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

(11) EP 0 900 941 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
10.03.1999 Bulletin 1999/10

(51) Int. Cl.[6]: **F04D 29/62**, F04D 29/66

(21) Application number: **98116329.8**

(22) Date of filing: **28.08.1998**

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

(30) Priority: **03.09.1997 IT BO970526**

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(54) Device for supporting the motor unit of fans

(57) The device for supporting the motor unit of fans and the like comprises a grille (2) which is adapted to be applied in a front region, along a peripheral annular part, to a head (3) of the enclosure of an impeller and forms, in a central region, a portion (9) for coupling to a motor unit of the impeller, which is supported in a cantilevered manner inside the enclosure. A vibration-damping insert (10) made of elastic material is interposed between the grille (2) and the head (3) and is provided with flaps (14a) which protrude transversely through corresponding slots (18) formed in the head (3). Fasteners (20) for locking the grille to the head are adapted to be inserted through respective openings (17) formed in the grille (2), at the slots (18) of the head (3), and to retain the flaps (14a) of the vibration-damping insert (10) on the head (3) so as to wrap around the head in the fastening position by acting from outside.

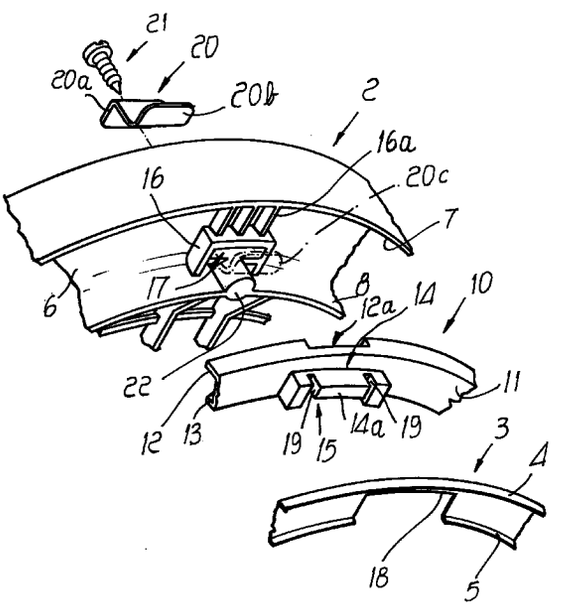

FIG.4

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Description

[0001] The present invention relates to a device for supporting the motor unit of fans and the like, particularly for filtering suction hoods.

[0002] In the above field it is known to use fans, for example of the centrifugal type, which are constituted by an impeller driven by a corresponding motor unit inside a suitable enclosure. A conventioal enclosure has a pair of mutually opposite heads between which a jacket, forming a sort of volute, is fastened; these heads are formed by rings of metal plate which are closed by respective grilles, made for example of plastics, one of which supports the motor.

[0003] The generation of unpleasant vibrations is often complained about in the operation of said suction elements. These vibrations are generally produced by impellers which are not perfectly balanced and by defective driving shafts; the impellers can become dirty over time, collecting grease particles, or deform due to the high temperatures.

[0004] The aim of the present invention is to solve the above-described problem, providing a device for supporting the motor unit of fans and the like which can absorb any vibrations that might be produced, so as to ensure silent operation.

[0005] Within the scope of this aim, an object of the present invention is to provide a device for supporting the motor unit which is simple in concept, safely reliable in operation and versatile in use.

[0006] This aim, these objects and others are all achieved, according to the invention, by the present device for supporting the motor unit of fans and the like, of the type comprising a grille which is suitable to be applied in a front region, along a peripheral annular part, to a head of the enclosure of an impeller and forms, in a central region, means for coupling to a motor unit of said impeller, which is supported in a cantilevered manner inside said enclosure, which is characterized in that it comprises a vibration-damping insert made of elastic material which is adapted to be interposed between said grille and said head at said peripheral annular part, and is provided with flaps which protrude transversely through corresponding slots formed in said head; and means for locking said grille to said head which are adapted to be inserted through respective openings formed in said grille, at said slots of said head, and to retain said flaps of said vibration-damping insert on said head so as to wrap around said head in the fastening position by acting from outside.

[0007] The details of the present invention will become apparent from the following detailed description of a preferred embodiment of the device for supporting the motor unit of fans and the like, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a partially cutout lateral view of the device according to the invention for supporting the motor of a fan for filtering suction hoods;

Figure 2 is a sectional view of said device, taken along the plane II-II of Figure 1;

Figure 3 is a sectional view of a detail of said device, taken along the plane III-III of Figure 1;

Figure 4 is an exploded perspective view of a portion of the device according to the invention;

Figure 5 is a similar perspective view of a different embodiment of the device;

Figure 6 is a sectional view of another detail of the device, taken along the plane VI-VI of Figure 2.

[0008] With particular reference to the above figures, 1 generally designates the device for supporting the motor unit of fans and the like, particularly for filtering suction hoods.

[0009] The device 1 has a grille 2, particularly made of plastic material, which is adapted to be applied in a front region to a head 3 of the fan enclosure. The head 3 is conventionally shaped, by a sheet metal ring which is shaped like a scroll and is surrounded by sides 4 and 5 along the outer and inner edges.

[0010] The grille 2 has a peripheral annular part 6 which is circular and is surrounded by corresponding sides 7 and 8 which are directed toward the head 3, along the outer and inner edges; the grille 2 forms, in a central region, a shaped portion 9 for the coupling of the motor unit of the fan, which is not shown. In the illustrated case, the coupling portion 9 is adapted to rigidly couple a motor having a rectangular profile; however, the grille 2 may of course be provided so as to support motors having a different shape, for example a circular or square one.

[0011] An insert 10, made of a material such as rubber and suitable to damp the vibrations produced by the motor, is suitable to be interposed between the grille 2 and the head 3. The vibration-damping insert 10 is constituted by an annular element 11 which has corresponding peripheral edges 12 and 13 which are directed toward the circular annular part 6 of the grille 2 in the assembled position.

[0012] A series of prism-shaped protrusions 14 is formed along the annular element 11 of the vibration-damping insert 10; said protrusions are evenly distributed and are directed toward the head 3 in the assembled position. The protrusions 14 delimit corresponding cavities 15 formed at the internal perimeter of the annular element 11 and are suitable to wrap around corresponding raised portions 16 which are prism-shaped, in practice rectangular, and are formed at the rim of respective openings 17 formed in the circular annular part 6 of the grille 2.

[0013] The raised portions 16 are joined to the outer side 7 of the grille 2 by a series of ribs or ridges 16a which are suitable to center the insert 10 and damp vibrations. The ridges 16a engage a corresponding cavity 12a formed on the edge 12 of the insert 10 (reference

should be made in particular to Figure 6).

[0014] In the illustrated case, the annular element 11 of the vibration-damping insert 10 covers the entire circumference and has protrusions 14 which are evenly distributed along said circumference. However, it is possible to use individual inserts which are localized at said raised portions 16 of the grille 2, each insert forming a corresponding protrusion 14 which is shaped like the one that has already been described.

[0015] The head 3 in turn has, along the internal edge, a corresponding series of slots 18 which are adapted to wrap around respective protrusions 14 of the vibration-damping insert 10. In practice, said protrusions 14 are clamped, in the assembled position, respectively between the raised portions 16 of the grille 2 and the edge of the slots 18 of the head 3.

[0016] The protrusions 14 further have two transverse notches 19 which are suitable to delimit a median portion 14a of said protrusions which substantially forms a flexible flap.

[0017] The grille 2 is meant to be locked to the head 3 by means of a plurality of step-shaped brackets 20 which are inserted through said openings 17 formed in the grille 2 and are fastened by means of corresponding screws 21 which screw into respective stubs 22 which are formed by said grille 2 along the inner side 8 at said openings 17.

[0018] The brackets 20 are adapted to fold said flaps 14a of the vibration-damping insert 10 onto the head 3, so as to wrap around said head 3 in the clamping position.

[0019] More specifically, the brackets 20 have, at their ends, respective portions 20a and 20b which are folded in a parallel arrangement on opposite sides; the first folded portion 20a has a hole 23 for the insertion of the screw 21, while the second portion 20b is adapted to fold, in the assembled position shown by the dashed lines 20c in figure 4, the flap 14a of the vibration-damping insert 10 onto the opposite head 3.

[0020] The operation of the device can be easily understood from the above description.

[0021] The vibration-damping insert 10 is interposed between the grille 2 and the metal plate head 3 of the enclosure, taking care to fit the protrusions 14 on the corresponding raised portions 16 of the grille 2 and to subsequently engage thereon the corresponding slots 18 of the head 3.

[0022] It should be observed that the slots 18 formed on the head 3 also center said head 3 with respect to the grille 2 and prevent their mutual rotation.

[0023] In the assembled position, the flaps 14a formed by said protrusions 14 of the vibration-damping insert 10 protrude transversely through said slots 18 of the head 3 (see Figure 2 in particular).

[0024] The respective locking brackets 20 are then inserted through the openings 17 of the grille 2 by acting from outside. Said brackets 20 pass through the corresponding cavities 15 of the annular element 11 of the insert 10 and, by means of the folded portion 20b, fold the flaps 14a of said insert 10 against the head 3 (see also Figure 3).

[0025] The locking brackets 20 are then fastened to the grille 2 by means of the screws 21 which screw into the stubs 22.

[0026] In the locking position, essentially, the grille 2 that supports the motor is rigidly coupled to the head 3 of the casing by interposing the vibration-damping insert 10 wrapping around said head 3 by means of the flaps 14a folded by the locking brackets 20. In other words, there is no direct contact of the sheet metal head 3 of the casing with the grille 2 or with the brackets 20 that provide mutual locking, and this produces an elastic support.

[0027] The vibration-damping insert 10 acts as a damping element for the vibrations produced by the motor and by the elements connected thereto, particularly the impeller. Said vibration-damping effect also affects axial rotation in the two opposite directions and the radial direction, by virtue of the configuration of the protrusions 14 of the insert 10 wrapping around the slots 18 of the head 3.

[0028] The vibration-damping insert 10 can of course be made of materials having different rigidities according to the weight of the motor, so as to achieve the best damping effect according to the specific requirements.

[0029] Said damping effect can also be adjusted appropriately by means of suitable washers inserted between the folded portion 20a of the locking brackets and the corresponding sleeves 22 so as to act as spacers. The insert is accordingly compressed more or less intensely according to the thickness of said washers.

[0030] The outer edge 12 of the insert 10 also acts as a hermetic sealing element if a charcoal filter or the like is applied to the grille 2 to form a filtering hood.

[0031] Figure 5 illustrates a different embodiment of the device, in which the means for locking the grille 2 to the head 3 are constituted by a plate 24 which is provided with a threaded stem 25 whereon a corresponding nut 26 is preassembled. The raised portion 16 shaped on the grille 2 forms, in this case, a sort of hollow into which the plate 24 is guided, causing in this case also the bending of the flap 14a of the insert 10 so as to wrap around the head 3, providing a latch-like closure. The stem 25 of said plate 24 passes through a slot 27 formed on the bottom of said hollow.

[0032] As an alternative, the flaps 14a of the vibration-damping insert 10 can be provided rigidly in said folded shape adapted to wrap around the head 3. In this case, of course, the brackets 20 retain said flaps 14a in said fastening position.

[0033] The aim of the present invention is to provide the support of the motor unit of fans and the like so as to damp any vibrations produced and thus ensure silent operation.

[0034] This aim is achieved in particular thanks to the fact that said brackets 20 or, as an alternative, the plates

24 can be inserted after assembling the supporting elements of the motor and the corresponding insert in the respective seat.

[0035] It should be observed that the device can be advantageously applied not only to the above-mentioned centrifugal aspirators but also to helical and vane aspirators and more generally to other similar industrial and civil applications and in different fields, such as for example the automotive field, the air-conditioning field and the like.

[0036] It should be observed that the device according to the invention allows to easily lock the support of the motor by way of the locking means earlier described once said motor has been arranged in its seat. Likewise, it is possible to perform release from the outside.

[0037] This is particularly advantageous if the scroll-shaped head is small, as in the case of hoods.

[0038] Furthermore the device is very sturdy and electrically very safe, when it uses plastics elements, such as said grille, to support the motor, and in particular does not require earthing.

[0039] In the practical embodiment of the invention, the materials employed, as well as the shape and the dimensions, may be any according to requirements.

[0040] The disclosures in Italian Patent Application No. BO97A000526 from which this application claims priority are incorporated herein by reference.

[0041] 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. A device for supporting the motor unit of fans and the like, comprising a grille (2) which is adapted to be applied in a front region, along a peripheral annular part, to a head (3) of the enclosure of an impeller and forms, in a central region, means (9) for coupling to a motor unit of said impeller, which is supported in a cantilevered manner inside said enclosure, characterized in that it comprises a vibration-damping insert (10) made of elastic material adapted to be interposed between said grille (2) and said head (3) at said peripheral annular part and is provided with flaps (14a) protruding transversely through corresponding slots (18) formed in said head (3); and means (20,24) for locking said grille (2) to said head (3) which are adapted to be inserted through respective openings (17,27) formed in said grille (2), at said slots (18) of said head (3), and to retain said flaps (14a) of said vibration-damping insert (10) on said head (3) so as to wrap around said head in the fastening position by acting from outside.

2. The device according to claim 1, characterized in that said vibration-damping insert (10) is constituted by an annular element (11) provided with respective prism-shaped protrusions (14) which form said flaps (14a) and are adapted to delimit corresponding cavities (15) formed in said annular element (11), at said openings (17,27) formed in said grille (2).

3. The device according to claim 2, characterized in that said protrusions (14) of said vibration-damping insert (10) are adapted to wrap around corresponding prism-shaped raised portions (16) which are formed respectively at the edge of said openings (17,27) formed in said grille (2).

4. The device according to claim 1, characterized in that said slots (18) of said head (3) engage, in said locking position, corresponding prism-shaped raised portions (16) formed by said grille (2), respectively at said openings (17,27), by way of the interposition of corresponding protrusions (14) of said vibration-damping insert (10).

5. The device according to claim 1, characterized in that said means for locking said grille (2) to said head have a series of step-shaped brackets (20) which are adapted to be inserted through said openings (17) formed in said grille (2), so as to engage said flaps (14a) of said vibration-damping insert (10), and are fastened through corresponding screws (21) screwing into respective stubs (28) formed by said grille (2).

6. The device according to claim 5, characterized in that said brackets (20) have, at their ends, respective portions (20a,20b) which are folded in parallel directions on opposite sides and are meant respectively for the insertion of said screws (21) and to retain said flaps (14a) of said vibration-damping insert (10) on said head (3).

7. The device according to claim 1, characterized in that said means for locking said grille to said head have a series of plates (24) which are respectively provided with a threaded stem (25) whereon a corresponding nut (26) is preassembled, passing through said openings (27) formed in said grille (2), said plates (24) being adapted to be guided within a corresponding raised portion (16) which is shaped on said grille (2) at said openings (27), so as to engage said flaps (14a) of said vibration-damping insert (10).

8. The device according to claim 1, characterized in that said vibration-damping insert (10) is constituted by a series of annular elements (11) provided with respective prism-shaped protrusions (14)

which form said flaps (14a) and are adapted to delimit corresponding cavities (15) formed on said annular element (11) at said openings (17,27) formed in said grille (2).

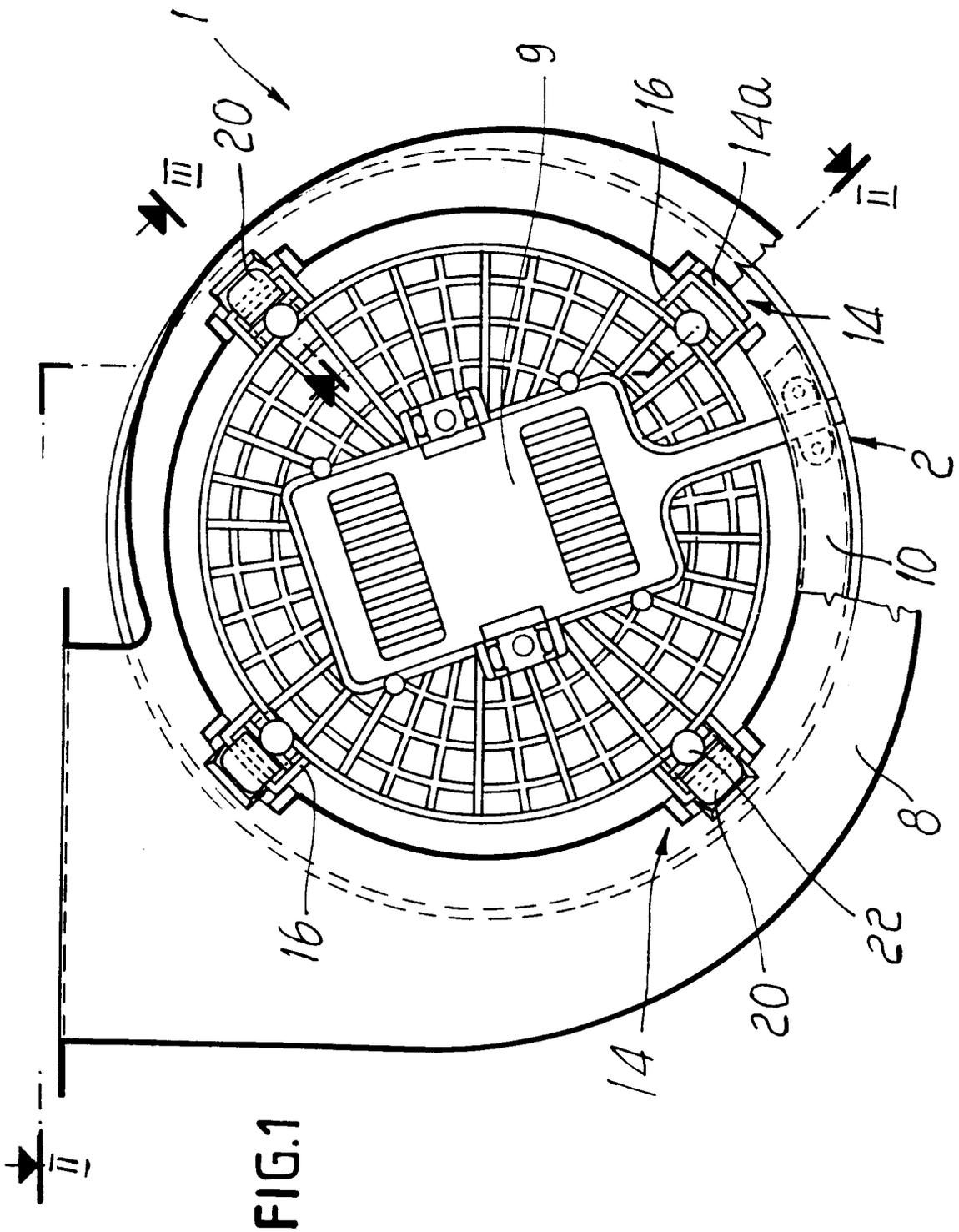

FIG.1

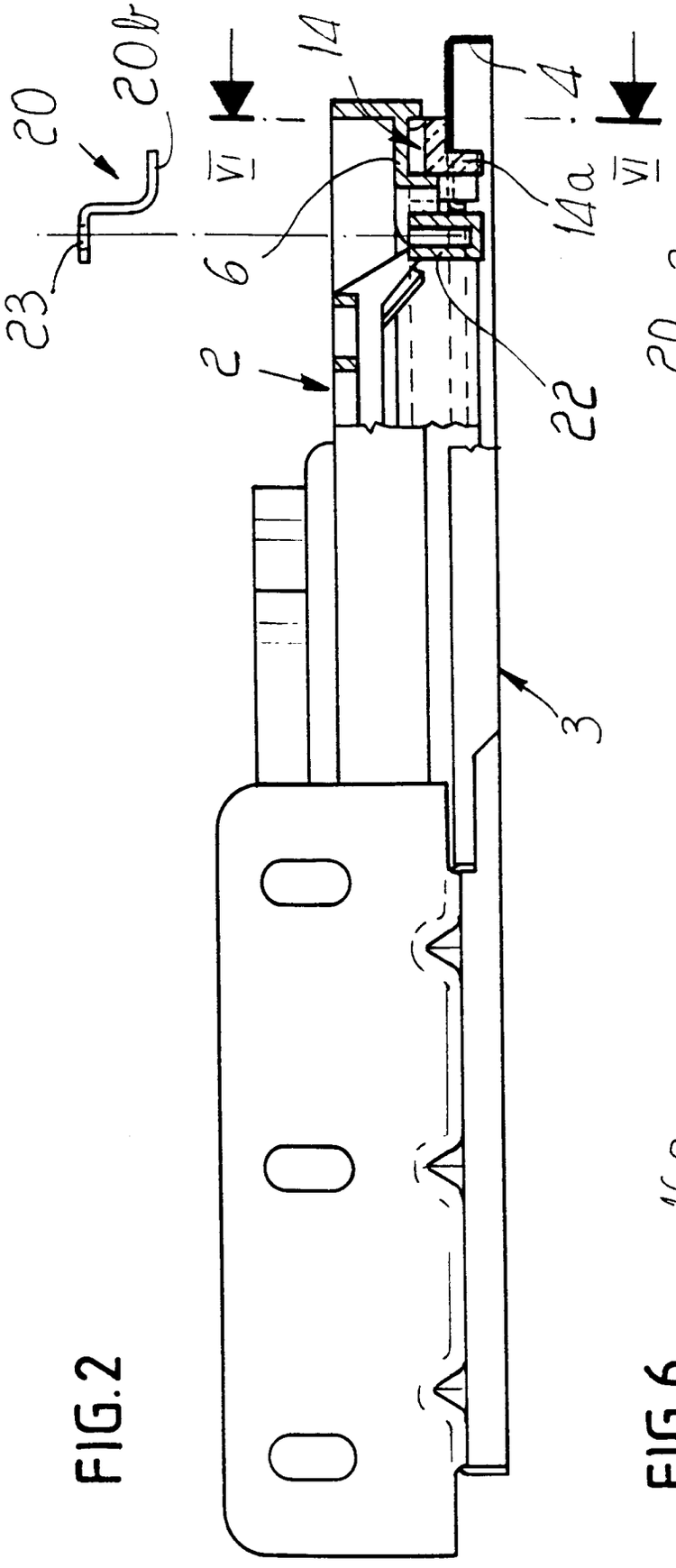

FIG.2

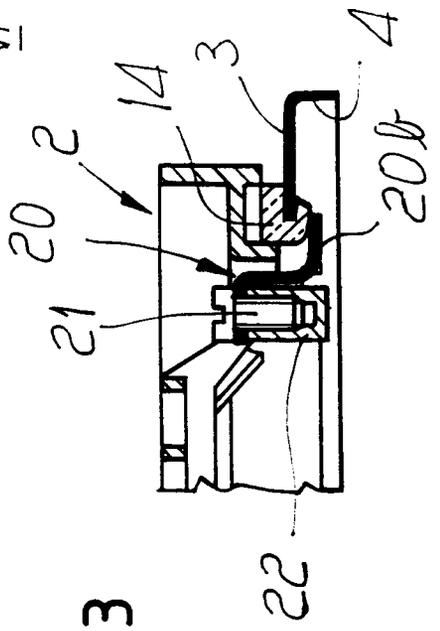

FIG.3

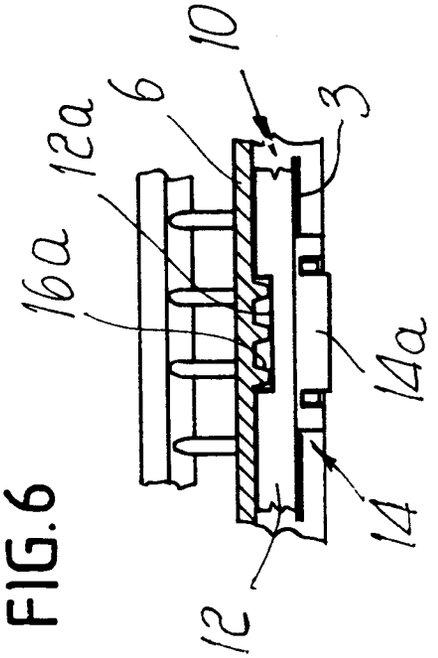

FIG.6

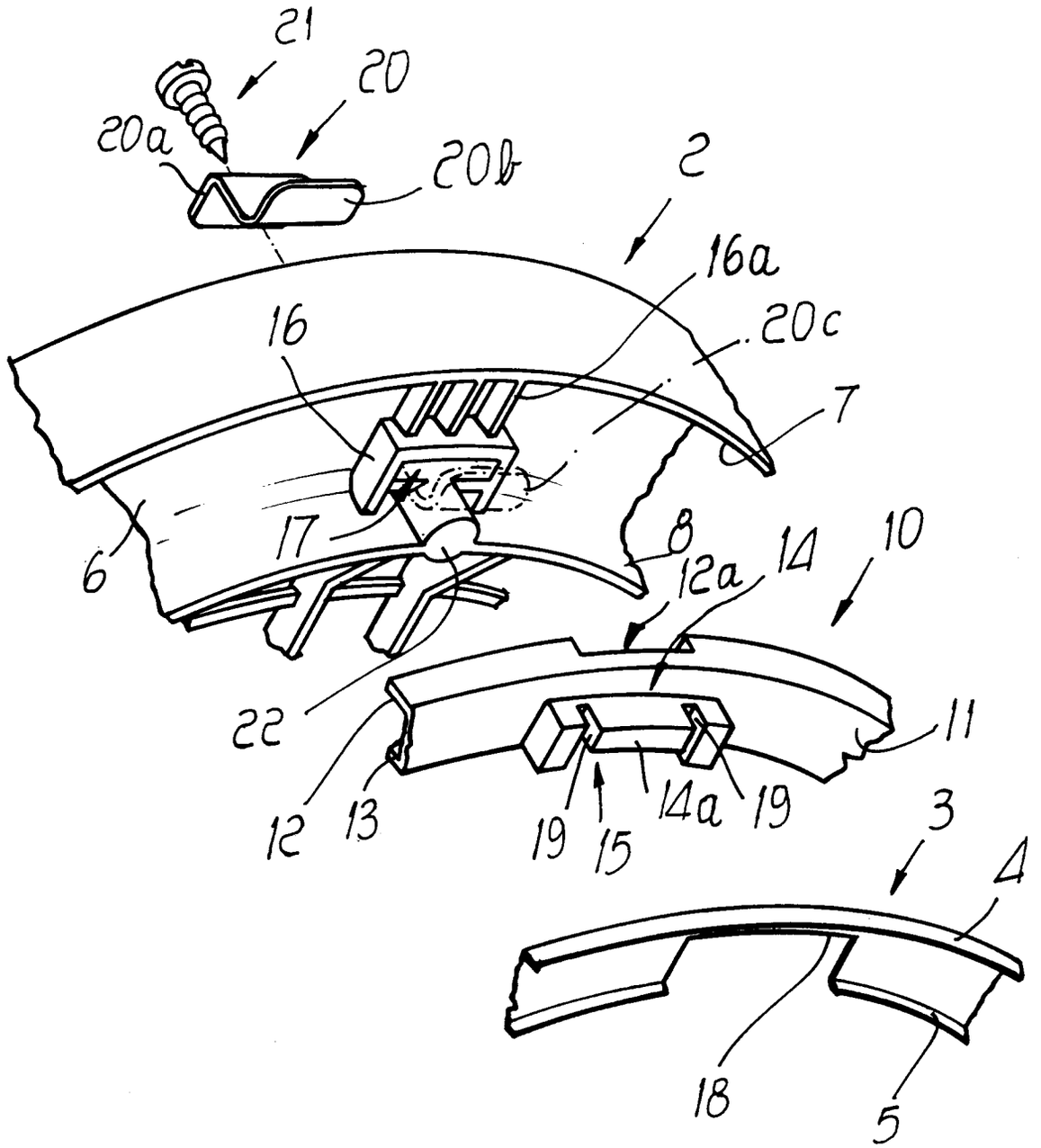
21
20
20a
20b
2
16a
16
20c
7
6
17
8
12a
14
10
22
11
12
13
19
15
14a
19
3
4
18
5

FIG.4

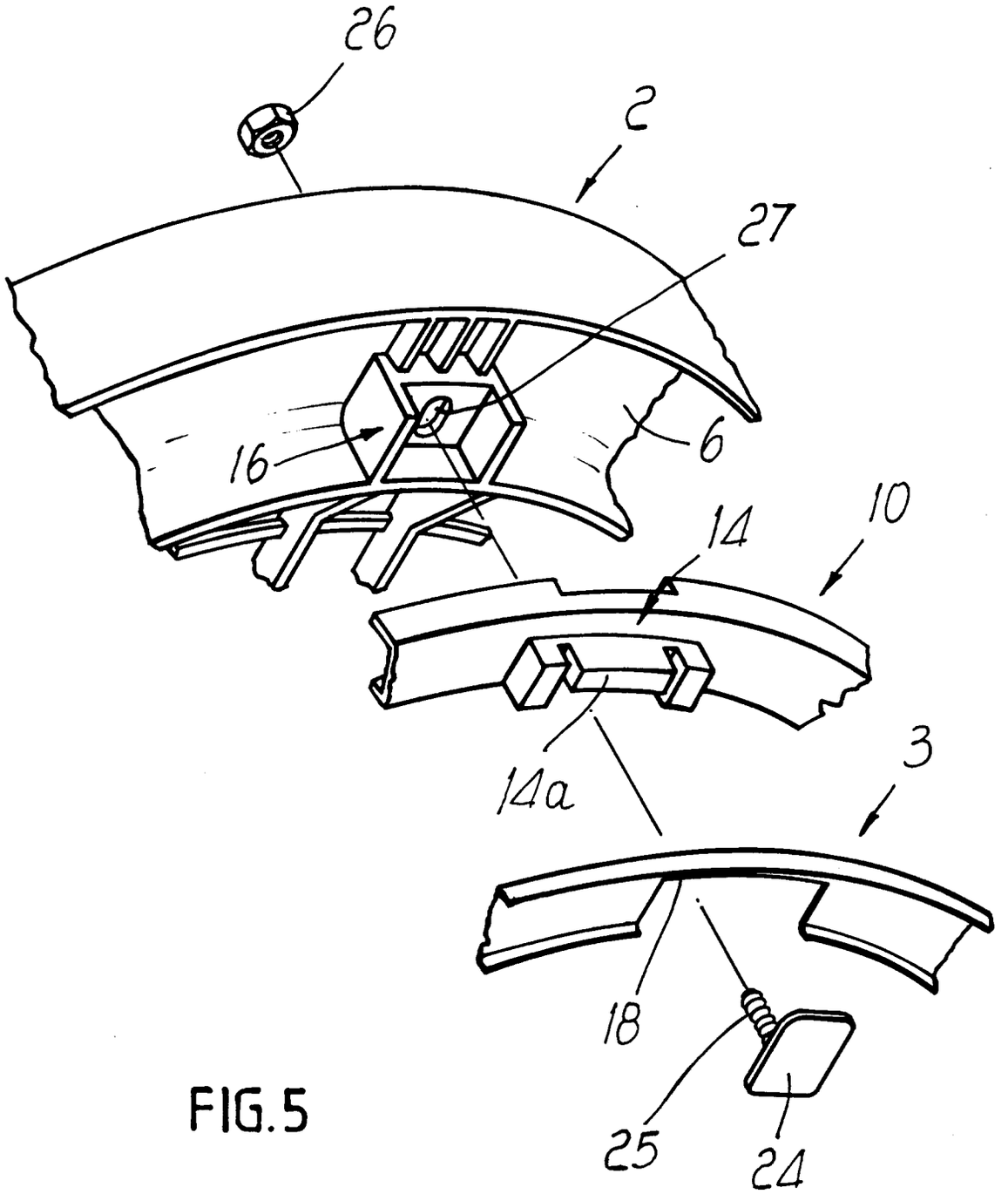

FIG.5