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(54) **Adjustable ventilator.**

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EP-A- 0 115 824
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GB-A- 2 100 418

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Description

The invention relates to an adjustable ventilator according to the preamble of claim 1.

In this known ventilator the shut-off element comprises two elongate strips, extending radially from, and being made in one piece with, a central elongate cylindrical carrying portion which is rotatably supported at its respective ends in the housing (see document EP-A-0 115 824).

To have the necessary strenght and resistance against bending, necessary for obtaining sealing over the entire length in the closed position as well as easy operation, the section parts must have a considerable thickness, which reduces the air passage in the open position and also increases the weight and the costs of the shut-off element. Even so it is in practice impossible to construct such a ventilator with a great length while retaining the desired qualities as outlined above, unless the supporting element is provided halfway with an extra bearing. This, of course, complicates the structure considerable.

The invention aims to eleminate the disadvantages and to propose a ventilator of the kind as referred to above which can be made with great lengths while retaining an easy rotatability of its shut-off element, using a small number of parts and ensuring a good seal and an excellent guidence of the shut-off element in the housing.

These objects are obtained by the measures as defined in the characterising clause of the main claim.

These measures not only produce such strength of the shut-off element that the ventilator can be made in great lengths, but also achieve a considerably greater air passage than that which can be achieved with a known ventilator of corresponding dimensions; the air resistance is lower, so that the ventilation properties are better. Less material is also needed for the production of the simply designed ventilator, and the shut-off element is much easier to rotate. It has also been found that in the open position the shape of the shut-off element has a beneficial effect on the air passage.

It is observed that GB-A-2 100 418 discloses a ventilator structure which is particularly intended to be placed in the dashboard of an automobile and comprises a disc-shaped shut-off element. This shut-off element, made of solid material, is at its circumference provided with a number of shadow cut-outs for accommodating the radially inwardly directed fastening lips of a circular sealing strip. The whole structure is such that the air passage is either closed or shut: the air passage is not finally adjustable.

Preferred embodiments of the invention are described in Claims 2 to 9.

The invention is explained with reference to the drawing, in which:

Figure 1 is a cross-section through the ventilator according to the invention, along the line I - I in Figure 2;

Figure 2 is a rear view of this ventilator;

Figure 3 is a top view of the ventilator;

Figure 4 is a detail cross-section showing the fixing of the shut-off element;

Figure 5 shows a cross-section of a second embodiment of the ventilator according to the invention;

Figure 6 shows in cross-section part of the shut-off element used therein.

The ventilator 2 according to the invention has an elongated shut-off element 4 which is supported in a manner to be described in greater detail so that it rotates about the longitudinal axis 6 thereof.

This shut-off element 4 is accommodated in an elongated housing manufactured by extrusion and having an air passage 8 which is bounded by the top edge 10, the bottom edge 12, a right end piece 14 with the head plate 16 connecting to it, and a left end piece 18 with the head plate 20 connecting to it. The top edge 10 merges into a water baffle 22 comprising a downward sloping part 24 which continues into a straight downward running part 26; at a distance from this lies the also straight downward running part 28 which connects to the bottom edge 12. This forms an air inlet opening 30 containing a filter gauze 32 which is retained by one or more spring-loaded retaining clips 34.

As can be seen from the figures, the shut-off element 4 has a height h (see Figure 2) which is considerably greater than its width or thickness so that, when the shut-off element 4 is rotated out of the position shown in Figure 1 through 90° clockwise or anticlockwise, air can flow virtually unimpeded from the inlet opening 30 to the passage 8. In the position shown this opening is shut off.

The shut-off element 4 also comprises a section part and has two outer walls 40, 42 which are interconnected by means of connecting legs 44, each with two ridges 48. These ridges lie resiliently against a square metal reinforcement tube 52 which is accommodated in the shut-off element 4 and which gives the shut-off element the necessary rigidity in the lengthwise direction and makes it possible to produce the ventilator in very great lengths (for example, up to 3 metres).

The end edges 40a, 42a of the walls 40, 42 are flanged towards each other and engage in a constriction 54 of a sealing strip 56. Below these flanged end edges 40a, 42a short ribs 40b, 42b facing each other go out from the walls 40, 42 and with the end edges 40a, 42a determine a nesting

space for the bottom part of the sealing strip 56.

The ribs 40b, 42b with the connecting legs 48 also determine a nesting space 58 (see Figure 4) for the lips 60 of a carrier 62 which is provided with a nesting groove 64 for an operating cord 66 and with a cylindrical bearing stub 68 which is rotatably supported in the end piece 14, 18, so that the whole unit is easy to fit or remove. The carrier 62 also has a stub 63 which is rectangular in cross-section and which fits inside the tube 52.

A thermal barrier, formed by a plastic filling 70, 72, is provided both in the top edge 10 and the bottom edge 12.

Initially the legs 10a and 10b are connected to each other by the transverse ribs 80, and the transverse ribs 82 end at a distance from each other; the legs 12a, 12b are also initially connected by the ribs 84, and the ribs 86 end at a distance from each other. Through the openings thus formed the spaces thus obtained are filled with setting plastic 70, 72, and after setting thereof the other ribs are milled, so that no further metallic contact exists between the parts interconnected by the plastic filling. If desired, an additional sealing element, as indicated by 88, can be provided in the plastic filling.

Figure 5 shows an embodiment which is essentially the same as the one described above but in which the shut-off element has a somewhat different configuration. Parts which correspond to the ones disclosed in the preceeding figures are indicated with the same reference numerals as used in these figures.

The shut-off element in this embodiment, indicated as a whole with 96, comprises two identical parts (98a, 98b) which are combined with each other in an inverted relationship. Each of these parts, one of which is shown in figure 6 comprises in cross-section a wall 100 with at the one edge a hook-shaped rib 102 and at the other edge a similar hook-shaped rib 104 with, at short distance thereunder, a leg 106 which ends in an upstanding, also hook-shaped rib 108. Both the wall 100 and the leg 106 are provided with ridges 110, 112 respectively. As figure 5 shows the two parts 98, 98' are combined with each other in an inverted relationship, such that the hook 102 of the one part fits behind and around the hook 108' of the other part, and vice-versa. Within the space delimited by the walls 100, 100' on the one hand and the legs 106, 106' on the other hand fits a reinforcing member 114.

This embodiment has the advantage that the fitting of the reinforcing member is much more easily done as this member is simply placed within one of the parts whereafter the other part is clipped around it.

The shut-off element can be rotated around its axis by means of a suitable driver (not shown) fitting in the space within the reinforcing member 114.

Claims

1. Ventilator (2) with a finely adjustable air passage, having an elongated shut-off element (4, 96), accommodated in an elongated housing and rotatable about a longitudinal axis which is parallel to the housing axis, the shut-off element (4, 96), made of section material, having a dimension in a first direction (h) transverse to said longitudinal axis greater than the dimension thereof in a second direction which is perpendicular to the first, characterized in that the shut-off element (4, 96) has two outer walls (40, 42, 100, 100'), running in the first direction and lying at a distance of eachother to accommodate a reinforcing element (52, 114) therebetween, with connecting legs (44, 106, 106') between said walls lying on either side of the axis of rotation, and having between the end edges (40a, 42a; 104, 108) of said walls a nesting space with a sealing strip (56) engaged therein.

2. Ventilator according to claim 1, characterized in that the shut-off element (96) consists of a first and a second, identical part (98a, 98b) interconnected combined in inverted relationship, each part having in cross-section an outer wall (100, 100') part with at each end edge a short inwardly directed hook-shaped rib (102, 104, 102', 104') and at one end at short distance thereunder a connecting leg (106, 106') extending to the outer wall of the other part and terminating in an upwardly directed hook-shaped rib (108, 108') surrounded by the inwardly directed rib of the other, opposite, part.

3. Ventilator according to claims 1-2, characterized by a reinforcement element (52, 114) accommodated in the space bounded by the connecting legs.

4. Ventilator according to claim 3, characterized in that the reinforcement element (52, 114) comprises a reinforcing tube with square cross-section, enclosed by the connecting legs (44, 106, 106').

5. Ventilator according to claim 4, characterized in that the connecting legs (44, 106, 106') are provided with ridges (48, 112) resting resiliently against the reinforcing tube.

6. Ventilator according to claims 1 - 4, characterized in that an additional rib (40b, 42b) extends between each connecting leg and an outer wall, for determining a nesting space for a driver which projects from a rotatably mounted carrier connecting to the shut-off element.

7. Ventilator according to claims 1 - 6, characterized in that the end edges of the shut-off element walls (40a, 42a; 104, 102') are flanged towards each other and engage in a constriction, running in the longitudinal direction, of a sealing strip (56) situated partially inside and partially outside the shut-off element.

8. Ventilator according to claims 1 - 7, characterized in that the housing is provided at the front side with a water baffle (22) extending from the top edge thereof and having a short downward slanting part, merging into a straight downward running part having at a distance from it and parallel to it a shut-off edge connecting to the bottom edge of the housing.

9. Ventilator according to claim 8, characterized in that a filter gauze (32) is provided, extending from the transition between the downward slanting part and the straight downward running part, on the one hand, and the bottom edge of the opposite-lying protective edge, on the other.

10. Ventilator according to claim 9, characterized in that the top and bottom edges of each housing are each formed by two section parts (10a, 10b, 12a, 12b) lying at a distance from each other and separated from each other by a plastic connecting piece (70, 72).

Patentansprüche

1. Lüfter (2) mit einem feineinstellbaren Luftdurchlaß, der ein längliches Verschlußteil (4, 96) aufweist, welches in einem länglichen Gehäuse aufgenommen ist und um eine Längsachse drehbar ist, die parallel zu der Gehäuseachse ist, wobei das Verschlußteil (4, 96), welches aus einem Profilmaterial hergestellt ist, eine Abmessung in einer ersten Richtung (h) quer zu der Längsachse besitzt, die größer ist als seine Abmessung in einer Zweiten Richtung, die senkrecht zu der ersten ist, dadurch **gekennzeichnet,** daß das Verschlußteil (4, 96) zwei äußere Wände (40, 42, 100, 100') aufweist, die entlang der ersten Richtung verlaufen und voneinander beabstandet sind, um ein Verstärkungsteil (52, 114) dazwischen aufzunehmen, wobei Verbindungsschenkel (44, 106, 106') zwischen diesen Wänden zu beiden Seiten der Rotationsachse liegen, und zwischen den Endseiten (40a, 42a; 104, 108) der Wände ein Einsteckraum vorhanden ist, in den ein Dichtungsstreifen (56) eingreift.

2. Lüfter nach Anspruch 1, dadurch **gekennzeichnet,** daß das Verschlußteil (96) aus einem ersten und einem zweiten, identischen Teil (98a, 98b) besteht, die miteinander verbunden sind und mit entgegengesetzter Ausrichtung kombiniert sind, wobei jedes Teil im Querschnitt einen äußeren Wandabschnitt (100, 100') aufweist, der an jeder Endseite eine kurze, nach innen gerichtete hakenförmige Rippe (102, 104, 102', 104') und an einem Ende in einem kurzen Abstand darunter einen Verbindungsschenkel (106, 106') aufweist, der sich zu der äußeren Wand des anderen Teils hin erstreckt und in einer nach oben gerichteten hakenförmigen Rippe (108, 108') abschließt, die von der nach innen gerichteten Rippe des anderen, gegenüberliegenden Teils umgeben wird.

3. Lüfter nach den Ansprüchen 1 - 2, **gekennzeichnet** durch ein Verstärkungselement (52, 114), das in dem Raum aufgenommen ist, der von den Verbindungsschenkeln begrenzt wird.

4. Lüfter nach Anspruch 3, dadurch **gekennzeichnet,** daß das Verstärkungselement (52, 114) ein Verstärkungsrohr mit quadratischem Querschnitt umfaßt, das von den Verbindungsschenkeln (44, 106, 106') eingeschlossen ist.

5. Lüfter nach Anspruch 4, dadurch **gekennzeichnet,** daß die Verbindungsschenkel (44, 106, 106') mit Stegen (48, 112) versehen sind, die elastisch an dem Verstärkungsrohr anliegen.

6. Lüfter nach den Ansprüchen 1 - 4, dadurch **gekennzeichnet,** daß sich eine weitere Rippe (40b, 42b) zwischen jedem Verbindungsschenkel und einer Außenwand erstreckt, um einen Einsteckraum für einen Antriebszapfen festzulegen, der aus einem drehbar befestigten Träger vorsteht, der mit dem Verschlußteil verbunden ist.

7. Lüfter nach den Ansprüchen 1 - 6, dadurch **gekennzeichnet,** daß die Endseiten der Wände des Verschlußteils (40a, 42a; 104, 102') mit zueinander hin gerichteten Flanschen versehen sind und in eine in Längsrichtung verlaufende Einschnürung eines Dichtungsstreifens (56) eingreifen, der sich teilweise innerhalb und teil-

weise außerhalb des Verschlußteils befindet.

8. Lüfter nach den Ansprüchen 1 - 7, dadurch **gekennzeichnet,** daß das Gehäuse an der Vorderseite mit einer Wasserablenkplatte (22) versehen ist, die sich von dessen Oberkante aus erstreckt und einen kurzen, nach unten gerichteten schrägen Abschnitt aufweist, der in einen geraden, nach unten verlaufenden Teil übergeht, von dem beabstandet und parallel zu dem ein Abschlußrand liegt, der mit der Unterkante des Gehäuses verbunden ist.

9. Lüfter nach Anspruch 8, dadurch **gekennzeichnet,** daß eine Filtergaze (32) vorgesehen ist, die sich von dem Übergang zwischen dem schräg nach unten verlaufenden Teil und dem gerade nach unten verlaufenden Teil einerseits und der Unterkante des gegenüberliegenden Schutzrandes andererseits erstreckt.

10. Lüfter nach Anspruch 9, dadurch **gekennzeichnet,** daß der obere und untere Rand jedes Gehäuses jeweils durch zwei Profilteile (10a, 10b, 12a, 12b) gebildet werden, die voneinander beabstandet sind und voneinander durch ein Verbindungsteil (70, 72) aus Kunststoff getrennt sind.

Revendications

1. Ventilateur (2) pourvu d'un passage d'air à réglage fin, comportant une pièce allongée d'obturation (4, 96) logée dans un logement allongé et pouvant tourner autour d'un axe longitudinal qui est parallèle à l'axe du logement, la pièce d'oburation (4, 96) faite en matière profilée ayant une dimension (h), dans une première direction perpendiculaire audit axe longitudinal, plus grande que sa dimension dans une seconde direction perpendiculaire à la première, caractérisé en ce que la pièce d'obturation (4, 96) comporte deux parois externes (40, 42, 100, 100'), dirigées dans la première direction et situées à une certaine distance l'une de l'autre, pour loger entre elles une pièce de renfort (52, 114), avec des entretoises de liaison (44, 106, 106') entre lesdites parois situées de chaque côté de l'axe de rotation, et comportant, entre les bords extrêmes (40a, 42a; 104, 108) desdites parois, un espace d'emboîtage avec une bande de scellement engagée dedans.

2. Ventilateur suivant la revendication 1, caractérisé en ce que la pièce d'obturation (96) consiste en une première et une seconde partie identique (98a, 98b) qui sont interconnectées et combinées de manière inversée, chaque partie ayant, en coupe, une paroi externe (100, 100') avec, à chaque bord extrême, un court rebord (102, 104, 102', 104') en forme de crochet, dirigé vers l'intérieur et, à une extrémité, à faible distance au-dessous, une entretoise de liaison (106, 106') allant vers la paroi externe de l'autre partie et se terminant par un rebord (108, 108') en forme de crochet, dirigé vers le haut, recouvert par le rebord dirigé vers l'intérieur de l'autre partie opposée.

3. Ventilateur suivant les revendications 1 et 2, caractérisé par une pièce de renfort (52, 114) logée dans l'espace limité par les entretoises de liaison.

4. Ventilateur suivant la revendication 3, caractérisé en ce que la pièce de renfort (52, 114) comporte un tube de renforcement à section carrée, prisonnier des entretoises de liaison (44, 106, 106').

5. Ventilateur suivant la revendication 4, caractérisé en ce que les entretoises de liaison (44, 106, 106') sont pourvues d'arêtes (48, 112), reposant élastiquement contre le tube de renforcement.

6. Ventilateur suivant les revendications 1 à 4, caractérisé en ce qu'un rebord supplémentaire (40b, 42b) est situé entre chaque entretoise de liaison et une paroi externe pour déterminer un espace d'emboîtage pour une roue motrice en saillie sur un support monté rotatif, qui le relie à la pièce d'obturation.

7. Ventilateur suivant les revendications 1 à 6, caractérisé en ce que les bords extrêmes (40a, 42a; 104, 102') des parois de la pièce d'obturation sont rabattus l'un vers l'autre et entrent en contact, dans un étranglement dirigé longitudinalement, avec une bande de scellement (56) qui est située partiellement à l'intérieur et partiellement à l'extérieur de la pièce d'obturation.

8. Ventilateur suivant les revendications 1 à 7, caractérisé en ce que le carter est muni, du côté avant, d'un piège à eau (22) partant de son bord haut et comportant une courte partie en pente descendante, se réunissant dans une partie droite descendante comportant, à une certaine distance de lui et parallèle à lui, un bord d'obturation qui est relié au bord bas du logement.

9. Ventilateur suivant la revendication 8, caractérisé en ce qu'un treillis de filtrage (32) est prévu partant de la transition entre la partie en pente descendante et la partie droite descendante, d'une part, et le bord bas du bord protecteur situé en face, d'autre part.

10. Ventilateur suivant la revendication 9, caractérisé en ce que les bords haut et bas de chaque logement sont chacun formés de deux parties (10a, 10b, 12a, 12b) situées à une certaine distance l'une de l'autre et séparées l'une de l'autre par une pièce de liaison en plastique (70, 72).

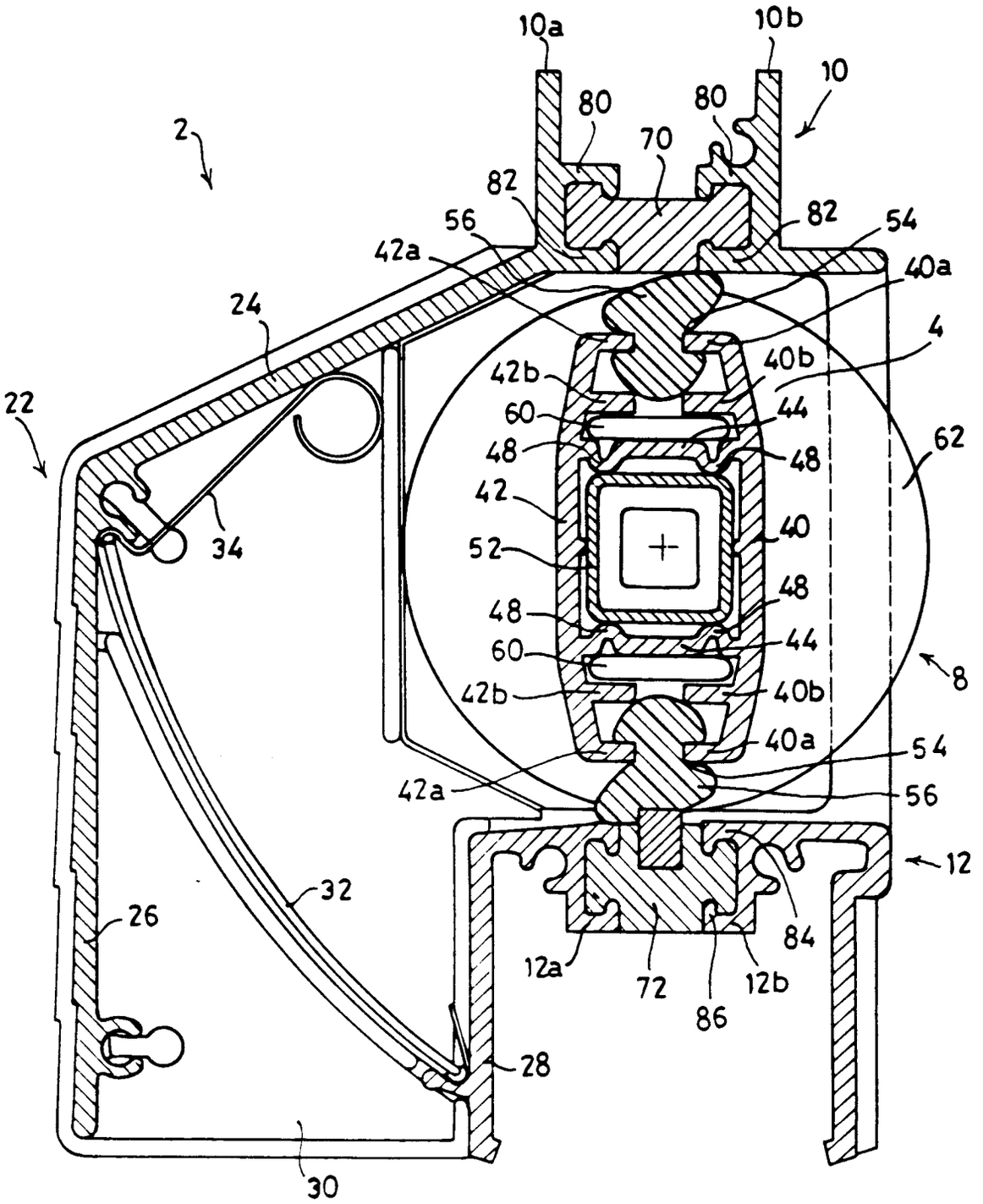

10a
10b
10
80
80
70
2
82
82
56
54
42a
40a
24
4
42b
40b
60
44
22
48
48
62
42
34
40
52
48
48
44
60
8
42b
40b
40a
54
42a
56
12
32
26
84
12a
72
86
12b
28
30

Fig. 1.

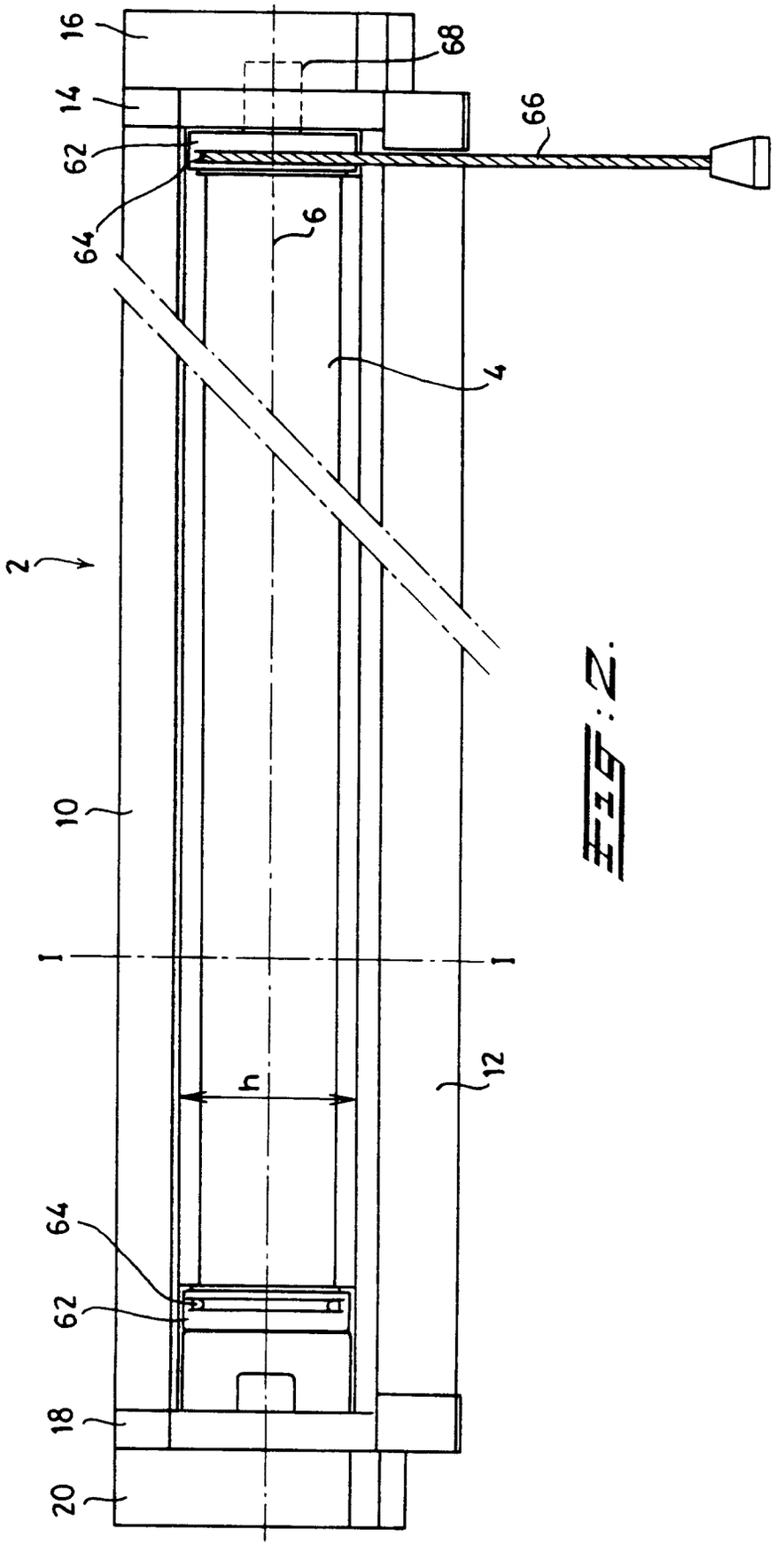


Fig. 2.

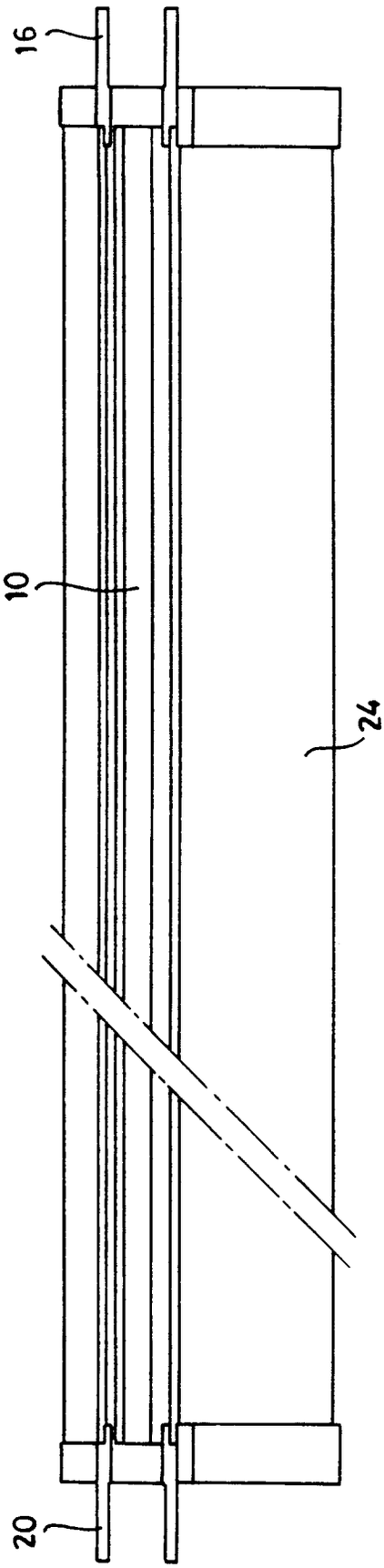


FIG. 3

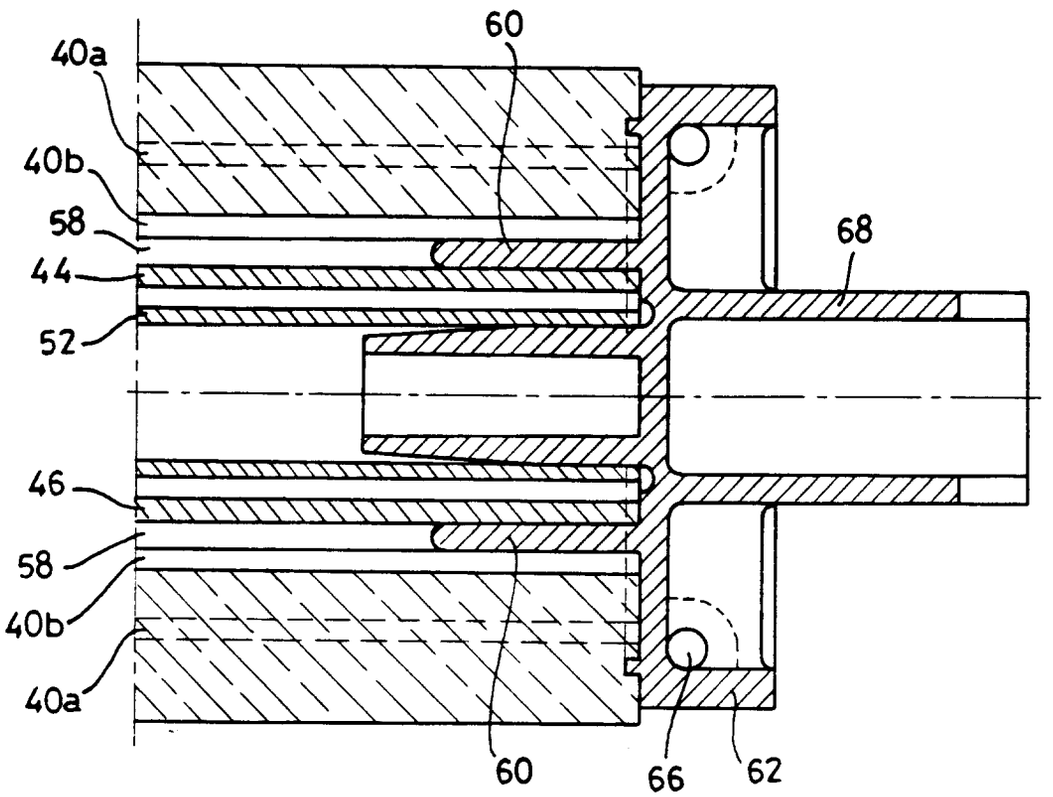


Fig. 4.

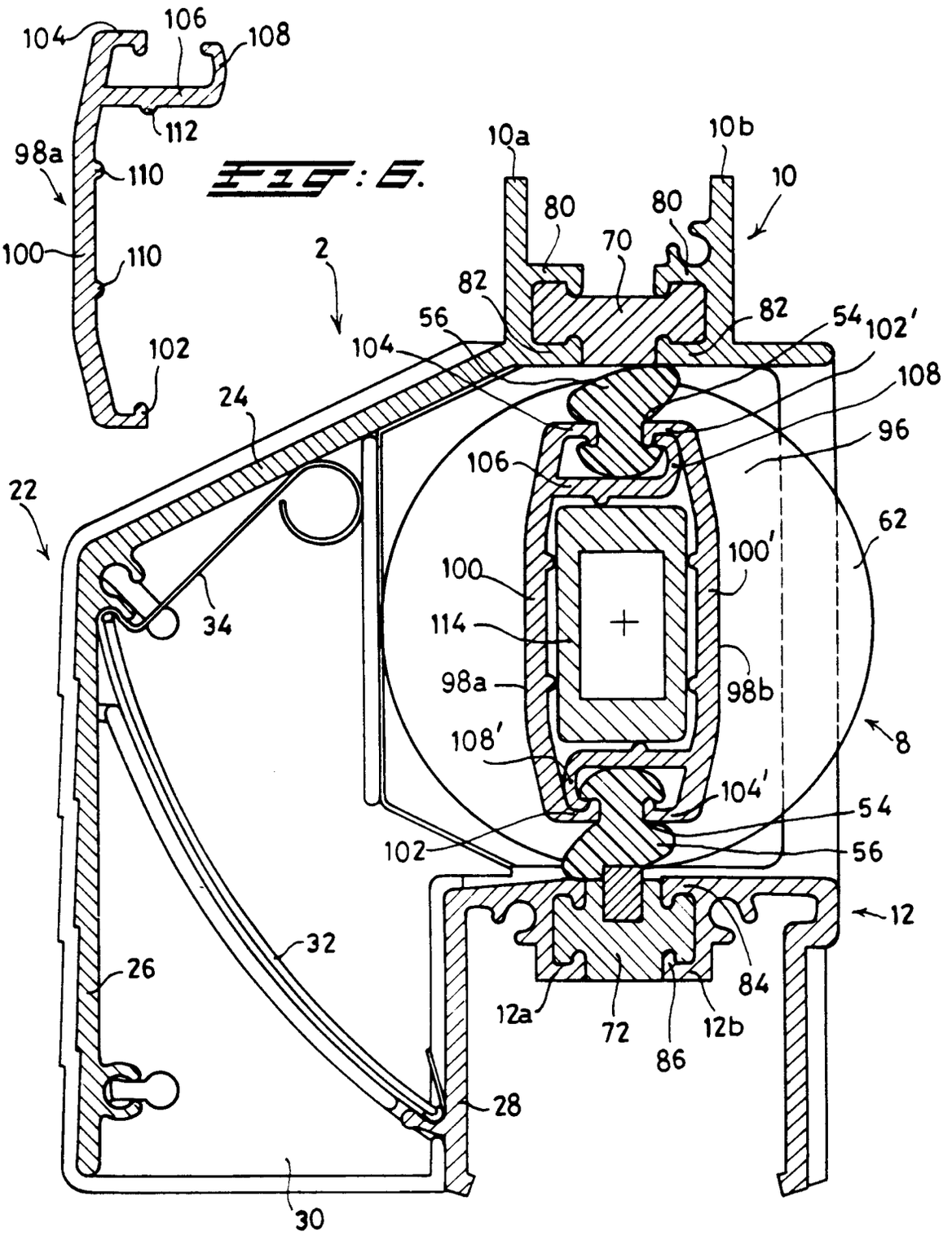

104
106
108
112
98a
110
100
110
102
10a
10b
10
80
80
70
2
82
82
56
54
102'
104
108
24
96
106
22
62
100'
100
114
98a
98b
108'
8
104'
54
102
56
12
32
26
84
12a
72
86
12b
34
28
30

Fig: 5.

Fig: 6.