



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 234 940 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**28.08.2002 Bulletin 2002/35**

(51) Int Cl.7: **E05D 1/04**

(21) Application number: **02003526.7**

(22) Date of filing: **15.02.2002**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR**  
Designated Extension States:  
**AL LT LV MK RO SI**

(71) Applicant: **OIKOS VENEZIA S.R.L.**  
**30020 Gruaro, VE (IT)**

(72) Inventor: **Fornasari, Paolo**  
**33084 Cordenons, PN (IT)**

(30) Priority: **21.02.2001 IT TV010023**

(74) Representative: **Dalla Rosa, Adriano**  
**via Vettorel 3**  
**31015 Conegliano (TV) (IT)**

(54) **Not visible slidable hinge**

(57) A concealed-type slidable, adjustably opening hinge, in particular for articulated joints in doors and windows of residential buildings, as well as for doors of furniture pieces, and the like, comprising a plurality of sectors (9) that are separated from and capable of cooperating with each other so as to vary the angle of rotation

of the hinge between the open and closed positions of said doors and windows, under interposition of anti-friction means (17, 27, 29) therebetween, and comprising means (20) for delimiting the opening extent of the hinge, in which said means are adapted to enable said sectors (9) to only displace within said open and closed positions.

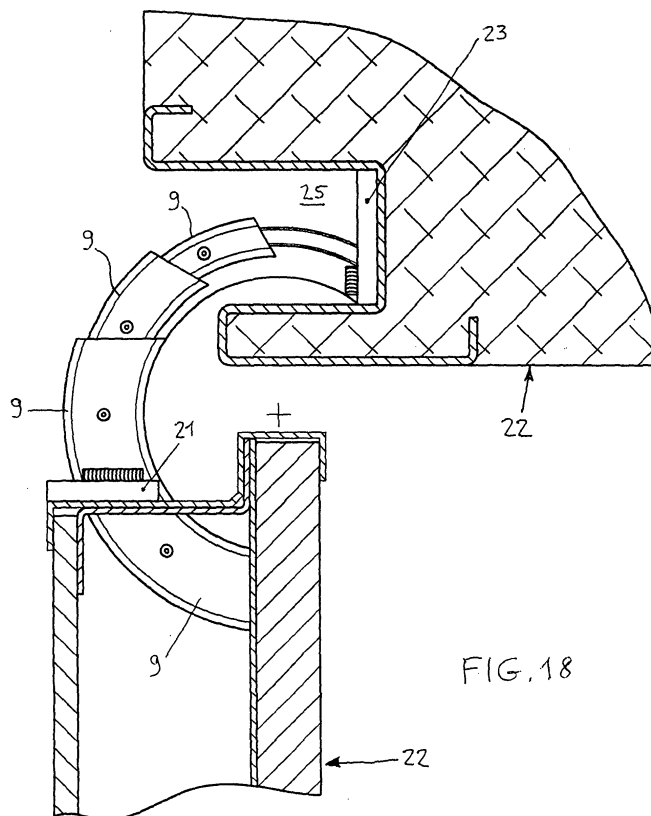


FIG. 18

EP 1 234 940 A2

**Description**

**[0001]** The present invention refers to a not-visible, i.e. concealed-type slidable, adjustably opening hinge, in particular for articulated joints in doors and windows of residential buildings or other applications, such as the doors of furniture pieces and the like, which is so formed and shaped as to enable said doors and windows to be displaced into various stable adjustment positions comprised between the full-open and full-closed ones, as well as to be concealed, i.e. non-visible from the outside when in their closed position.

**[0002]** At the present time, for doors, windows and similar fittings in residential buildings to be capable of being opened and closed, use is generally made of hinges that are pivotally fitted on pins that are fixed to peripheral portions of the frames of such doors and windows, thereby creating a condition in which said doors and windows are capable to be displaced from one to the other of the terminal positions by rotating about their hinging pins. Such hinges are furthermore visible from the outside in both the open and the closed position of the associated doors and windows, which on the one side require a corresponding space to be provided to cater for the installation of such hinges and, on the other side, have a resulting poor aesthetical appeal.

**[0003]** It therefore is a purpose of the present invention to do away with the above cited drawbacks and limitations of the current hinge systems by providing an adjustably opening, concealed-type slidable hinge that is so featured as to prevent the same hinge from been visible from the outside when in its closed position.

**[0004]** According to the present invention, these and further aims are reached in a hinge embodying the characteristics as recited and defined with particular reference to the appended claims.

**[0005]** Anyway, features and advantages of the present invention may be more readily understood from the description that is given below by way of nonlimiting example with reference to the accompanying drawings, in which:

- Figure 1 is a front view of a window in the closed position thereof, incorporating a hinge according to the present invention;
- Figure 2 is a front view of the window shown in Figure 1, as displaced into the open position thereof;
- Figure 3 is a front view of a hinge according to the present invention, in a first embodiment thereof and as displaced in an operational position thereof;
- Figure 4 is a side view of the hinge illustrated in Figure 3;
- Figure 5 is a plan view of the hinge illustrated in Figure 3;

- Figure 6 is a perspective rear view of the hinge illustrated in Figures 3 to 5;
- Figure 7 is a perspective front view of the hinge illustrated in Figures 3 to 6, as displaced in another operational position thereof;
- Figure 8 is a side view of the hinge illustrated in Figure 7;
- Figure 9 is a perspective rear view of the hinge illustrated in Figures 7 and 8;
- Figure 10 is a perspective front view of the hinge according to the present invention, in a second embodiment thereof and as displaced in an operational position thereof;
- Figure 11 is a side view of the hinge illustrated in Figure 10;
- Figure 12 is a perspective front view of the hinge illustrated in Figures 10 and 11, as displaced in another operational position thereof;
- Figure 13 is a perspective front view of the hinge according to the present invention, in a third embodiment thereof and as displaced in an operational position thereof;
- Figure 14 is a side view of the hinge illustrated in Figure 13;
- Figure 15 is a perspective front view of the hinge illustrated in Figures 13 and 14, as displaced in another operational position thereof;
- Figure 16 is a schematic, cross-sectional plan view of a hinge according to the present invention, as installed in the application position thereof and displaced in an operational position thereof;
- Figure 17 is a plan cross-sectional view of the hinge illustrated in Figure 16, as displaced in another operational position thereof;
- Figure 18 is a plan cross-sectional view of the hinge illustrated in Figure 16, as displaced in further operational position thereof;
- Figure 19 is a perspective exploded side view of some construction details of the hinge according to the present invention;
- Figure 20 is a schematic plan view of a further construction detail of the hinge according to the present invention, as displaced in an operational position thereof;

- Figure 21 is a schematic plan view of the construction detail illustrated in Figure 20, as displaced in another operational position thereof.

**[0006]** Figures 1 and 2 are shown to illustrate a hinge that is applied on to a window 6. In particular, in Figure 1, where the leaves 7 and 8 of the window are shown to be displaced into the closed position thereof, it can be noticed that, for the reasons that will be described in greater detail further on, the corresponding hinges used to pivotally support said window leaves on the respective pins thereof are not visible from the outside, whereas in Figure 2, in which said window leaves 7 and 8 are shown to be displaced into the open position thereof, it can be noticed that the various hinges 5 used in the application are visible from the outside.

**[0007]** The above cited hinge can most obviously be used also to fit other kinds of applications, such as for example in kitchen cabinets to enable the doors thereof to be closed and opened as well as to be displaced into intermediate opening or closing positions according to the same principles and in the same way.

**[0008]** Referring now to Figures 3 to 9, which are shown to illustrate a hinge according to the present invention in a first embodiment thereof, it can be noticed that this hinge is substantially comprised of a set of mutually cooperating sectors 9 (see Figures 7 and 8) having the same extension and provided with a peripheral wall 10 with a semi-circular contour that is so shaped as to show a lateral profile delimited by upper and lower plane surfaces 11 and 12 and formed by a central rectilinear wall 13 and two rectilinear terminal walls 14 and 15 extending outwards and radiused with respect to the central rectilinear wall 13, as well as slightly bent orthogonally inwards at their end portions, in such a manner as to ensure that all of said sectors 9 are capable of being arranged one upon the other, i.e. in an overlapping arrangement, by slidably engaging each other with their respective bent end portions 16 and setting themselves with their respective central rectilinear walls 13 slightly spaced from each other.

**[0009]** In the illustrated example, there are provided four sectors 9a, 9b, 9c and 9d, which are arranged upon each other telescopically and capable of sliding with respect to each other, wherein each one of such sectors is clad with correspondingly shaped plates 17 of an anti-friction material, such as brass, in correspondence of the bent end portions 16 thereof, in order to promote slidability of the various sectors on each other without them incurring any damage.

**[0010]** These correspondingly shaped plates 17 are properly attached on to the respective bent end portions, for instance by means of a pair of slightly protruding studs 18 that are adapted to be press-fitted into corresponding through-holes 19 (see Figure 19), or they can be either welded or adhesive-bonded against the respective bent end portions 16.

**[0011]** Furthermore, these sectors 9 are provided in

the central wall portion 13 thereof with mutually cooperating displacement limiting members 20, which, in the example being considered, are formed by a pair of protruding members 20 that are attached in a side-by-side arrangement to the end portions of the central wall 13 of each sector, wherein such members are protruding from both mutually opposite surfaces of the same wall, respectively, so as to be able to come into contact with corresponding protruding members of the contiguous sectors, so that each sector is capable to be caused to slide with respect to the other sectors, about a virtual axis of rotation, from a position in which all sectors are telescopically retracted, i.e. overlapping each other and coinciding with each other (see Figures 7, 8 and 20), corresponding to the condition in which the associated door or window is fully closed, to a position in which such a sector is brought into a state of maximum extension along with the remaining adjacent sectors (see Figures 6, 9 and 21), corresponding to the condition in which the associated door or window is fully open.

**[0012]** The contact that the protruding members of the various sectors in this way establish with each other, further to limiting the extent of the sliding displacement of the sectors with respect to each other, allows for the same sectors to be able to pull each other along in both directions, i.e. towards both the closed and the open position of the hinge of the invention.

**[0013]** Finally, the hinge according to the present invention is further provided with plates for fixing the same hinge on to the door or window frame and the support case, respectively, wherein such plates are attached externally against the central wall 13 in such a way as to laterally protrude therefrom. In the example being considered, they are constituted by the plate 21, that is intended for fixing against the inner surface of the door or window frame 22, and the plate 23, which is intended for fixing to the bottom 24 of a recess 25 provided all along the peripheral edge 26 of the support case (see Figures 16, 17 and 18).

**[0014]** In Figures 16 and 17, in particular, the door or window frame incorporating the hinge of the invention can be noticed to be displaced into the closed position and the fully-open position thereof, respectively, wherein in the first case the sectors of the hinge are fully retracted, i.e. overlapping and coincident with each other in a condition in which is partially accommodated in the recess 25, so that it is not visible from the outside, and in the second case said sectors of the hinge are on the contrary fully extended with respect to each other, in a condition in which the hinge has moved out of said recess 25 and is visible from the outside.

**[0015]** Figure 18 can furthermore be noticed to illustrate the case in which the door or window frame is displaced into an intermediate opening position.

**[0016]** The hinge being considered can be displaced in a continuous manner by causing the various sectors 9 thereof to slide, in the afore described manner, into adjustment positions comprised between the fully

closed and the fully open positions of the same hinge, wherein the door or window frame concerned is capable of remaining in each one of such adjustment positions in a firm and stable manner.

[0017] If Figures 10 to 12 are looked at now, in which a second embodiment of the hinge according to the present invention is illustrated, it can be noticed that the sectors 9 of the hinge are shaped so as to feature a lateral contour which is different from the one of the afore considered sectors. In this case, it is in fact formed by semi-circular box-shaped portions arranged concentrically and capable of being adapted to each other coaxially, which are adapted to slide individually in a circular direction, under interposition of rolling balls 27, rollers or bearings, between a box-shaped portion and the contiguous one, so as to enable them to slide smoothly, as described in connection with the afore considered case, and with less friction. In this particular example, they are constituted by the semi-circular box-shaped portions 28a, 28b, 28c and 28d.

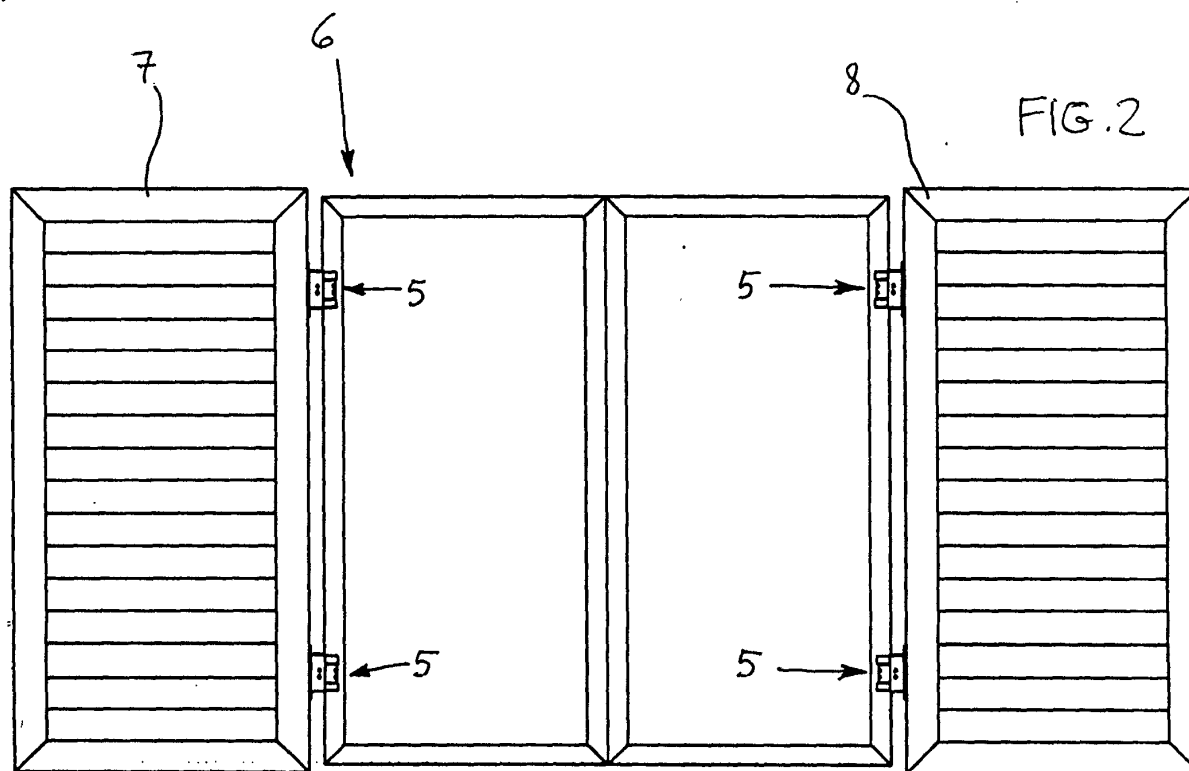
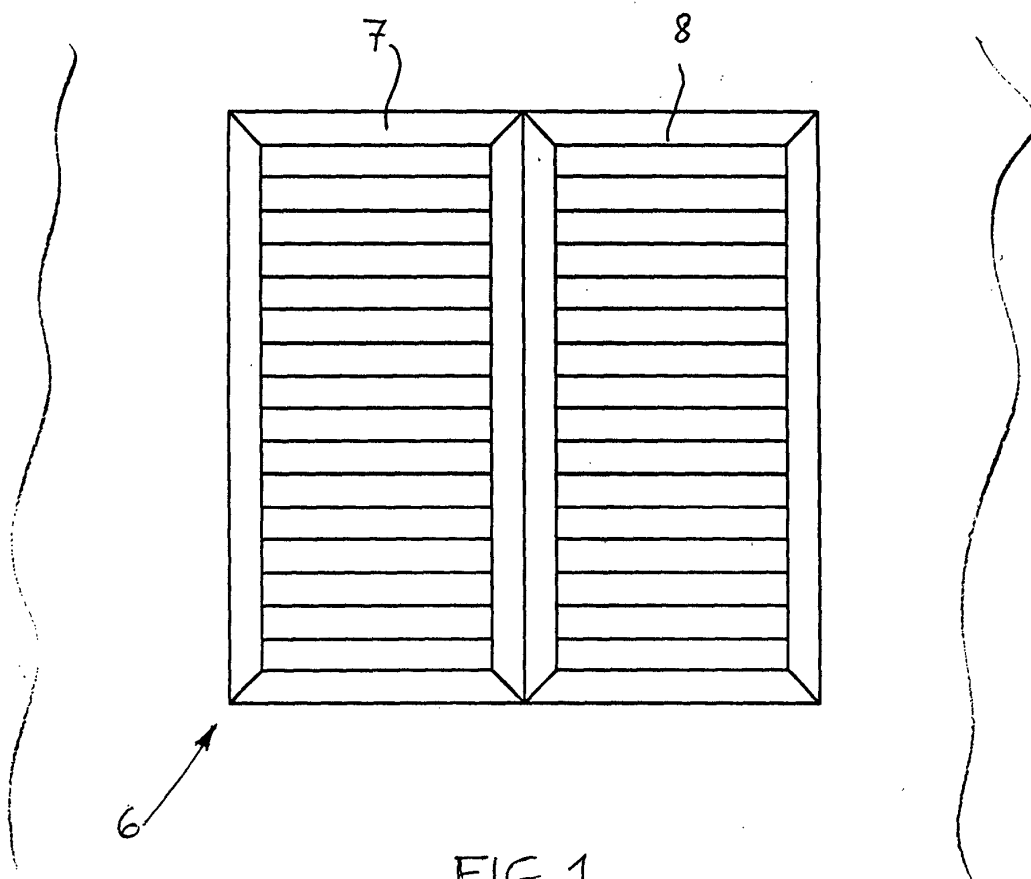
[0018] In Figures 13 to 15, finally, in which a third embodiment of the hinge according to the present invention is illustrated, it can be noticed that the sectors 9 of the hinge are so shaped as to feature a lateral contour formed by box-like portions of a semi-circular shape provided in a co-planar arrangement and capable of conforming to each other, which are adapted to slide individually in a circular direction, again under interposition of rolling balls 29, rollers or bearings, between a box-shaped portion and the contiguous one, which in this case are constituted by the semi-circular box-shaped portions 30a, 30b, 30c and 30d.

## Claims

1. Not-visible slidable, adjustably opening hinge, in particular for articulated joints in doors and windows of residential buildings, as well as for doors of furniture pieces, and the like, capable of displacing from an open position to a closed position, and vice-versa, **characterized in that** it comprises a plurality of sectors (9) that are separated from and capable of cooperating with each other so as to vary the angle of rotation of the hinge between said open and closed positions, under interposition of anti-friction means (17; 27; 29) therebetween, and **in that** it further comprises means (20) for delimiting the opening extent of the hinge, in which said means are adapted to enable said sectors (9) to only displace within said open and closed positions.
2. Hinge according to claim 1, **characterized in that** said sectors (9) are shaped to show a semi-circular peripheral contour and are slidably displaceable from a position in which they are telescopically retracted to overlap each other in a mutually conforming manner, to a position of maximum extension, by

rotating about a virtual axis of rotation, corresponding to the closed position and the open position of the hinge, respectively, in which said sectors (9) are joined at their end portions to corresponding plates (21, 23) for the attachment of the hinge in the installation position thereof.

3. Hinge according to claim 2, **characterized in that** said sectors (9) are shaped to show a lateral contour that is delimited by upper and lower plane surfaces (11, 12) and is formed by a central rectilinear wall (13) and two rectilinear terminal walls (14, 15) extending outwards and radiused with respect to the central rectilinear wall (13), as well as bent orthogonally inwards at their end portions (16).
4. Hinge according to claim 3, **characterized in that** said anti-friction means are formed by correspondingly shaped plates (17) of an anti-friction material, such as brass, which are applied on to the bent end portions (16) of each sector (9), in contact with the respectively adjacent sectors.
5. Hinge according to claim 2, **characterized in that** said sectors (9) are shaped to show a lateral profile formed by semi-circular box-like portions (28a, 28b, 28c, 28d) arranged concentrically and coaxially conformable to each other.
6. Hinge according to claim 2, **characterized in that** said sectors (9) are shaped to show a lateral profile formed by box-like portions of a semi-circular shape (30a, 30b, 30c, 30d) in a co-planar arrangement and conformable to each other.
7. Hinge according to claims 5 and 6, **characterized in that** said anti-friction means are formed by rolling balls (27; 29), rollers or bearings, provided between said sectors (9).
8. Hinge according to any of the preceding claims, **characterized in that** said opening-extent limiting members are formed by members (20) that are attached to said sectors (9) and protrude from both mutually opposite surfaces of the same sectors, respectively, so as to come into contact with corresponding protruding members (20) of the respectively contiguous sectors.



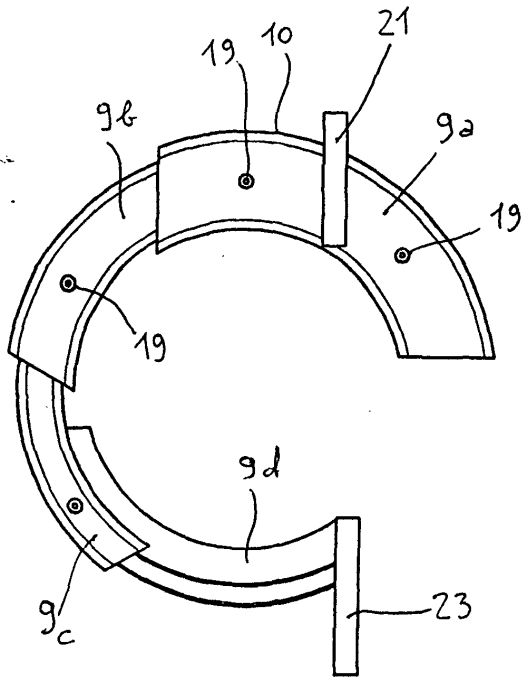


FIG. 4

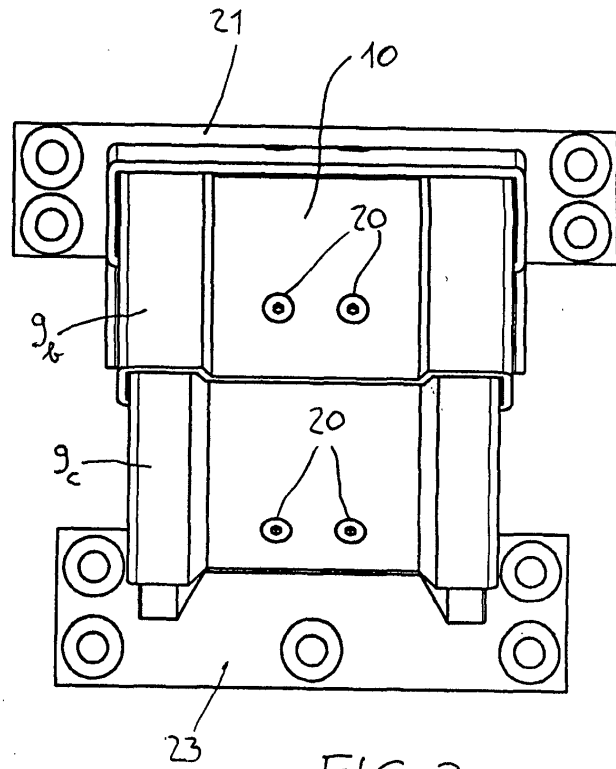


FIG. 3

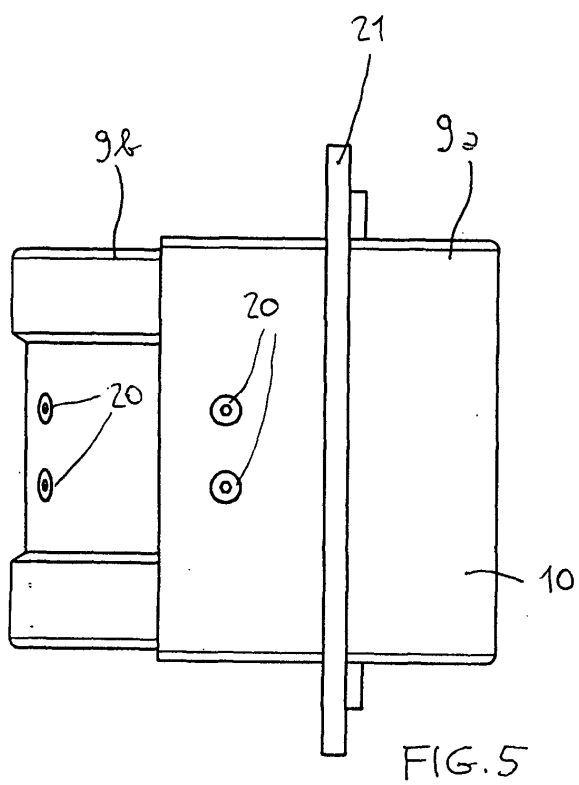


FIG. 5

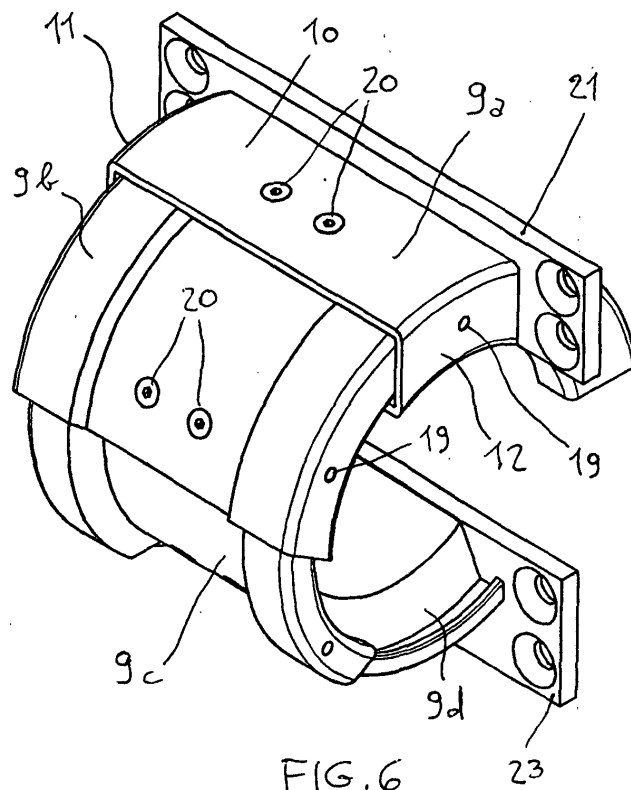
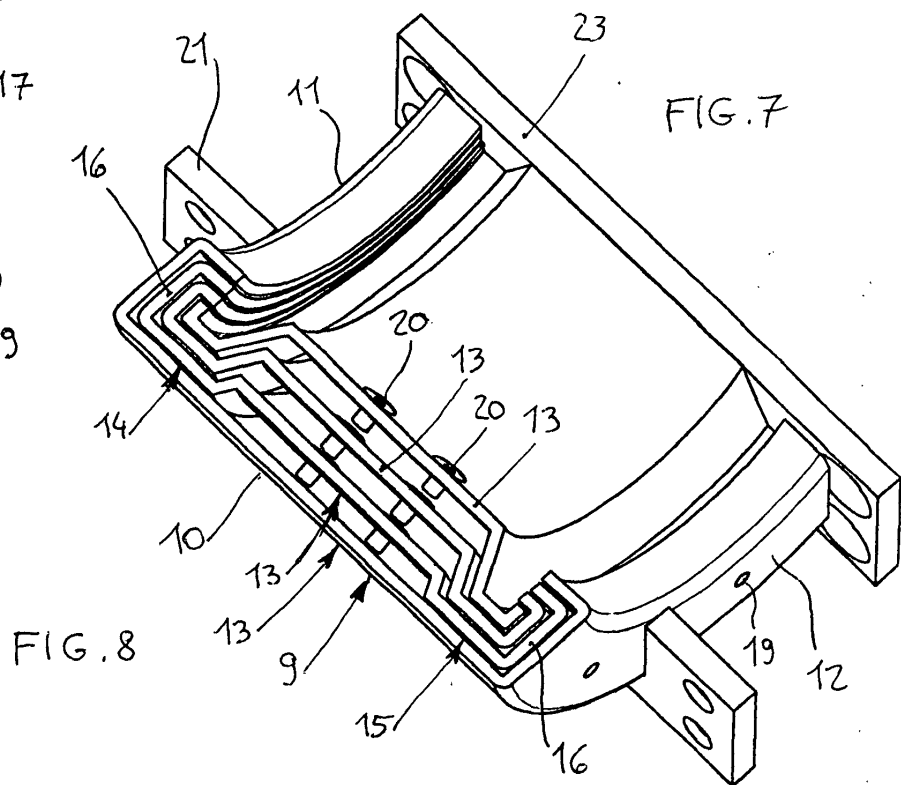
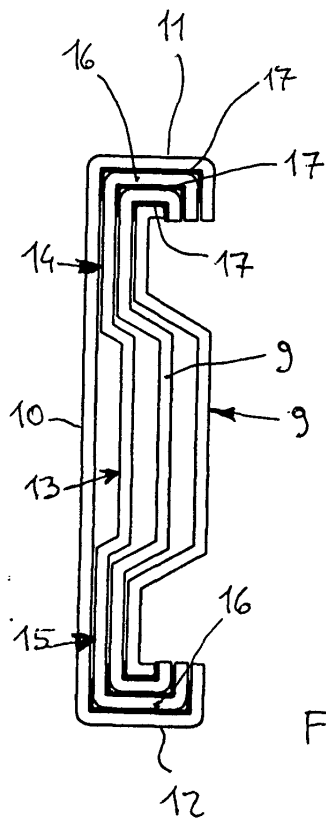
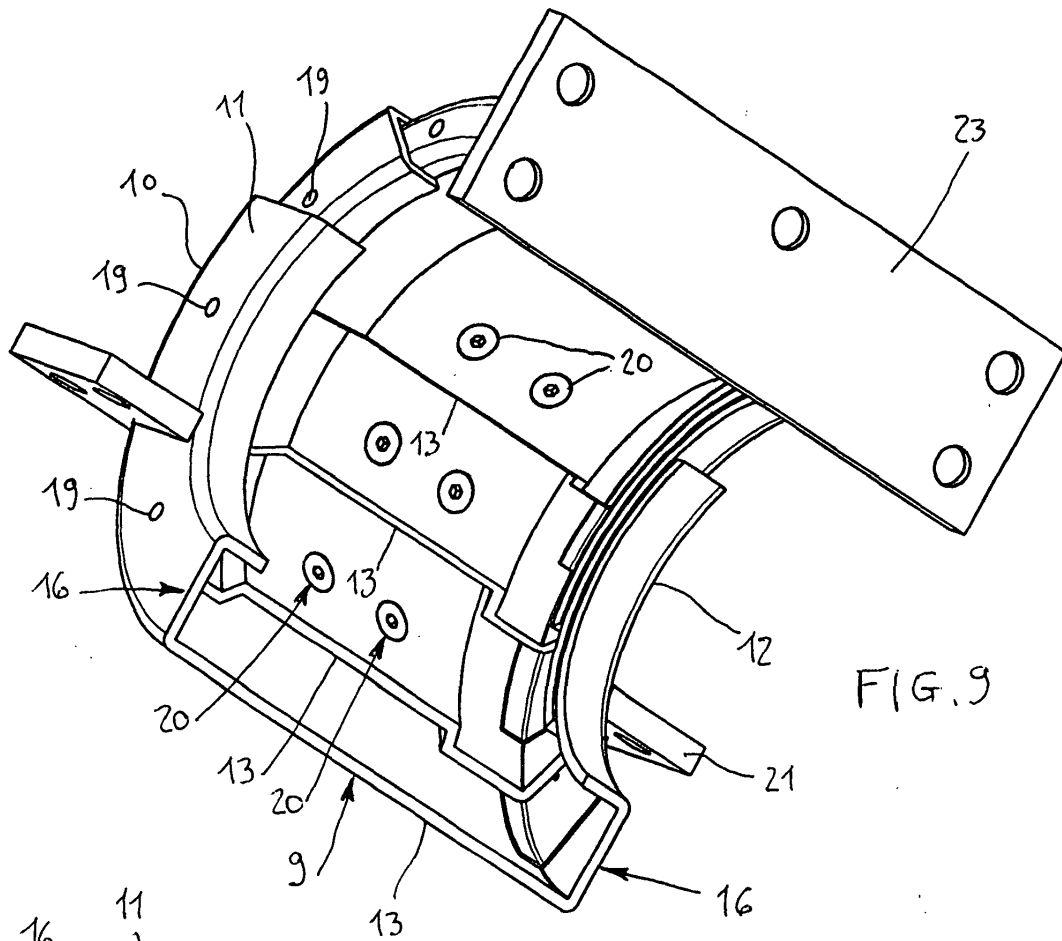
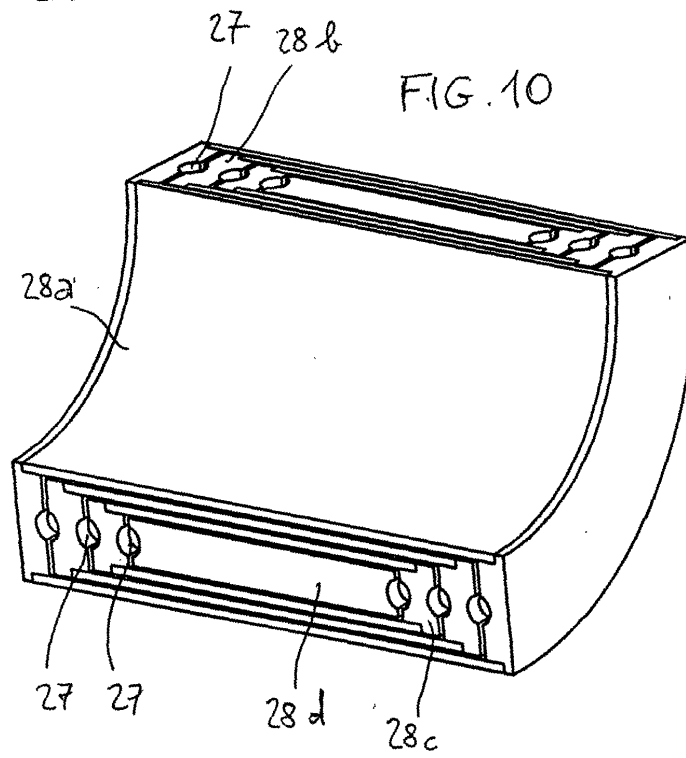
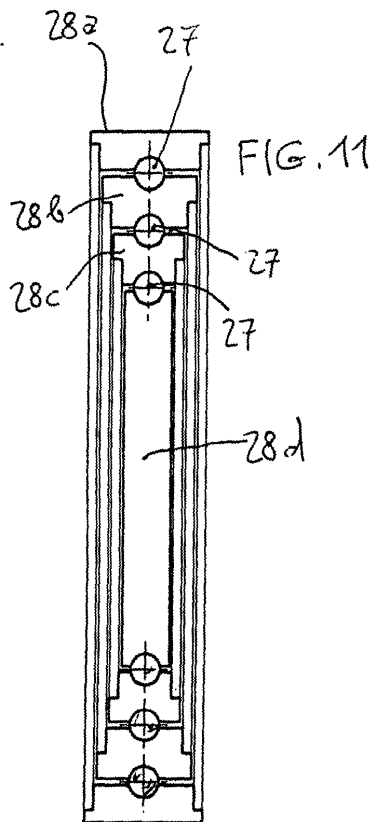
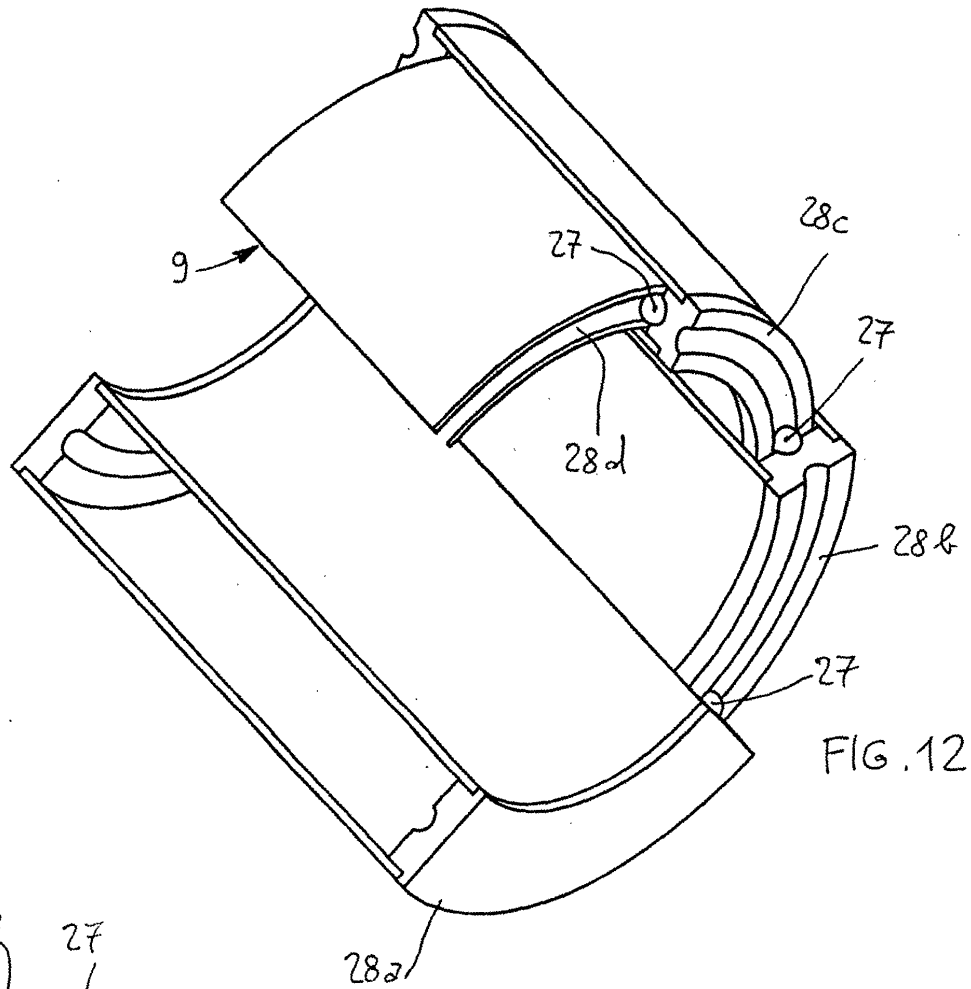
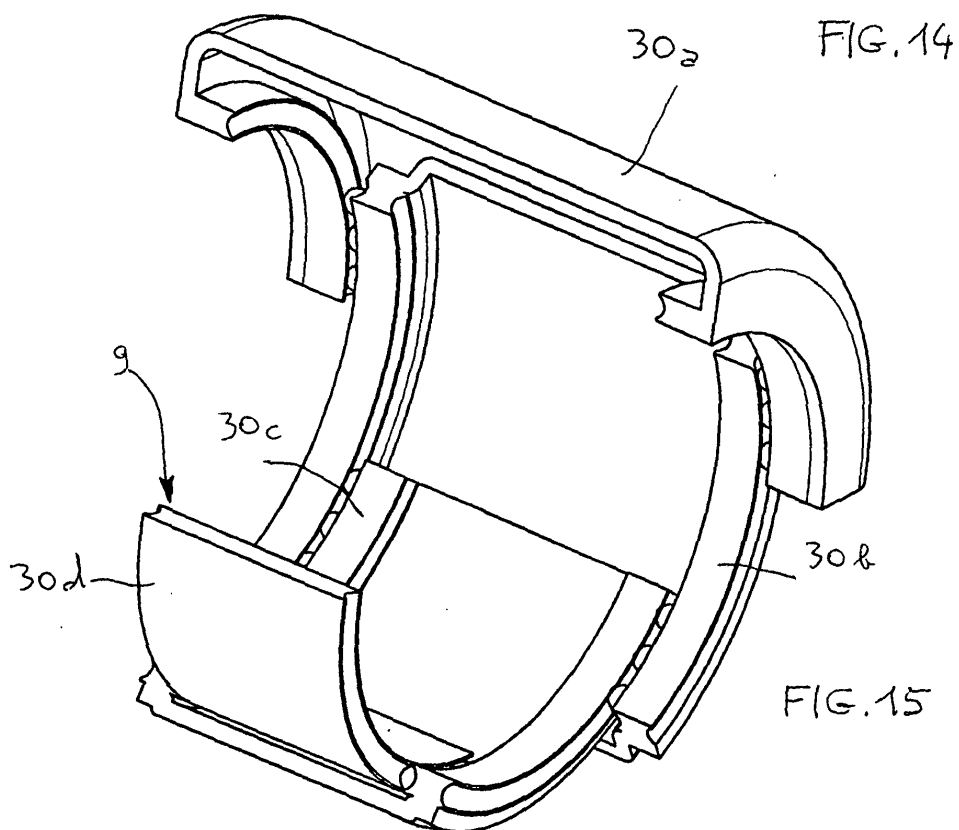
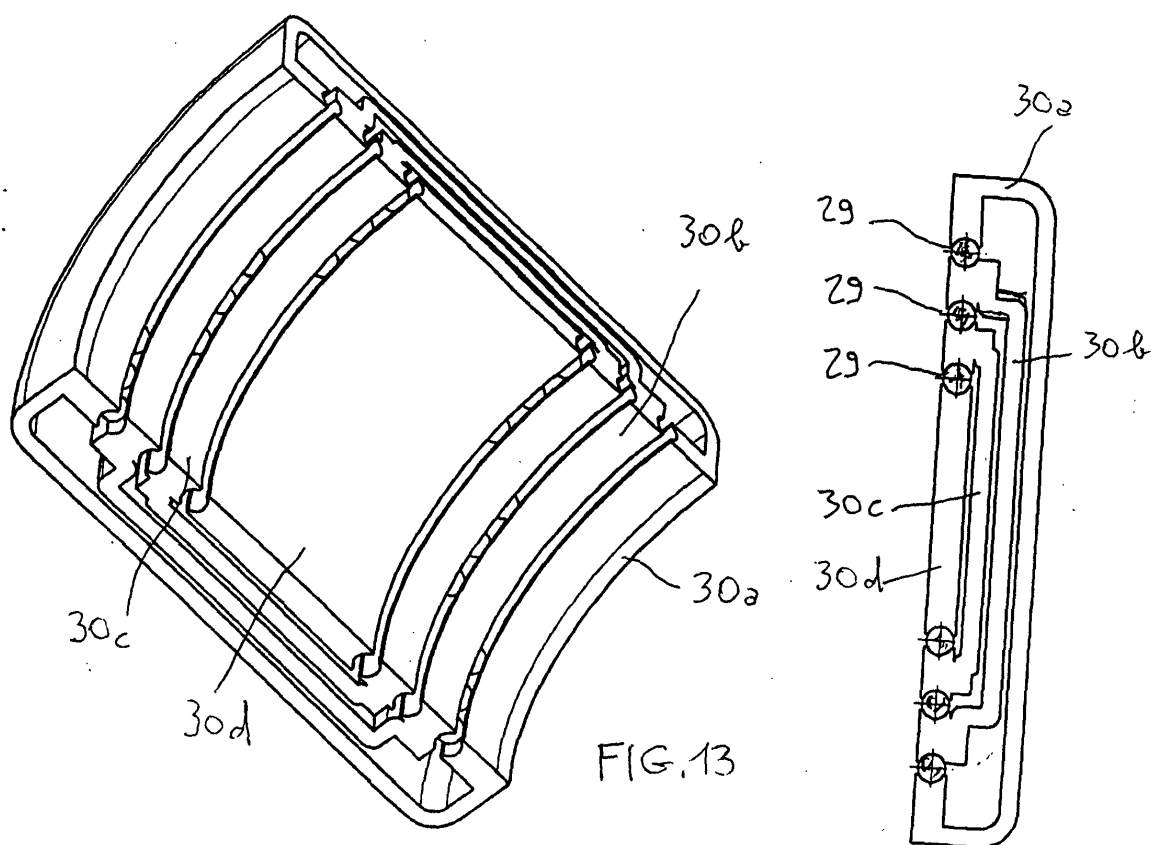
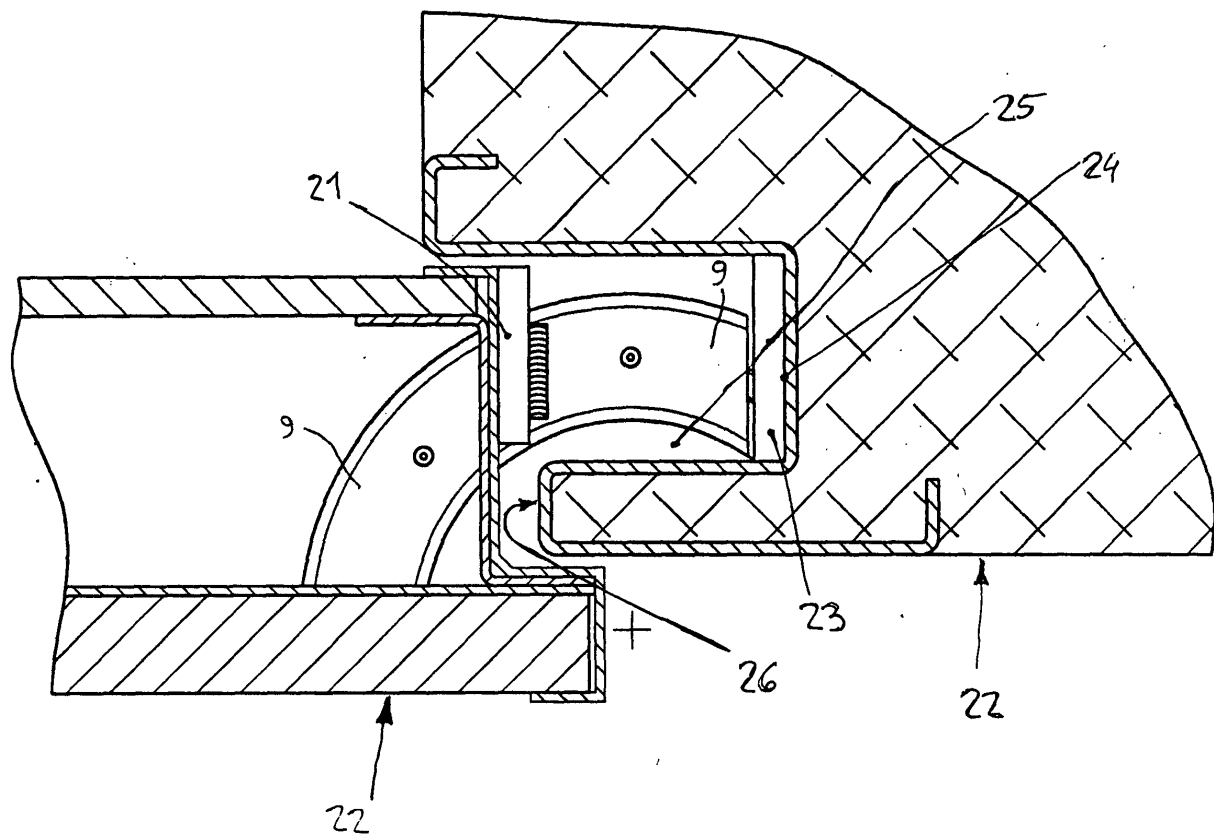


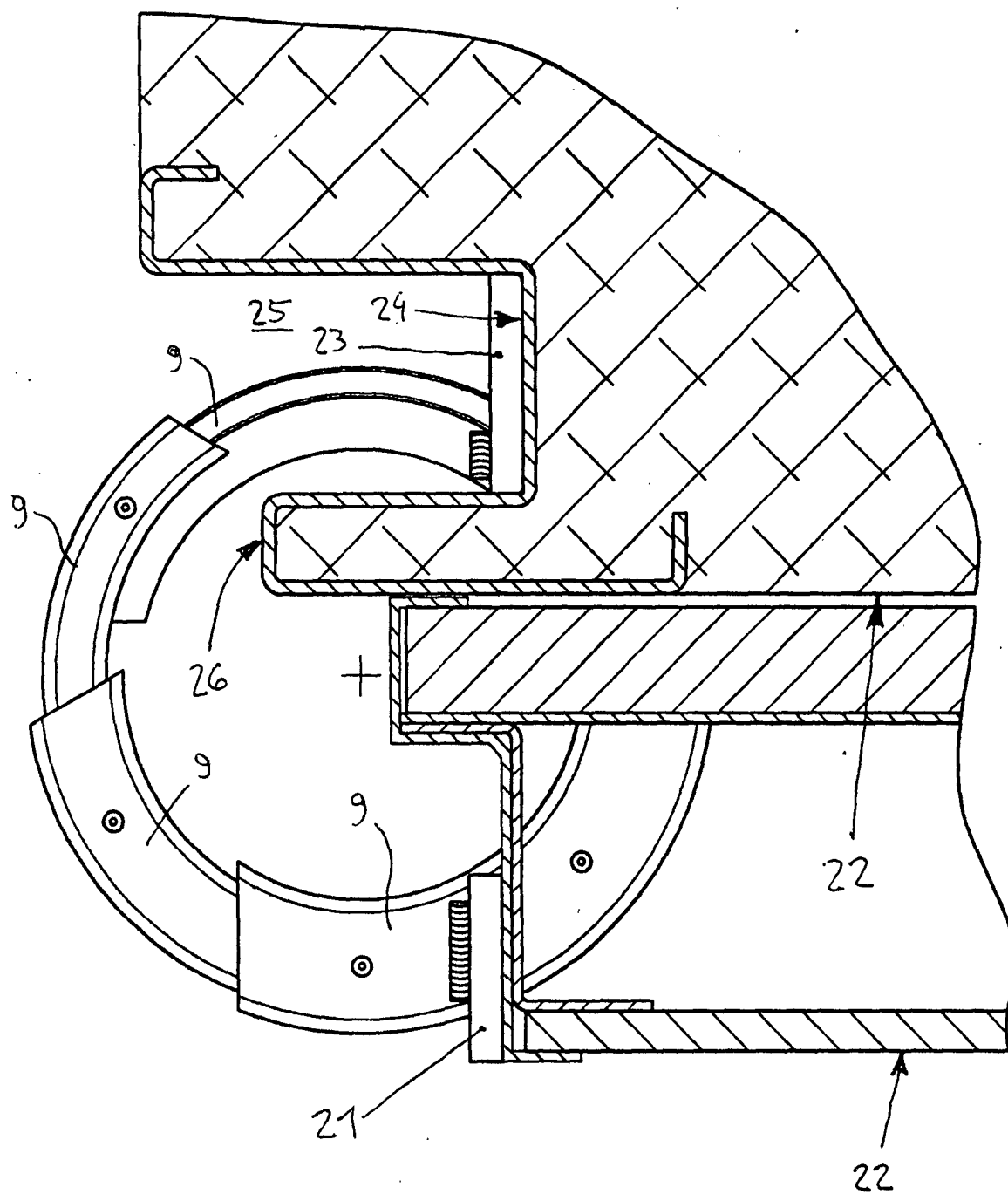
FIG. 6

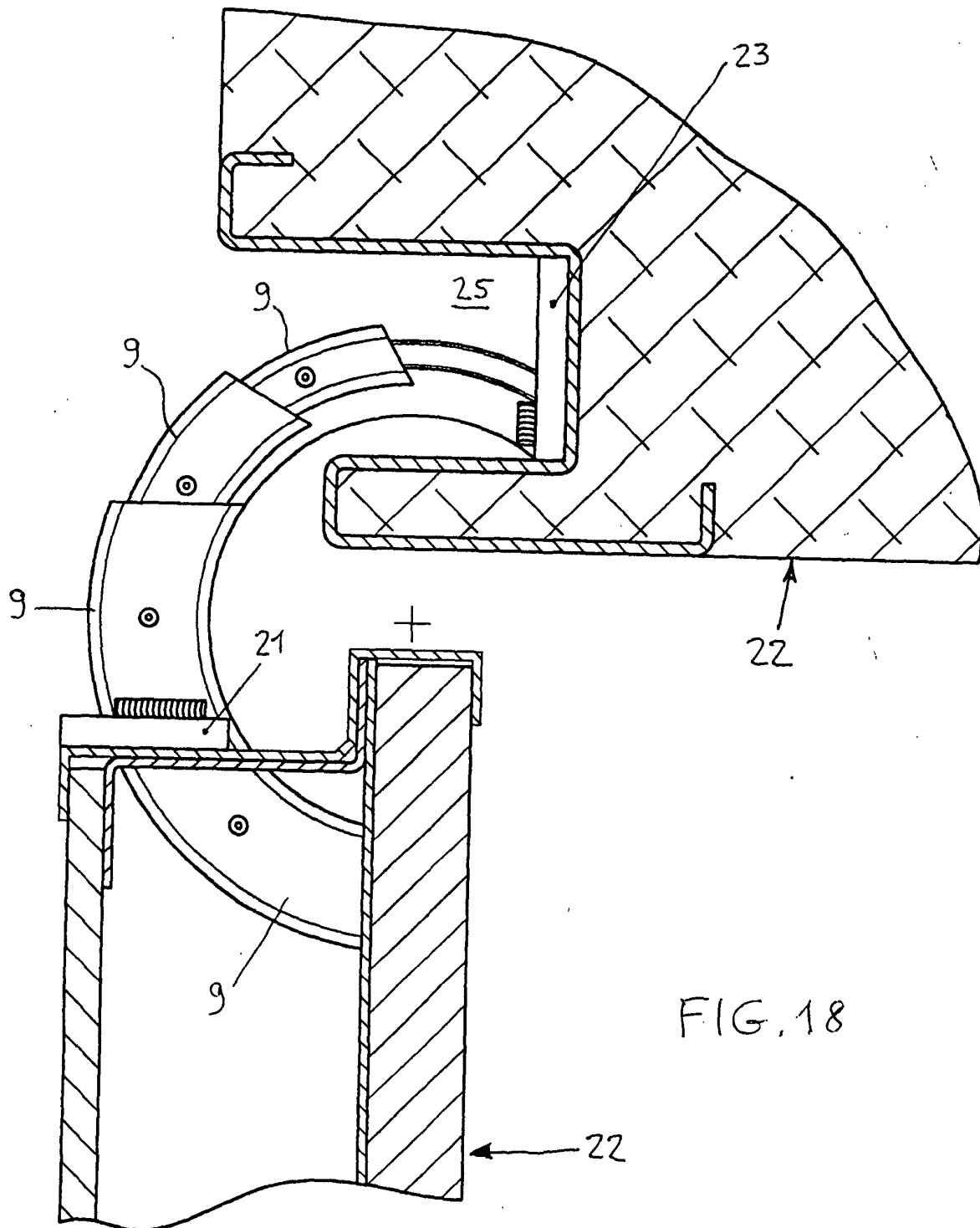












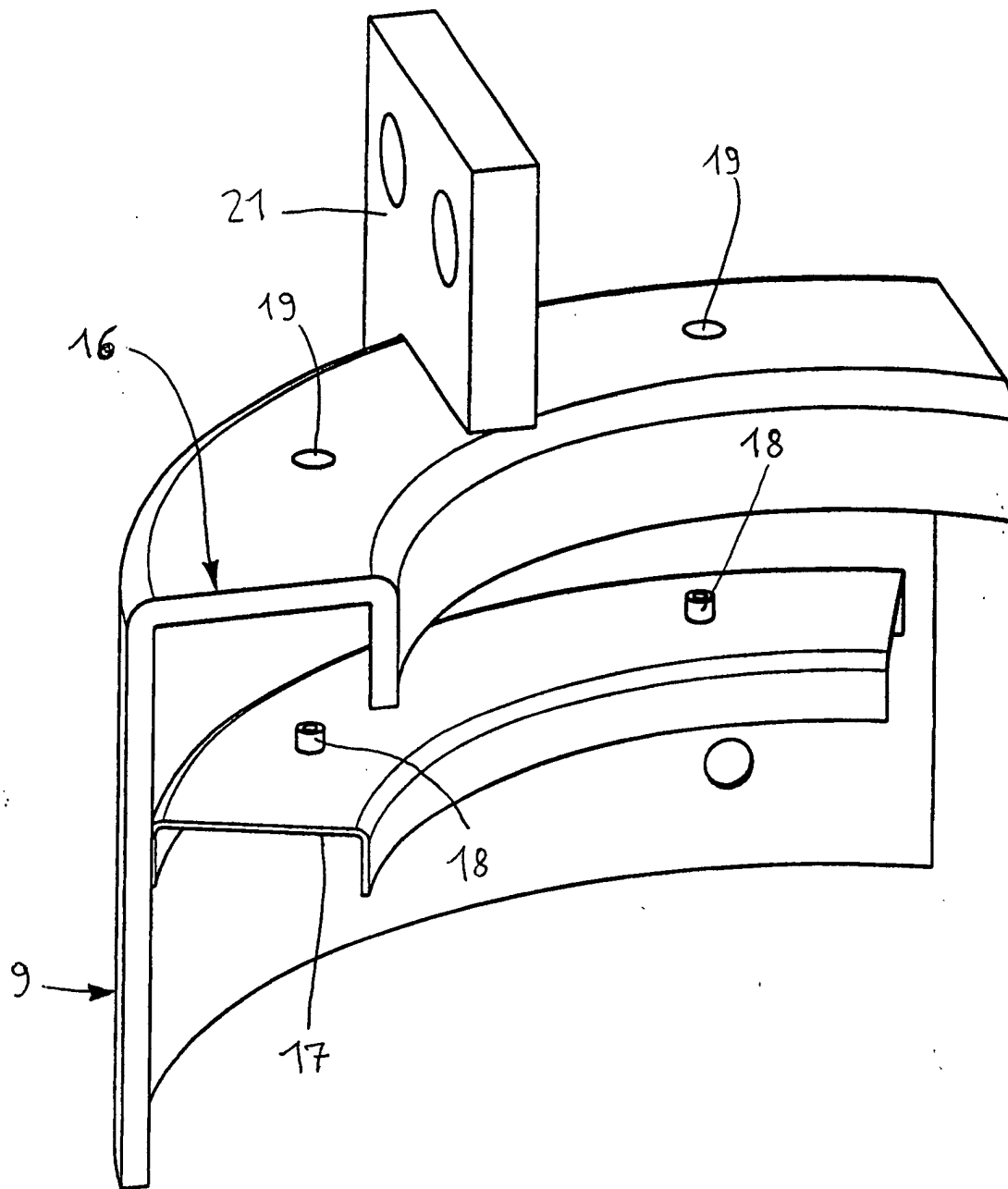


FIG. 19

