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NL-2587 BN 's-Gravenhage(NL)(54) **Ventilator with hinging control valve.**

(57) A ventilator (1) comprises a substantially rectangular frame with an air passage and a control valve (6). The control valve (6) hinges (27) about a shaft (13) extending in the longitudinal direction of the ventilator (1). The valve (6) can close off or at least partly clear the air passage. Further, a grate (7) is provided via which the air allowed to pass through the control valve (6) and the air passage can flow into a space to be ventilated. The frame comprises two end parts (4,5), one of the end parts comprising operating means for the control valve (6). These operating means comprise at least one transmission element extending from one end part (5) along the control valve (6). This transmission element is coupled with the control valve (6) at at least one point spaced from the two ends (4,5) of the control valve (6).

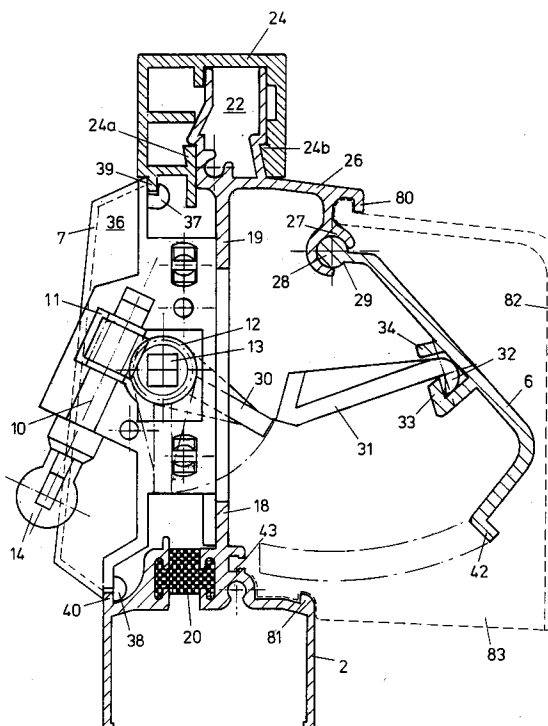


FIG.4

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This invention relates to a ventilator comprising a substantially rectangular frame with an air passage and a control valve which hinges about a shaft extending in the longitudinal direction of the ventilator, said control valve being capable of closing off or at least partly clearing the air passage, while further a grate is provided via which the air allowed to pass through the control valve and the air opening can flow into a space to be ventilated and the frame comprises two end parts, one of the end parts comprising operating means for the control valve.

Such ventilators are known from practice, for instance the ventilator marketed under the name of Climavent. In the known ventilators, for operating the control valve, a pull/push mechanism is provided adjacent one of the ends of the ventilator, for instance in the form of a Bowden cable, by means of which mechanism the control valve can be swivelled further open or less far open. A drawback of this known ventilator is that with a pull/push mechanism it is very difficult to achieve an exact setting. This applies in particular when in the course of time this mechanism becomes harder to adjust. Further, such a mechanism is not very suitable for use with relatively long ventilators, because it is not possible, with an operating mechanism that engages at one of the ends, for a valve of a length of 60 cm or more, for instance, to be so closed as to be properly sealed along its entire length, unless the valve has a very high torsional stiffness and, accordingly, is heavy and expensive in design.

The object of this invention is to remove the drawbacks outlined above and generally to provide an effective and robust ventilator adapted for easy and accurate operation. To that end, according to the invention, a ventilator of the above-described type is characterized in that the operating means comprise at least one transmission element extending from one end part along the control valve, the transmission element being coupled with the control valve at at least one point spaced from the two ends of the control valve.

Hereinafter the invention will be further described with reference to the accompanying drawings of some embodiments.

Fig. 1 is a diagrammatic, partly cutaway, front view of an example of a ventilator according to the invention;

Fig. 2 is a top plan view of the ventilator shown in Fig. 1;

Fig. 3 is a side elevation of the ventilator shown in Fig. 1, according to arrow III in Fig. 1;

Figs 4-6 are diagrammatic cross-sections taken on the lines IV-IV, V-V, and VI-VI in Fig. 1; and

Fig. 7 is a diagrammatic perspective end view of a ventilator according to the invention.

Figs 1-3 are schematic views of an embodi-

ment of a ventilator 1 according to the invention, respectively showing a front view, seen from the space to be ventilated, a top plan view, and a side elevation. The ventilator shown is suitable to be placed in a window frame together with a glass pane, which may or may not be of cavity glass. To that end, the ventilator comprises a lower section 2 which is open at the bottom and capable of receiving a glass pane with interposition of the conventional sealing materials. The width of the section 2 can vary depending on the thickness of the glass pane. Extending parallel to the lower section 2 is an upper section 3 which is preferably closed at the top. The upper section comprises an outwardly extending stop strip, which is shown in more detail in Fig. 4 and which is preferably as thick as the glass pane to be received in the lower section. The same applies to the end parts 4 and 5 adjoining the upper section and the lower section at the end faces thereof. The lower section lies exclusively within the area between the end parts or at least the outer portions thereof and in mounted position does not extend into the rebate of the frame. The outwardly extending stop strip of the upper section, together with the (outer portions of the) end parts, forms a stop surface both on the inside, i.e., the side of the space to be ventilated, and on the outside, this stop surface being in the same plane as the inside and outside surfaces of the glass pane, respectively. Therefore, the pane with the ventilator can be handled in the same manner as a pane without a ventilator. Recesses in the frame are not necessary and it is also possible to use continuous glass laths or other fastening means. These features are known per se from applicant's Netherlands patent 185031. The ventilator shown comprises on the outside thereof a hinging valve (not visible in Figs 1-3) by means of which the air stream through the ventilator can be controlled. The valve is shown in Figs 4-6 at 6. On the inside the ventilator shown comprises a louvered grate 7, to be described hereinafter.

In the example shown, the end parts 4 and 5 each have a portion 8 and 9, respectively, extending between the upper section and the lower section, the portion 9 being provided with transmission means for driving the control valve 6. The end parts may further comprise flanges and/or projections which engage in and/or about parts of the sections 4 and 5 or cooperate with suitable intermediate parts. In the example shown, the end parts each further comprise an inwardly directed section edge 25, as shown in Figs 4-6, which engages and accurately fits into at least a part of the ventilator. As can best be seen in Figs 4 and 6, the transmission means comprise a short shaft 10 which extends obliquely downwards and is bearing-mounted in a housing 11 in which is also bearing-mounted a

bar 13 fitted with a gear wheel 12. The bar 13 extends in the longitudinal direction of the ventilator transverse to the shaft 10. Within the housing 11, the shaft 10 is designed as a worm which meshes with the gear wheel 12 and thereby constitutes a right-angled transmission. Outside the end part 5, the shaft 10 comprises a ball joint 14 to which in operation an operating rod 15 is connected. By rotating the depending operating rod, the bar 13 is caused to rotate.

In the example shown, the bar 13 is made of bar stock of square cross-section and extends in the ventilator as far as approximately halfway the length thereof. The bar is for instance bearing-mounted in a support 16 arranged between the upper section 3 and the lower section 2 by means of a bearing bush having an inside cross-section of square shape and an outside cross-section of circular shape (Fig. 5).

Optionally, between the end part 5 and the intermediate support 16, additional supports fitted with bearings may be arranged at regular intervals, as shown in Fig. 1 at 17.

In the example shown, the intermediate support 16 is mounted on a crosspiece by means of a click-fit connection so as to form an exact fit therewith, the crosspiece being located between flanges 18,19 of the lower and the upper sections, directed towards each other. However, it can also be mounted in other suitable manners.

It is also possible to form the lower and upper sections at least partly as an edge section of a single section body, as shown in Fig. 6, for instance. The lower section, which comprises a cold bridge piece 20, forms the lower section edge of a body 21, made for instance of aluminum, having an upper hollow section edge 22. In the body 21, air passages have been formed which are bounded by flanges 18,19, as well as partly or wholly by crosspieces, as indicated at 23 at the level of the intermediate support, and as indicated at 17.

In the example shown, the upper hollow section edge 22 is covered by a plastics section 24 which at the same time constitutes a stop strip for the rebate of the frame and the glass laths and has been click-fitted by its inwardly extending edges 24a,24b onto complementarily shaped edges of the section edge 22.

In the example shown, the upper section edge 22 comprises a rain hood 26 having formed thereon a hinge portion 27 of the upper section. The hinge portion comprises a section part of substantially circular cross-section, which is open through an angle of approx. 90° for receiving a hinge pin 28 formed on the valve 6. In the example shown, the section part of substantially circular shape is open in the lower, outwardly directed quadrant. The slot 29 thus formed enables hinging motion of the

valve 6 between the closed position shown in Fig. 5 and the open position shown in Fig. 4.

For operating the valve 6, adjacent the intermediate support 16 a lever arm 30 has been rigidly mounted on the bar 13, the free end of the lever arm 30 being hinged to an intermediate arm 31. In turn, the end of the intermediate arm that is remote from the lever arm is hingedly coupled with the inside of the valve 6.

To that end, in the example shown, the intermediate arm 31 is provided with a hook-shaped end 32 which extends between the flanges 33,34 of a channel-shaped longitudinal section formed on the inside of the valve 6 and engages with one flange 33, which is also hook-shaped. The valve 6 is preferably made of aluminum and can advantageously be produced as an extruded element.

In the example shown, the rain hood portion 26 comprises a depending section edge 80 formed above the hinge portion 27. Likewise, an upright section edge 81 has been formed on the lower section 2 below the valve 6. If so desired, the upper edge of a cover can be hooked behind the section edge 80, as shown, by way of example, by means of broken lines shown in Fig. 4 at 82. Such a cover is preferably finished at the end with end walls, of which one is shown by means of broken lines in Fig. 4 at 83. The end walls are provided with means, such as the recess 84, for cooperation with the upright section edge 81 so as to fix the cover. For that purpose, however, separate support means may be used as well, which may or may not be combined with a fixation by the end walls. It is for instance conceivable to arrange additional supports between the end walls in the case of long covers.

In the example shown, the grate 7 is a louvered grate but it could for instance be a perforated grate. As can be seen in Fig. 1, the louvered grate is built up from a plurality of loose units, preferably of standard length, arranged side by side. Each unit comprises at least one support strip 35, which is located on the outside of the grate.

Each unit of the louvered grate further comprises at the top and bottom thereof hook-shaped attachment members 37, 38 which are open in upward and downward direction, respectively, engaging with corresponding edges 39, 40 of the upper section and the lower section. In this example, the edge 39 is a narrow flange of the plastics cover section 24. The hook-shaped attachment members can be formed on the support strips or on the intermediate grate units, or even on both. Shown at 36 are flanges of the end parts 4 and 5, extending transverse to the louvers. These flanges lock the louvered grate at the short ends thereof.

In the situation shown, the louvers are directed slightly obliquely downwards towards the space to

be ventilated, so that in operation the air stream is also directed obliquely downwards. However, as shown, the units of the louvered grate are preferably formed so as to permit their being mounting in inverted position, as required, i.e., with the hook-shaped attachment member 38 arranged at the top and the hook-shaped attachment member 37 at the bottom. The louvers are then directed obliquely upwards. In this manner, an even more exact control of the desired ventilation is possible. It is possible to mount all units in the same manner, but it is also possible to arrange for a number of louvers to point obliquely upwards and for a number of them to point obliquely downwards.

A unit of a louvered grate can be simply removed by exerting a pressure by hand as indicated by arrows 41 in Fig. 5 and drawing the unit in question outwards.

In the example shown, the control valve 6 comprises a lip 42 which is substantially vertical in the closed position and is located opposite a slot 43 in the lower section. In this slot a sealing strip (not shown) can be mounted.

Fig. 7 schematically shows a different embodiment of a ventilator according to the invention. The ventilator shown in Fig. 7 also comprises at the top thereof an aluminum section with a cold bridge piece 70. Further, the embodiment shown in Fig. 7 comprises on the outside thereof a depending hood 71 extending throughout the height of the ventilator. Support members 72 can be arranged between the hood 71 and the lower section 2. Further, as noted with respect to the cover 82 shown in Fig. 4, end walls may be used which may or may not at the same time have a support function. Located below the hood 71 is further a hinging control valve 73 which in this example can close the air passage by abutting a strip 74 which extends upright from the lower section and is bent slightly outwardly. The strip 74 can be made of supply material.

In this example, the units of the louvered grate 7 have upper and lower narrow longitudinal edges which are detachably retained in corresponding channel sections 75,76.

It is observed that after the foregoing various modifications will readily occur to those skilled in the art. For instance, if so desired, mosquito netting may be arranged direct against the louvered grate or perforated grate on the inside thereof. In principle, it is also possible for the louvers to be movably mounted and to be provided with operating means in a similar manner to that used in Venetian blinds.

Further, a plurality of operating members 30, 31 spaced along the length of the control valve could be used.

Also, instead of a louvered grate 7, or even in

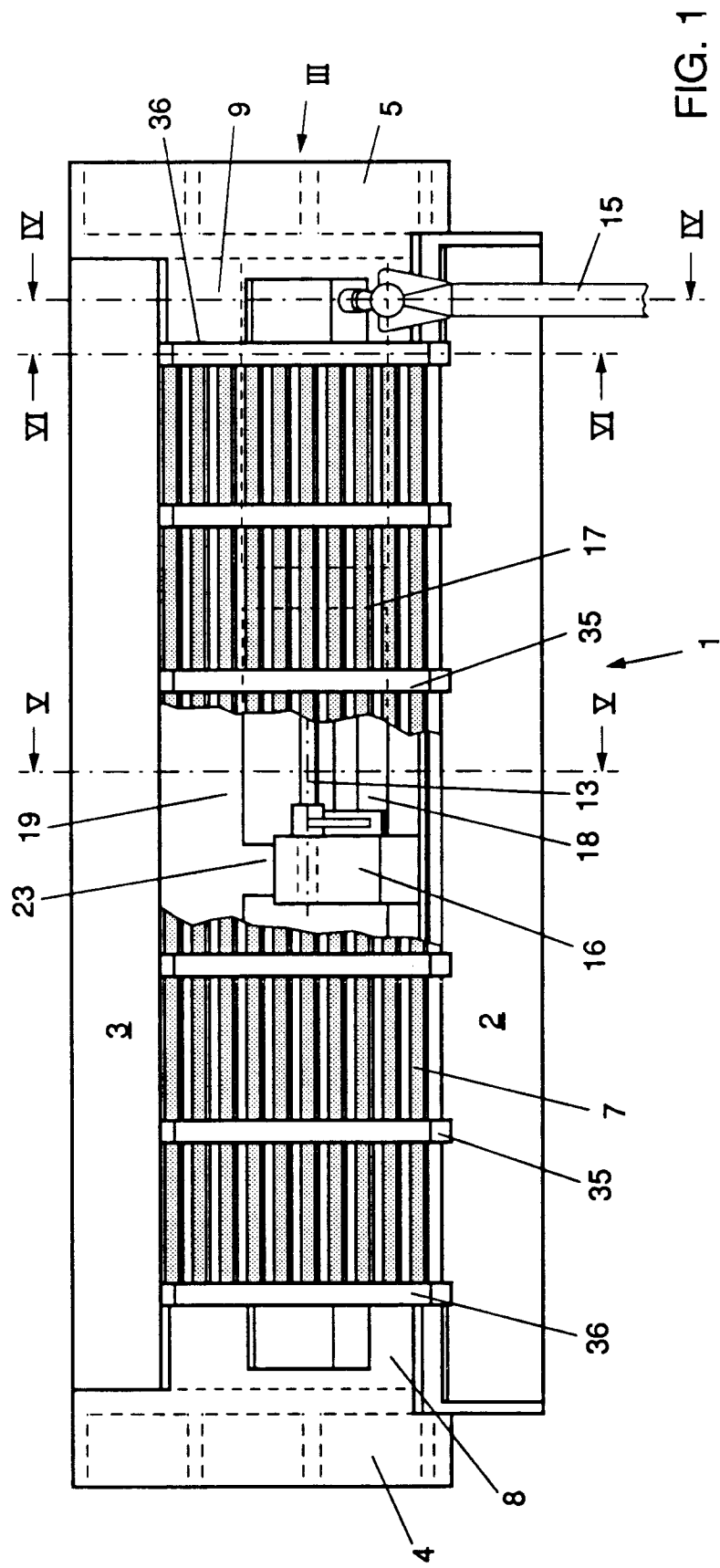
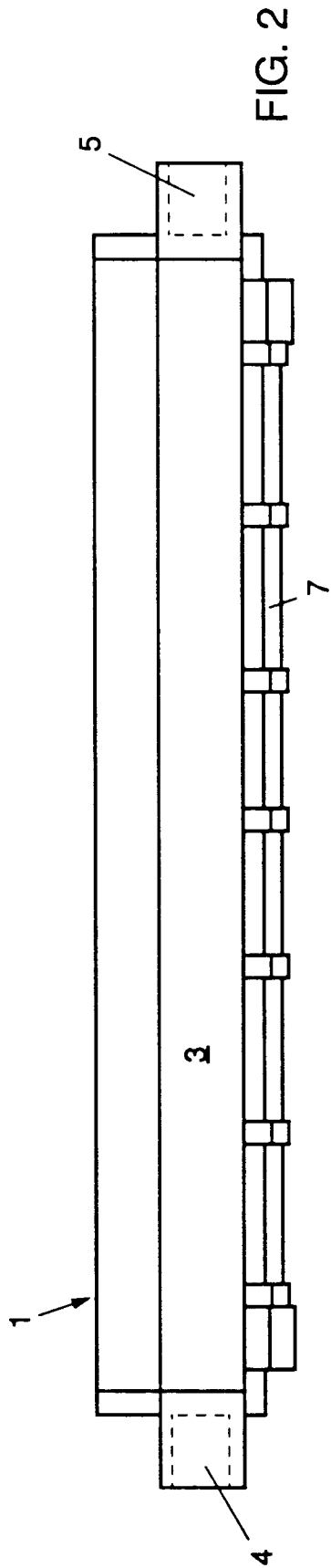
combination therewith, or, instead of a cover, a baffle could be arranged which is mounted in a similar manner.

These and similar modifications are understood to fall within the framework of the invention.

Claims

1. A ventilator comprising a substantially rectangular frame with an air passage and a control valve which hinges about a shaft extending in the longitudinal direction of the ventilator, said control valve being capable of closing off or at least partly clearing the air passage, while further a grate is provided via which the air allowed to pass through the control valve and the air passage can flow into a space to be ventilated and the frame comprises two end parts, one of the end parts comprising operating means for the control valve, characterized in that the operating means comprise at least one transmission element extending from said one end part along the control valve, said transmission element being coupled with the control valve at at least one point spaced from the two ends of the control valve.
2. A ventilator as claimed in claim 1, characterized in that the transmission element comprises a bar extending along the frame in the longitudinal direction of the control valve, said bar comprising teeth in said one end member, said teeth cooperating with a worm member mounted on an operating shaft.
3. A ventilator as claimed in claim 2, characterized in that the bar is bearing-mounted, at least in the central area of the ventilator, in a support arranged in the frame and that the bar adjacent to the support comprises a lever arm rigidly mounted on the bar, said lever arm being coupled with the control valve.
4. A ventilator as claimed in claim 3, characterized in that the lever arm is coupled with the control valve via an intermediate arm coupled with the free end of the lever arm.
5. A ventilator as claimed in claim 4, characterized in that the intermediate arm has a hook-shaped end extending between the flanges of a channel section formed on the inside of the control valve and engages with at least one of the flanges.
6. A ventilator as claimed in any one of claims 2-5, characterized in that the bar is made from bar stock of rectangular cross-section.

7. A ventilator as claimed in any one of claims 3-6, characterized in that the support is mounted between flanges of an upper section and a lower section of the frame, which flanges are directed towards each other. 5
8. A ventilator as claimed in any one of claims 3-6, characterized in that the support is mounted on a crosspiece formed between the upper section and the lower section. 10
9. A ventilator as claimed in any one of the preceding claims, characterized in that the control valve is pivotaly mounted by its upper longitudinal edge in a section part having the shape of an open circle in cross-section, said part having been formed below a rain hood. 15
10. A ventilator as claimed in claim 9, characterized in that the rain hood, beyond the hinge area of the control valve, comprises a cover depending substantially throughout the entire height of the ventilator. 20
11. A ventilator as claimed in claim 10, characterized in that the cover has its upper edge detachably retained by a section edge of the rain hood. 25
12. A ventilator as claimed in claim 11, characterized in that the cover comprises end walls which cooperate with a section edge of the lower section so as to fix the cover. 30
13. A ventilator as claimed in any one of the preceding claims, characterized in that the grate is a louvered grate detachably and reversibly mounted on the frame, the louvers taking up an oblique position relative to the horizontal in at least one of the positions. 35
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14. A ventilator as claimed in claim 13, characterized in that the louvered grate is built up from loose units which can each be separately attached to the frame of the ventilator by means of a click action. 45
15. A ventilator as claimed in any one of the preceding claims, characterized in that the upper section of the frame comprises an outwardly extending stop strip which, together with the corresponding parts of the two end members, forms a strip which has inside and outside stop surfaces and extends around the ventilator, said stop surfaces being positioned relative to a lower section of the frame in such a manner that the inside and outside stop surfaces are substantially in the same plane as 50
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- the respective inside and outside surfaces of a glass pane received in the lower section.



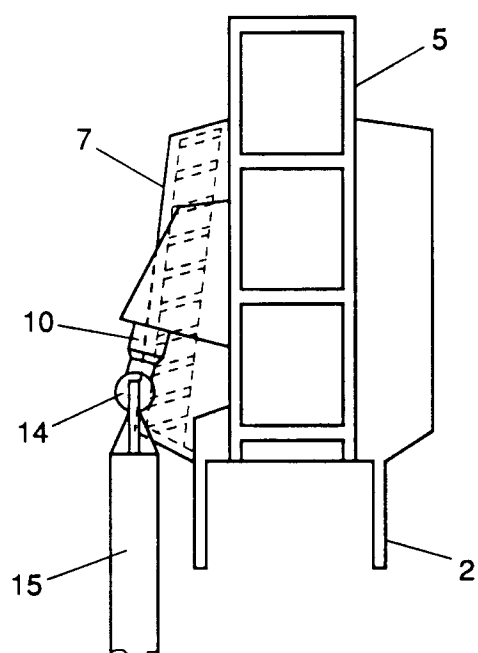


FIG. 3

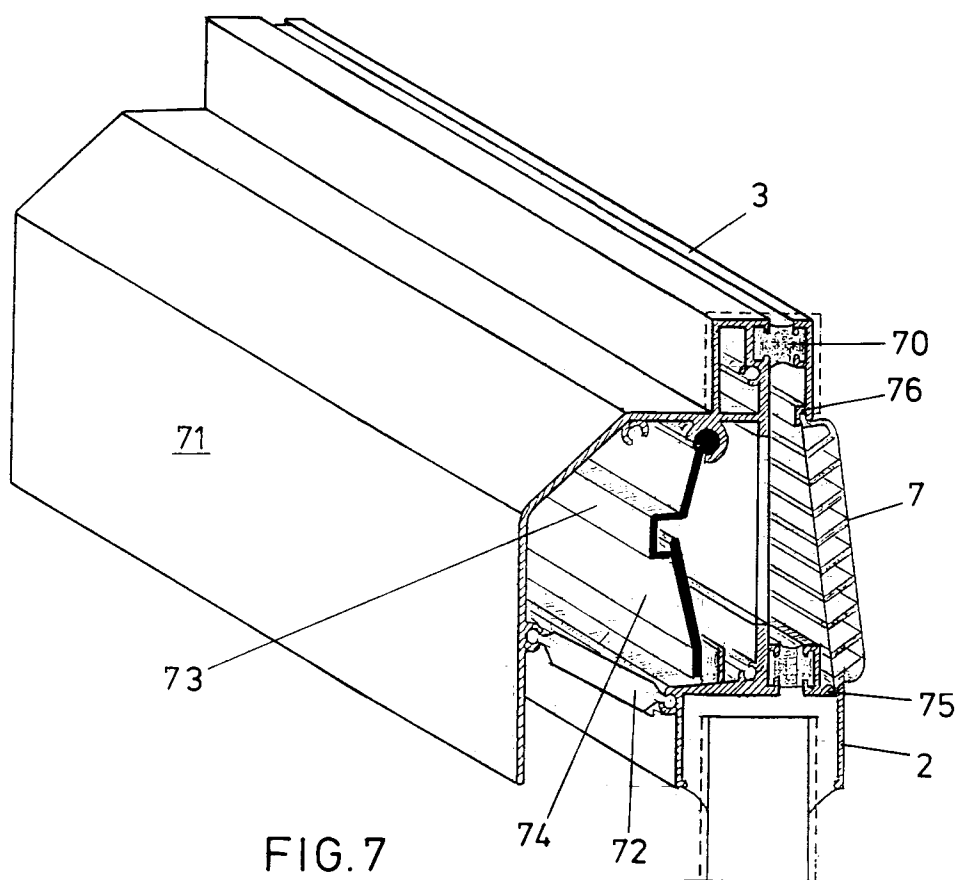


FIG. 7

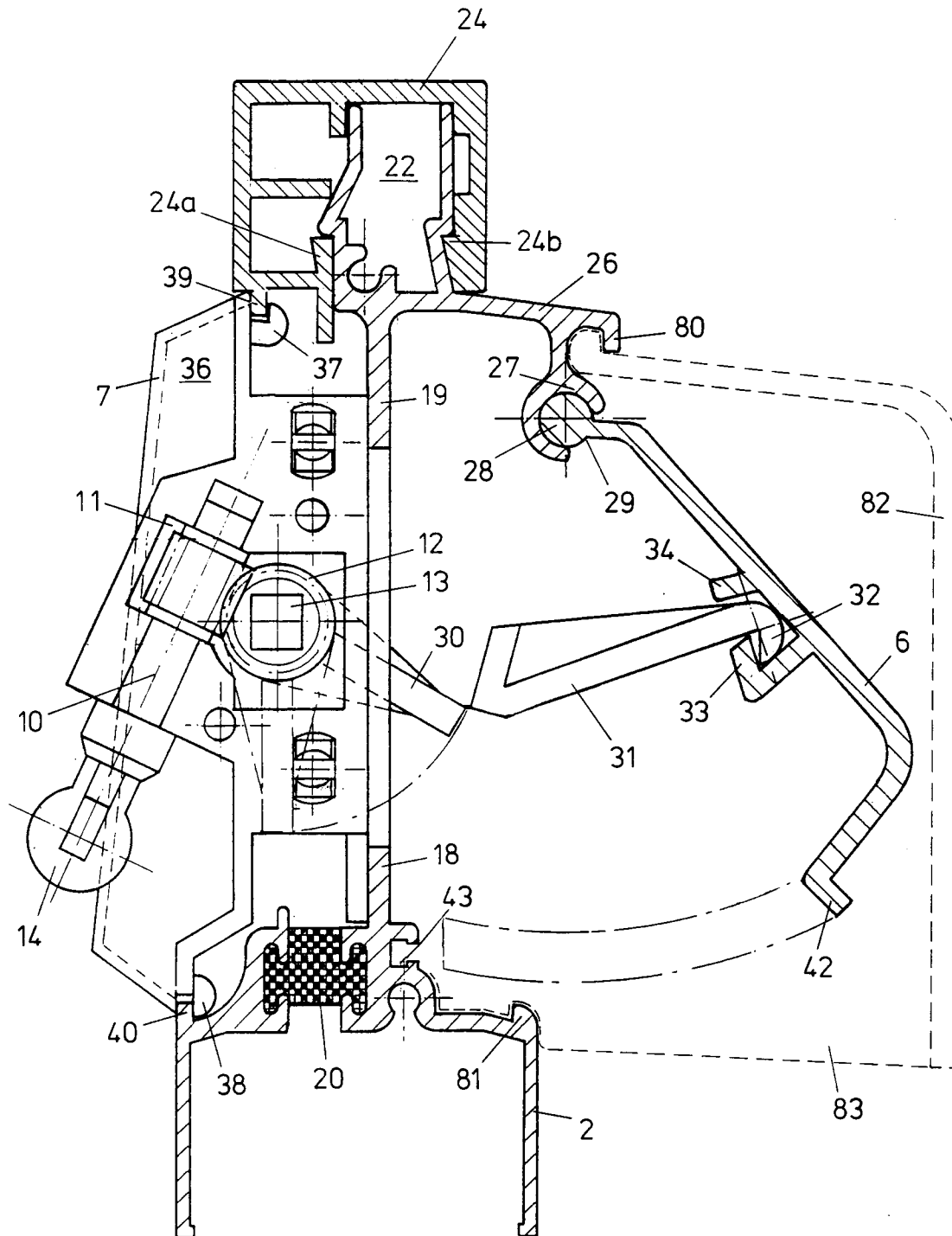


FIG. 4

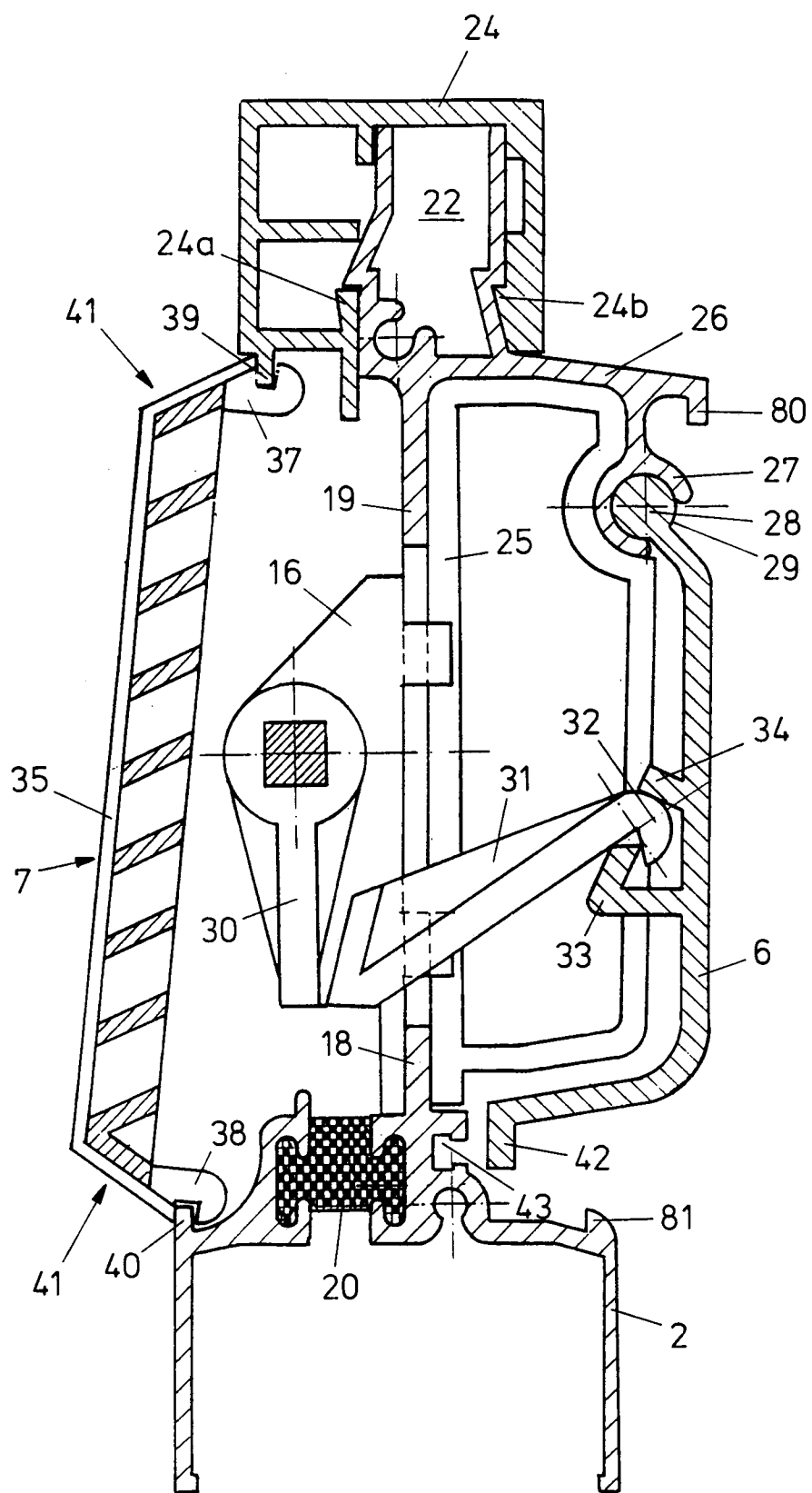


FIG. 5

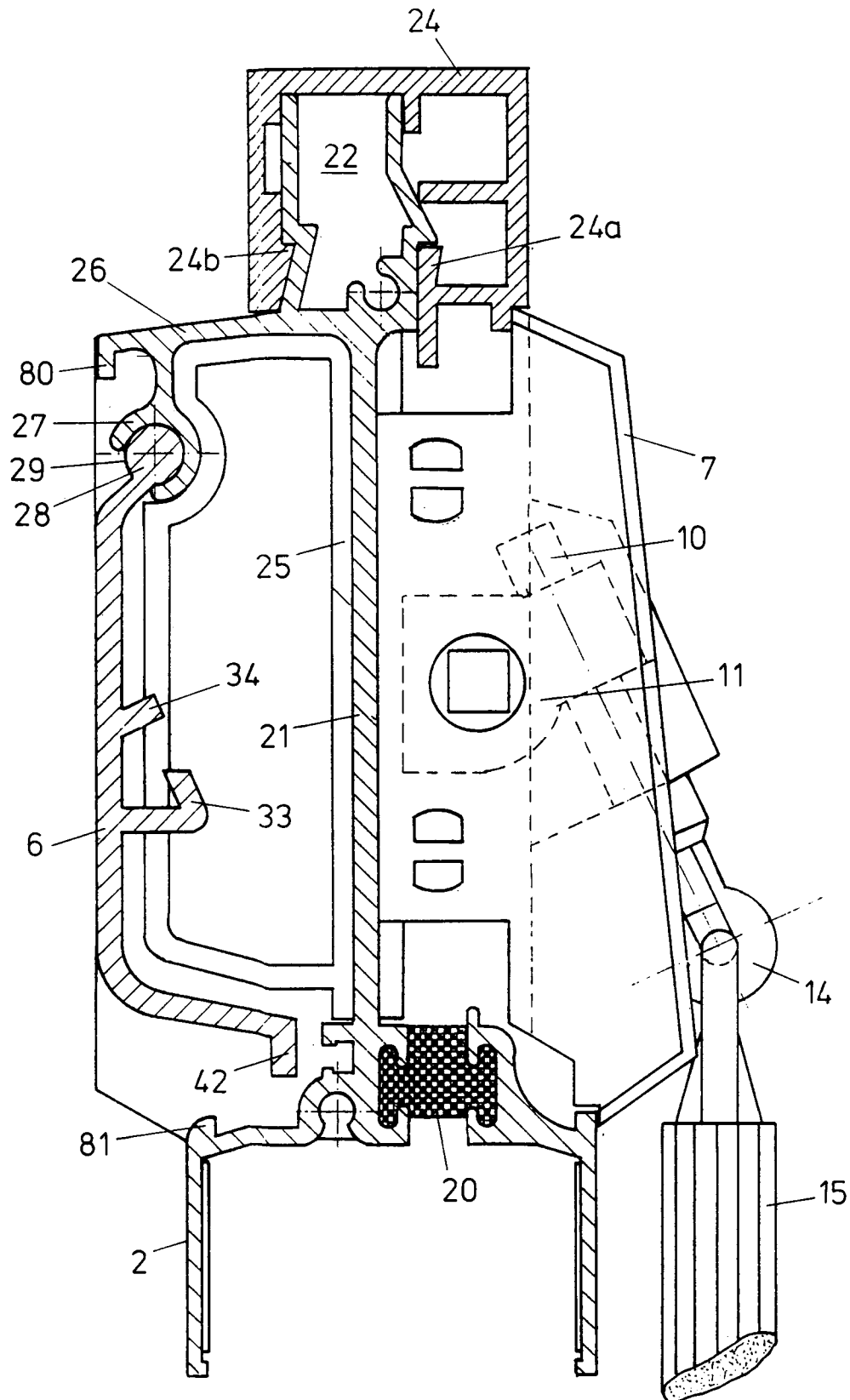


FIG.6



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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 1197

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	NL-A-6 813 968 (MARCE) * figure * -----	1	F24F13/18 E06B7/06
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F24F E06B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 03 SEPTEMBER 1992	Examiner PESCHEL G.
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