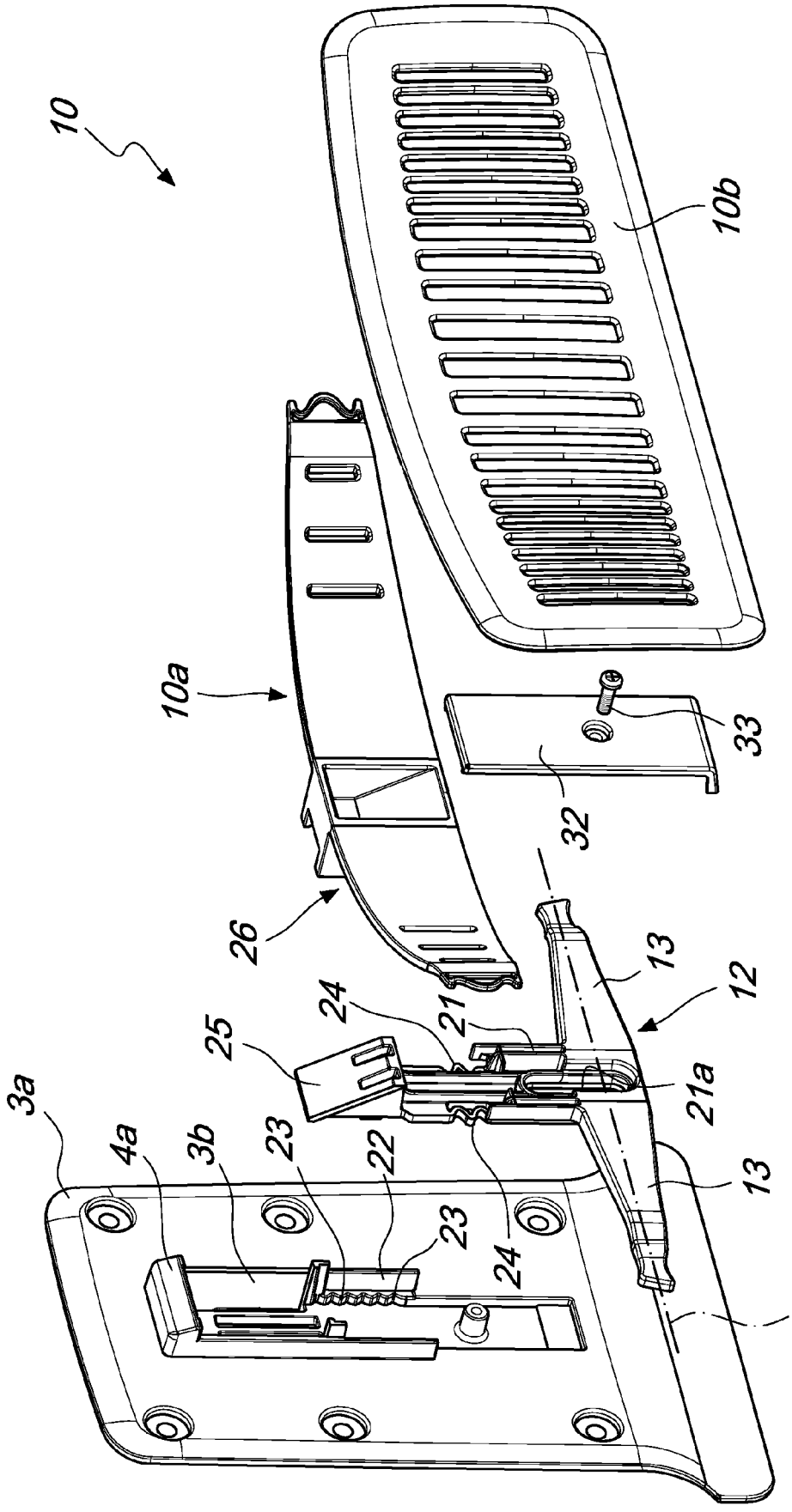

Fig. 9

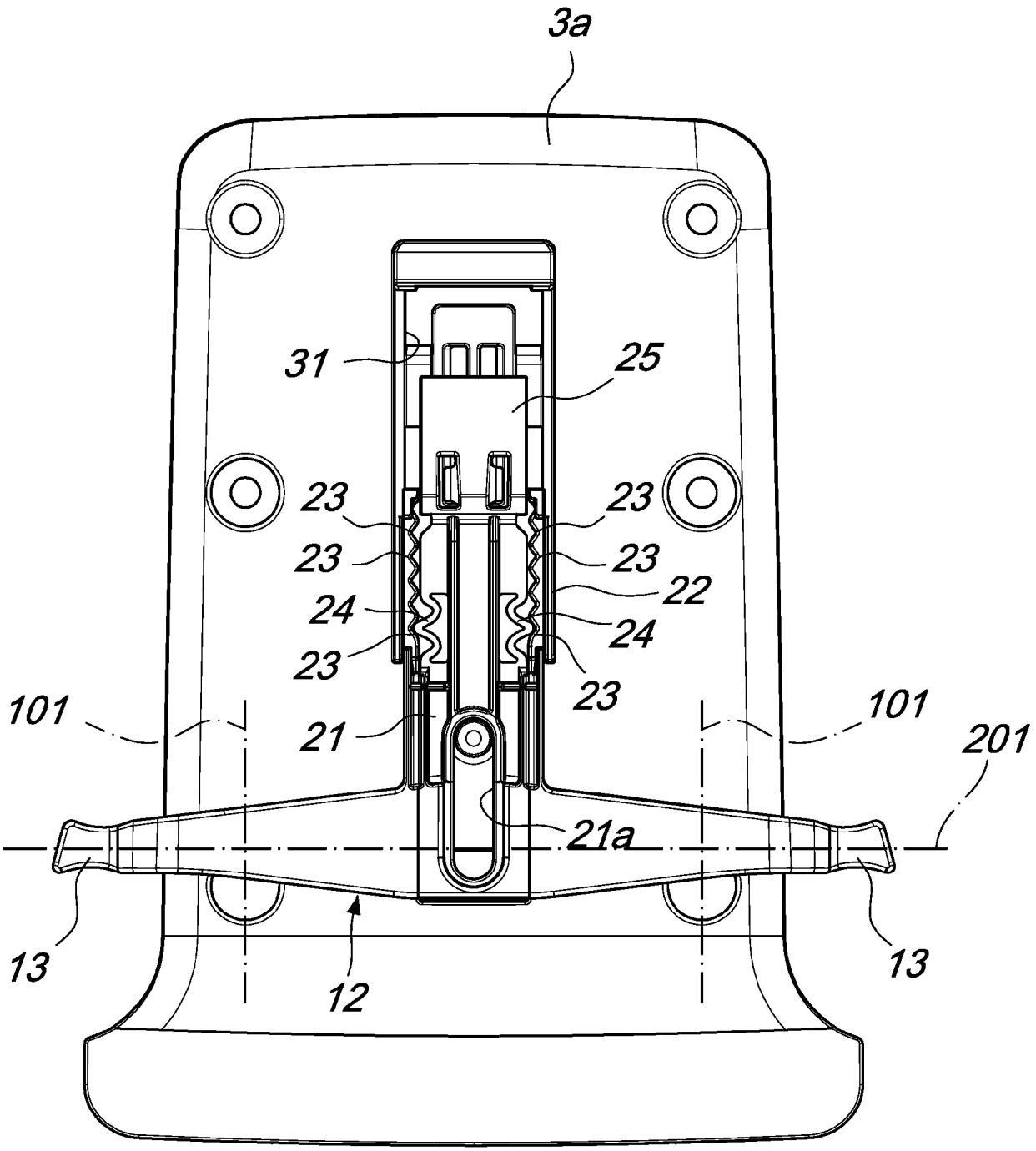

Fig. 10

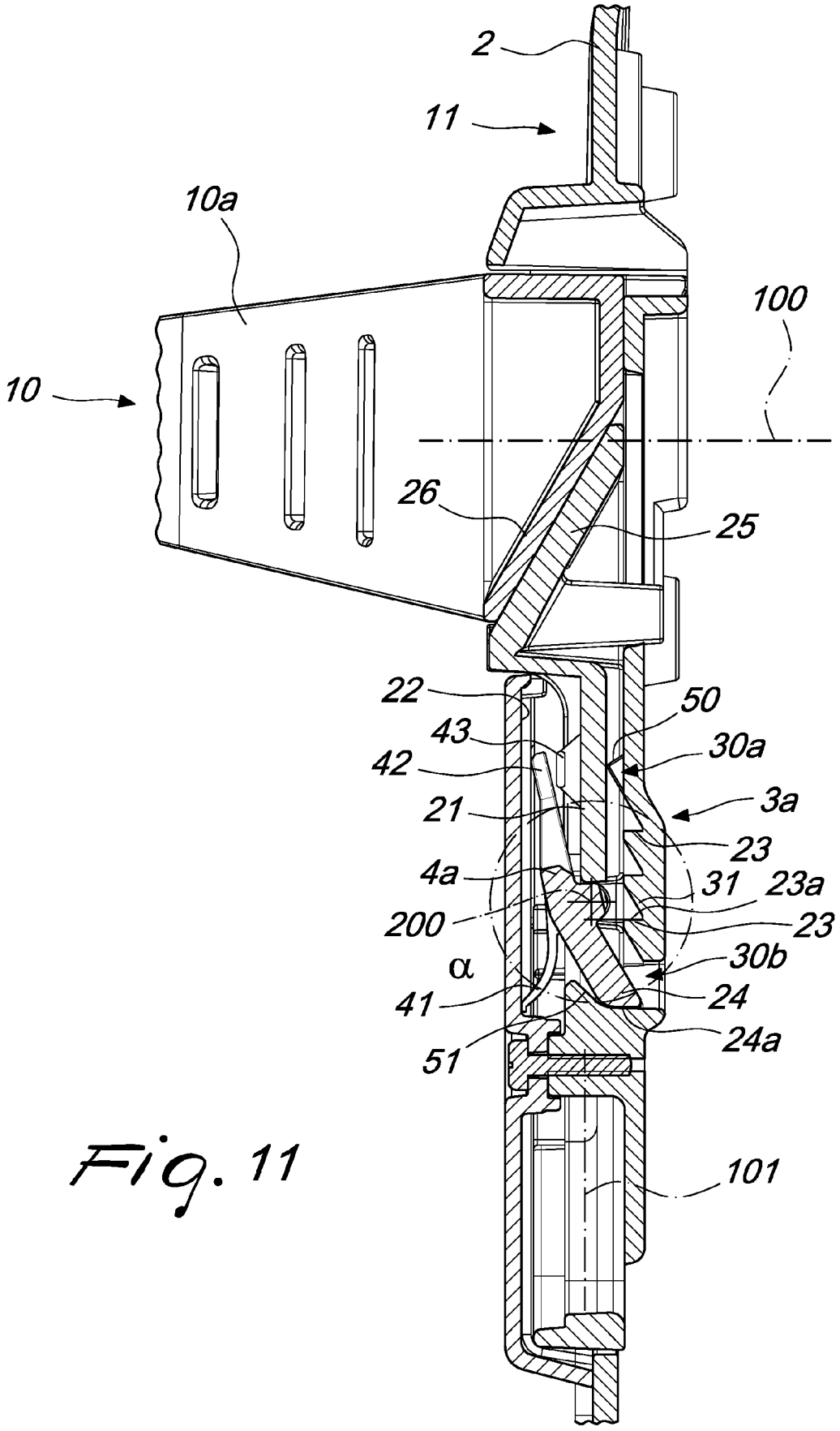
2
11
10a
100
10
26
25
22
50
43
30a
42
3a
21
23
4a
31
23a
200
23
α
30b
41
24
24a
51
101

Fig. 11

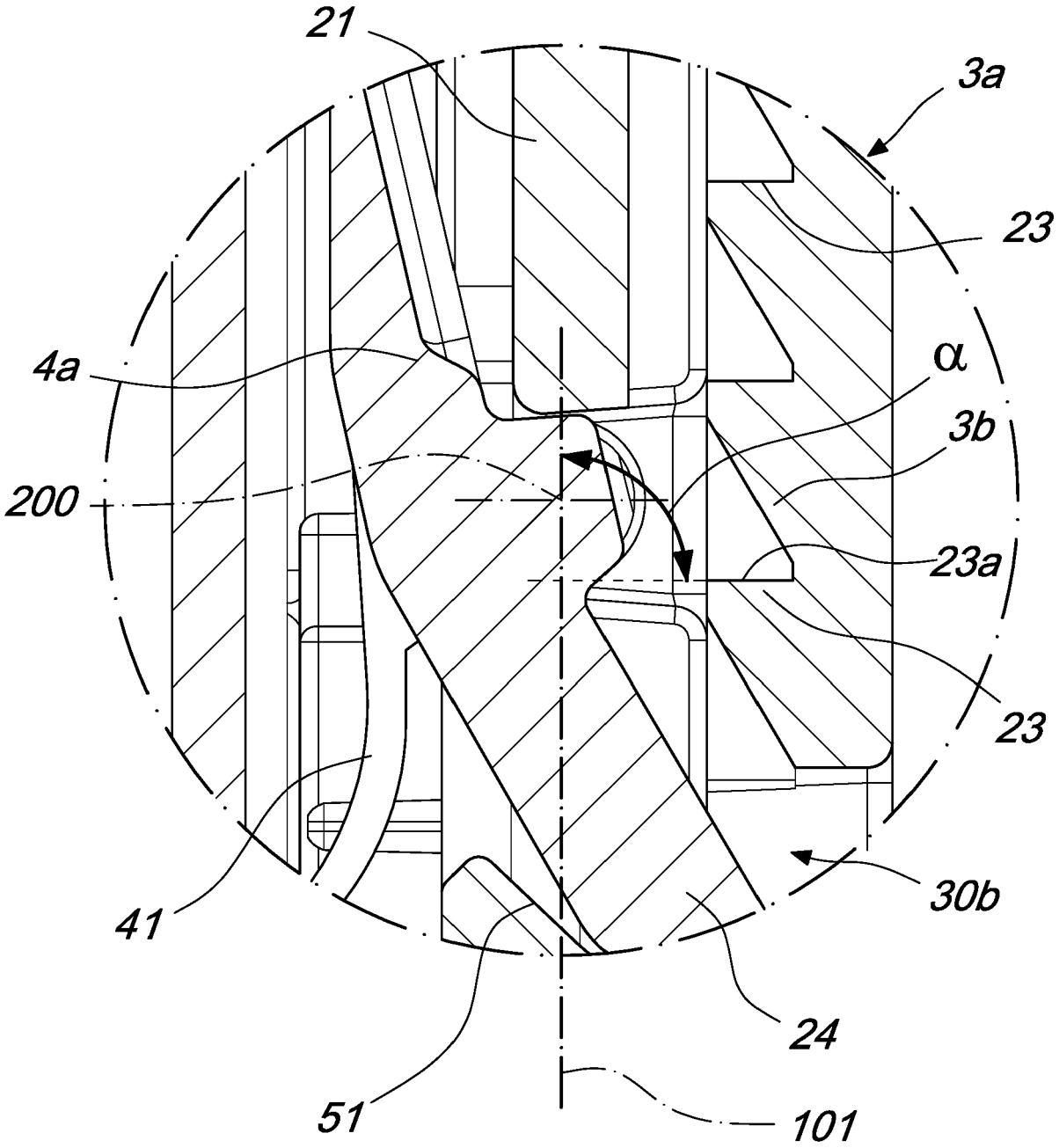

Fig. 11a

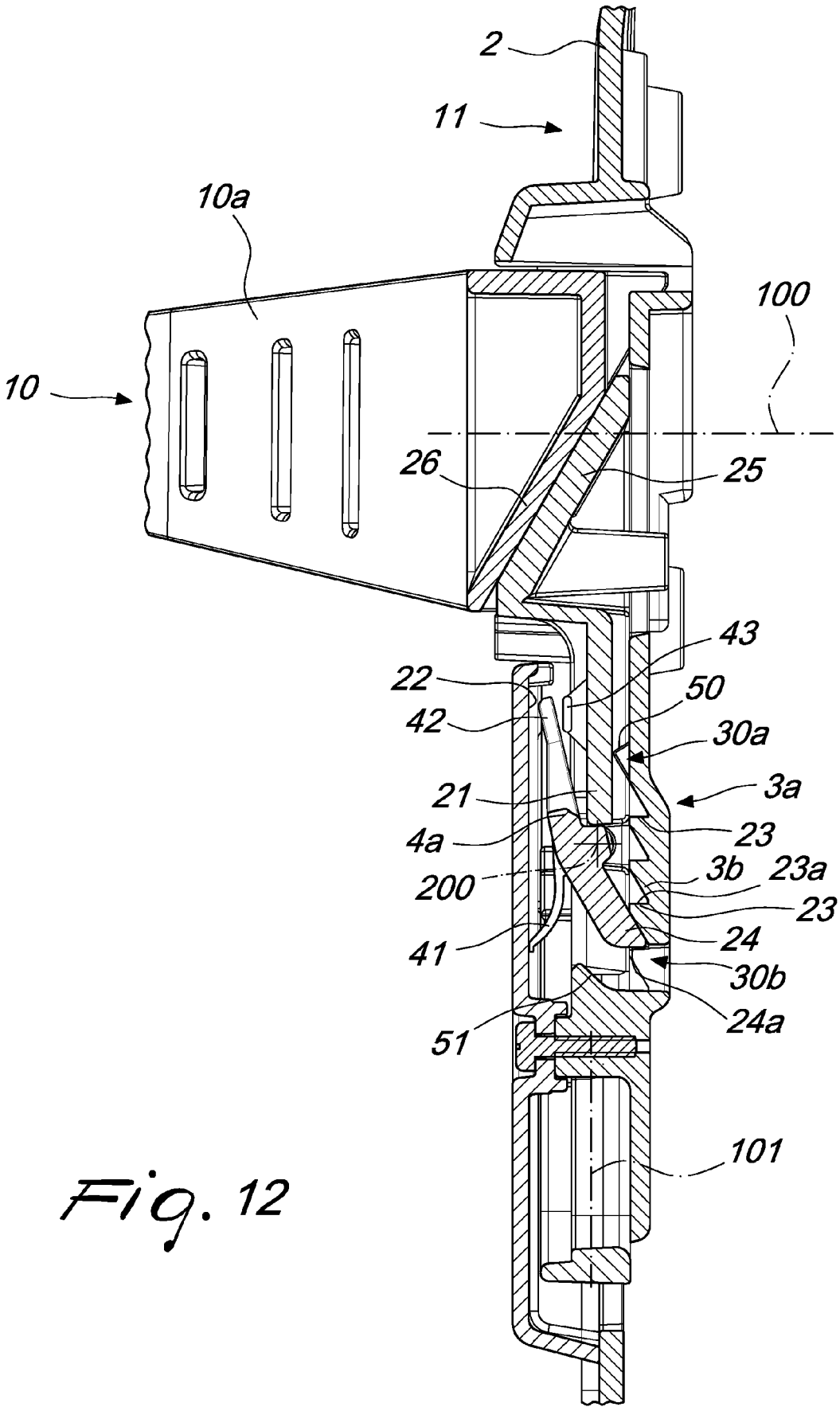
2
11
10a
100
10
26
25
43
22
50
42
30a
3a
21
23
4a
3b
23a
200
23
24
41
30b
24a
51
101

Fig. 12

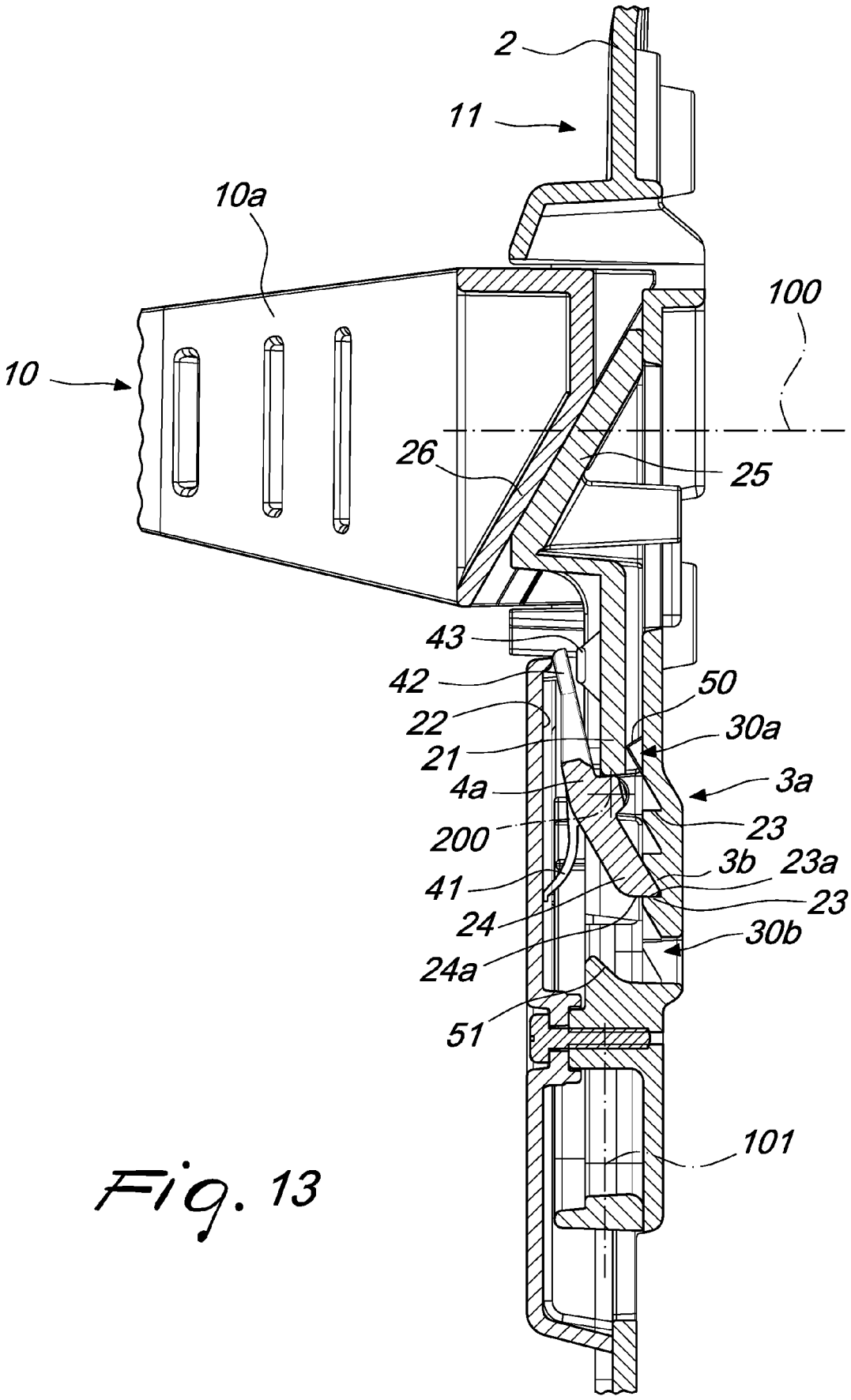
2
11
10a
100
10
26
25
43
42
50
22
30a
21
3a
4a
23
200
3b
23a
41
23
24
30b
24a
51
101

Fig. 13

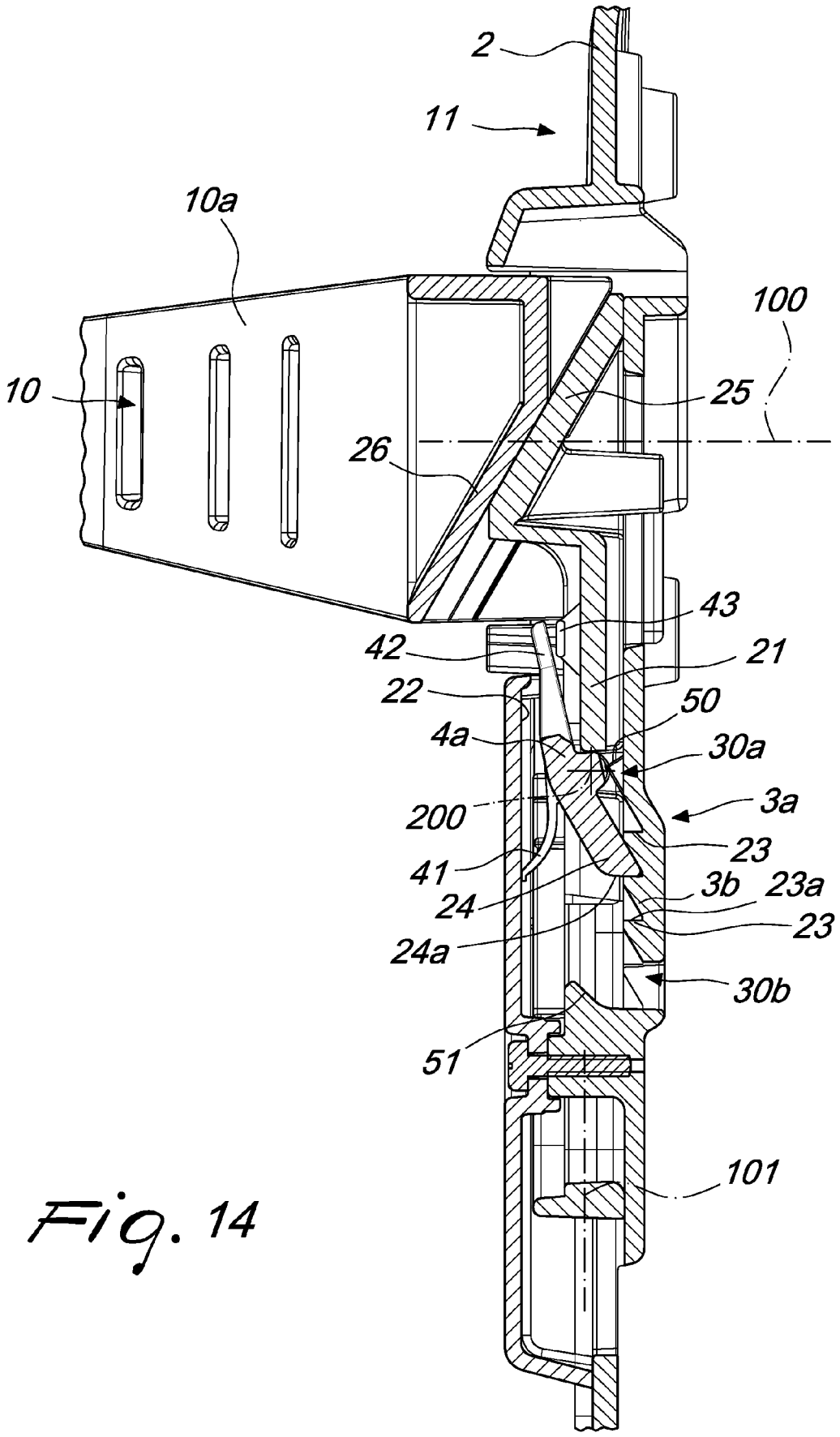
2
11
10a
100
10
25
26
43
42
21
22
50
4a
30a
3a
200
23
41
3b
23a
24
23
24a
30b
51
101

Fig. 14

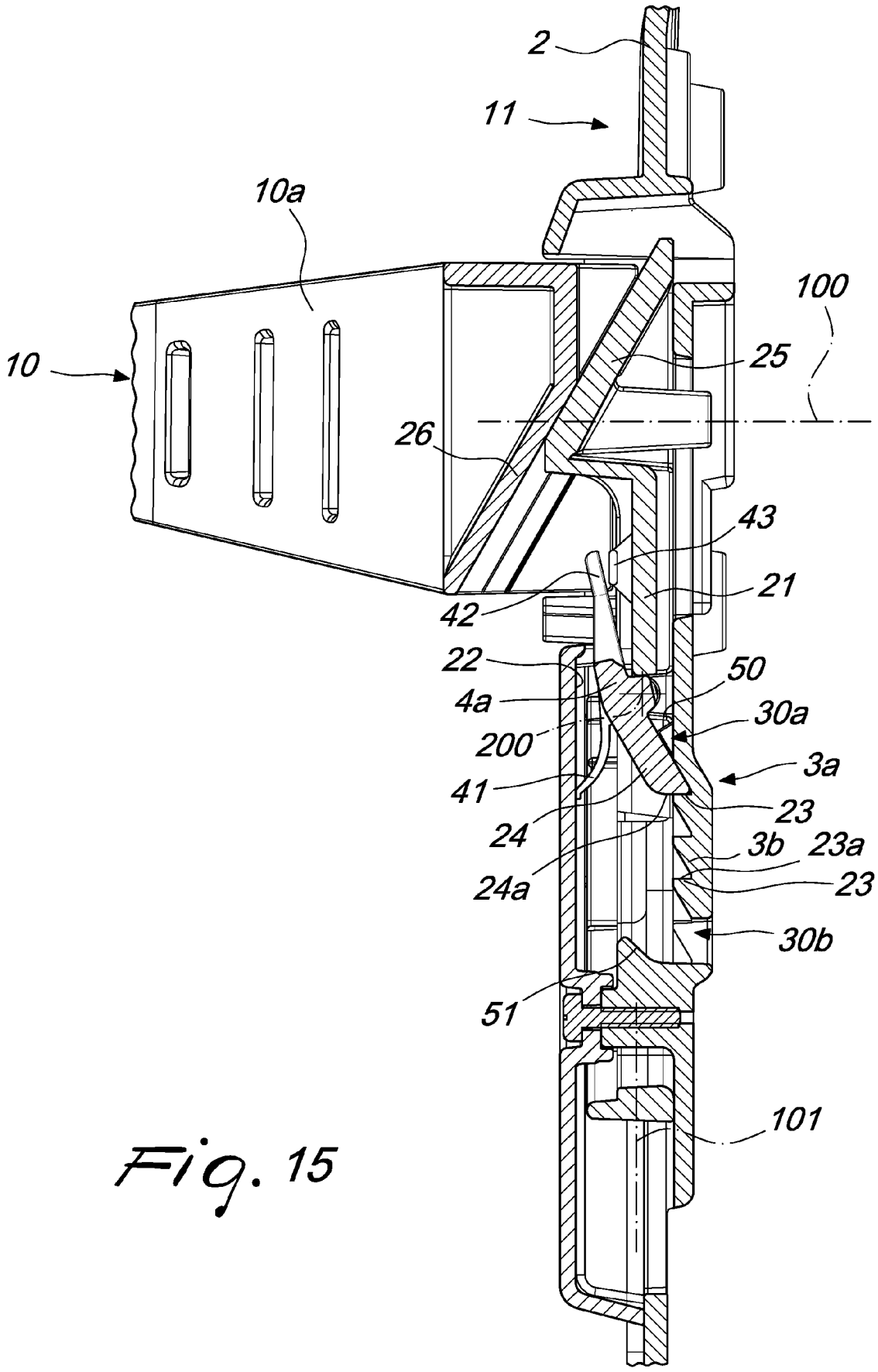
2
11
10a
100
10
25
26
43
21
42
22
50
4a
30a
200
3a
41
23
24
3b
23a
24a
23
30b
51
101

Fig. 15

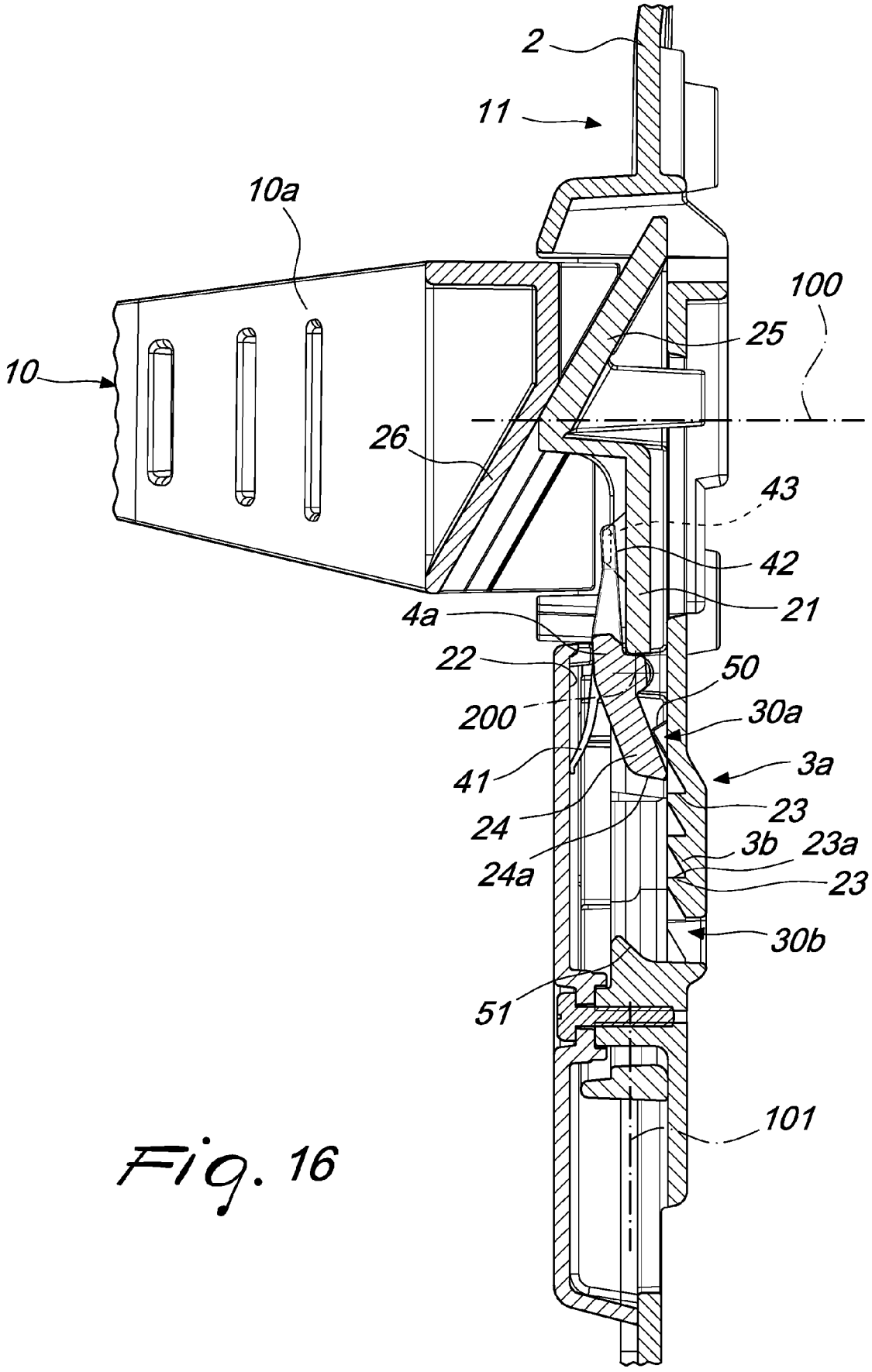
2
11
10a
100
10
25
26
43
42
21
4a
22
50
200
30a
3a
41
23
24
3b
23a
24a
23
30b
51
101

Fig. 16

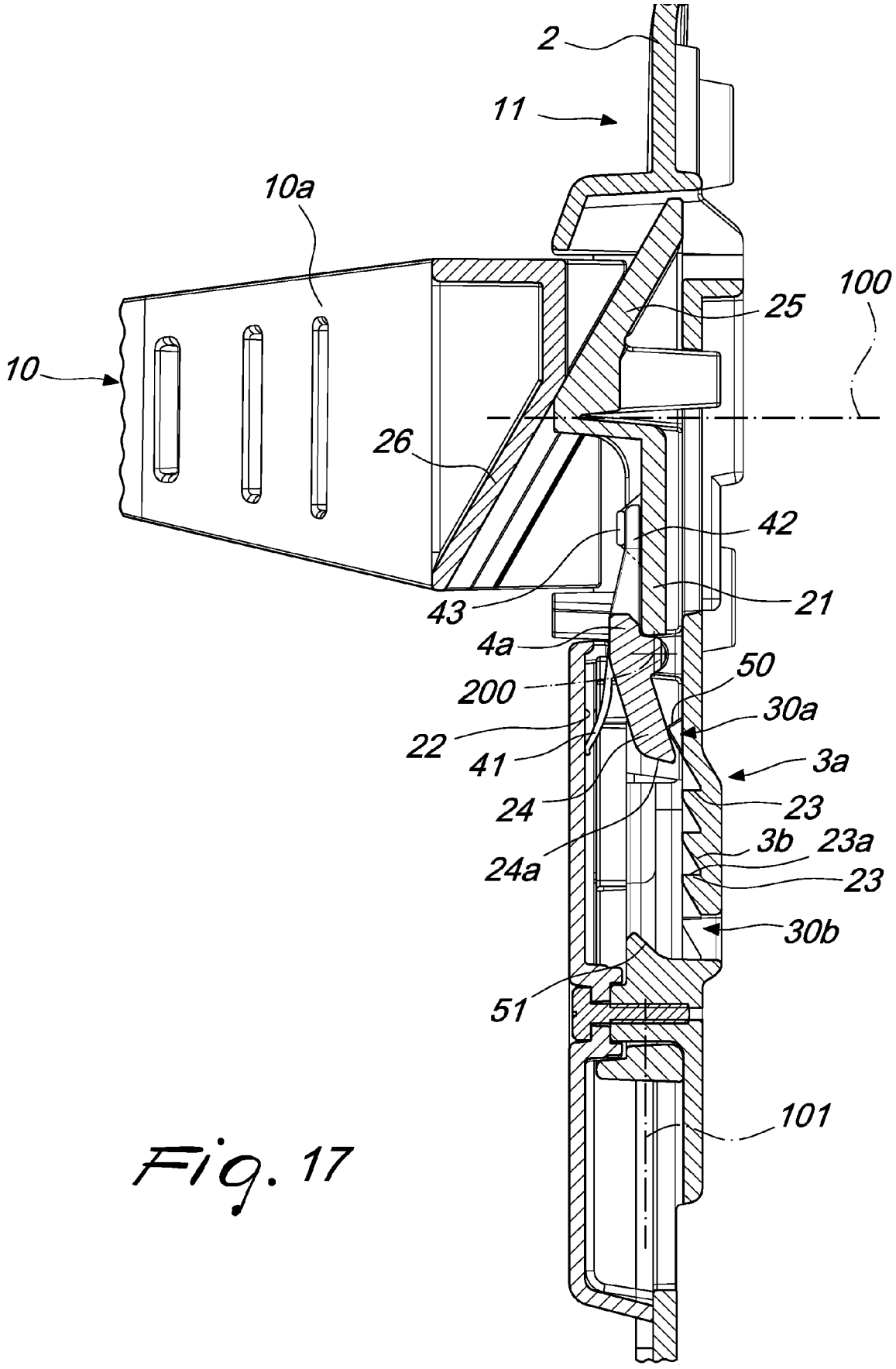
2
11
10a
100
25
10
26
42
21
43
4a
50
200
30a
22
41
3a
24
23
3b
23a
24a
23
30b
51
101

Fig. 17

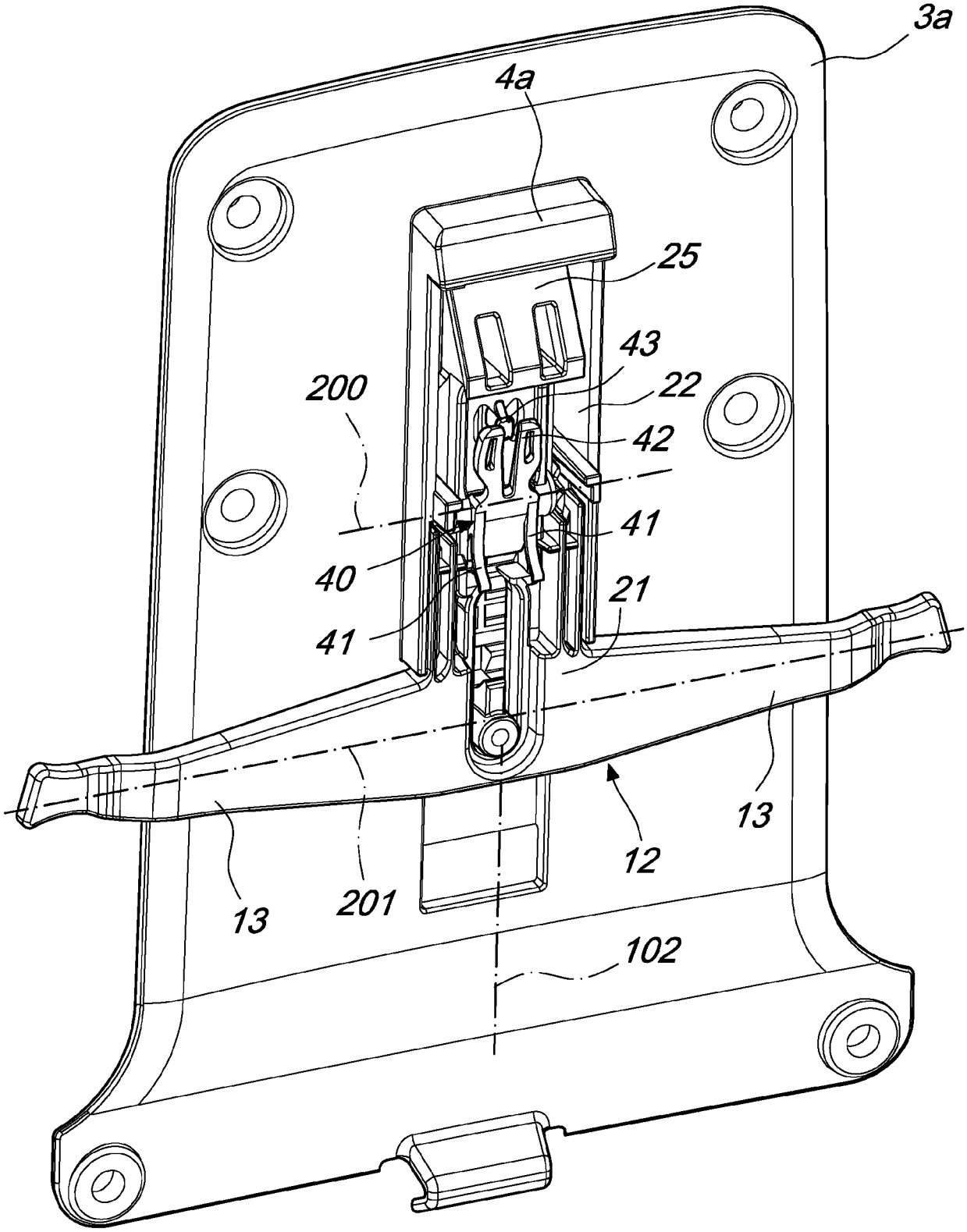

Fig. 18

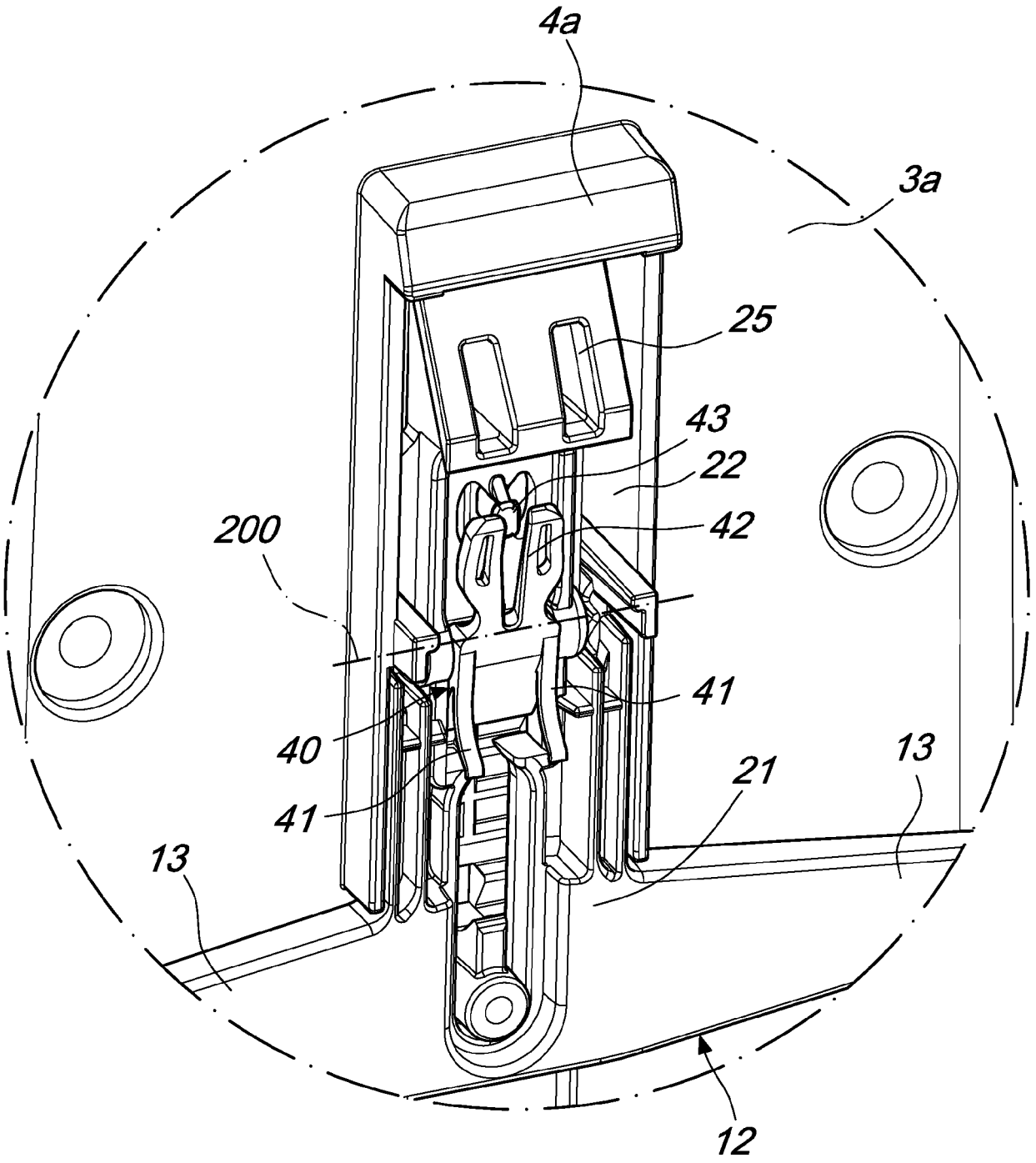

Fig. 19

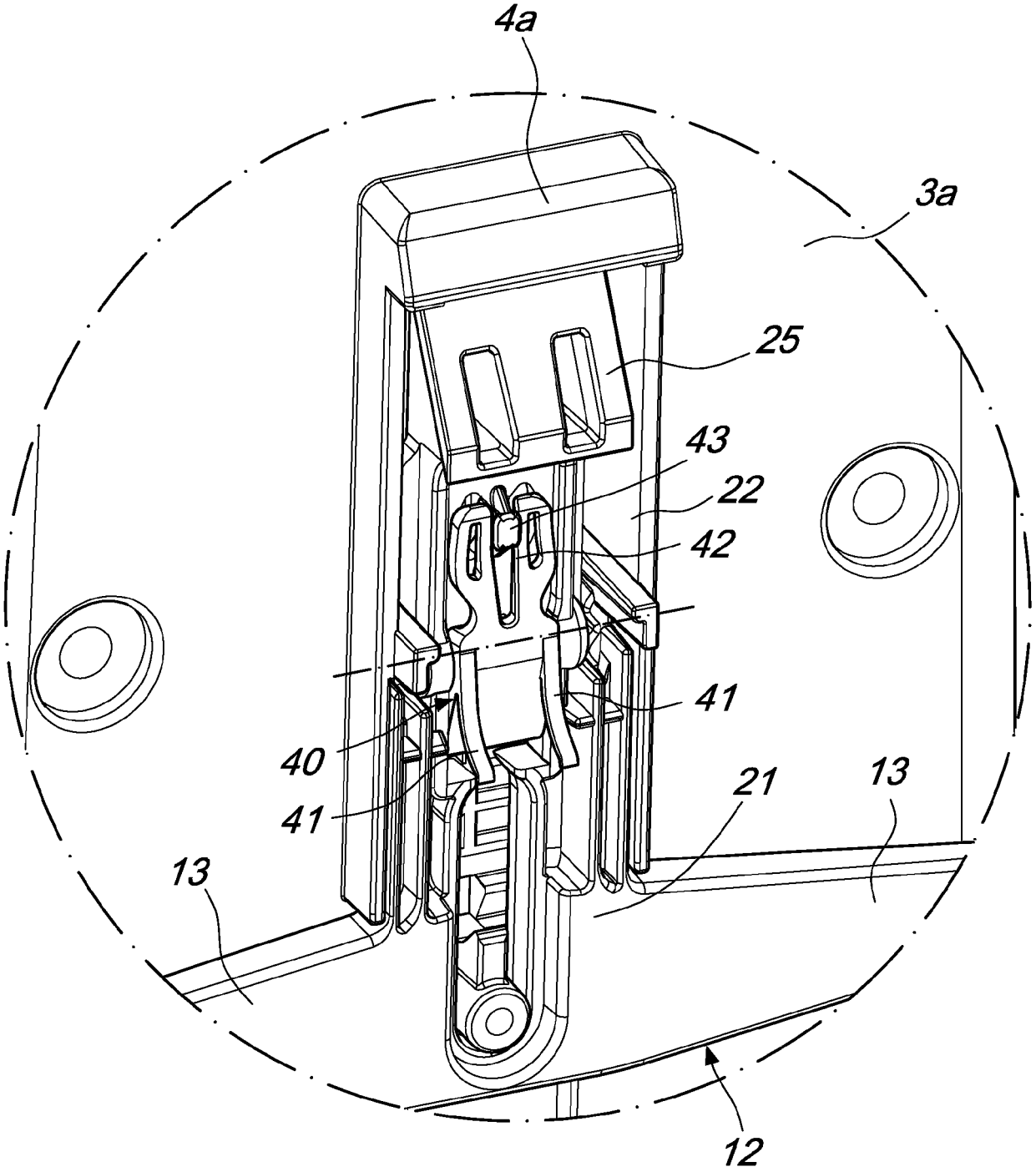

Fig. 20

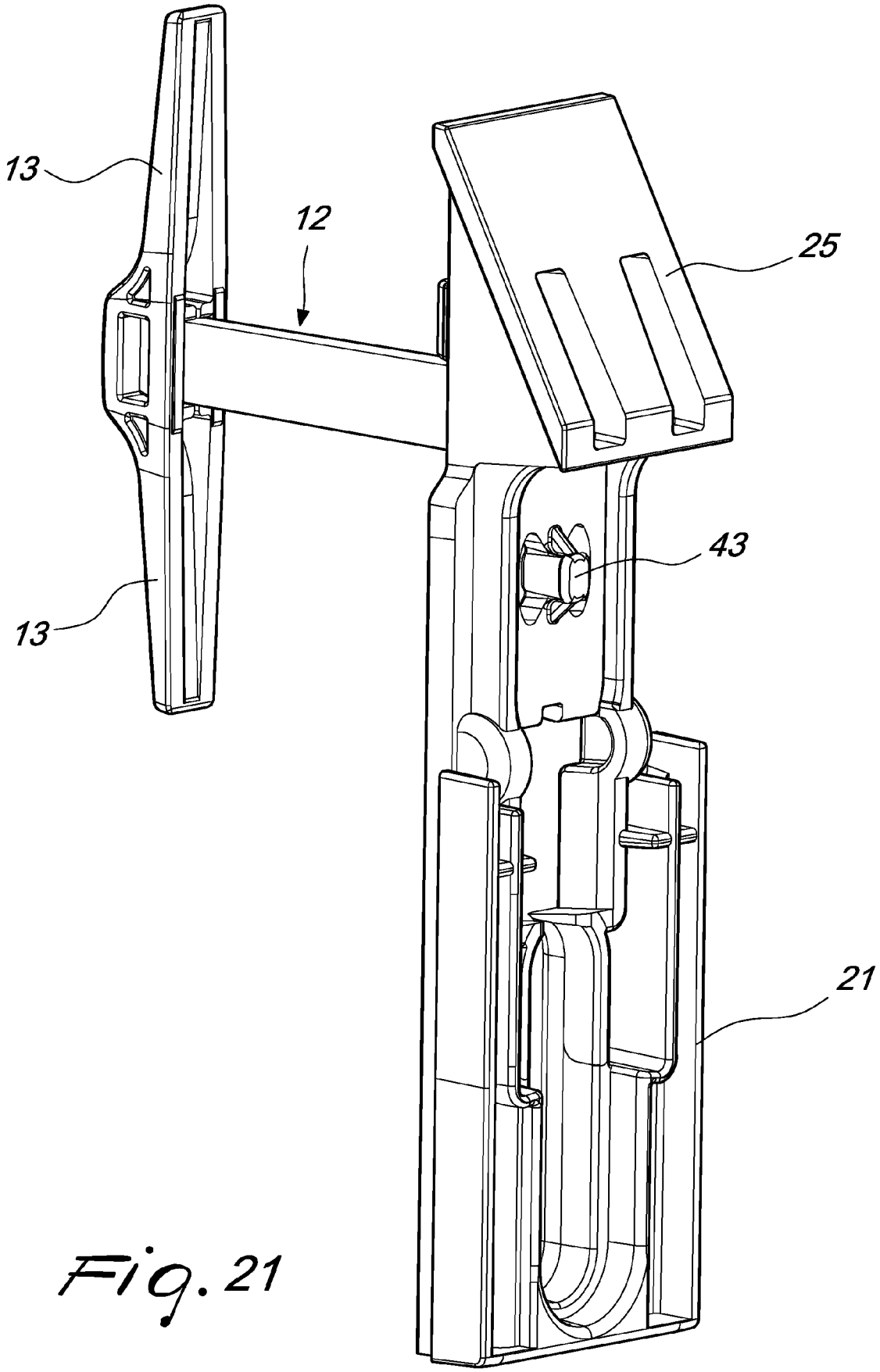

Fig. 21

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 24 17 2002

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	KR 102 390 126 B1 (PATRA [KR]) 25 April 2022 (2022-04-25) * figures 1-15 *	1-8	INV. A47C7/46
X	KR 101 608 737 B1 (KOAS CO LTD [KR]) 4 April 2016 (2016-04-04) * figures 1-7 *	1,2,6-8	
X	DE 20 2004 011519 U1 (BOCK 1 GMBH & CO KG [DE]) 25 November 2004 (2004-11-25) * figures 1-4 *	1,2,6-8	
X	CN 115 005 625 A (ANJI BOYU INTELLIGENT FURNITURE TECH CO LTD) 6 September 2022 (2022-09-06) * figures 1-39 *	1,2,6-10	

TECHNICAL FIELDS SEARCHED (IPC)

A47C
B60N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	4 September 2024	Linden, Stefan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 17 2002

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

04-09-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 102390126 B1	25-04-2022	KR 102390126 B1	25-04-2022
		US 2023190001 A1	22-06-2023
KR 101608737 B1	04-04-2016	NONE	
DE 202004011519 U1	25-11-2004	NONE	
CN 115005625 A	06-09-2022	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- IT 102023000008922 **[0072]**
- IT 102024000001725 **[0072]**