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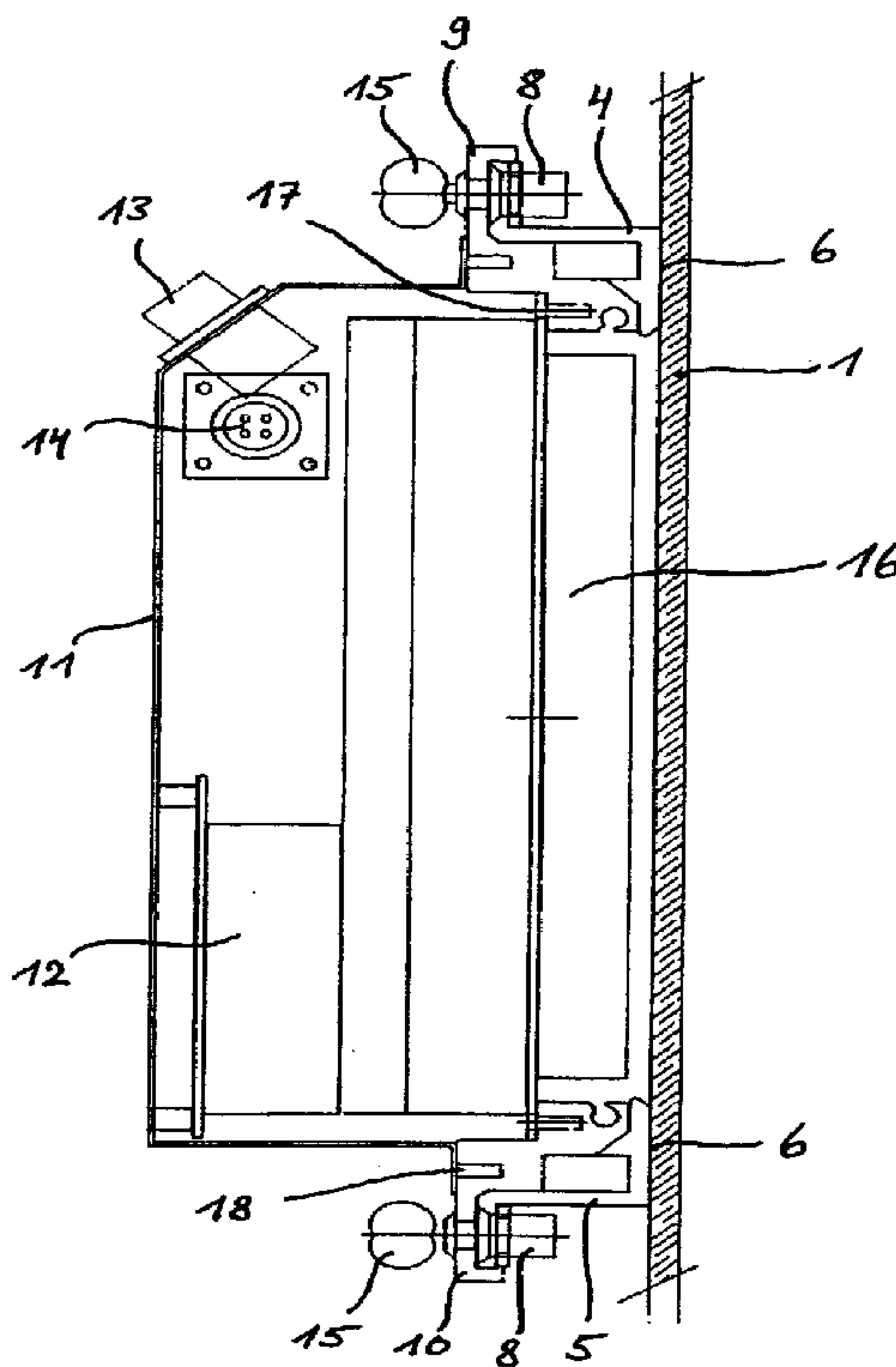
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(54) **PROCEDE DE MONTAGE D'ELEMENTS INDICATEURS A
SEGMENTS BASCULANTS DERRIERE DES VITRES**

(54) **METHOD FOR MOUNTING TILTING ELEMENT DISPLAYS
BEHIND GLASS PANELS**



(57) L'invention concerne un procédé de montage d'un module indicateur (16) derrière une vitre (1), notamment une vitre d'un véhicule. Le module indicateur (16) comprend une pluralité d'éléments indicateurs, qui présentent chacun un segment basculant et une source lumineuse associée au segment basculant. Afin de simplifier le montage et de faciliter les opérations de maintenance, le module indicateur est fixé au moyen d'éléments de fixation (3) qui sont collés sur la face intérieure (2) de la vitre (1).

(57) The invention relates to a method for mounting a display module (16) behind a glass panel (1), especially a glass panel of a vehicle. The display module (16) comprises a plurality of display elements, each having a tilting segment and a light source allocated to said tilting element. In order to simplify assembly and to facilitate servicing, the invention provides that the display module is fixed by fixing elements (3) which can be glued on the inner side (2) of the glass panel (1).

Abstract

The invention relates to a method for mounting a display module (16) behind a glass panel (1), especially a glass panel of a vehicle. The display module (16) comprises a plurality of display elements, each having a tilting segment and a light source allocated to said tilting segment. In order to simplify assembly and to facilitate servicing, the invention provides that the display module is fixed by fastening elements (3) which can be glued to the inner side (2) of the glass panel (1).

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Method for Mounting Tilting Segment
Displays Behind Glass Panels

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The invention concerns a method for mounting a display module behind a glass panel, in particular a vehicle glass panel, wherein the display module generates a display which is visible from outside the glass panel and comprises a plurality of display elements, each having a tilting segment and a light source associated therewith. The invention also concerns a system of matched components designed to be used with the method and components of this system.

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The display modules with which the invention is concerned are disposed behind glass panels. These glass panels may be stationary, e.g. for passenger information, or mobile, e.g. in vehicles used for public transportation. For example, buses often have displays indicating the travel destinations which comprise display modules inside the bus behind the front windscreen, the side windows and the rear window. The invention is described below by way of example with respect to displays showing travel destinations in buses. This is not to be regarded as a limitation.

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According to prior art, one or more display modules are arranged in an encased box having its own glass panel on the visible side. The glass panel is independent of the

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vehicle and is mounted in the vehicle using special fastening means connected to the vehicle chassis. Disadvantageously, special fastening means are required which may differ for each vehicle model. In addition, the fastening casings for display modules are heavy and, for windshield displays, may weigh as much as approximately 60 kg. Moreover, access to the display modules within the closed casings is difficult, which is troublesome for servicing. Visibility is also impaired, since the display is located at some distance from the windscreen and since an additional glass panel is interposed in the casing. To avoid reflections, the glass panels are sometimes provided with an antireflection coating.

Conventional displays comprise a transparent member having an illuminated background or one or more display modules each comprising a matrix of display elements having tilting segments. Each tilting segment thereby comprises a pivotable disc, one side of which is bright, e.g. yellow, and the opposing side of which is darkened, e.g. black. Each tilting segment may be individually brought into the one or other position, preferably by magnetic actuation with electro-magnetic control, such that the combination of the bright sides of the tilting segments can display numbers and letters.

As a particularly advantageous characteristic, the tilting segments can be bi-stable. A control current is thereby only required to tilt the tilting segments, and the orientation of these segments is stable in both positions without requiring current flow.

In order to improve readability, the tilting segments can be illuminated by a common illumination means, e.g. a neon tube extending along the display module.

Conventional tilting segment displays can also comprise one light source associated with each tilting segment. The light source is preferably a light diode, but may be effected in any other manner, e.g. using optical fibers. The light source associated with each tilting segment may be realized in various ways.

In a first variant, the light source is disposed to illuminate the display side, i.e. the bright side of the tilting segment. A viewer will exclusively or substantially only see the scattered light diffusely reflected from the display side. No part or only a small part of the light emitted by the light source is seen directly, e.g. at certain angles of view. The light source may e.g. be disposed next to the tilting segment to illuminate it from the side. In certain embodiments, the light source may also be disposed above the tilting segment to illuminate the display side.

This first variant has several disadvantages in practice. When the light source illuminates the tilting segment, it must be arranged in the space between the tilting segment and the inside of the glass panel. A mechanical support and an electric connection are thereby required. Moreover, it may be necessary to shield the emitted light from the viewer using a screen. For these reasons, some embodiments may require larger separation from the inside of the glass panel than would be otherwise required to permit pivoting of the tilting segment. Displays of this type therefore tend to have larger separations from the glass panel.

Disadvantageously, the light which is thereby diffusely reflected by the tilting segments illuminates a larger

surface at the inner side of the glass panel and impinges thereon at a larger angle of incidence. As a result, the interfering light reflected and scattered by the glass panel can spread over a larger area, possibly up to the
5 neighboring tilting segment, to thereby impair the contrast and the readability of the display. The illuminated elements radiate scattered light in all directions and reflections deteriorate contrast generation behind the glass panel.

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Moreover, reflections on and in the glass panel deteriorate the intensity and contrast. For buses, this glass panel often has a large curvature and is made from a relatively strong material through which the light can
15 spread in single or multiple reflections. This is particularly critical, since the intensity of light reflected by the tilting segment is, in any event, small and, in practice, a considerably stronger light diode current is therefore required to compensate for intensity
20 losses associated with indirect illumination. This is disadvantageous with regard to durability, current consumption as well as the above-mentioned scattered light effects.

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In a second variant, the light source associated with a tilting segment is disposed to emit light towards the viewer. The light from the light source is thereby directly visible by the viewer (not indirectly via the tilting segment). The viewer "looks into the light
30 source". The light sources do not illuminate the tilting segments, rather emit light (at least the main portion thereof) directly towards the viewer. Light emission must thereby be effected over some angular range to assure that the display can be recognized by viewers at various
35 locations.

As a result thereof, a double display matrix is formed, i.e. one by the bright sides of the tilting segments and one by the switched-on light sources. These matrices generate the desired display independently of each other.

5 The double display matrix has the advantage that the human eye automatically and individually (in dependence e.g. on eyesight) selects that display which is easiest to recognize. This facilitates improved reading of the displayed information, i.e. independent of the instantaneous illumination conditions, whether it is day or

10 night, on the weather conditions and on other adverse vision effects.

Of course, two or more light sources can also be associated with each tilting segment or (vice versa) two or

15 more tilting segments with each light source, should double or multiple display segments be advisable for practical reasons and economically reasonable.

20 The arrangement of the one or more light sources associated with one tilting segment with respect to that tilting segment may be effected in various ways in the second variant. The light source may e.g. be disposed relative to the tilting segment (e.g. in a section thereof or adjacent to the edge of the tilting segment) such that it

25 is visible to the viewer when the bright side of the tilting segment is displayed, and is covered by the tilting segment when the dark side is displayed. In these and other embodiments, the light source may preferably be

30 switched off when the dark side of the tilting segment is displayed. The light source may also be disposed next to the tilting segment, in particular at a border or corner adjacent to a neighboring support element or base body of a tilting segment without the tilting segment covering

35 the light source in the "dark" position.

The light source could also be disposed in a hole in the tilting segment, in particular in a hole fashioned in a stationary part of the tilting segment. In same conventional embodiments, a part of the tilting segment is
5 folded open and forms the bright surface together with a neighboring stationary part. The stationary part accommodates the light source. It emits light directly towards the viewer without substantially illuminating the bright
10 surface of the tilting segment.

With light sources according to the second variant which emit light directly towards the viewer, a smaller glass panel surface is penetrated by the light source compared
15 to the light of a completely illuminated tilting segment. Since the light passes essentially in a perpendicular fashion through the glass panel, bothersome reflections and loss of contrast are considerably reduced compared to the first variant.

20

Display elements with tilting segments having a light source associated therewith are described e.g. in the documents EP 0401980 B1, EP 0463725 A2, EP 0556954 B1, EP
0731435 A1, US 3,942,274, US 4,243,978, US 4,531,318, US
25 5,005,305 and US 5,022,171.

Up to this time, experts thought it necessary to install displays showing travel destinations, including the first and second variant with light sources as described above,
30 by mounting them securely to the chassis and by providing suitable attachment means such as angles, bars and cross-bars exhibiting sufficient stability to accommodate the large weight of the casing including the display modules disposed therein.

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Departing from the above-mentioned prior art, the purpose of the invention is to create a method of mounting display modules comprising tilting segment displays, an associated system, and suitable components to avoid or reduce the disadvantages of prior art with respect to installation difficulty, casing weight, ease of maintenance of the display modules and visibility of display.

In a method of the initially described type this problem is solved by the present invention by gluing a fastening means onto the inside of the glass panel and by mounting the display module to the fastening element with the display elements having a small separation from the glass panel.

It has been surprisingly discovered within the context of the present invention, that the difficult requirements concerning installation of display modules in vehicles can be solved by glueing these modules to the inside of the vehicle windshield using suitable attachment elements without requiring special components for mounting to the chassis. The invention therefore achieves goals which experts have been trying to achieve for a long time.

The fastening element preferably has an extensive bonding surface to facilitate gluing to the glass panel. If the glass panel is flat, the bonding surface may also be flat. If the glass panel is only slightly curved, the bonding surface may still be flat if gap differences can be compensated for by the glue. For larger glass panel angles of curvature, the bonding surface of the fastening element may be shaped to follow the curvature of the glass panel. The curvature of the bonding surface may thereby be adapted to that of the glass panel in a horizontal and/or vertical direction.

An expert can select the adhesive from a plurality of suitable, commercially available adhesives taking into consideration the fastening element material. For reasons
5 of appearance, a transparent or colorless adhesive is preferred. The adhesive should be water-proof to prevent detachment of steamed up panels. Moreover, the adhesive should preferably harden at room temperature so that heat treatments are not required to fix the fastening elements
10 to the panel.

The panel and/or the fastening element may be prepared in the usual manner for producing an adhesive bond, e.g. by cleaning, etching, by applying an intermediate layer in
15 the form of a foil or using a screen-printing method. The adhesive or the adhesive bond preferably permanently attach the fastening element to the panel such that the panel or the fastening element must be destroyed or damaged for removal or, such that special removing techniques must in any event be used. This provides a secure,
20 reliable attachment.

The number of fastening elements required for mounting the display module to the panel depends on the structural
25 characteristics of the mounting. If the fastening elements are point-like or have a small bonding surface, a plurality of distributed fastening elements will normally be required. In contrast thereto, the mounting can be effected with only one single fastening element having a
30 sufficiently large, in particular, longitudinal bonding surface. The fastening element could therefore be a fastening frame which may be closed or open (e.g. U-shaped). A frame advantageously provides good dust protection.

In a particularly advantageous embodiment, two fastening elements are used which are fashioned as profiled strips, wherein the profiled strips are glued, parallel to one another, to the panel. In this case, the profiled strips
5 preferentially extend in a substantially horizontal direction and may accommodate one or more display modules arranged next to one another. The height of the display modules therefore determines the required separation between the profiled strips.

10

Since the height of the display modules produced by different manufacturers is substantially constant, a standardized fastening system can be advantageously created. In this connection, a module support profiled strip can
15 be advantageously mounted to the display module and the display module mounted via the module support profiled strip. The module support profiled strip can be directly mounted on the fastening element. In other embodiments, adapting elements may be disposed between the fastening
20 elements on the panel and the module support profiled strips on the display modules, or on the display modules themselves.

The system in accordance with the invention for mounting
25 a display module behind a glass panel, in particular, a panel of a vehicle, wherein the display module is designed to be viewed from outside the panel and comprises a plurality of display elements having a tilting segment and a light source associated with each tilting segment,
30 comprises fastening elements and display modules matched to one another, wherein the fastening elements have a bonding surface for glueing the fastening elements to the panel.

Since the display modules themselves, or module support profiled strips or adapting elements mounted thereon match the fastening elements, the display modules can be mounted to the fastening elements with accurate fit with regard to shape and/or arrangement. The inventive system therefore combines bonding and connecting techniques, wherein the connection between the display module and the fastening element is preferably effected for easy mounting either directly or indirectly, by sliding, screwing, locking or the like.

The invention has the following advantages with respect to prior art:

- 15 - installation of the display modules does not require constructive changes to the vehicle chassis and there are no vehicle-specific requirements, e.g. the mounting of casings to the chassis,
- installation can always be effected retroactively without difficult or costly chassis mountings,
- 20 - the time required to install a travel destination display can be considerably reduced, e.g. from 150 minutes to 30 minutes,
- the weight can be reduced by up to 60%,
- 25 - the depth of installation is reduced, e.g. by 20%,
- the costs are reduced,
- serviceability is improved, since the display modules can be removed, installed and exchanged quickly, so that repairs, servicing, and cleaning operations can be carried out on the bench and must not be effected in the installed state in the vehicle,
- 30 - visibility is improved since the conventional device panel covering the display modules can be omitted to

avoid reflections therefrom, light reduction associated therewith and reflections on multiple glass panels with the separation between the display elements and the inside of the panel being reduced,

- 5 - a steaming-up of the panels is reduced, since the intrinsic heat of the display modules can be discharged into the passenger area,
- the invention can be realized easily for standardized, uniform configurations, e.g. in series production, and
10 also for customer-specific models, and
- the ease and strength of installation is improved as are the readability, distinctness and contrast of display.

15 The advantages, particularly the latter ones, are preferentially achieved through the use of tilting segment displays, wherein the light sources are disposed to substantially emit light directly towards the viewer. In this case, the distance between the light sources or the tilt-
20 ing segment displays and the vehicle glass plane may be particularly small. This reduces reflections, especially for non-perpendicular viewing angles, and reduces interference from extraneous and external light from outside and inside the vehicle.

25 Particularly with curved panels, the inventive method allows to maintain a short distance to the panel, since the fastening elements can be adapted to the curvature thereof. Conventional display modules accommodated in a
30 box-shaped casing require a large separation between the display element and the panel due to the panel curvature.

Further the reduced influence of external and interfering light advantageously improves the precision and reliabil-

ity of automatic light source dimming in dependence on the ambient light, since the light sensor disposed in or proximate the display is less disturbed by the light diffusely scattered from the display and can be better
5 shielded from the light emitted from the passenger area.

For the reasons mentioned above, these advantages are greater with directly visible light sources than with indirectly visible light sources illuminating the tilting
10 segments.

The embodiments of the invention described in more detail in the drawings illustrate further advantageous features and characteristics.

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Fig. 1 shows a section through a glass panel with two fastening profiled strips,

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Fig. 2 shows a section through a casing cover with two module support profiled strips,

Fig. 3 shows the parts of Fig. 1 and 2 in the assembled state;

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Fig. 4 shows the same as Fig. 3 with a display module in the assembled state;

Fig. 5 shows a variant of Fig. 4;

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Fig. 6 shows a section through an upper fastening profiled strip;

Fig. 7 shows a section through a lower fastening profiled strip,

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Fig. 8 shows a section through an upper module support profiled strip;

5 Fig. 9 shows a section through a lower module support profiled strip with a quick-connector;

Fig. 10 shows a modification of Fig. 4 with adapter profiled strip;

10 Fig. 11 shows a detail of Fig. 10;

Fig. 12 shows a detail of Fig. 11;

15 Fig. 13 shows a modification of Fig. 10;

Fig. 14 shows a detail of Fig. 13; and

Fig. 15 shows a detail of Fig. 14.

20 Fig. 1 shows a section through a glass panel 1 of a vehicle. Two fastening elements 3, designed as profiled strips, are mounted on the inside 2 of the glass panel 1. In this embodiment, an upper fastening profiled strip 4 and a lower fastening profiled strip 5 are glued to the
25 panel 1 via the bonding surfaces 6 in a horizontal direction and parallel to each other. The fastening profiled strips 4, 5 are made from one single piece. They could, however, also be made from several pieces.

30 The fastening profiled strips 4, 5 can be glued to the glass panel 1 using a conventional adhesive. The glueing may advantageously be effected using a template or a suitable fastening tool to mount the fastening profiled strips 4, 6 in a predetermined position. The glass panel
35 1 manufacturer can glue the fastening profiled strips 4,

6. Alternatively, others could perform the glueing before, during or after the glass panel 1 is installed in the vehicle. The fastening profiled strips may e.g. be extruded aluminium profiles.

5

The display modules could, in principle, be mounted directly to the fastening elements 3, e.g. to support cams 8 formed therein. However, an embodiment is preferred having module support profiled strips 7 which can be
10 mounted to the display modules and which cooperate with the fastening elements 3. Fig. 2 shows module support profiled strips, e.g. in the form of extruded aluminium profiles. They comprise an upper module support profiled strip 9 and a lower module support profiled strip 10. The
15 display module is not shown for reasons of clarity.

The module support profiled strips 9, 10 bear an optional cover 11 for the casing in which an electronic unit 12 may be provided. Two possible plug connections 13, 14 are
20 also indicated for electrically connecting the display modules. They may be provided at any arbitrary location in the casing cover 11. If there is no casing cover 11, the required plug connection may also be fashioned directly on the display module.

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Fig. 3 shows the mutual arrangement of the parts of Fig. 1 and 2, in the assembled state.

The upper fastening profiled strip 4 is in positive engagement with the upper module support profiled strip 9
30 and the lower fastening profiled strip 5 with the lower module support profiled strip 10. The mounting is preferentially effected using quick-connectors 15, engaging into the support cams 8. The quick-connectors may com-

prise e.g. wing heads for manual operation or, to hinder manipulations, a receptacle for a quick mounting tool.

Fig. 4 shows how the display module 16 can be attached to and mounted with the module support profiled strips 7 to fittingly cooperate with the fastening elements 3. In addition to the above described matrix of display elements having tilting segments, the display module 16 generally comprises a main board to which the display elements are mounted and one or more additional boards with control electronics. The entire display module 16 may be screwed to the stable main board or to a support frame.

The module support profiled strips 9, 10 comprise grooves 17 which are suitable for mounting the display modules 16 or for fastening other components. Additional grooves 18 are provided for screwing in bolts to mount the casing cover 11. The module support profiled strips 9, 10, and the fastening profiled strips 4, 5 are preferably completely pre-fabricated, provided with all necessary bores, and cut to the proper length.

The fastening profiled strips 4, 5 are glued to the glass panel 1 and the display module 16 is connected to the module support profiled strips 9, 10 and, optionally, to the casing cover 11. A pre-mounted construction unit is thereby generated which is ready for operation and installation. It can be precisely fitted to the glued fastening profiled strips 4, 5 and secured by the quick-connectors 15.

In the embodiment shown, the upper and lower fastening profiled strips 4, 5 and module support profiled strips 9, 10, respectively, have the same design. This simplifies stocking, but is not absolutely necessary. In other

embodiments, the display module 16 could be inserted into a support groove in the lower strip and mounted to the upper strip via attachment means, e.g. using screws. In other embodiments, the display module 16 (particularly in the form of a pre-mounted construction component) can be hung in the upper strip and mounted to the lower strip using attachment means. The respective profiles may be shaped to fit within another, e.g. in a recessed manner.

Installation in accordance with the invention can be advantageously carried out quickly and at low cost. In addition, the tilting segments are disposed at a very small separation from the inside 2 of the glass panel 1. A lower limit is defined by the pivoting radius required for tilting the tilting segments. The distance between the pivoting axes of the tilting segments and the inside 2 of the glass panel 1 may be smaller than five times, preferably smaller than three times the maximum pivoting radius of the tilting segments (relative to their pivoting axes). With a tilting segment diameter of 15 mm and a pivoting radius of 7.5 mm, the separation can e.g. be between approximately 8 mm and 25 mm. In order to minimize the distance and, optionally, to compensate for production tolerances (in particular, in the glass panel) the fastening elements, the fastening profiled strips, the module support profiled strips or the display module itself may have suitable distance adjusting means.

Fig. 5 shows a variant of the embodiment of Fig. 4 having a larger height. This can be effected with identical installation of the display module 16 using identical fastening parts, simply by glueing the fastening profiled strips 4, 5 onto the glass panel 1 at a larger separation from each other. Fastening, using a quick connector 15 or other means, is not effected thereby. In particular, fas-

tening means connected to the chassis of the vehicle must not be modified.

Figures 6 and 7 show detailed sections through an upper
5 fastening profiled strip 4 and a lower fastening profiled strip 5, respectively. The section in Fig. 7 thereby passes through a support cam 8 and that of Fig. 6 through another location. The fastening profiled strips 4, 5 are shown at a separation from the panel 1 so that the bonding
10 ing surfaces 6 can be better recognized. The legs 19 may have support cams 8 or other bores for mounting an attachment means. The interior extensions 20, i.e. those facing one another, may be sufficiently long as to cover portions of the display module 16 which should not be
15 visible, e.g. such as soldering locations. The interior ends 21 are chamfered to facilitate better viewing of the display elements.

Fig. 8 shows (in correspondence with Fig. 6) an upper
20 module support profiled strip 9. Fig. 9 shows (in correspondence with Fig. 7) a lower fastening profiled strip 10. The grooves 17, 18 and the quick connectors 15 are visible. The leg 22 may also comprise additional bores for fastening the attachment means. One or more sliding
25 surfaces 23 are preferably provided for play-free installation. In figures 8 and 9, these are the chamfers 23a and 23b, which extend in an inclined manner towards one another and are supported on corresponding sliding surfaces 24a and 24b of the fastening profiled strips 4, 5.
30 The sliding surfaces facilitate an accurate, fitted installation.

The module support profiled strips 9, 10 also have a channel 25 which is open towards the outside and broadens
35 at least partly with increasing depth to receive adapting

elements 26 described in connection with the following figures. The channel 25 may also be used for fastening lateral covers to cover the sides of the fastening profiled strips 4, 5, the module support profiled strips 9, 10 and the display module 16.

Fig. 10 shows an embodiment comprising adapting elements 26, adapted for connecting the fastening elements 3 to the display module 16. A display module 16 smaller than the one shown in Fig. 4 can thereby be attached to the fastening elements 3 with the fastening elements 3 having a predetermined separation from each other. In this connection, adapter profiled strips 27, 28 (designed as profiled strips) are disposed between the display module 16 and the fastening elements 3. Alternatively, the adapting elements 26 may also be disposed between the module support elements 7 and the fastening elements or between the display modules 16 and the fastening elements 3.

Figures 11 and 12 show details of the adapter profiled strips 27, 28. They comprise a connecting piece 29 which may be accommodated in the channel 25. In the example, the piece shown has a round profile. Other embodiments, e.g. with a dovetailed shape, are also possible. Other sliding surfaces are also possible for play-free installation of the adapting elements 26. Similar to the module support profiled strips 9, 10, the adapter profiled strips 27, 28 are preferably extruded profiles, in particular, made from aluminium. They may have a recess 30 or a corresponding resting edge for positioning the display modules 16 as well as a groove 31 for screwing in bolts to install the display modules 16. The extension 32 may cover portions of the display module 16 which should not be visible. The chamfers 33 facilitate viewing of the display elements at large view angles.

Fig. 13 shows a variation in which the adapter profiled strips 27, 28 comprise an extension which is longer than that of the embodiment of Fig. 10 for bridging a larger distance from the fastening profiled strips 4, 5 and module support profiled strips 9, 10. The associated adapter profiled strips 27a, 28a are illustrated in figures 14 and 15.

10 For conventional travel destination displays in buses, each individual travel destination display, e.g. the front display, the sideward left-hand display, the side-ward right-hand display and the rear display, each has its own intelligent control means for controlling the display module which must be programmed in a customer-specific manner. In the inventive embodiment of the display modules, a central, intelligent control means can be provided for all display modules. This control unit can be disposed at a central location in the bus and can be
20 programmed according to the wishes of the customer to control all display modules. In contrast to practice up to now, the vehicle manufacturers must only install the display modules, define one, preferably standardized, installation location for the control means, and provide
25 the required information to the customer concerning the display module interfaces. A control unit or its programming can then be provided by the customer or a service company according to the respective requirements.

List of Reference Numbers

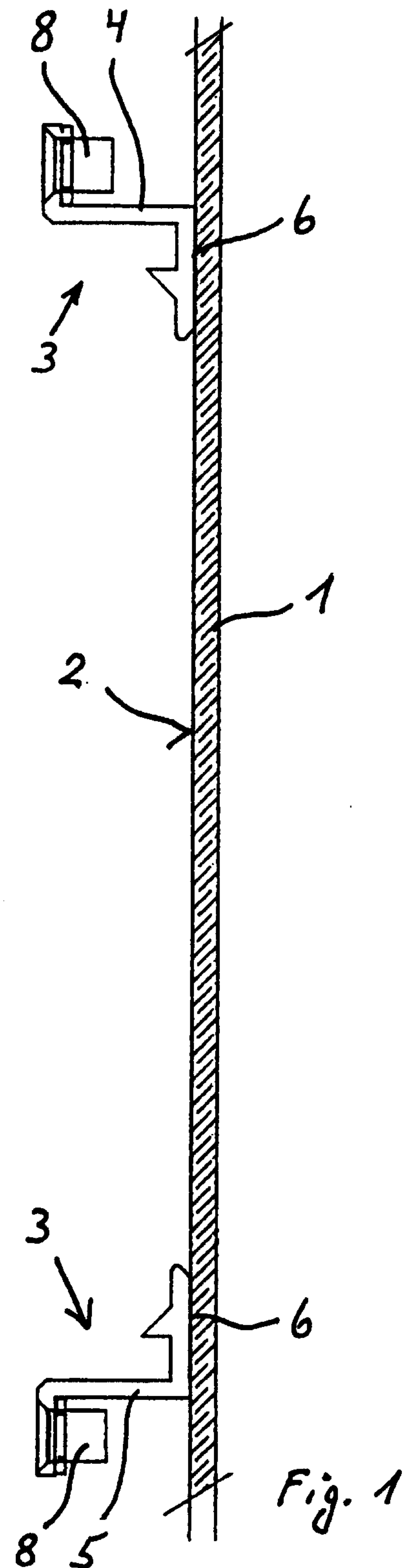
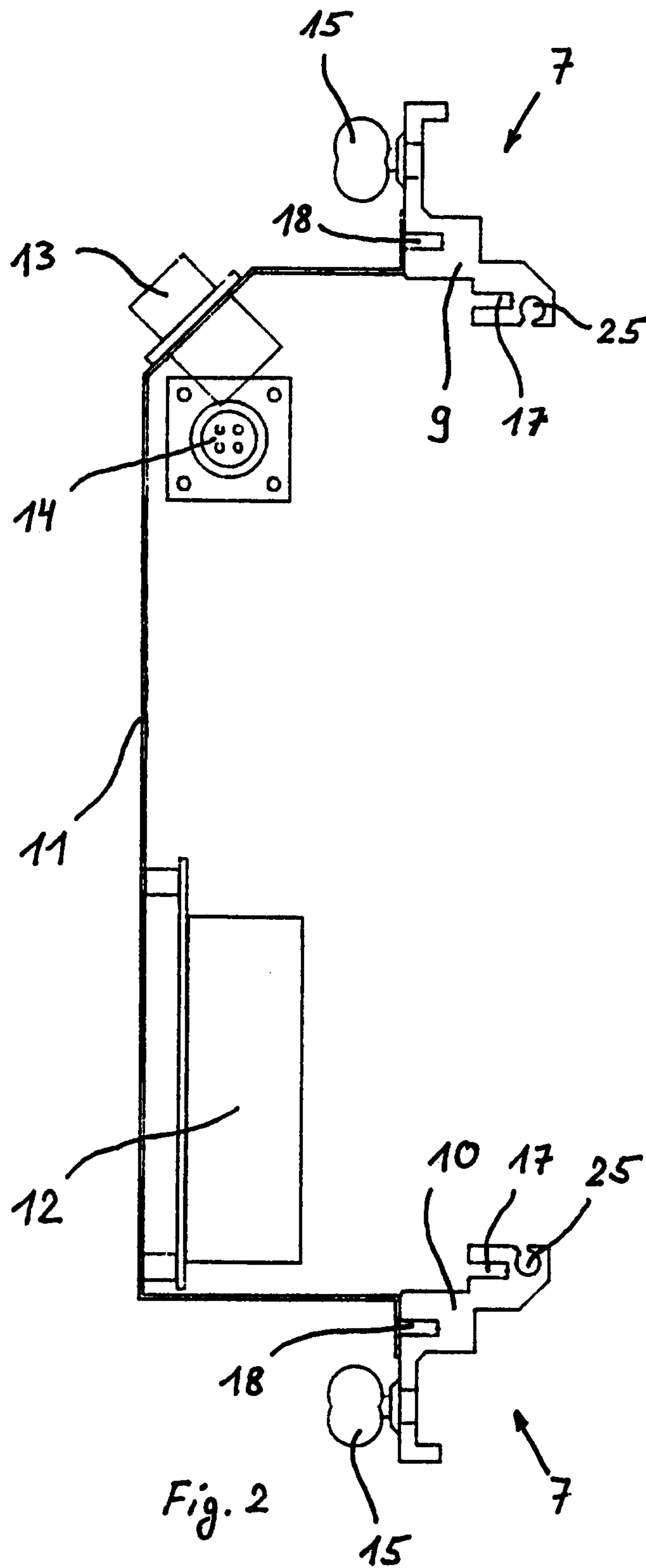
	1	glass panel
	2	inside
5	3	fastening element
	4	upper fastening profiled strip
	5	lower fastening profiled strip
	6	bonding surface
	7	module support element
10	8	support cams
	9	upper module support profiled strip
	10	lower module support profiled strip
	11	casing cover
	12	electronic unit
15	13	plug connection
	14	plug connection
	15	quick-connector
	16	display module
	17	groove
20	18	groove
	19	leg
	20	extension
	21	end
	22	leg
25	23	sliding surface
	24	sliding surface
	25	channel
	26	adapting element
	27	upper adapter profiled strip
30	28	lower adapter profiled strip
	29	connecting piece
	30	recess
	31	groove
	32	extension
35	33	chamfer

Claims

1. Method for mounting a display module (16) behind a glass panel (1), in particular a glass panel (1) of a vehicle, wherein the display module (16) provides a display visible from outside the glass panel (1) and comprises a plurality of display elements each comprising a tilting segment and a light source associated therewith,
5 characterized in that
10 at least one fastening element (3) is glued to the inside (2) of the panel (1) and the display module (16) is installed on the at least one fastening element (3) with a short separation between the display
15 elements and the panel (1).
2. Method according to claim 1, **characterized in that** two fastening elements (3) shaped as profiled strips (9,10) are used, wherein the profiled strips (9,10)
20 are glued, parallel to one another, to the panel (1).
3. Method according to claim 1, **characterized in that** a fastening frame is used as the fastening element (3).
- 25 4. Method according to any one of the preceding claims, **characterized in that** a module support profiled strip (7) is mounted to the display module (16) and the display module (16) is mounted via the module support profiled strip (7).
- 30 5. Method according to claim 4, **characterized in that** the display module (16) is mounted via a quick-connector (15).

6. Method according to claim 1, **characterized in that** the display elements comprise light sources which are arranged to substantially emit light directly towards the viewer.
7. System for mounting a display module (16) behind a glass panel (1), in particular a panel (1) of a vehicle, wherein the display module (16) generates a display visible from outside the panel (1) and comprises a plurality of display elements each of which comprises one tilting segment and one light source associated with the tilting segment, for use in a method according to any one of claims 1 to 6, comprising fastening elements (3) and display modules (16) shaped for mutual matched cooperation, wherein the fastening elements (3) comprise a bonding surface (6) for glueing the fastening elements (3) to the panel (1).
8. System according to claim 7, **characterized by** module support profiled strips (7) which can be fastened to the display modules (16) and which cooperate with the fastening elements (3) for mounting the display modules (16).
9. System according to claim 8, **characterized by** adapting elements (26) for connecting the fastening elements (3) to the display modules (16) or to the module support profiled strips (7).
10. System according to claim 7, **characterized in that** the display elements comprise light sources which are disposed to substantially emit light directly towards the viewer.

11. Fastening element (3) for a system according to any one of claims 7 through 10, **characterized in that** it is designed as a profiled strip (9,10) or a fastening frame.
12. Fastening element (3) according to claim 11, **characterized in that** the bonding surface (6) is shaped to follow the curvature of the panel (1).
13. Module support profiled strip (7) for a system according to any one of claims 8 to 9, **characterized in that** it is shaped as a profiled strip (9,10) or as a frame.
14. Adapting element (26) for a system according to claim 9, **characterized in that** it is shaped as a profiled strip (27,28) or as a frame.
15. Fastening element (3) according to claim 11, module support profiled strip (7) according to claim 13 or adapting element (26) according to claim 14, **characterized in that** at least one sliding surface (23) is provided for play-free installation of the elements with respect to one another.



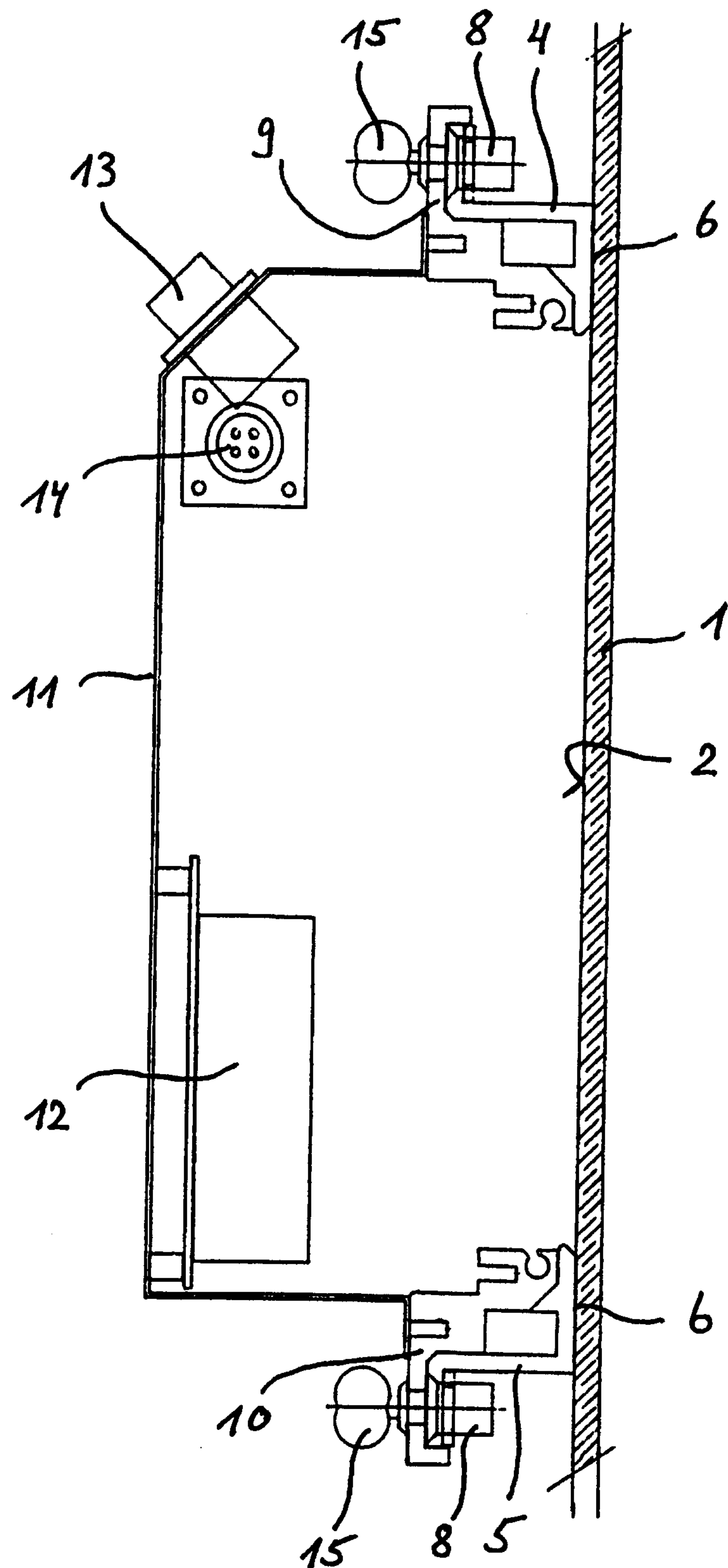


Fig. 3

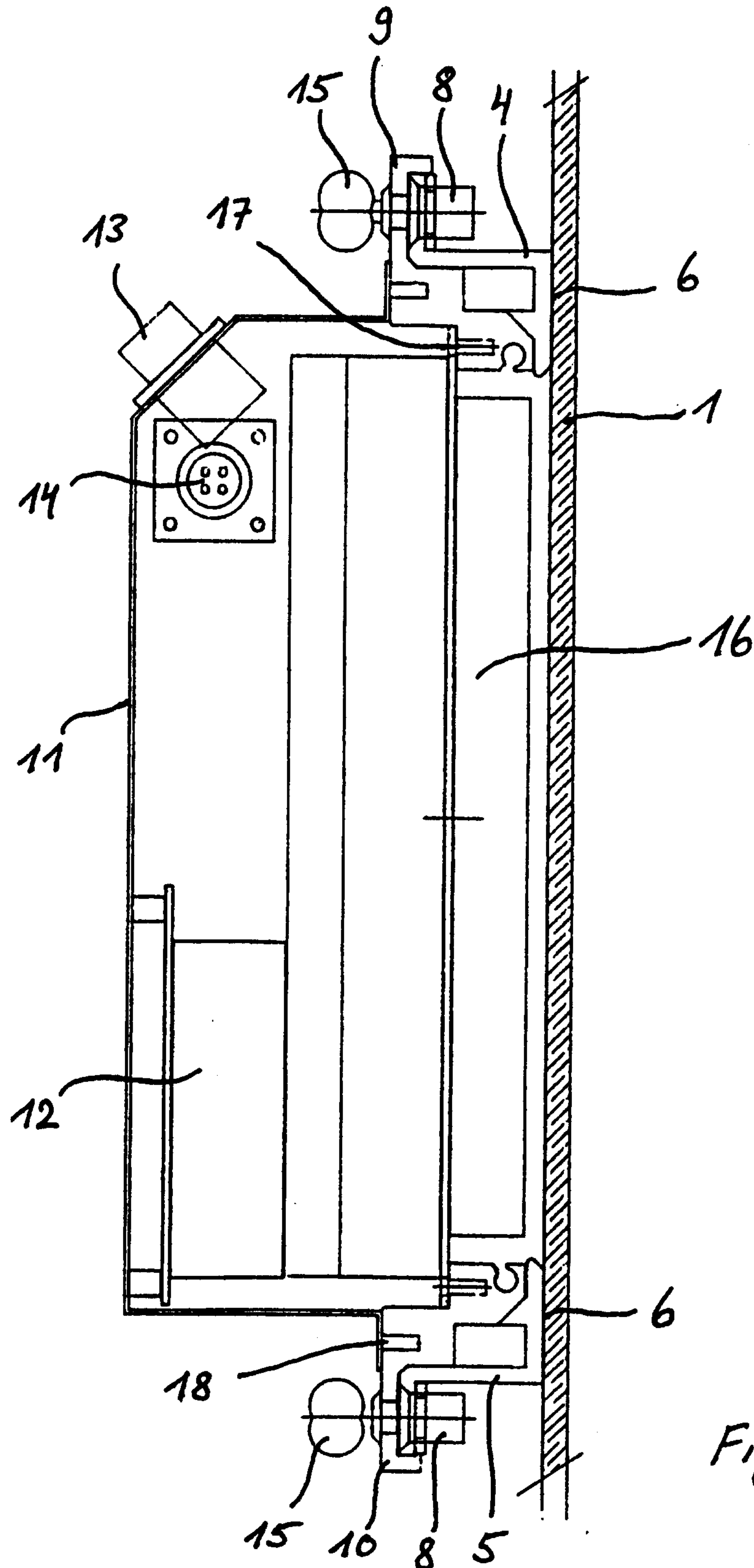


Fig. 4

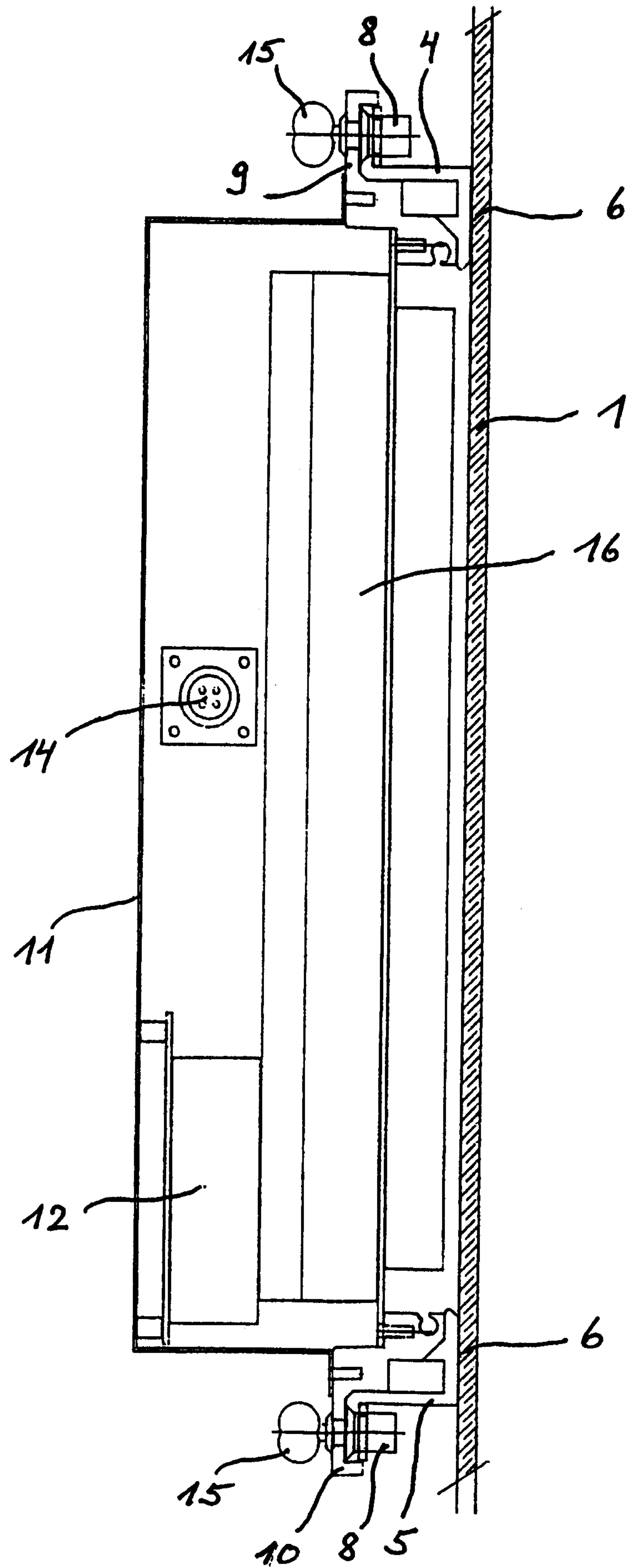
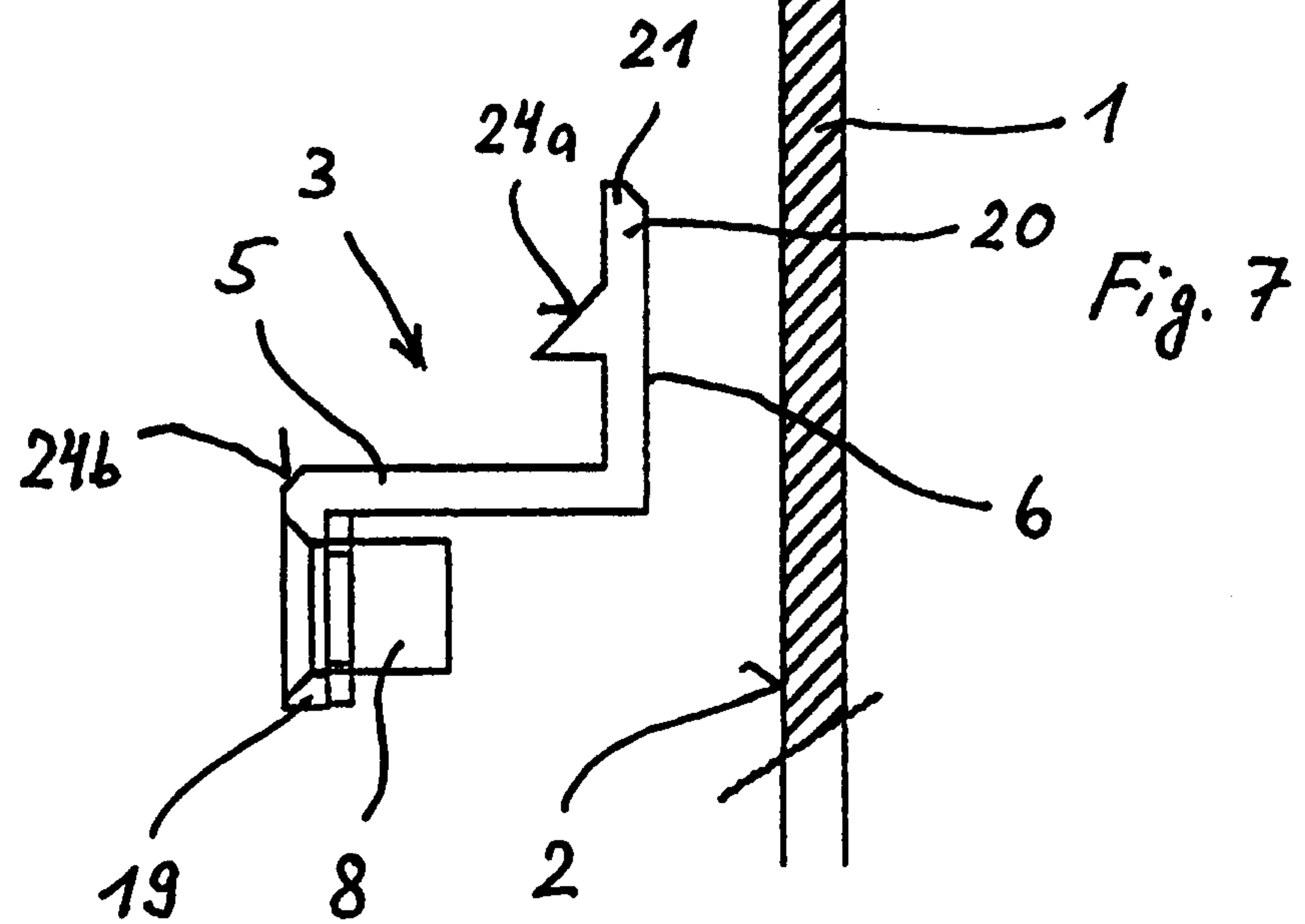
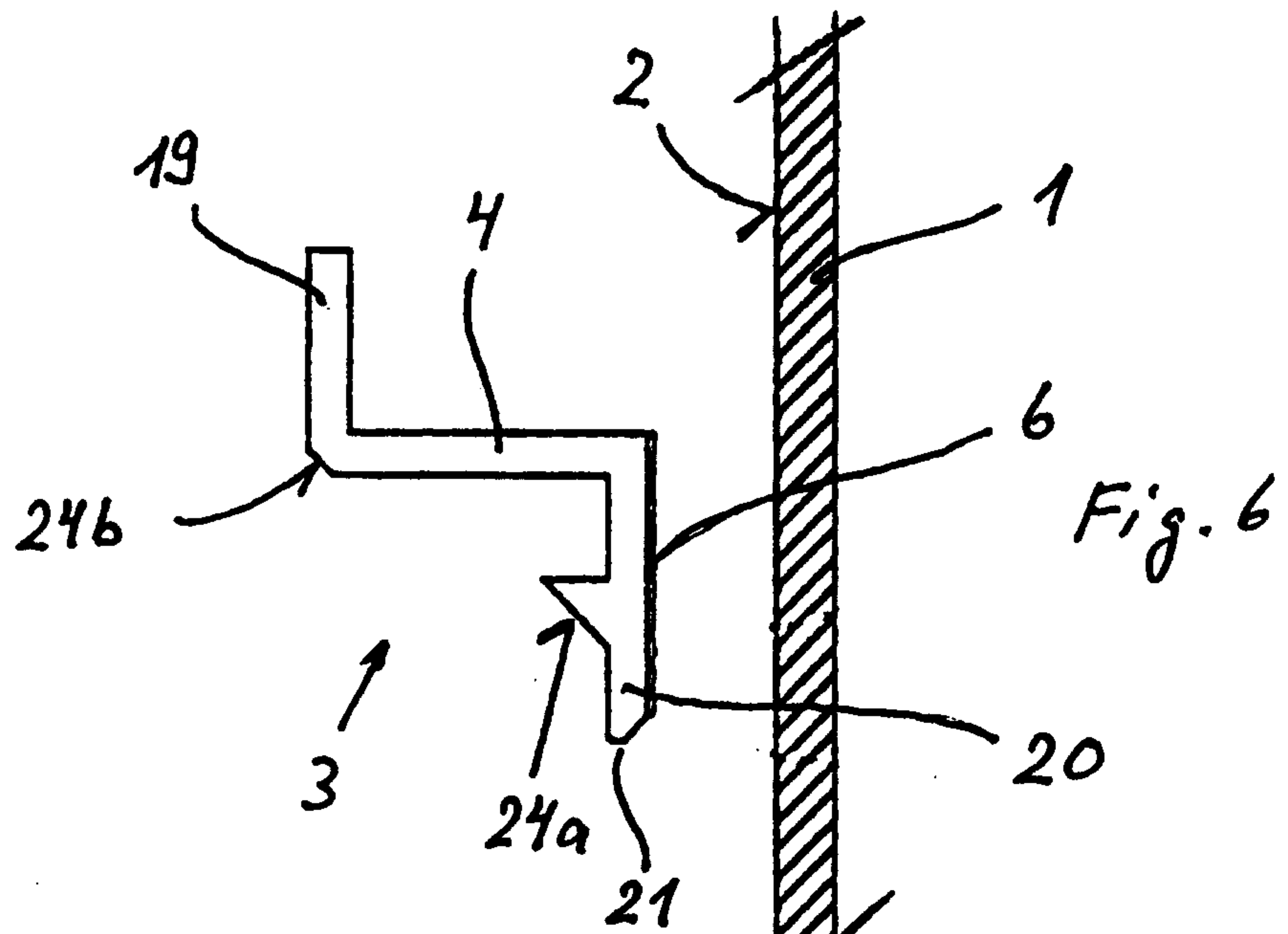
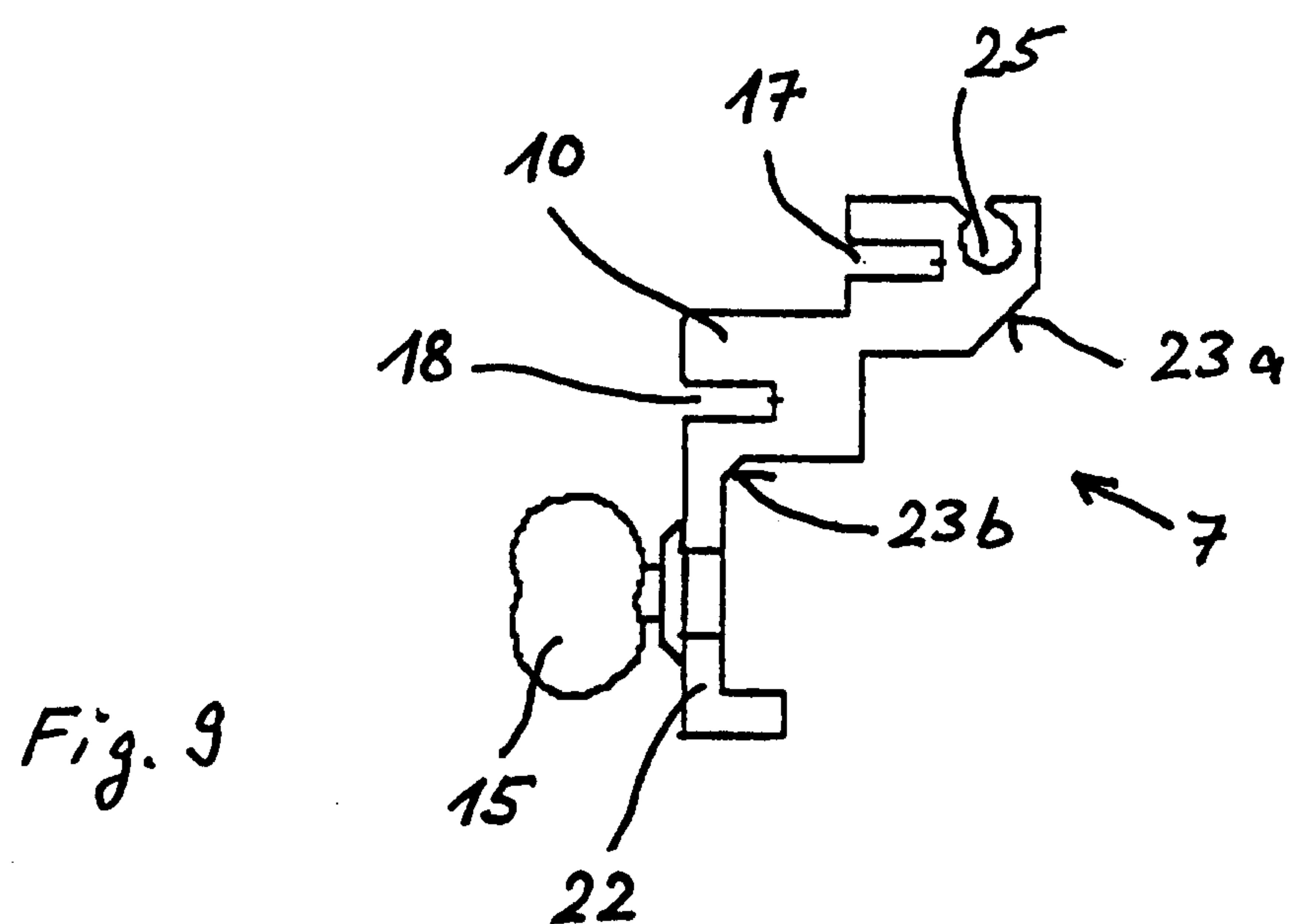
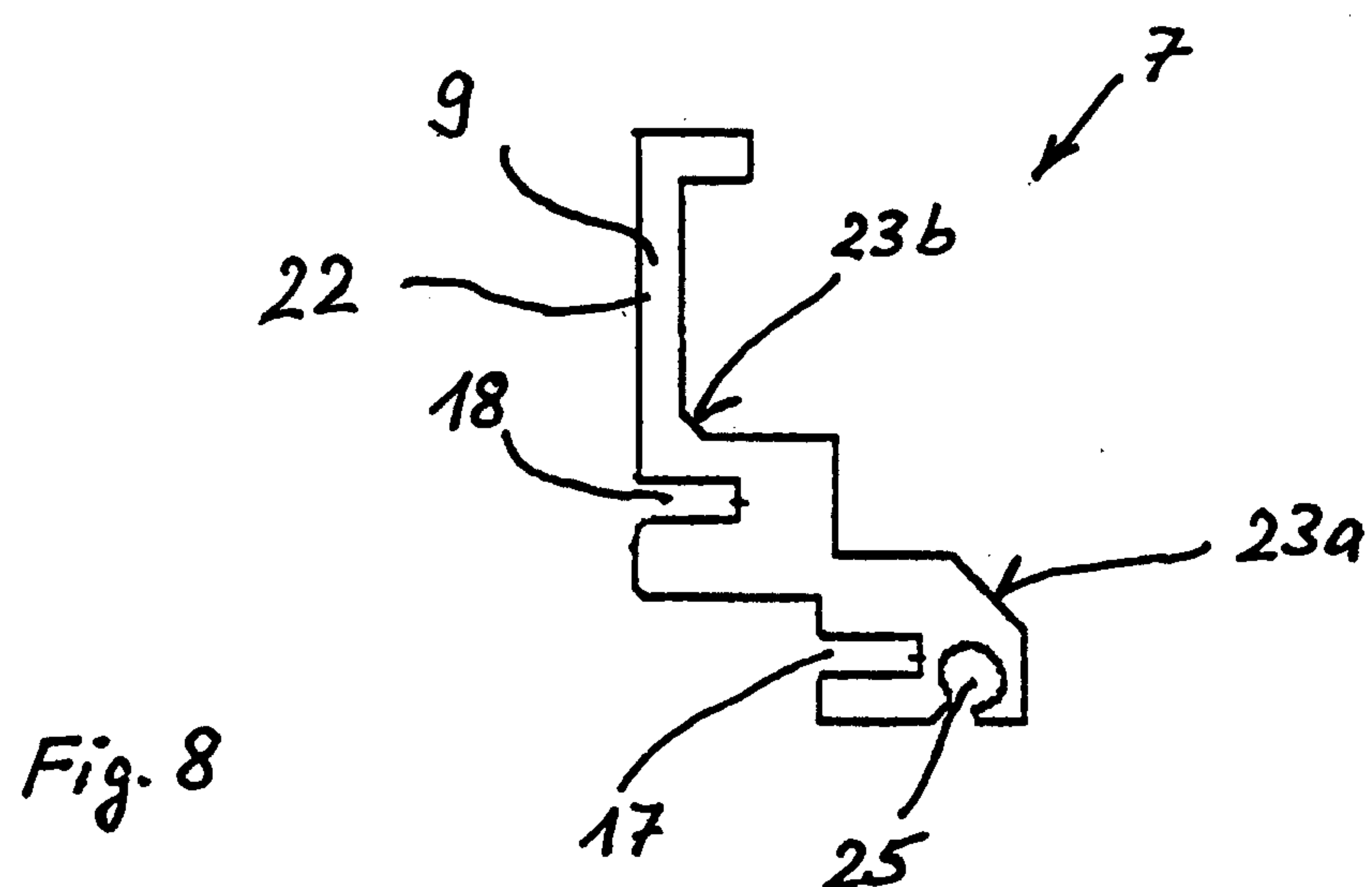


Fig. 5





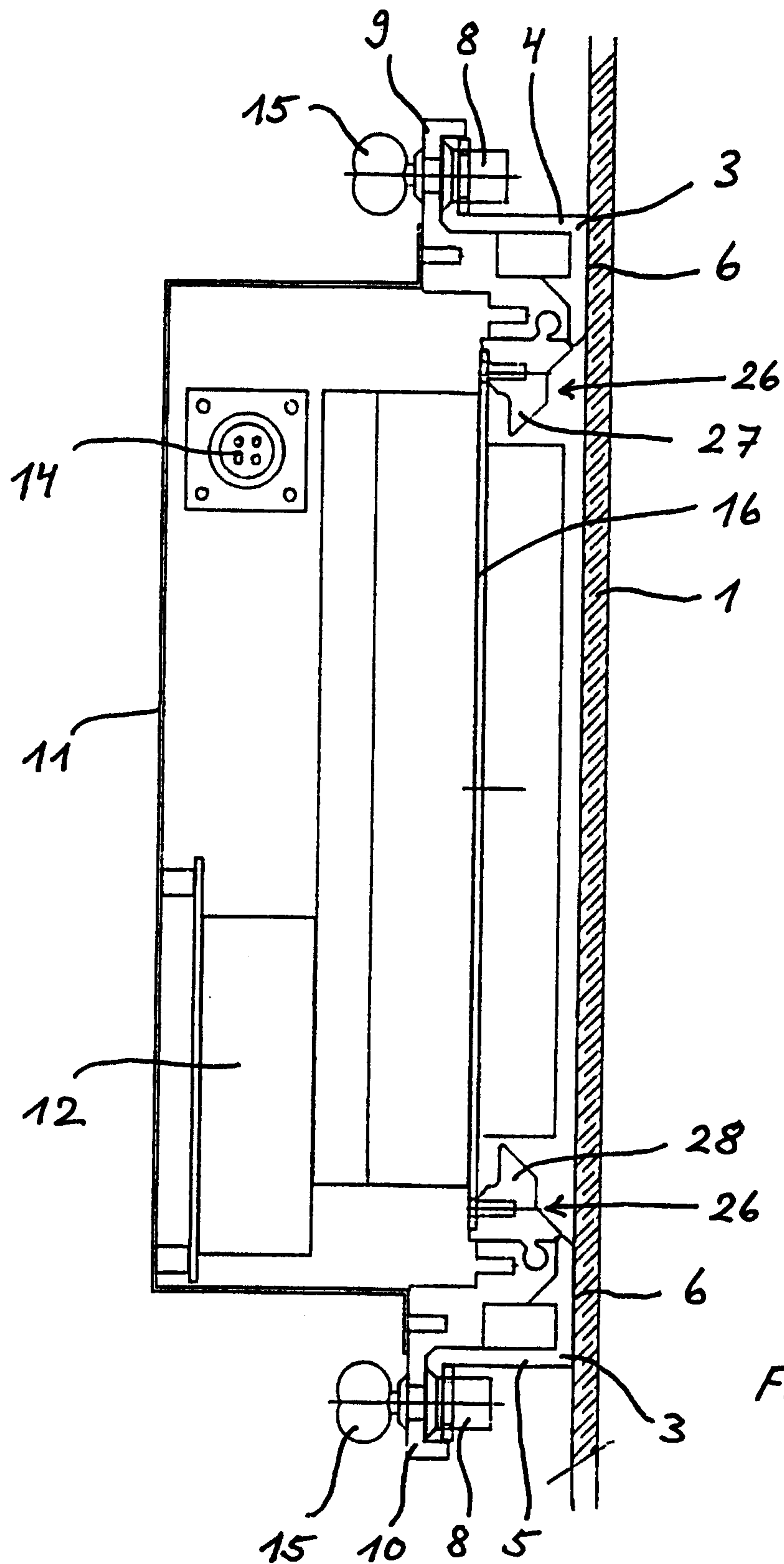
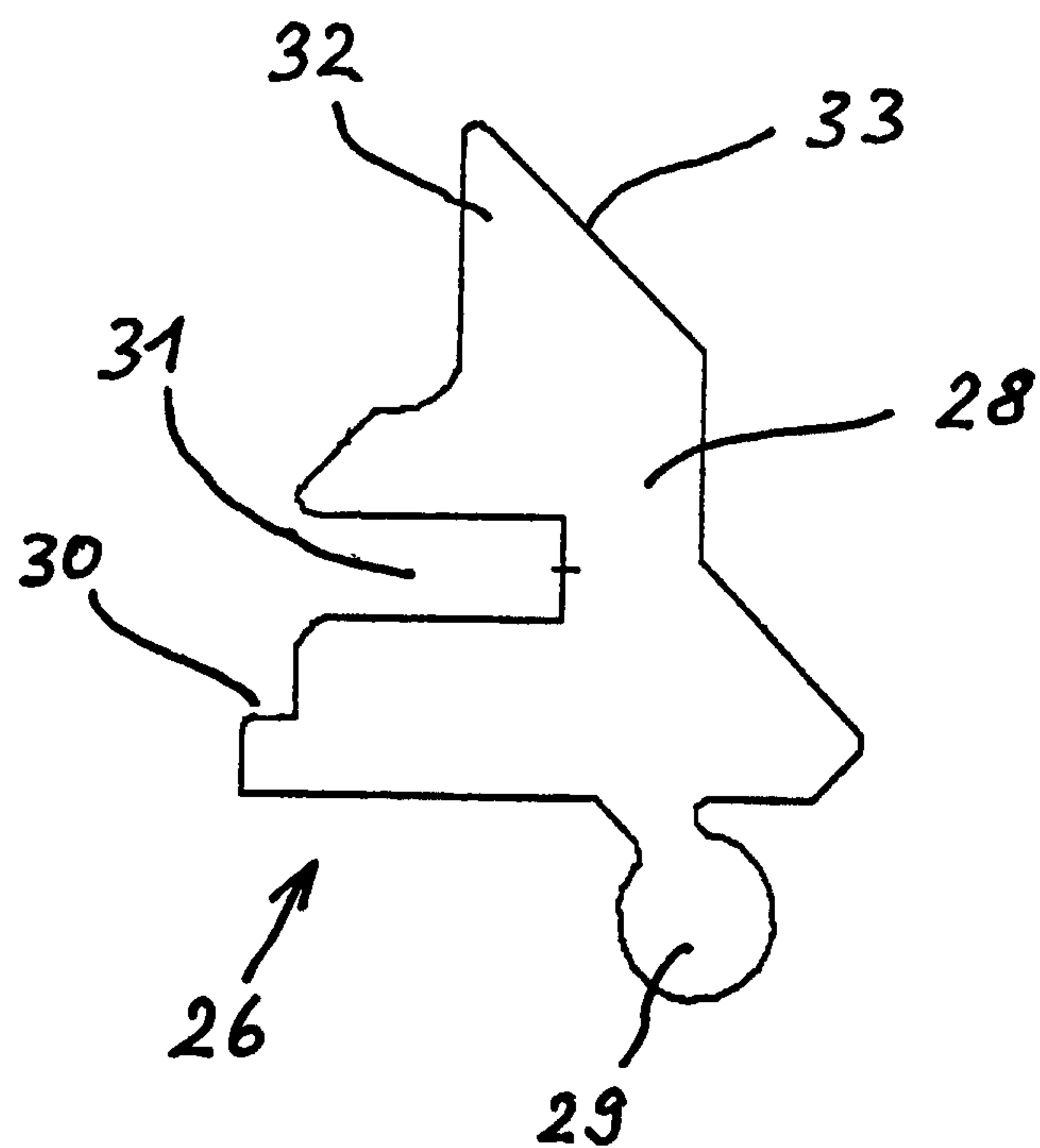
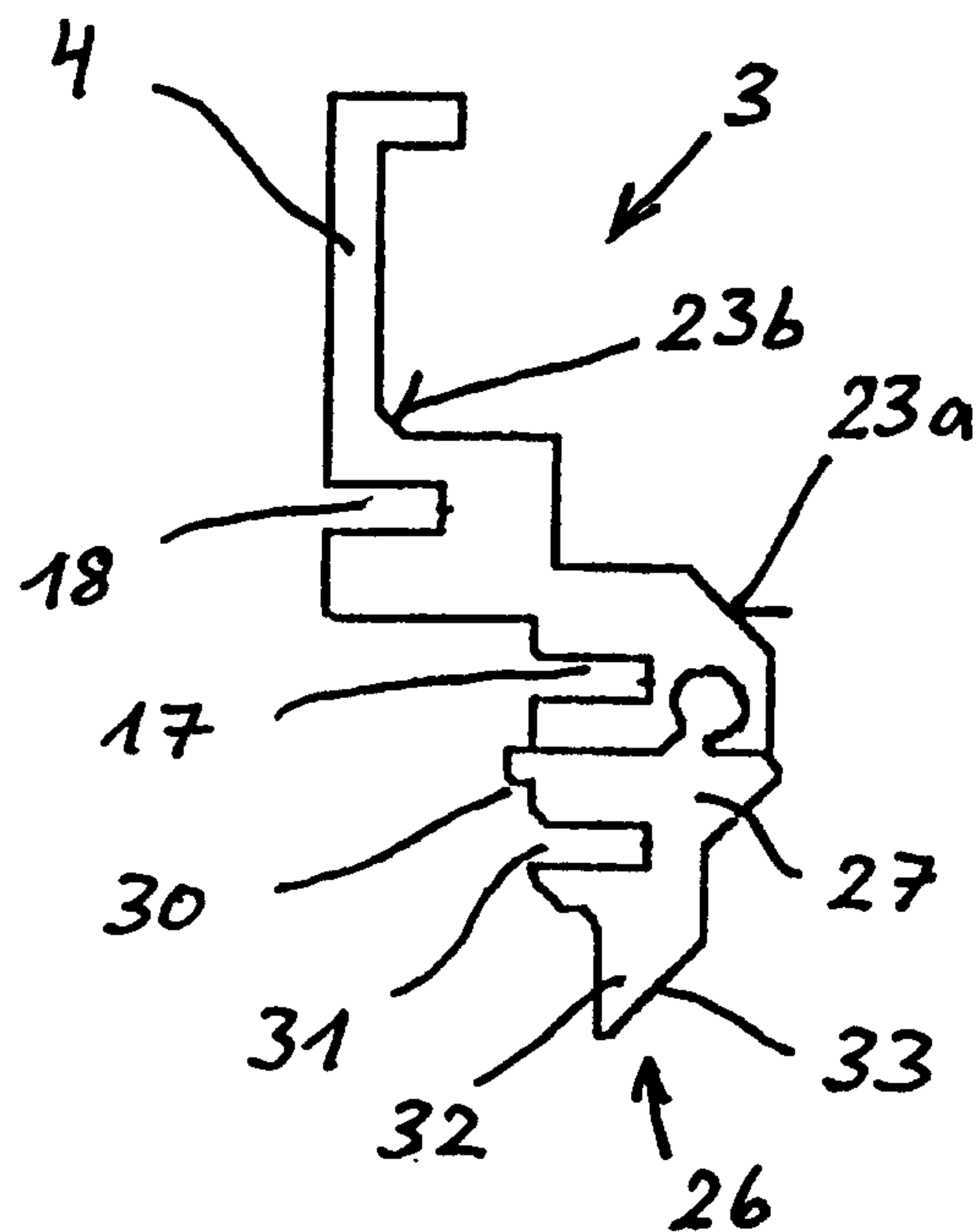


Fig. 10



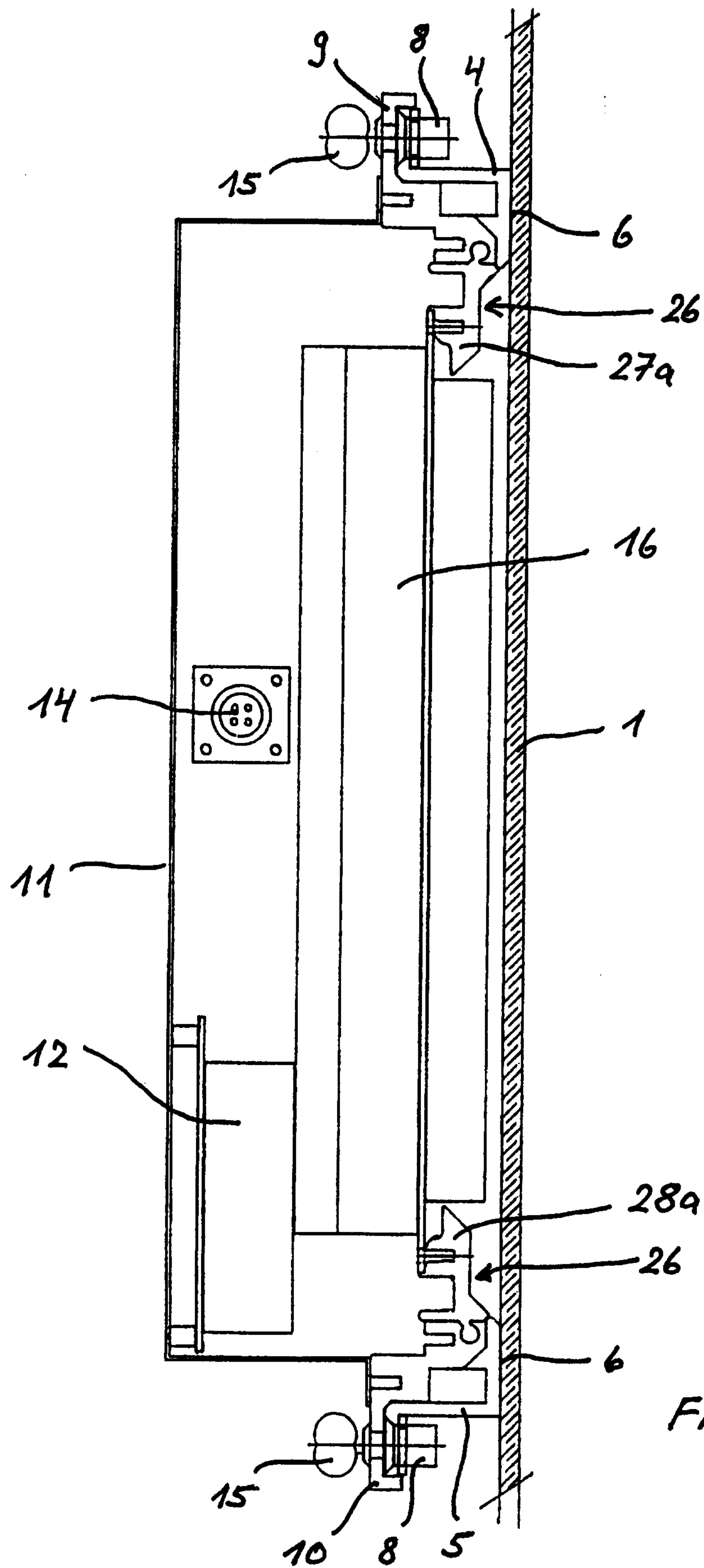


Fig. 13

