



EUROPEAN PATENT SPECIFICATION

Date of publication of patent specification :
13.10.93 Bulletin 93/41

Int. Cl.⁵ : **F24F 13/10**

Application number : **89909770.3**

Date of filing : **25.08.89**

International application number :
PCT/FI89/00156

International publication number :
WO 90/02296 08.03.90 Gazette 90/06

VENTILATION VALVE.

Priority : **30.08.88 FI 883984**

Date of publication of application :
29.08.90 Bulletin 90/35

Publication of the grant of the patent :
13.10.93 Bulletin 93/41

Designated Contracting States :
AT BE CH DE FR GB IT LI LU NL SE

References cited :
EP-A- 0 267 485
DE-A- 2 646 180
GB-A- 2 065 292
SE-B- 390 566
US-A- 4 653 384

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EP 0 383 894 B1

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Description

The present invention concerns a ventilation valve, comprising a first louvre component and a second louvre component, at least one of them being movable linearly for diminishing or enlarging the flow gap between said louvre components.

US 4653384 shows an air supply adjusting mechanism for an air conditioner, in which two louvre components are provided with an air flow gap defined between them. The louvre components are mounted for independent pivotal motion to adjust the flow gap geometry.

Ventilation valves are known in the art in which the ventilation valve is composed of two section parts, that is, of adjustment louvres which can be moved relative to one another. In prior art ventilation valves, the flow cross-section between the louvre components increases in the flow direction. The best possible passage for the air is not guaranteed by said arrangement.

For example, GB 1537167 shows an air exhaust ventilating device comprising two louvre components with a flow gap defined between them which increases in flow cross-section in the direction of the air flow.

The aim of the invention is a ventilation valve comprising an extensive adjustment area, enabling the use of a device of the same order for different targets. The objective of the invention is specifically a ventilation valve in which measurement and adjustment are easy. The aim of the invention is a ventilation valve in which the aerodynamic properties are advantageous and resonance phenomena have been avoided.

The present invention provides a ventilation valve, comprising a first louvre component and a second louvre component, each louvre component comprising a first curved surface portion upstream of the flow and a second surface portion downstream of the first curved surface portion, at least the second louvre component being moveable for altering the size of a flow gap between the louvre components, characterized in that said second surface portion is at an angle relative to the central axis of the flow gap of the ventilation valve, the second curved surface portion of each louvre component being connected to a curved surface section adjacent the trailing part of the flow, and to the first surface portion, and in that the flow gap comprises an elongate gap defined between the louvre components, the flow gap diminishing in flow cross-sectional area in the direction of flow and the movable louvre component being moveable linearly for diminishing or enlarging the flow gap.

The invention is described now referring to some advantageous embodiments of the invention presented in the figures of the accompanying drawings, to which, however, the invention is not intended to be exclusively confined.

Fig. 1A presents in axonometric image the ventilation valve of the invention when assembled.

Fig. 1B presents in axonometric image the ventilation valve of the invention with the detachable basic components depicted in separation.

Fig. 2 presents in axonometric image the ventilation valve of the invention with the front cover plate removed.

Fig. 3A presents in principle view the ventilation valve of the invention. The image is taken primarily along the section line I-I of Fig. 2, and the image has been simplified with reference to Fig. 2. The operational position of a valve implementing the maximal air flow is presented.

Fig. 3B presents the valve of Fig. 3a in the operational position implementing the minimal air flow.

Fig. 4 presents the operational graphs of the ventilation valve.

Fig. 5A presents a first advantageous location of the adjustment scale.

Fig. 5B presents a second advantageous location of the adjustment scale.

Fig. 6A presents the louvre component in axonometric image.

Fig. 6B presents section II-II of Fig. 6A.

In Fig. 1A is presented the ventilation valve 10 of the invention in assembled form. The direction of the air flow is indicated by arrow L. As shown in the figure, the ventilation valve 10 comprises an envelope part 11 to which the front cover 13 has been attached. The front cover comprises the front part 13a and edges 13b. The entire front cover 13 has advantageously been constructed of a similar structure and comprises flow apertures 13c being in shape e.g. gaps, slots, holes, etc. The front cover 13 may also be composed of a structure which comprises a planar, non-apertured plate section in front of the louvre components. The flow gap or gaps are hereby defined between the edges of the plate part and the collar of the envelope part 11. In said design the front cover 13 may be attached to the envelope part 11 by projecting irons or by equivalent arrangements.

In Fig. 1B is presented a ventilation valve with the detachable central components being depicted in separation. The ventilation valve comprises an envelope part 11 and an adjustment component 12 attachable thereto, and furthermore, a detachable front cover part 13.

The envelope part 11 comprises a duct part 14, enclosing therein a flow duct A₁. The flow passage direction is indicated also in Figs 1A and 1B by arrow L. The envelope 11 comprises a collar part 15 at one end of the duct part 14. The collar part comprises an edge 15a, its plane being in the direction of the longitudinal axis X of the duct. The collar part 15 also comprises a bottom part 15b which in plane is perpendicular to the longitudinal axis X of the duct portion 14. On top of the bottom part 15b is placed a

sealing material layer 15c.

The inner surface 14a of the duct part 14 comprises attaching means 16 attached thereto. There are two pieces of said attaching means 16 and they form a hook-like endface part 16a with the aid of which the bodyparts 17 of the adjustment part 12 are compressed against the sealing material layer 15c. The attaching means 16 may be made of an elastic plate material and they may be advantageously attached to the duct part 14 with rivets.

As shown in Fig. 1B, the adjustment part 12 attached to the envelope part 11 with the attaching means 16 has been placed in separation from the envelope part 11. The adjustment part 12 comprises two bodyparts 17. The bodypart 17 is advantageously an L-shaped section, comprising, when the adjustment part 12 is set in place, a plate component 17a in the direction of the X axis of the envelope part 11 and a plate component 17b at 90° angle relative to the plate component 17a connected thereto. The plate component 17b is perpendicular in plane to the X axis.

The adjustment part 12 comprises a first louvre component, that is, section 18a, and a second component, that is, section 18b. In the embodiment of Figs 1A-1B the louvre component 18b is movable, as shown in Fig. 1B, by arrow C. The louvre component 18b is movable linearly.

In this embodiment of the invention, only one of the louvre components 18 can be moved. Within the scope of the invention also such an embodiment is conceivable in which both of the louvre components are movable relative to one another.

The location adjustment means 19 of the movable louvre component 18b comprises a rod 20 provided at both ends with drive wheels 21, advantageously gears. By rotating the rod 20, the drive wheels 21 coupled fixedly to the rod 20 are rotated. The rod 20 may be a hexagonal section rod, whereby it can be turned with a spanner. The drive wheels 21 are engaged on the abutment surface 22 of the louvre part 18b. In the most advantageous embodiment of the invention, the drive wheel 21 is a gear and the abutment surface 22 is together with the gear 21 an interacting serration 22. The purpose of the rod 20 is to act as a synchronizing rod. With the aid of the rod 20 both ends of the movable louvre component 18b are moved simultaneously. Hereby, the transmission movement is made to be so synchronized that both ends of the louvre component are moved an equivalent length. The flow gap defined between the louvre components 18a, 18b remains in this case unchanged and in the desired flow cross-section area mode at all set values of the valve.

Between the first louvre component 18a and the second louvre component 18b is defined a flow gap A_2 . Said flow gap tapers relative to the incoming direction L of the air flow. Said flow gap A_2 is adjusted by moving the louvre component 18b linearly with the

location adjustment means 19 as is shown by arrow c.

In Fig. 2 is presented more in detail the ventilation valve of the invention. In Fig. 2 is presented the movable louvre component 18b and the devices engaged thereto in order to implement the linear adjustment movement. The location adjustment means 19 comprises an attachment plate 23 attached to the bodypart 17, on its plate section 17a. The plate 23 has a hole 24 through which the rod 20 has been disposed to pass. The attachment plate 23 serves at the same time as the bearing point for the rod 20. Furthermore, the ends of the rod 20 have been disposed to pass in the body 17 through the hole 25 located in its plate section 17a. The end of the rod 20 is provided with a notch 26 into which an end of a tool, such as of a screw driver, can be fitted for turning the rod 20 and for moving the section 18b.

The envelope part 11 has furthermore a notch 27 on the edge part 15a of the collar 15 through which a tool may be fixed to the rod 20.

By turning the rod 20 the drive wheel 21 is rotated, this being operationally connected to the abutment surface 22 being fixedly attached to the louvre 18b, said abutment surface being advantageously a straight abutment surface. In the embodiment of Fig. 2 the drive wheel 21 is a gear and the abutment surface 22 is a gearrack. Said parts are advantageously made of plastic.

The abutment stop face 22 is furthermore pressed against the plate section 17b of the body 17 and it can be moved in conformance to said even plate part. The abutment stop part 22 may furthermore comprise a separate plate part engaged to the other side of the plate section 17b of the body 17, ensuring the maintaining of the louvre component 18b on the body 17 in all circumstances of use.

As shown in Fig. 2, the adjustment part 12 is connected to the body 17 with an attaching member 16. The attaching member 16 presses the body 17 fast to the envelope part 11.

In the embodiment of the figure, the louvre component 18a is in a fixed position on the body 17. The louvre component 18a comprises a fixing plate 29 through which a fixing member 30, for instance a rivet, has been taken and which fixing member is furthermore fixed to the body 17, to its plate section 17b.

With the adjustment means 19 the louvre component 18b is moved linearly and the location of said louvre component can be read on the scale 28, which is advantageously a millimetre scale. In the embodiment presented in Fig. 2 the scale has been disposed on the inner surface 14a of the duct portion 14.

In Fig. 3A, a reduced image is presented of the ventilation valve of the invention and included primarily along the section line I-I of the figure. As shown in the figure, the louvre component 18b can be moved linearly. The louvre component 18b comprises a por-

tion 31 with a straight surface guiding the air flow, said portion being in plane in angle α relative to the central axis X of the ventilation valve flow duct A_2 . As shown in Fig. 3A, the duct A_2 tapers relative to the progression direction L of the air flow. In addition, the louvre component 18 comprises a smoothly curving preguiding surface 32 of the flow, which later joins the straight flange section 33, said flange section 33 being approximately perpendicular to the axis X. The flange section 33 acts as a mobile sealing component and enables the adjustment movement of the section and allows the passage of the air flow merely between the louvres 18b and 18a. In Fig. 3A is presented an on-position of the ventilation valve in which the flow passage A_2 is maximal.

In Fig. 3A the mobile louvre component 18b has been moved to a position implementing a minimal air flow, that is to a position in which the flow cross-section area A_2 is minimal. In Fig. 3B, arrow c presents the transfer of the mobile section 18b into the position of the ventilation valve implementing said minimal air flow.

The louvres 18a and 18b are equivalent, and therefore, there is no need to manufacture more than one kind of louvres. The louvre components 18a and 18b have respectively been so attached to the structure that the main surfaces of the louvre components, or the surface portions 31, deviating the flow are at respective angle α relative to the central axis X of the flow duct A_2 . Angle α is advantageously in the range 3-15°. The surface portions 31 are advantageously straight surfaces, and hereby, the surface plane is at angle α relative to the central axis X of the flow duct A_2 . Hereby, α is within the range 3-15°, advantageously about 7°.

In Fig. 4, the operation curves of the ventilation valves of the invention are presented. As taught by the invention, the operation diagram is used in Fig. 4 as follows. On the measurement scale is read the opening position and at the same time, the pressure across the ventilation valve is measured with a pressure connector to be described later. Thereafter, the volumetric flow corresponding to the opening position may be read on the curves.

In Fig. 5A is presented an advantageous positioning of the scale 28. In the embodiment of Fig. 5A the scale 28 is located on the inner wall 14a of the duct 14. By moving the louvre 18b the opening position is read at the edge E of the louvre 18b.

In the embodiment of Fig. 5B the scale 28 has been disposed on the surface of the plate portion 17b of the body 17. By moving the louvre component 18b, as shown by arrow c, the opening position may be read at the edge E.

In Fig. 6A is presented an embodiment of the louvre 18 in axonometric image. The louvre 18 comprises a hollow interior space 34. Into said space 34 the flow passages open through apertures 35 for

transmitting the flow pressure to the measuring instrument. Several apertures 35 are provided in the adjacency of the trailing edge of the flow. They are located linearly in the section 18, and therefore, a reliable measurement result and average are obtained throughout the whole flow passage. From the distributing chamber 34 is arranged a connector 36 on to the pressure gauge. The connector 36 is normally closed and it is only in a measuring situation when the connector 36 is connected to the measuring instrument.

In Fig. 6B is presented a section II-II of Fig. 6A. In Fig. 6A is presented moreover an embodiment in which the louvre 18 comprises an interior space 34 divided by a partition 37. Hereby, from the space 34a is provided a pressure connector 38 to a sensor.

It is feasible to produce within the scope of the invention also the other structures of the louvre components 18. A section component made of sheet metal may also be used.

Hereby, the pressure in a pressure measuring event is conducted directly through the apertures 35 to the collecting connector 36, and further to a measurement sensor. No distributing chamber is used here.

The trailing edges 39 of the louvres 18 are rounded. Said trailing edge 39 must not be sharp because that will cause turbulence, neither is excessive rounding desirable because that also causes turbulence. Therefore, as taught by the invention, the ventilation valve comprises a louvre portion 18 which is provided with a surface 32 guiding the flow, located foremost relative to the flow, and a second flow-guiding surface 31, advantageously a straight surface connected thereto. The flow gap A_2 tapers, as taught by the invention, more sharply at the foremost flow surface. The louvre component of the invention comprises further a curved trailing edge 39 joining to the flow surface 31 of the centremost louvre.

The ventilation valve of the invention may be installed on a ceiling or on a wall. The means may also be connected to pressure distributing boxes known in the art. The means of the invention is silent even at high volumetric flow ranges. No resonance occurs. The means is simple to dismantle and, therefore, it is easy to clean. The front plate 13 of the means is architectonically advantageous.

The ends 40 of the louvres 18 form a sealing, whereby the variations of longitudinal measuring or setting tolerances are eliminated.

The ventilation valve of the invention serves both as a ventilation valve and as a control part for the air flow. As taught by the invention, with the tapering duct, and particularly, with said tapering in the air flow direction are obtained the following advantages. The air speed increases, and at the same time, due to the surface friction between the air flow and the louvre surface, an adequate static duct pressure is achieved, as regards the measurement. Therefore,

when a sufficient measurement of the static pressure of the air flow is achieved, the adjustment can be accomplished for the means, and at the same time, the measurement of the air flow quantity of the room space. Consequently, no separate adjustment component is needed.

Such ventilation valve is described above that is suitable for an exhaust air means. Thus, through said ventilation valve, as shown in the figures related to the embodiments described, air is drawn off from the room space. Such embodiment is also feasible within the scope of the invention in which the ventilation valve is used as an incoming air means. In said embodiment the louvres are so positioned relative to one another that the flow gap between the louvres in the flow direction of the air is again tapered. The front cover plate 13 in said embodiment is positioned in the air travelling direction after the tapering flow gap.

Claims

1. A ventilation valve (10), comprising a first louvre component (18a) and a second louvre component (18b), each louvre component (18a, 18b) comprising a first curved surface portion (32) upstream of the flow and a second surface portion (31) downstream of the first curved surface portion (32), at least the second louvre component (18b) being moveable for altering the size of a flow gap (A_2) between the louvre components (18a, 18b), characterized in that said second surface portion (31) is at an angle (α) relative to the central axis (X) of the flow gap (A_2) of the ventilation valve (10), the second surface portion (31) of each louvre component (18) being connected to a curved surface section (39) adjacent the trailing part of the flow, and to the first surface portion (32), and in that the flow gap (A_2) comprises an elongate gap (A_2) defined between the louvre components (18a, 18b), the flow gap (A_2) diminishing in flow cross-sectional area in the direction of flow and the movable louvre component (18b) being moveable linearly for diminishing or enlarging the flow gap (A_2).
2. Ventilation valve according to Claim 1, characterized in that the ventilation valve (10) comprises an elongated gap (A_2) formed between the louvre components (18a, 18b) which diminishes in cross-section at a greater rate upstream of the flow than downstream of the flow.
3. Ventilation valve according to Claim 1 or 2, characterized in that the ventilation valve (10) comprises a front cover part (13) placed in front of the louvre components (18a, 18b) through which or around which the air flow may enter the flow gap (A_2) between said louvre components (18a, 18b).
4. Ventilation valve according to any one of the preceding Claims, characterized in that the ventilation valve (10) comprises adjustment means (19) comprising rotatable means (20), by rotating which the valve component (18b) may be moved.
5. Ventilation valve according to Claim 4, characterized in that the rotatable means (20) comprises at least one drive wheel (21) engaging an abutment surface (22) of the movable louvre component (18b), whereby, by rotating the rotatable means (20), the louvre component (18b) may be moved linearly.
6. Ventilation valve according to Claim 5, characterized in that the drive wheel (21) comprises a gear and the abutment surface (22) comprises an abutment gearing or gear track.
7. Ventilation valve according to any one of Claims 4 to 6, characterized in that the rotatable means (20) comprises a rod having equivalent actuating means on both its ends for moving the louvre component (18b) to the desired location.
8. Ventilation valve according to any one of Claims 4 to 7, characterized in that the rotatable means (20) comprises means in the form of indentations or a hexagonal profile for moving the rotatable means (20) and the louvre component (18b).
9. Ventilation valve according to any one of the preceding claims, characterized in that the ventilation valve (10) comprises a detachable adjustment part (12) composed of two bodyparts (17), to which a first louvre component (18a) and a second louvre component (18b) are attached, whereby when the ventilation valve (10) is cleaned, the adjustment part (12) can be detached using attaching means (16).
10. Ventilation valve according to any of the preceding Claims, characterized in that each louvre component (18a, 18b) comprises a substantially straight surface portion (31) which is at angle (α) relative to the central axis (X) of the flow gap (A_2) between the louvre components (18a, 18b) of the valve (10).
11. Ventilation valve according to any one of the preceding Claims, characterized in that at least one of the louvre components (18b) comprises at least one aperture (35) adjacent the trailing part of the flow (39) so that the static pressure of the air flow can be measured for measuring the air flow quantity.

12. Ventilation valve according to any of the preceding Claims, characterized in that the movable louvre component is moved by the straight flange part (33).

13. Ventilation valve according to Claim 12, characterized in that the aperture (35) opens into an internal distributing chamber (34) of the louvre component (18), communicating via a connector (36) to a pressure gauge.

14. Ventilation valve according to any one of the preceding Claims, characterized in that the ventilation valve comprises a scale (28), whereby the valve opening can be read by the edge (E) of the moveable louvre component (18b).

15. Ventilation valve according to any of the preceding Claims, characterized in that both the first louvre component (18a) and the second louvre component (18b) can be moved linearly relative to the body (17).

Patentansprüche

1. Lüftungsventil (10), mit einem ersten Lüftungskanalbauteil (18a) und einem zweiten Lüftungskanalbauteil (18b), wobei jedes Lüftungskanalbauteil (18a, 18b) stromaufwärts der Strömung einen ersten gekrümmten Flächenabschnitt (32) und einen zweiten Flächenabschnitt (31), der stromabwärts des ersten gekrümmten Flächenabschnitts (32) angeordnet ist, hat, wobei zumindest das zweite Lüftungskanalbauteil (18b) bewegbar ist, um die Größe der Durchströmöffnung (A2) zwischen den Lüftungskanalbauteilen (18a, 18b) zu ändern,

dadurch gekennzeichnet, daß der zweite Flächenabschnitt (31) zur Mittelachse (X) der Durchströmöffnung (A2) des Lüftungsventils (10) in einem Winkel (α) angeordnet ist, daß der zweite Flächenabschnitt (31) jedes Lüftungskanalbauteils (18) mit einem gekrümmten, sich in der Nähe des hinteren Abschnitts der Strömung befindlichen Flächenabschnitt (39) und mit dem ersten Flächenabschnitt (32) verbunden ist, und

daß die Durchströmöffnung (A2) eine längliche Öffnung (A2) hat, die durch die Lüftungskanalbauteile (18a, 18b) gebildet ist, wobei sich die Durchströmöffnung (A2) hinsichtlich der Strömungsquerschnittsfläche in Strömungsrichtung verkleinert, und das bewegliche Lüftungskanalbauteil (18b) linear bewegbar ist, um die Durchströmöffnung (A2) zu verkleinern oder zu vergrößern.

2. Lüftungsventil gemäß Anspruch 1, dadurch ge-

kennzeichnet, daß das Lüftungsventil (10) eine längliche Öffnung (A2) hat, die zwischen den Lüftungskanalbauteilen (18a, 18b) ausgebildet ist und sich in ihrem Querschnitt in stärkerem Maße stromabwärts als stromaufwärts verkleinert.

3. Lüftungsventil gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Lüftungsventil (10) ein Frontabdeckungsbauteil (13) hat, daß vor den Lüftungskanalbauteilen (18a, 18b) angeordnet ist, durch welches oder um welches herum der Luftstrom in die Durchströmöffnung (A2) zwischen den Lüftungskanalbauteilen (18a, 18b) eintreten kann.

4. Lüftungsventil nach einem der vorangegangenen Ansprüche, dadurch gekennzeichnet, daß das Lüftungsventil (10) eine Einstelleinrichtung (19) hat, die eine drehbare Einrichtung (20) hat, durch deren Drehung das Lüftungskanalbauteil (18b) bewegbar ist.

5. Lüftungsventil gemäß Anspruch 4, dadurch gekennzeichnet, daß die drehbare Einrichtung (20) mindestens ein Antriebsrad (21) hat, daß mit einer Anlagefläche (22) des bewegbaren Lüftungskanalbauteils (18b) in Eingriff steht, wobei durch Drehung der drehbaren Einrichtung (20) das Lüftungskanalbauteil (18b) linear bewegbar ist.

6. Lüftungsventil gemäß Anspruch 5, dadurch gekennzeichnet, daß das Antriebsrad (21) ein Zahnrad hat und die Anlagefläche (22) eine Anlageverzahnung oder eine Verzahnungsspur hat.

7. Lüftungsventil nach einem der Ansprüche 4 bis 6, dadurch gekennzeichnet, daß die drehbare Einrichtung (20) einen Stab enthält, der an seinen beiden Enden einander entsprechende Antriebs-einrichtungen hat, um das Lüftungskanalbauteil (18b) in die gewünschte Position zu bewegen.

8. Lüftungsventil nach einem der Ansprüche 4 bis 7, dadurch gekennzeichnet, daß die drehbare Einrichtung (20) Einrichtungen in Form von Verzahnungen (Identationen) oder mit einem sechseckigem Querschnitt hat, um die drehbare Einrichtung (20) und das Lüftungskanalbauteil (18b) zu bewegen.

9. Lüftungsventil nach einem der vorangegangenen Ansprüche, dadurch gekennzeichnet, daß das Lüftungsventil (10) ein abnehmbares Einstellbauteil (12) hat, das aus zwei Grundkörperabschnitten (17) besteht, an denen ein erstes Lüftungskanalbauteil (18a) und ein zweites Lüftungskanalbauteil (18b) befestigt sind, wobei zur Reinigung des Lüftungsventils (10) das Einstell-

bauteil (12) unter Benutzung der Befestigungseinrichtungen (16) entfernbar ist.

10. Lüftungsventil nach einem der vorangegangenen Ansprüche, dadurch gekennzeichnet, daß jedes Lüftungskanalbauteil (18a, 18b) einen im wesentlichen geraden Flächenabschnitt (31) hat, der zur Mittelachse (X) der Durchströmöffnung (A₂) zwischen den Lüftungskanalbauteilen (18a, 18b) des Ventils (10) im Winkel α angeordnet ist. 5
11. Lüftungsventil nach einem der vorangegangenen Ansprüche, dadurch gekennzeichnet, daß mindestens eines der Lüftungskanalbauteile (18b) mindestens eine Öffnung (35) hat, die sich in der Nähe zum hinteren Strömungsabschnitt (39) befindet, so daß der statische Druck des Luftstromes zur Messung der Luftstrommenge gemessen werden kann. 10
12. Lüftungsventil nach einem der vorangegangenen Ansprüche, dadurch gekennzeichnet, daß das bewegbare Lüftungskanalbauteil durch den geraden Flanschabschnitt (33) bewegbar ist. 15
13. Lüftungsventil entsprechend Anspruch 12, dadurch gekennzeichnet, daß die Öffnung (35) in eine inneren Verteilungskammer (34) des Lüftungskanalbauteils (18) öffnet, die über ein Verbindungselement (36) mit einem Druckmeßgerät in Verbindung steht. 20
14. Lüftungsventil nach einem der vorangegangenen Ansprüche, dadurch gekennzeichnet, daß das Lüftungsventil eine Skala (28) hat, wodurch die Ventilöffnung über die Kante (E) des bewegbaren Lüftungskanalbauteils (18b) ablesbar ist. 25
15. Lüftungsventil nach einem der vorangegangenen Ansprüche, dadurch gekennzeichnet, daß sowohl das erste Lüftungskanalbauteil (18a), als auch das zweite Lüftungskanalbauteil (18b) linear relativ zum Grundkörper (17) bewegbar sind. 30

Revendications

1. Vanne de ventilation (10) comprenant un premier volet d'aération composant (18a) et un second volet d'aération composant (18b), chaque volet d'aération composant (18a, 18b) comprenant une première portion à surface courbe (32) en amont du flux et une seconde portion de surface (31) en aval de la première portion de surface courbe (32), le second volet d'aération composant (18b) au moins étant mobile pour modifier la dimension de l'interstice de passage (A₂) entre les volets d'aération composants (18a, 18b), caractérisée 35

en ce que ladite seconde portion de surface (31) forme un angle (α) avec l'axe central (X) de l'interstice de passage (A₂) de la vanne de ventilation (10), la seconde portion de surface (31) de chaque volet d'aération composant (18) étant reliée à une section de surface courbe (39) adjacente de la partie arrière du flux et de la première portion de surface (32), et en ce que l'interstice de passage (A₂) comprend un interstice allongé (A₂) défini entre les volets d'aération composants (18a, 18b), l'interstice de passage (A₂) diminuant en aire de section transversale d'écoulement dans la direction du flux et le volet d'aération composant mobile (18b) étant mobile linéairement pour diminuer ou agrandir l'interstice de passage (A₂). 40

2. Vanne de ventilation selon la revendication 1, caractérisée en ce que la vanne de ventilation (10) comprend un interstice allongé (A₂) formé entre les volets d'aération composants (18a, 18b), qui diminue en section plus fortement en amont du flux d'air qu'en aval du flux d'air. 45

3. Vanne de ventilation selon la revendication 1 ou 2, caractérisée en ce que la vanne de ventilation (10) comprend un couvercle frontal (13) placé à l'avant des volets d'aération composants (18a, 18b), à travers lequel ou autour duquel le flux d'air peut pénétrer dans l'interstice de passage (A₂) entre lesdits volets d'aération composants (18a, 18b). 50

4. Vanne de ventilation selon l'une quelconque des revendications précédentes, caractérisée en ce que la vanne de ventilation (10) comprend des moyens de réglage (19) comportant des moyens rotatifs (20) par la rotation desquels le composant (18b) de la vanne peut être déplacé. 55

5. Vanne de ventilation selon la revendication 4, caractérisée en ce que les moyens rotatifs (20) comprennent au moins une roue d'entraînement (21) en prise avec une surface de butée (22) du volet d'aération composant mobile (18b), ce composant (18b) pouvant être déplacé linéairement par la rotation des moyens rotatifs (20). 60

6. Vanne de ventilation selon la revendication 5, caractérisée en ce que la roue d'entraînement (21) comprend un engrenage et la surface de butée (22) comprend un engrènement de butée ou une crémaillère. 65

7. Vanne de ventilation selon l'une quelconque des revendications 4 à 6, caractérisée en ce que les moyens rotatifs (20) comprennent une tige comportant des moyens d'actionnement équiva- 7

lents à ses deux extrémités pour déplacer le volet d'aération composant (18b) vers la position désirée.

8. Vanne de ventilation selon l'une quelconque des revendications 4 à 7, caractérisée en ce que les moyens rotatifs (20) comprennent des moyens ayant la forme de cannelures ou un profil hexagonal pour déplacer les moyens rotatifs (20) et le volet d'aération composant (18b). 5
10
9. Vanne de ventilation selon l'une quelconque des revendications précédentes, caractérisée en ce que la vanne de ventilation (10) comprend un élément de réglage détachable (12) composé de deux parties de corps (17) auxquelles sont fixés un premier volet d'aération composant (18a) et un second volet d'aération composant (18b), l'élément de réglage (12) pouvant être détaché en utilisant les moyens de fixation (16) quand la vanne de ventilation (10) est nettoyée. 15
20
10. Vanne de ventilation selon l'une quelconque des revendications précédentes, caractérisée en ce que chaque volet d'aération composant (18a, 18b) comprend une portion de surface sensiblement rectiligne (31) qui forme un angle (α) avec l'axe central (X) de l'interstice de passage (A_2) entre les volets d'aération composants (18a, 18b) de la vanne (10). 25
30
11. Vanne de ventilation selon l'une quelconque des revendications précédentes, caractérisée en ce que l'un au moins des volets d'aération composants (18b) comprend au moins une ouverture (35) adjacente de la partie arrière du flux (39) de manière que la pression statique du flux d'air puisse être mesurée pour mesurer le débit de l'air. 35
40
12. Vanne de ventilation selon l'une quelconque des revendications précédentes, caractérisée en ce que le volet d'aération composant mobile est déplacé par la partie de bride rectiligne (33). 45
13. Vanne de ventilation selon la revendication 12, caractérisée en ce que l'ouverture (35) débouche dans une chambre de distribution interne (34) du volet d'aération composant (18), communiquant par un connecteur (36) avec une jauge de pression. 50
14. Vanne de ventilation selon l'une quelconque des revendications précédentes, caractérisée en ce que la vanne de ventilation comprend une échelle (28) par laquelle l'ouverture de la vanne peut être lue sur le bord (E) du volet d'aération composant mobile (18b). 55

15. Vanne de ventilation selon l'une quelconque des revendications précédentes, caractérisée en ce que le premier volet d'aération composant (18a) et le second volet d'aération composant (18b) peuvent être déplacés linéairement par rapport au corps (17).

FIG 1A

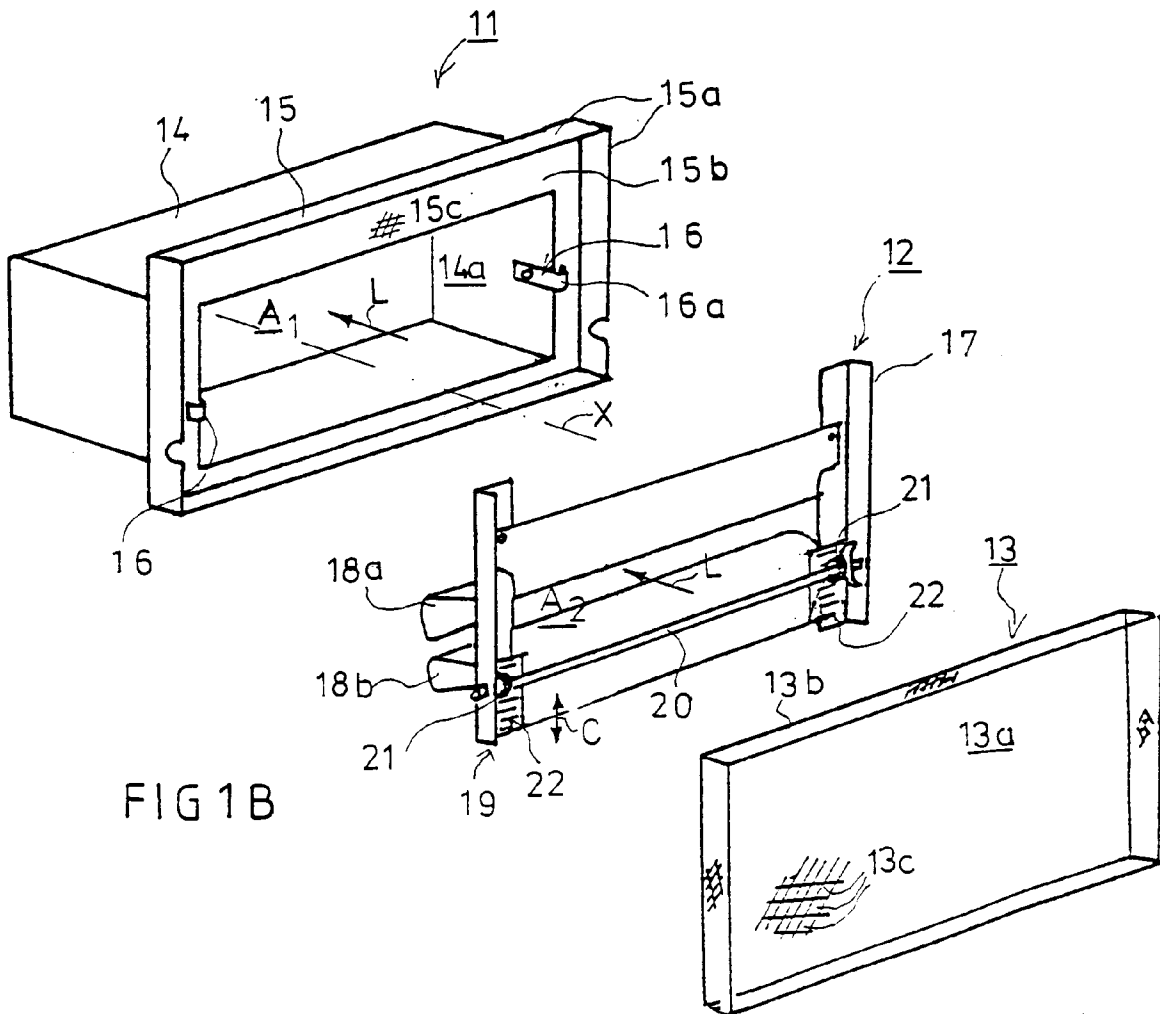
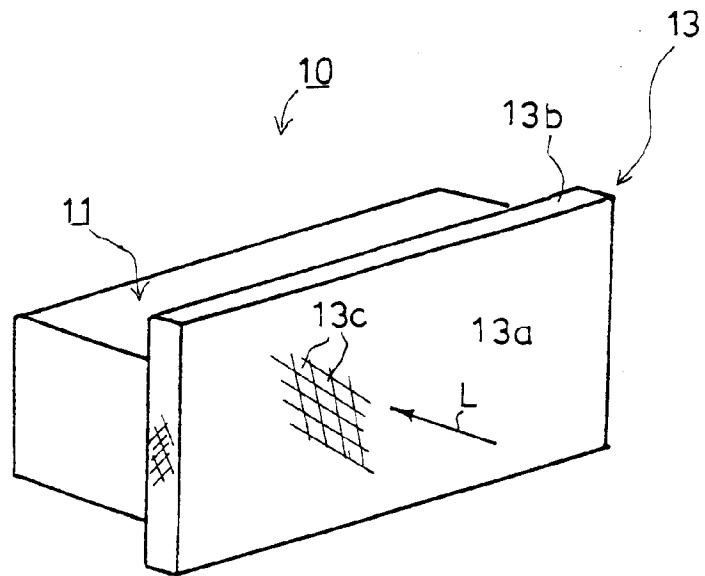


FIG 1B

FIG 2

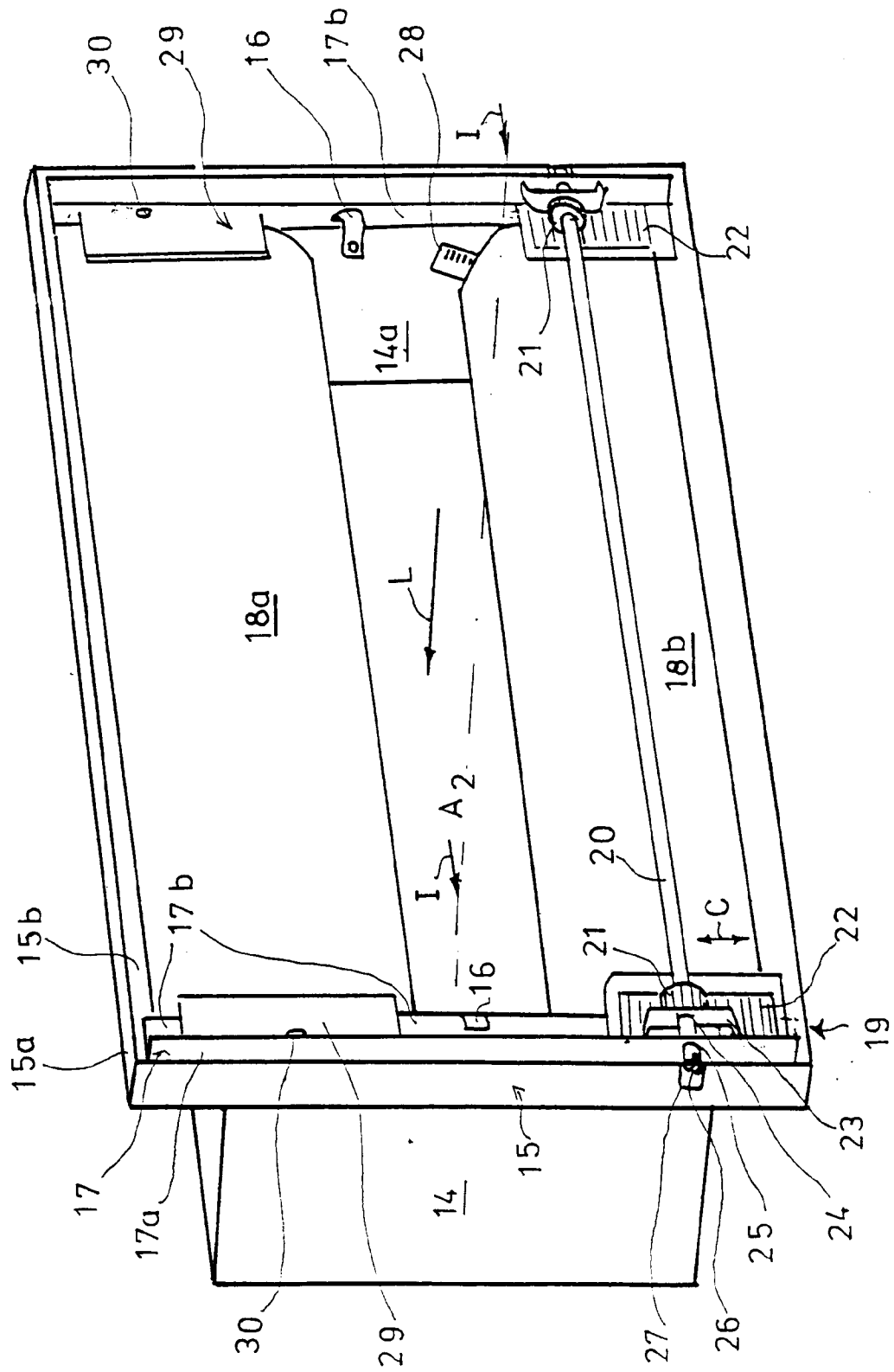


FIG 3A

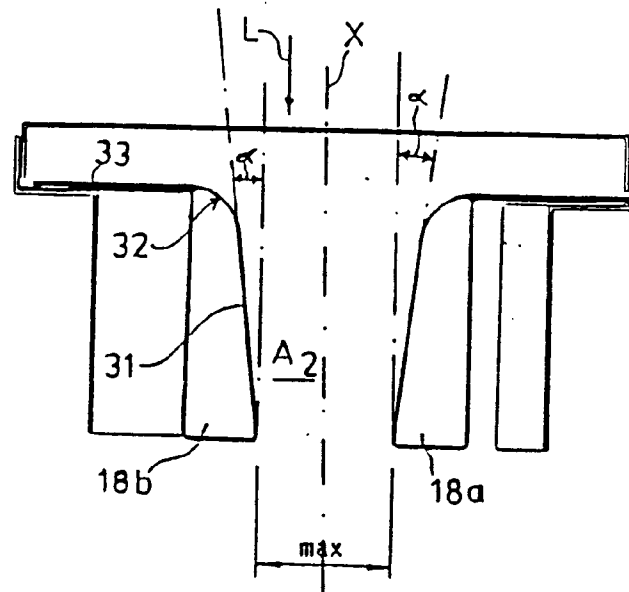


FIG 3B

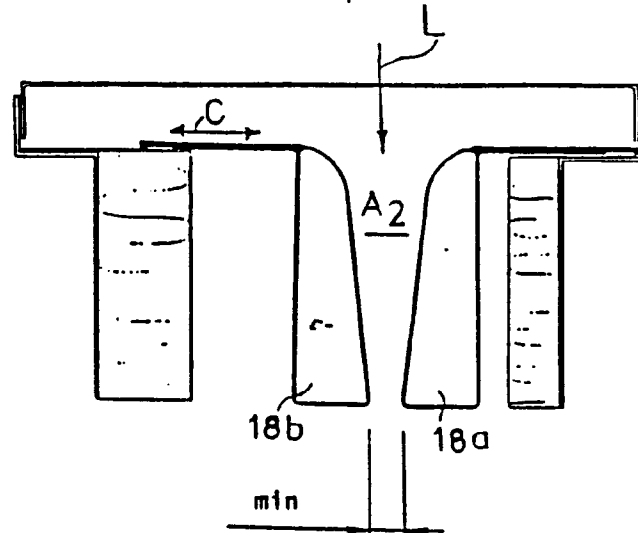


FIG 4

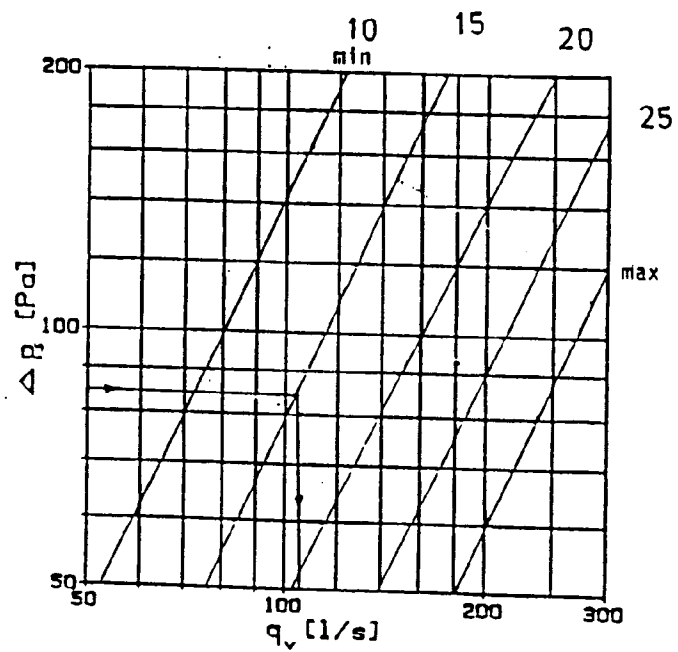


FIG 5A

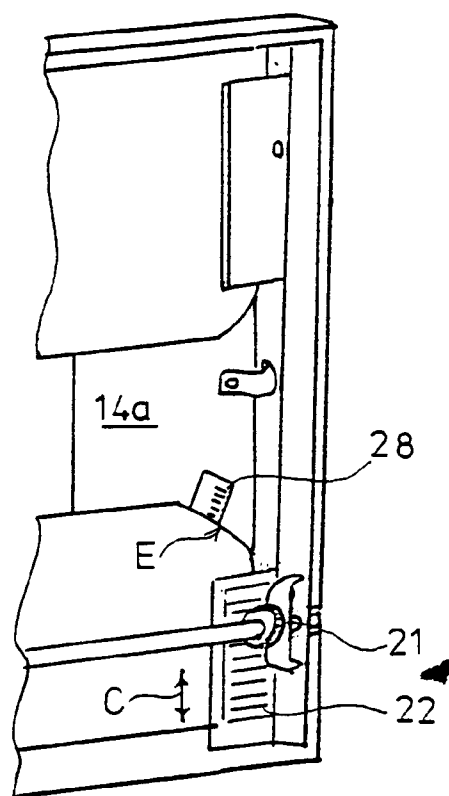
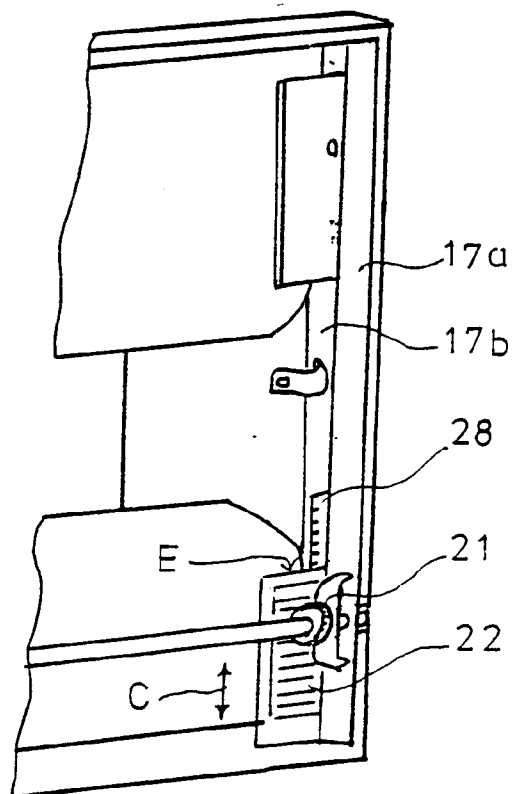


FIG 5B



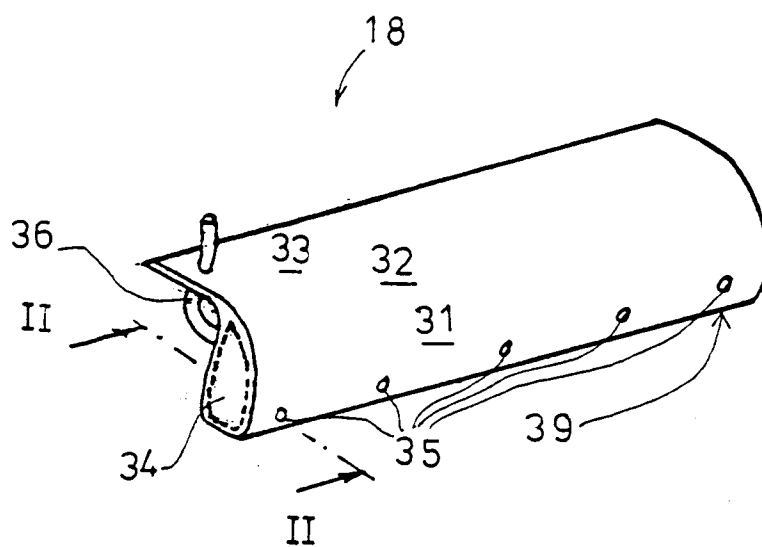


FIG 6A

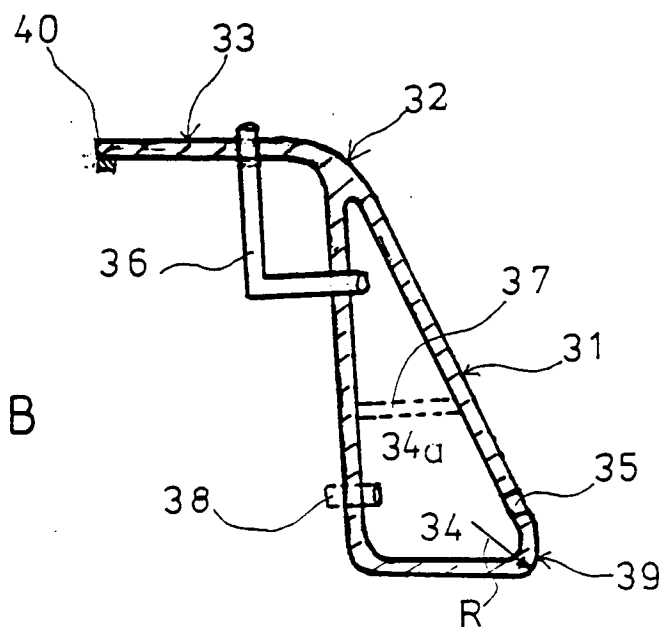


FIG 6B