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(71) Applicant: **Tarpio, Tapio**
11710 Riihimäki (FI)

(72) Inventor: **Tarpio, Tapio**
11710 Riihimäki (FI)

(74) Representative: **Tampereen Patenttitoimisto Oy**
Hermiankatu 1 B
33720 Tampere (FI)

(54) **VENTILATION ELEMENT FOR A WINDOW**

(57) The present invention relates to a ventilation element (1) for a window (14). The ventilation element comprises means for forming one or more air channels (20) for providing supply air via the window (14). The means for forming one or more air channels (20) comprise a base part (2); a first support (3) for a filter (10); a second support (4) for another filter (11); and one or more fixing parts (6) for attaching the base part (2) inside the window (14) at a distance from a frame (13) of the window (14).

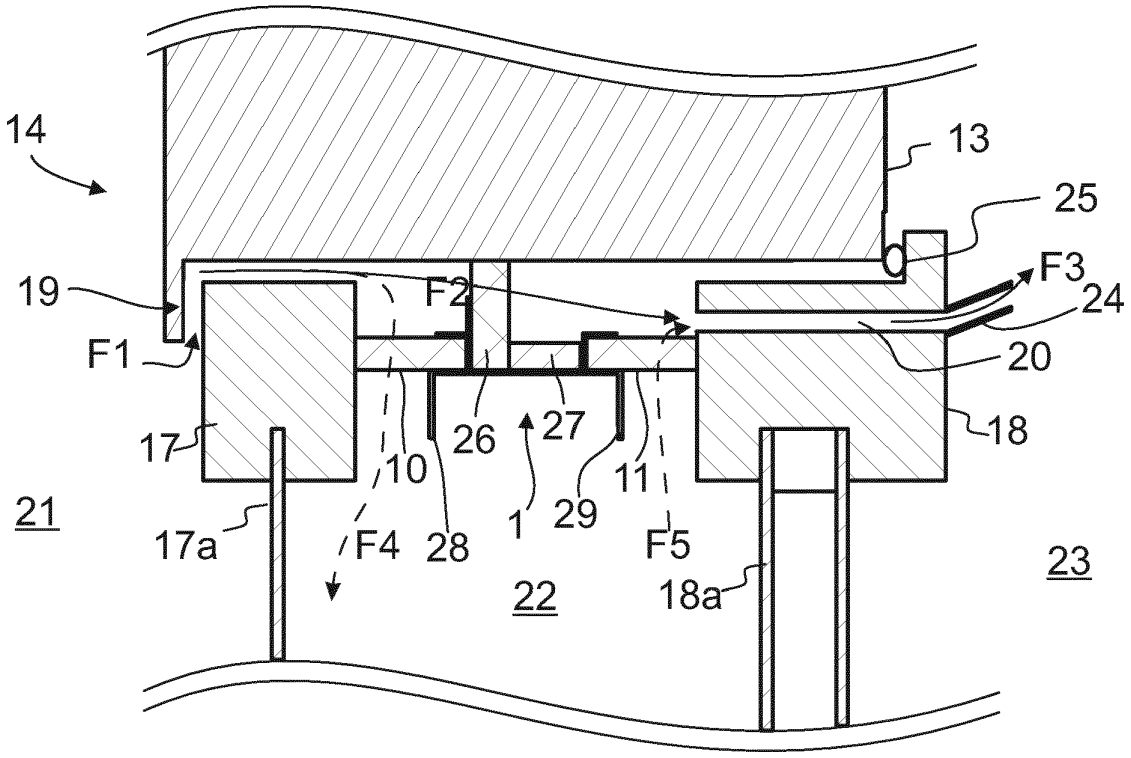

Fig. 6

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Description

Field of the invention

[0001] The present invention relates to a ventilation element for a window and a window. The ventilation element comprises means for forming one or more air channels for providing supply air via the window. The window comprises at least two glasses (window panes) and an intermediate space between the glasses; an air inlet for receiving supply air; and an air outlet for outputting the supply air from the window.

Background of the invention

[0002] Controlled ventilation of buildings is, at present, more important than before, in view of e.g. habitability, energy saving, and preventing moisture from damaging structures. In many cases, buildings are equipped with an exhaust system for removing air from the rooms of the building and for conveying the removed air, for example, outdoors, either directly or via a heat recovery unit. Supply air, that is, replacement air, can be introduced into the rooms via replacement air valves and increasingly by means of supply air windows. Typically, in supply air windows, replacement air is introduced from atmospheric air by means of an inlet either directly to the building or via the supply air window. Supply air windows typically comprise a window frame and two or more glasses attached to window sashes. The window sashes may be attached to the frames by hinges to that the window sashes can be opened, if necessary. There is also a so called an intermediate space between the glasses. This intermediate space can be used to warm the supply air before leading it into the room. Especially in winter this may reduce the feeling of draft in the room because the incoming air is warmer compared to the situation in which the supply air comes directly from outside into the room.

[0003] A drawback in supply air windows of prior art may be that some slits are needed in the window frame and possibly also in one or more of the window slashes. These slits are meant to form different routes for the supply air so that supply air may flow either directly from outside into a room (a so called summer position of the supply air window) or via the intermediate space (a so called winter position of the supply air window).

Brief summary of the invention

[0004] It is an aim of the present invention to provide a ventilation element for a window and an improved supply air window so that the structure of the supply air window is simpler than prior art supply air windows. The ventilation element may also be called as a ventilation apparatus. The present invention is based on the idea of providing the ventilation element with a base part; a first support for a first filter; a second support for a second filter; and one or more fixing parts for attaching the base part inside the window at a distance from a frame of the window. To put it more precisely, the ventilation element according to the present invention is primarily characterized in that the means for forming one or more air channels comprise:

a base part;
a first support for a filter;
a second support for another filter; and
one or more fixing parts for attaching the base part inside the window at a distance from a frame of the window.

[0005] The window according to the present invention comprises:

a first slash for a first window pane;
a second slash for a second window pane; and
the ventilation element of any of the claims 1 to 5.

[0006] Some example embodiments are defined in the dependent claims.

[0007] The present invention shows some advantages over solutions of prior art. When applying the ventilation element according to the invention, it is possible to obtain the supply air window which is simpler than prior art supply air windows and less cutting of slots are needed. In some embodiments there is no need to make the slots at all but appropriate routes for supply air may be achieved by leaving some parts of the window slashes without gaskets.

Description of the drawings

[0008] In the following, the present invention will be described in more detail with reference to the appended drawings, in which

Fig. 1a shows a perspective view of an example of a ventilation element according to an advantageous embodiment of the invention;

Fig. 1b shows a perspective view of a base part of the ventilation element of Figure 1 a cut at the location A-A;

Fig. 2a shows the ventilation element according to Fig. 1 in a first operational position as a cross sectional view in the direction A-A of Fig. 1;

Fig. 2b shows the ventilation element according to Fig. 1 in a second operational position as a cross sectional view in the direction A-A of Fig. 1;

Fig. 3a shows the supply air window according to a first embodiment in a first operational position, in a cross-sectional view;

Fig. 3b shows the supply air window according to a first embodiment in a second operational position, in a cross-sectional view;

Fig. 4 shows a perspective view of an example of a ventilation element according to another advantageous embodiment of the invention;

Fig. 5 shows a perspective view of an example of a ventilation element according to a third advantageous embodiment of the invention;

Fig. 6 shows an example of attachment of the ventilation element to a frame of the supply air window, in a cross-sectional view;

Fig. 7 shows the ventilation element of Figure 5, in a cross-sectional view in the direction B-B;

Fig. 8 depicts an example of an air channel formed between the window frame and the slash of the innermost window;

Fig. 9a depicts a cross section of an air guide according to another example embodiment;

Fig. 9b depicts the air guide of Fig. 9a as a top view;

Fig. 9c depicts an example of a control plate of the air guide of Fig. 9a;

Fig. 10 depicts an example of a supply air window in which the air guide of Figs. 9a to 9c is used;

Fig. 11 depicts a cross section of a ventilation element according to a fourth advantageous embodiment of the invention attached to a frame of the supply air window, in a cross-sectional view;

Fig. 12 depicts a cross section of an air guide according to yet another example embodiment;

Fig. 13a depicts a cross section of a ventilation element according to a fifth advantageous embodiment of the invention in a first operational position;

Fig. 13b depicts a cross section of a ventilation element according to the fifth advantageous embodiment of the invention in a second operational position;

Fig. 14a depicts a top view of the ventilation element according to the fifth advantageous embodiment of the invention;

Fig. 14b depicts a front view of the ventilation element according to the fifth advantageous embodiment of the invention;

Fig. 14c depicts a back view of the ventilation element according to the fifth advantageous embodiment of the invention; and

Fig. 14d depicts a cross section at point B-B of Figure 14a of the ventilation element according to the fifth advantageous embodiment of the invention in a first operational position.

Detailed description of the invention

[0009] Figure 1 a shows a perspective view of an example of a ventilation element 1 according to an advantageous embodiment of the invention. In this embodiment the ventilation element 1 comprises a base part 2, a first support 3 for a first filter 10 and a second support 4 for a second filter 11. Fig. 1 b shows a perspective view of the base part 2 of the ventilation element of Figure 1a cut at the location A-A. The ventilation element 1 may also comprise a regulator 7 for regulating air flow above the base part 2 as will be described later. The position of the regulator 7 may be automatically adjusted on the basis of temperature of supply air which flows via the ventilation element 1 or the position of the regulator 7 may be adjusted manually. In some embodiments both the automatic and manual adjustment may be used. The base part 2 is also provided with fixing parts 6 at both ends of the base part 2. The purpose of the fixing parts is to attach the ventilation element 1 to a window frame and to keep the base part 2 at a distance from the window frame so that an air channel is formed between the window frame and the base part 2 when the ventilation element 1 is attached with the window frame. Figures 3a and 3b illustrate some examples of this.

[0010] The first support 3 may be obtained e.g. by forming two slices 3a, 3b (a first pair of slices) to the base part 2 so that the mutual distance of the slices 3a, 3b is substantially the same. The length of the slices 3a, 3b may the same or less than the length of the base part 2 in the longitudinal direction. Correspondingly, the second support 4 may be obtained e.g. by forming a second pair of slices 4a, 4b of a sheet to the base part 2 so that the mutual distance of the slices 4a, 4b is substantially the same. The length of the second pair of slices 4a, 4b may the same or less than the length of the base part 2 in the longitudinal direction. The mutual distance of the slices 3a, 3b; 4a, 4b and the width of the slices 3a, 3b; 4a, 4b is advantageously such that filters 10, 11 can be attached with the base part 2 without using any adhesive. In other words, the filters can be pressed between the slices which induces a force by the filters against the slices and the filters remain supported by the slices. This kind of arrangement makes it easier to remove the filters 10, 11 for cleaning or to replace the filters 10, 11 with new filters 10, 11, when necessary.

[0011] These slices 3a, 3b; 4a, 4b form a kind of a U-form to which the filter 10, 11 may be pushed so that the filter 10, 11 is only partly within the U-form.

[0012] The slices 3a, 3b; 4a, 4b need not be continuous but they also may be formed as smaller slices along the base part. For example, there may be a multiple of pairs of some kind of teeth which can keep the filters 10, 11 properly attached with the base part. This kind of arrangement may increase the cross section through which supply air can flow to and from the intermediate space of the window.

[0013] In some embodiments the ventilation element 1 may also comprise an air guide 9. The air guide 9 may be used to direct incoming supply air towards the ends of the ventilation element 1 when supply air flows directly from outside into the room without significantly flowing via the intermediate space of the window.

[0014] The regulator 7 is arranged to be tiltable so that the regulator 7 may reduce or even prevent direct supply air flow from the outside into the room. As was already mentioned above, this regulation of supply air flow may be automatic or manual or both. Automatic regulation may be implemented e.g. by using a piece 8 of thermometal. In the example embodiment of Figure 1 a the piece 8 of thermometal may bend upwards when the temperature of supply air decreases. Thus, the regulator 7 is pushed upwards by the piece 8 of thermometal, wherein the regulator 7 rotates (tilts) with respect to the hinge 12 and reduces the cross section of the air channel above the ventilation element 1 and below the window frame 13, or even closes the air channel. This situation is depicted in Figures 2a and 3a. Respectively, when the temperature of the supply air is higher, the piece 8 of thermometal becomes more straight and the regulator 7 can move towards the bottom 2a of the base part 2 as is depicted in Figures 2b and 3b. Hence, supply air can also flow via the channel between the ventilation element 1 and the window frame 13. This arrangement enables to have at least two different operational positions for the ventilation element 1 and the supply air window 14: a first operational position for warmer weather conditions and a second operational position for colder weather conditions. The first operational position can also be called as a summer position and the second operational position can also be called as a winter position.

[0015] In some embodiments a gasket 7a may be attached to the tiltable edge of the regulator 8 (i.e. the edge which is not near the hinge 12). One purpose of the gasket 7a is to improve the air tightness of the regulator 7 when the regulator 7 is tilted against the frame 13 of the window 14.

[0016] In some embodiments the tilting angle of the regulator 7 may be adjusted, in addition to or instead of the automatic control, manually e.g. by using a screw 15. The screw may be implemented e.g. by using two nuts 16, which also keep the centre of the piece 8 of thermometal attached with the bottom 2a of the base part 2. The screw 15 can then be screwed upwards, if the regulator 8 needs to be moved upwards, and, correspondingly, the screw 15 can be screwed downwards, if the regulator 8 needs to be moved downwards. However, there are also other options to arrange the manual adjustment of the regulator 8.

[0017] Figure 2a shows the ventilation element 1 according to Fig. 1 a in a first operational position as a cross sectional view and Figure 2b shows the ventilation element 1 according to Fig. 1 in a second operational position as a cross sectional view.

[0018] Figures 3a and 3b show as a cross sectional view the ventilation element 1 according to Fig. 1a attached to a frame 13 of a window 14. In the situation of Figure 3a the ventilation element 1 is in the first operational position and in the situation of Figure 3b the ventilation element 1 is in the second operational position. Figures 3a and 3b also illustrate flows of supply air in both positions.

[0019] When the ventilation element 1 is in the first operational position, i.e. the regulator 8 is not significantly tilted upwards, supply air may enter the supply air window 14 via an air inlet 19 (illustrated with arrow F1 in Figure 3a), which may be formed e.g. by leaving a part of the space between the upper most part of the window frame 13 and the upper most part of a first slash 17 of the first (outermost) window pane 17a without a gasket. Hence, an inlet air channel exists from the outside into the intermediate space 22 of the window 14. The intermediate space 22 means in this specification the space which is limited by the outermost window pane 17a, the slash 17 of the outermost window pane 17a, the innermost window pane 18a, the slash 18 of the innermost window pane, and the window frame 13 which surrounds the window slashes 17, 18. The supply air can flow above the ventilation element 1 (arrow F2) and enter an outlet air channel 20. The supply air then flows through the outlet air channel 20 into the room 23. The outlet air channel 20 may be formed e.g. by cutting a slit through the slash 18 of the innermost window 18a. The supply air window may also comprise an air guiding element 24 on the surface of the slash 18 so that supply air which flows through the outlet air channel 20 is directed upwards and also possible sidewards (arrow F3). In other words, the air guiding element 24 may vertically and/or horizontally deviate the flow of the incoming supply air.

[0020] In this specification the terms first window slash, first window pane, outermost window slash and outermost window pane mean the window slash and window pane which are facing the atmosphere (the outside of the room). Respectively, the terms innermost window slash and innermost window pane mean the window slash and window pane which are facing the room. A supply air window may also comprise one or more intermediate window slashes and window panes between the outermost and innermost window slashes and window panes. In such windows the second filter 11 may be located in the same space than the first filter 10 i.e. between the slash 17 of the outermost window pane and the slash of the

window pane which is adjacent to the outermost window pane, or the supply air may be arranged to circumvent the intermediate window pane from under, i.e. the supply air may flow through the first filter 10, go downwards between the outermost window pane 17a and the intermediate window pane, and then flow upwards on the other side of the intermediate window pane and further through the second filter 11. Therefore, the terms second window slash and second window pane may mean the innermost window slash and window pane, or in window structures comprising one or more intermediate windows the second window slash and the second window pane may mean the window slash and window pane which are adjacent to the outermost window slash and window pane, or some other intermediate window slash and window pane, or the innermost window slash and window pane.

[0021] It should also be noted that one window pane may consist one or more glasses arranged together as one window element as is the case in the innermost window pane 18a of Figures 6, 8 and 9.

[0022] Figures 3a and 3b also depict a gasket 25 between the window frame 13 and the slash 18 of the innermost window pane. This gasket 25 may be needed to prevent air leakages from the intermediate space 22 into the room 23 via the slit between the window frame 13 and the slash 18 of the innermost window pane.

[0023] When the ventilation element 1 is in the second operational position, i.e. the regulator 8 is significantly tilted upwards due to e.g. cold weather conditions outside 21, supply air may still enter the supply air window 14 via the air inlet 19 into the intermediate space 22 of the window 14. However, the regulator 8 closes the direct path above the ventilation element 1 but supply air can flow through the first filter 10 downwards (arrow F4). If the temperature in the room 23 is higher than the outside temperature, the supply air begins to warm up because some thermal energy conducts through the window pane 18a into the intermediate space 22. Warmer supply air begins to rise near the surface of the inner window pane 18a towards the second filter 11 (arrow F5). The supply air can flow through the second filter11 and enter the channel 20 and further through the air guiding element 24 into the room 23 (arrow F6).

[0024] It should be noted here that although supply air is not prevented to flow through the filters 10, 11 when the ventilation element 1 is in the first operational position (as can be seen from Figure 3a), in practise almost all supply air which enters the supply air window through the air inlet 19 flows directly over the ventilation element 1 to the outlet air channel 20 so that hardly any air goes through the filters 10, 11. This is also true even if the air temperature in the intermediate space below the ventilation element 1 is warmer than the temperature of the outside air. In this situation the flow rate of the colder incoming air may be so high that it blocks the flow of the warmer air through the second filter 11. Thus, at least most of the supply air which enters the room is coming through the direct route above the ventilation element 1.

[0025] Figure 4 shows a perspective view of an example of a ventilation element 1 according to another advantageous embodiment of the invention. In this embodiment the base part 2 is without the air guide 9.

[0026] Figure 5 shows a perspective view of an example of a ventilation element 1 according to a third advantageous embodiment of the invention. In this embodiment the base part 2 is without the regulator 7 and the piece 8 of thermometal 8. Instead, the base part 2 is provided with a third filter 26. The third filter 26 may be attached with the base part 2 e.g. by using adhesive or by using a piece 27 of resilient material so that the third filter 26 and the piece 27 of resilient material fills the bottom of the U-shape of the base part 2 as is illustrated in Figure 6. There are also other possibilities to provide the third filter 26 in connection with the base part 2. The piece 27 may also prevent or decrease the risk of water condensing on the surface of the base part 2.

[0027] In Figure 6 there is depicted an example in which the ventilation element 1 of Figure 5 is installed in an intermediate space 22 of the window 14. In this embodiment the supply air which enters the intermediate space 22 through the air inlet 19 may flow directly through the third filter 26 to the outlet air channel 20, or through the first filter 10 to the intermediate space below the air ventilator 2 to be warmed and through the second filter 11 to the outlet air channel 20. When the outside air is colder than the air in the intermediate space 22 and the outermost window pane 17a is in substantially same temperature than the outside air, the cold air tends to flow through the first filter 10 and flow downwards near the surface of the outermost window pane 17a. In other words, the low surface temperature of the outermost window pane 17a induces a draft to the supply air wherein a great amount of the incoming supply air flows follows this route and does not directly enter the channel 20. Especially in winter time in certain areas of the globe the outside temperature may often be below 5 degrees Celsius or even below 0 degrees Celsius, wherein the above behaviour of the supply air may be quite probable. On the other hand, when the outside air temperature is higher than the above mentioned values, most of the supply air may flow directly through the third filter 26 without flowing through the first 10 and the second filter 11.

[0028] In Figure 6 the base part 2 also has a first air guiding section 28 and a second air guiding section 29. One purpose of the first air guiding section 28 is to more strongly direct the supply air towards the outermost window. Correspondingly, one purpose of the second air guiding section 29 is to more strongly collect the supply air from the intermediate space 22 through the second filter 11 to the air channel 20.

[0029] Although Figures 2a, 2b, 3a and 3b show that the ventilation element is without the air guiding sections 28, 29 and Figure 6 shows that both the first air guiding section 28 and the second air guiding section 29 are used, it should be noted that in some embodiments only the first air guiding section 28 or the second air guiding

section 29 is used.

[0030] Figure 7 depicts an example of how the ventilation element 1 may be attached with the window frame 13. There is provided an attaching device 30 which comprises a supporting part 31 and an adhesive 32. The adhesive is, for example, a double-sided adhesive which attaches the supporting part 31 with the window frame 13. The thickness of the adhesive 32 is preferably substantially the same or slightly less than the thickness of the fixing parts 6 of the ventilation element 1. Hence, the attaching device 30 may be attached with the window frame and the ventilation element 1 may be pushed to place so that the fixing part 6 slides in the space between the supporting part 31 and the window frame 13. To make the attachment more secure one or more screws (not shown) may be screwed through the supporting part 31 and the adhesive 32. If screws or other similar fixtures are used, the adhesive 32 may not be needed but a sheet may be used instead having substantially the same thickness than the adhesive 32.

[0031] In the embodiments described above the slash 18 of the innermost window was provided with a slit which forms the air channel 20. In some other embodiments this slit is not needed but the air channel 20 may be achieved by leaving a part of the space between the upper most part of the window frame 13 and the upper most part of the slash 18 of the innermost window pane 18a without a gasket. Hence, the air channel 20 exists which may lead supply air from the intermediate space 22 of the window 14 into the room 23. Figure 8 depicts an example of an embodiment in which the air channel 20 is formed between the window frame 13 and the slash of the innermost window. In these embodiments the air guide 9 may also be provided but in a different location. An example of such solution is illustrated in Figure 8.

[0032] Figures 9a to 9c and 10 depict an example of the air guide 9 which may be used with the air supply window of Figure 8. The air guide 9 may be fixed on the surface of the window frame 13, just above the window slash 18. Hence, supply air which exits the air channel 20 can flow through the aperture 40 of the air guide 9 and into the room. The air guide 9 may also comprise a guiding wall 41 which turns the direction of the supply air at least partly upwards towards a ceiling of the room (not shown) and possibly sidewards. The surface of the guiding wall 41 may be provided with a condensing preventer 45 which reduces the risk that humidity could condense into water on the surface of the guiding wall 41. The air guide 9 may further comprise a backflow trap 43 which prevents or at least reduces the risk of air flowing from the room into the supply air window i.e. in a reversed direction. This kind of risk could occur if the pressure inside the room were greater than the pressure in the supply air window 14. The air guide 9 may further comprise a control plate 44 which may be used to control the amount of supply air coming via the supply air window. The control plate 44 may be pushed towards the window slash 18 to reduce the amount of the flow of the supply air, and the control plate 44 may be pulled farther from the window slash 18 to increase the amount of the flow of the supply air.

[0033] Figure 9a depicts a cross section of the air guide 9, Figure 9b depicts the air guide as a top view, and Figure 9c depicts an example of a control plate 44 and Figure 10 depicts as a cross sectional view the supply air window in which the air guide 9 of Figures 9a-9c is used.

[0034] In an embodiment the control plate 44 may be attached with a magnetic tape 49 (Figure 12) or some other kind of magnetic material. Hence, if the bottom of the air guide comprises metal or some other material which may induce generation of forces between the control plate 44 and the magnetic material. Hence, the control plate 44 may be moved to a desired position and it remains in that position due the generated forces. However, the strength of such forces is usually at a level which enable intentional movement of the control plate 44 to another position by a user. By this arrangement the adjustment of the air flow can be made quite easily.

[0035] The filters 10, 11 and the base part 2 may be designed in such a way that when the filters 10, 11 and the base part 2 are installed inside the intermediate space 22, the first filter 10 rests against the surface of the slash 17 of the first window and the second filter 11 rests against the surface of the slash 18 of the second window.

[0036] Figure 11 shows a perspective view of an example of a ventilation element 1 according to a fourth advantageous embodiment of the invention. In this embodiment the ventilation element 1 comprises the base part 2, the first filter 10 and the third filter 26, but the second filter 11 is not used in the ventilation element 1 of this embodiment. Also in this embodiment the base part 2 is without the regulator 7 and the piece 8 of thermometal 8. The base part 2 may be designed in such a way that the first filter 10 and/or the third filter 26 may be pushed to a U-formed slit or to another kind of arrangement in which the filter(s) 10, 26 stay firmly due to an adequate pressure caused by the base part 2 to the filter(s) 10, 26. However, it may be possible to use some kind of adhesives instead or in addition to the pressure.

[0037] The above mentioned slits or other arrangements correspond with the first support 3 and the second support 4, but in this embodiment the second support 4 is provided for the third filter 26,

[0038] The base part 2 may be provided with elements 6 for fixing the ventilation element 1 e.g. to the window frame 13 by screws or by some other fixation elements.

[0039] Figure 11 also shows another embodiment of the air guide 9. In this embodiment the backflow trap 43 is arranged at one edge into a slit which may be formed by fixing a sheet to a back wall 47 of the air guide, or forming the back wall 47 so that it includes the slit at the top of the back wall. A detailed drawing of the air guide is depicted in Figure 12. The backflow trap 43 is not tightly secured to the slit but advantageously is loosely connected to the slit to enable more easier operation of the backflow trap 43. The nut 46 may be used to prevent the back-

flow trap 43 from dropping out from the slit.

[0040] The air guide 9 may further be provided with a gasket 48 to make the interface between the window frame 13 and the air guide 9 more air tight to prevent or at least reduce air from flowing between the window frame 13 and the air guide 9.

[0041] Figure 13a depicts a cross section of an example of a ventilation element 1 according to a fifth advantageous embodiment of the invention attached in connection with a window. The ventilation element according to the fifth advantageous embodiment of the invention is a further development of the fourth embodiment wherein the ventilation element of the fifth embodiment comprises similar elements to the fourth embodiment. There are, however, some differences. There is provided a tiltable or pivotable back wall 50 beside the third filter 26. In Figure 13a the back wall 50 is in a first operational position, wherein the back wall prevents or reduces air flowing through the third filter 26. Hence, air is directed through the first filter 10 to the intermediate space 22 of the window and further to the outlet air channel 20. This operational position can also be called as a winter position because in winter, when the outside air may be much colder than in summer in many geographical locations, it may be desired to utilize heat leakages through the inner glass of the window. As a consequence, air entering the room 23 may be warmer than in a situation in which the air did not circulate via the intermediate space 22.

[0042] Although air flows through the first filter 10 and not significantly through the third filter 26, the third filter 26 may still be able to filter some impurities from the air, especially when the third filter 26 is electrostatic material.

[0043] Figure 13b depicts a cross section of the fifth example embodiment of the ventilation element 1 in a second operational position, wherein the back wall 50 is pivoted to another position compared to the first operational position. There is thus a possibility for the air to flow directly through the third filter 26 without substantially circulating via the intermediate space 22. This operational position can also be called as a summer position because in summer, when the outside air may be even warmer than the room temperature, it may be desired to prevent air to warm in the ventilation element 1. In this position the majority of air entering the ventilation element 1 flows directly through the third filter 26 and does not significantly warm up.

[0044] The possibility to pivot or tilt a section of the back wall 50 may be implemented e.g. by using a hinge or by attaching a piece of a resilient fabrics on the surface of the back wall 50. There may also be other means to enable such a tiltable/pivotable structure.

[0045] The tiltable/pivotable section of the back wall 50 may, in the second operational position, operate as the second air guiding section 29.

[0046] Figures 14a-14d depict in more detail the ventilation element 1 of the fifth example embodiment. Figure 14a is a top view of the ventilation element 1. Figure 14b is a front view of the ventilation element 1 i.e. the ventilation element 1 is viewed from the direction in which air enters the ventilation element 1 (from the left in the structure of Figures 13a and 13b). Respectively, Figure 14c is a back view of the ventilation element 1 i.e. the ventilation element 1 is viewed from the direction where the back wall 50 is located (from the right in the structure of Figures 13a and 13b).

[0047] The length of the ventilation element 1 may be selected so that it fits inside the intermediate space 22 and enables to achieve adequate cross sectional area for supply air flows. Some non-limiting example values for the length of the ventilation element 1 (and the base part 2) are 460 mm, 660 mm, 860 mm, 1000 mm, 1060 mm, etc.

[0048] The present invention is not limited to the above-presented embodiments, but it can be modified within the scope of the appended claims.

Claims

1. A ventilation element (1) for a window (14), the ventilation element comprising means for forming one or more air channels (20) for providing supply air via the window (14), **characterised in that** the means for forming one or more air channels (20) comprise:

   a base part (2);
   a first support (3) for a filter (10);
   a second support (4) for another filter (11, 26);
   one or more fixing parts (6) for attaching the base part (2) inside the window (14) at a distance from a frame (13) of the window (14).

2. The ventilation element (1) according to claim 1, **characterised in that** the base part (2) comprises the first support (3) adapted to attach the filter (11) to the base part (2) and the second support (4) adapted to attach the another filter (11, 26) to the base part (2).

3. The ventilation element (1) according to claim 1 or 2, **characterised in that**
   the first support (3) comprises a first slice (3a) and a second slice (3b) parallel to the first slice (3a) adapted to receive the filter (10); and
   the second support (4) comprises a first slice (4a) and a second slice (4b) parallel to the first slice (4a) adapted to receive the another filter (11, 26).

4. The ventilation element (1) according to claim 1, 2 or 3, **characterised in that** the filter (10) is adapted to filter supply air flowing to an intermediate space (22) of the window (14) via the ventilation element (1), and the another filter (26) is adapted to filter supply air flowing between the frame (13) and the base part (2).

5. The ventilation element (1) according to any of the claims 1 to 4, **characterised in that** the base part (2) further comprises at least one of:

a first air guiding section (28) adapted to direct supply air downwards from the filter (10) into an intermediate space (22) of the window (14);
a second air guiding section (29) adapted to direct supply air upwards from the intermediate space (22).

6. A window (14) comprising at least:

a first slash (17) for a first window pane (17a);
a second slash (18) for a second window pane (18a);
an intermediate space (22) between the first window pane (17a) and the second window pane (18a); and
the ventilation element (1) of any of the claims 1 to 5 between the first slash (17) and the second slash (18).

7. The window (14) according to claim 6, **characterised in that** the window (14) comprises:

an air inlet (19) for receiving supply air into the window (14); and
an outlet air channel (20) for outputting the supply air from the window (14),

wherein the ventilation element (1) is adapted to control the flow of the supply air from the air inlet (19) to the outlet air channel (20) either directly from the air inlet (19) to the outlet air channel (20) or at least partly via the filter (10).

8. The window (14) according to claim 7, **characterised in that** the window (14) further comprises an air guide (9) for controlling the direction of the flow of the supply air leaving the outlet air channel (20).

9. The window (14) according to claim 8, **characterised in that** the air guide (9) comprises a control plate (44) adapted to adjust flow of the supply air from the outlet air channel (20).

10. The window (14) according to claim 9, **characterised in that** the control plate (44) is attached with a magnetic strip for maintaining the control plate (44) in a set position.

11. The window (14) according to any of the claims 7 to 10, **characterised in that** the air inlet (19) comprises a space between the frame (13) and the first slash (17), and the outlet air channel (20) comprises at least one of the following:

a slit in the second slash (18);
a space between the frame (13) and the second slash (18).

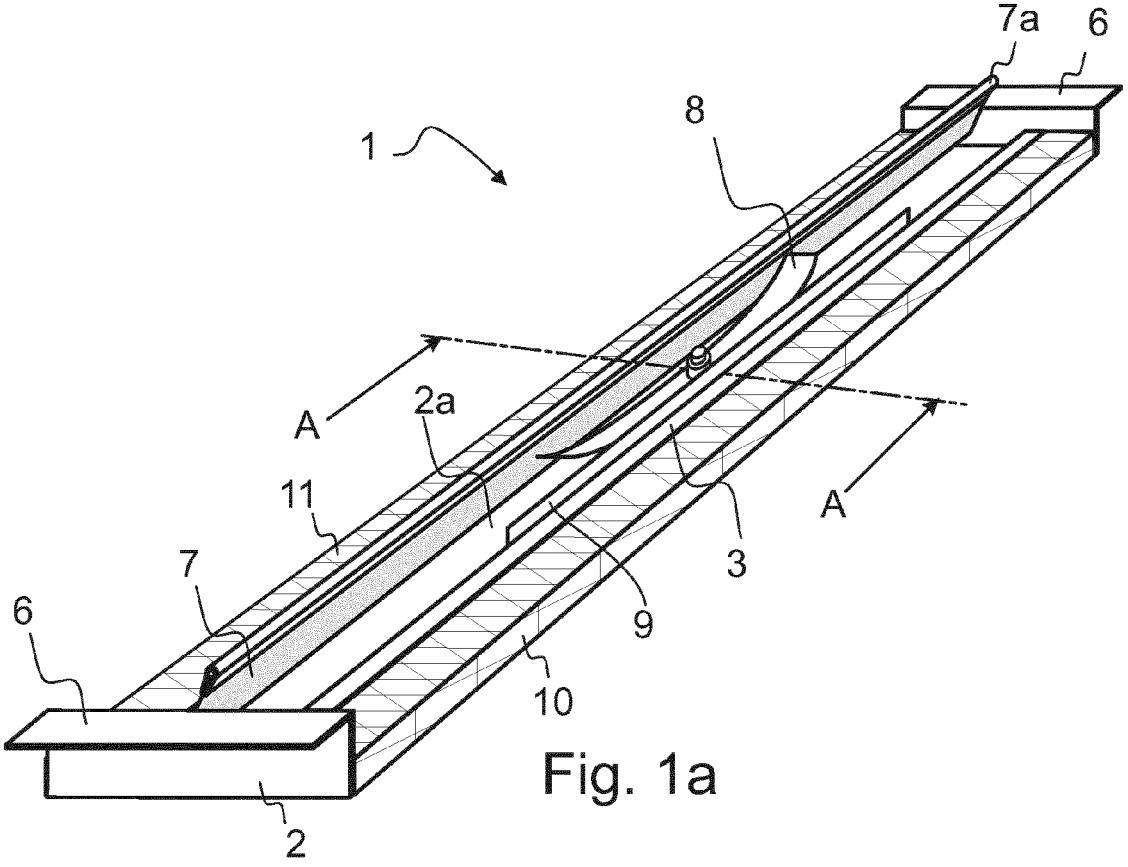


Fig. 1a

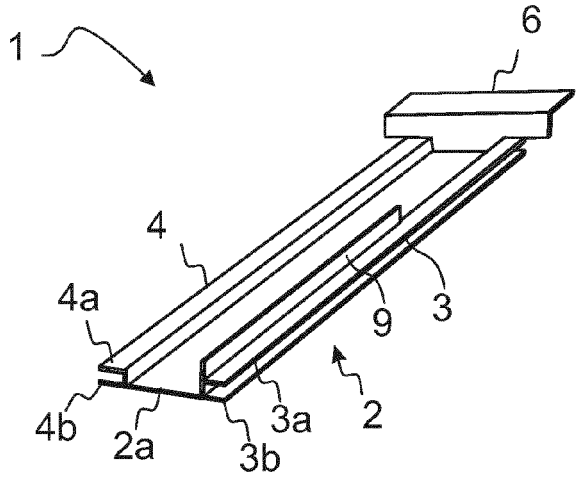
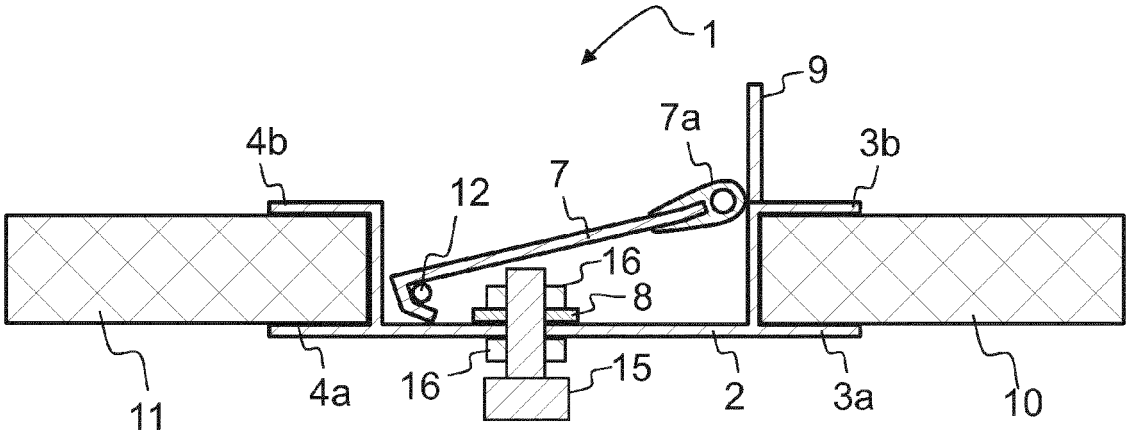


Fig. 1b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4b
3b
12
7
16
8
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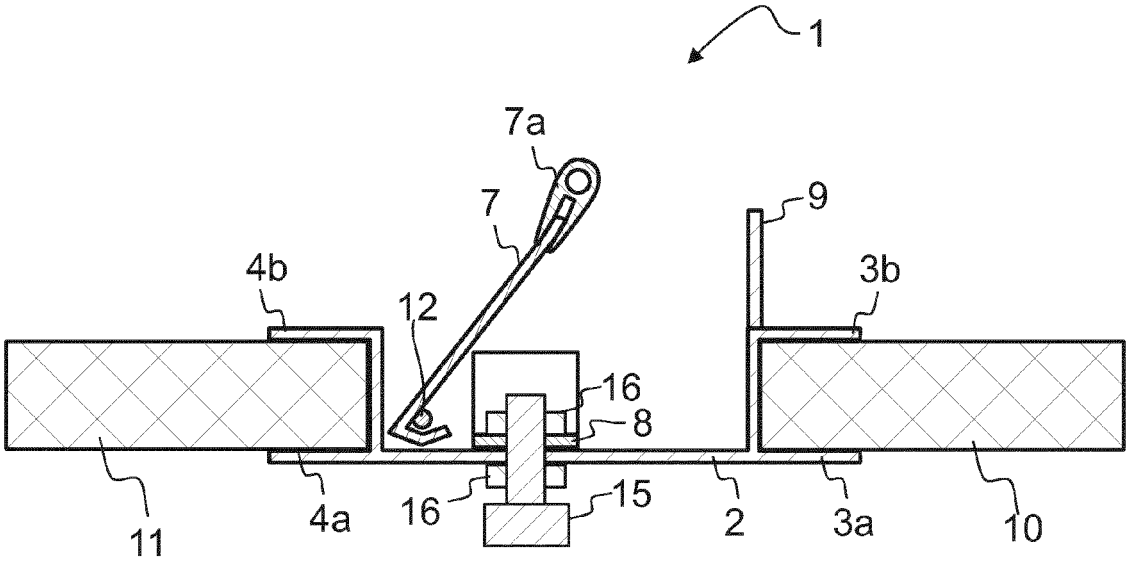
4a
16
15
2
3a
10

Fig. 2a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3b
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4a
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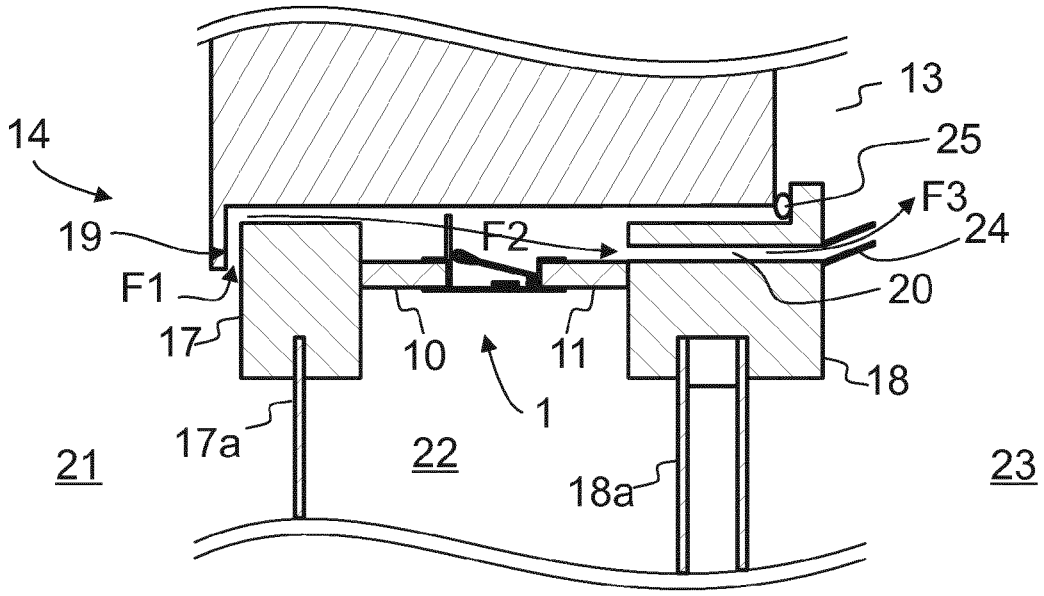
15
2
3a
10

Fig. 2b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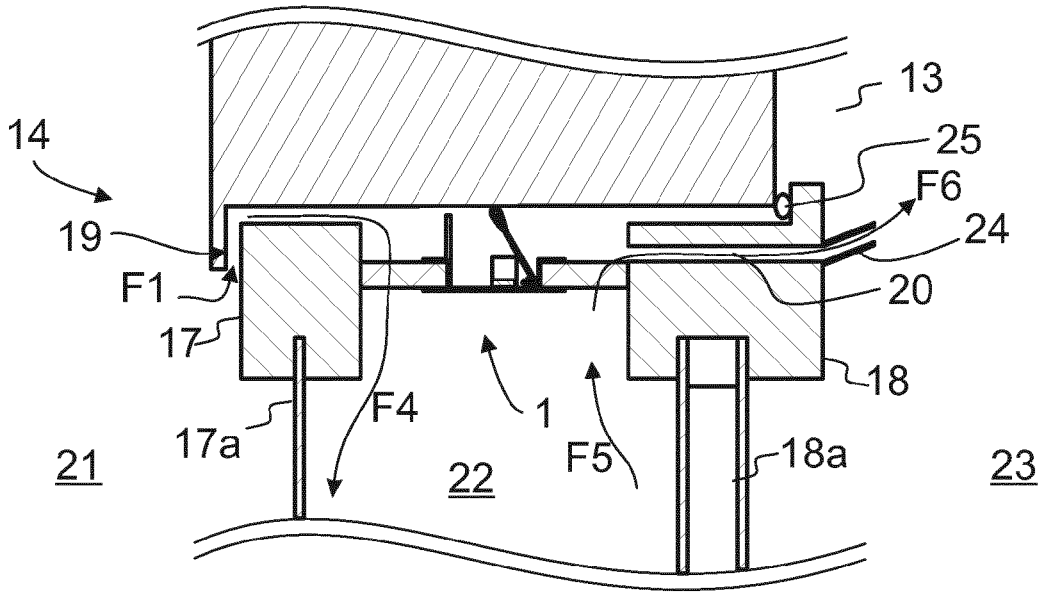
14
25
F3
19
F2
24
F1
20
17
10
11
18
1
17a
22
21
18a
23

Fig. 3a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17a
F5
18a
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Fig. 3b

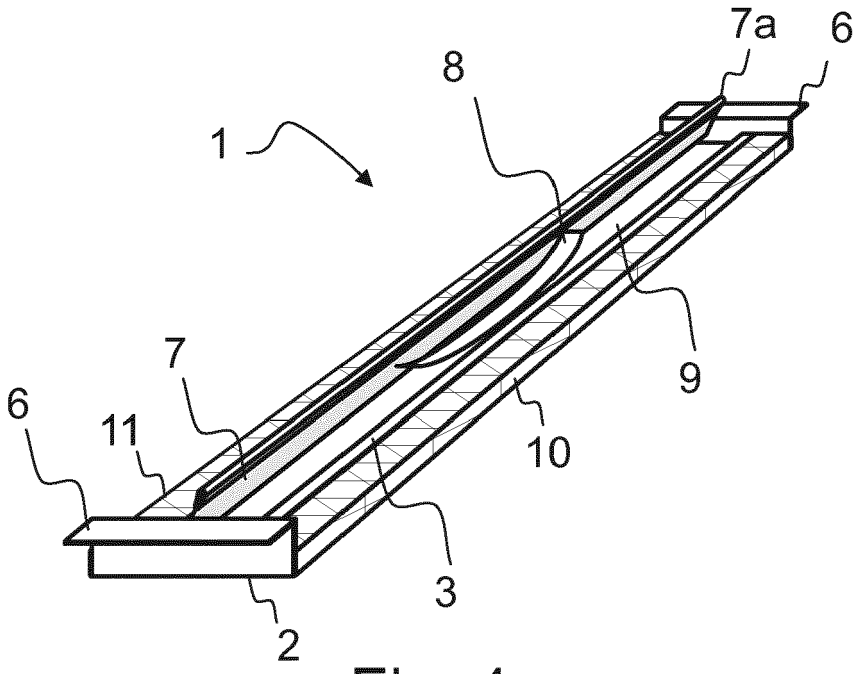


Fig. 4

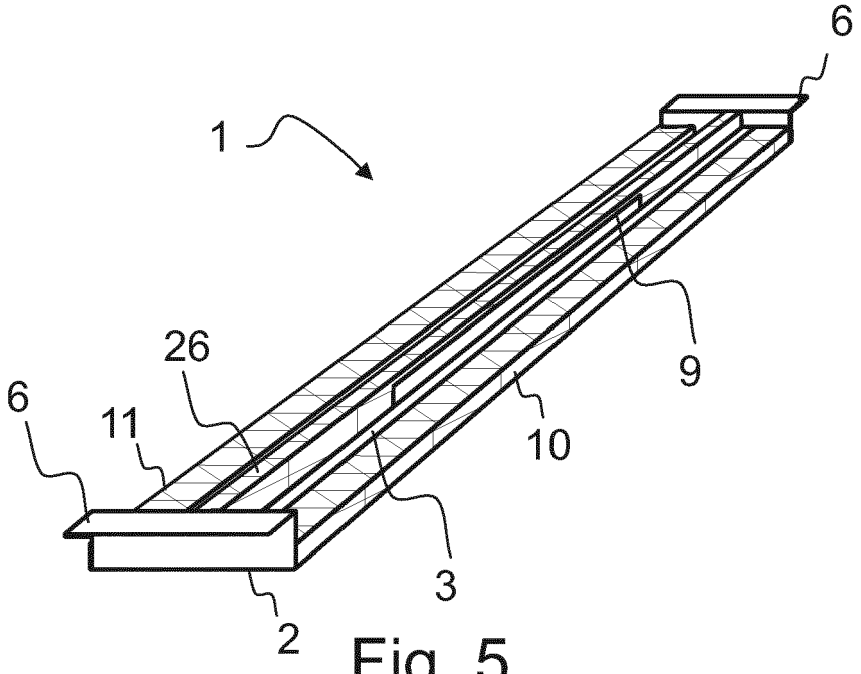
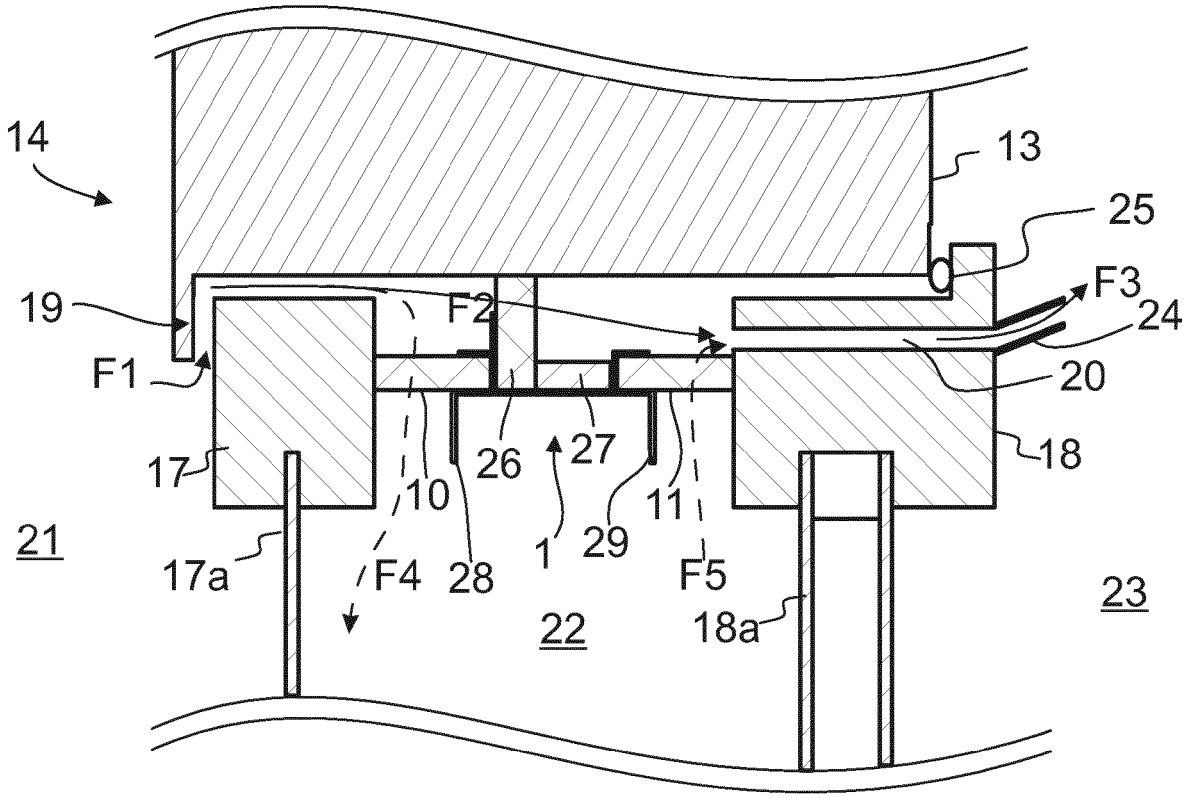


Fig. 5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F3
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19
F2
F1
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17a
F4
28
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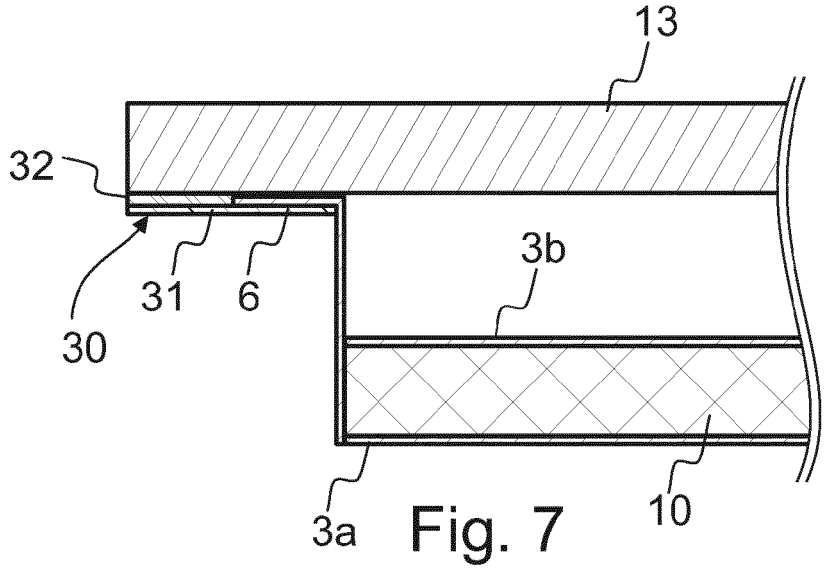
29
F5
23
22
18a

Fig. 6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3b
31
6
30
3a
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Fig. 7

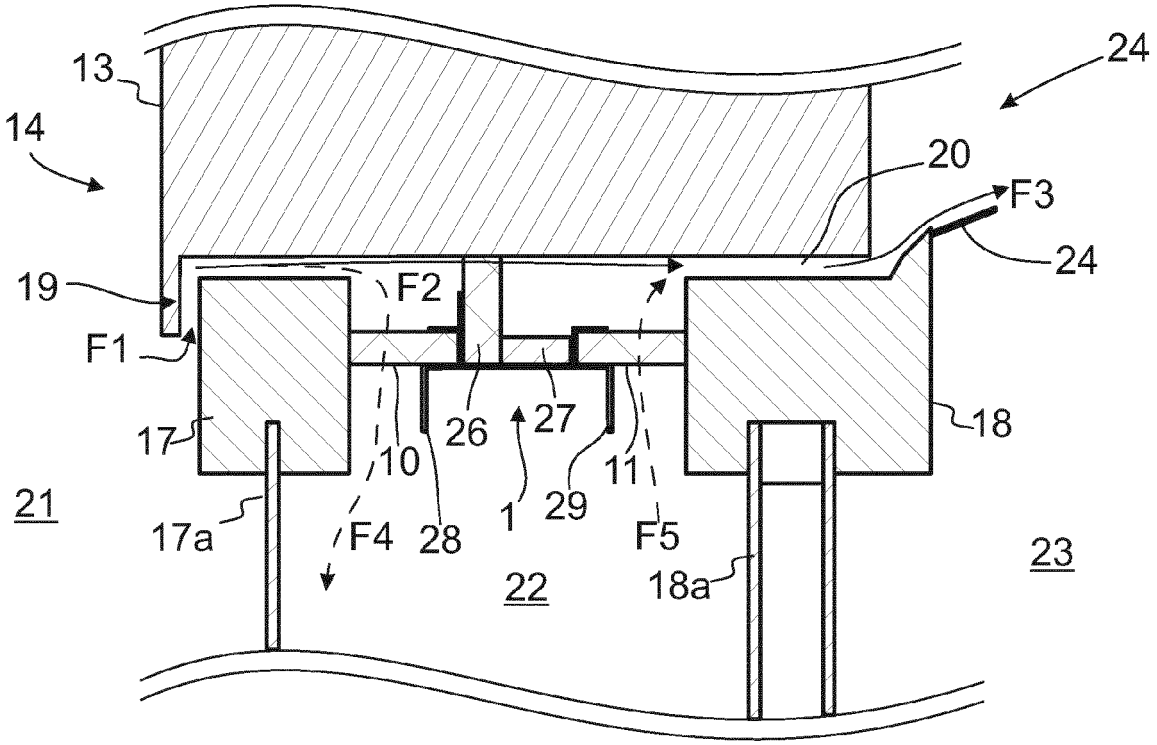


Fig. 8

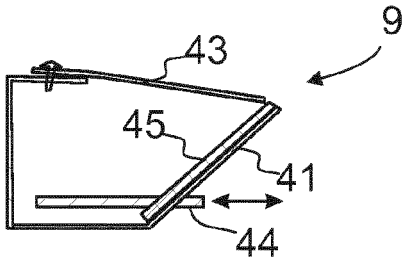


Fig. 9a

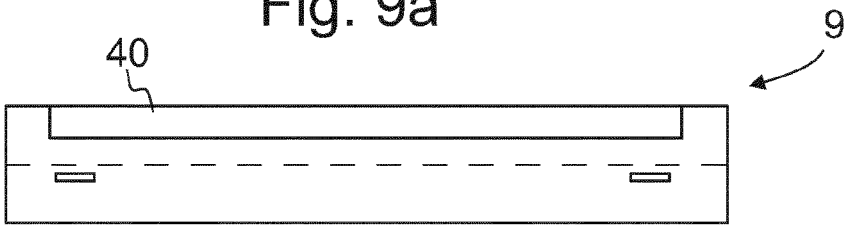
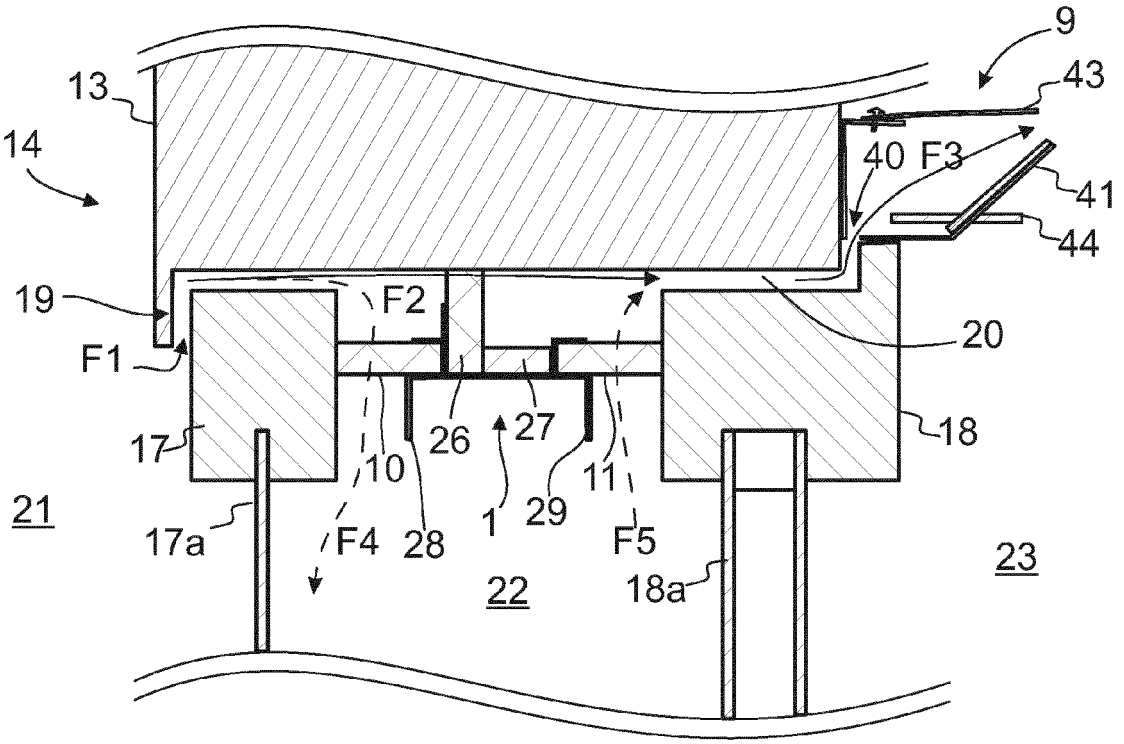


Fig. 9b

Fig. 9c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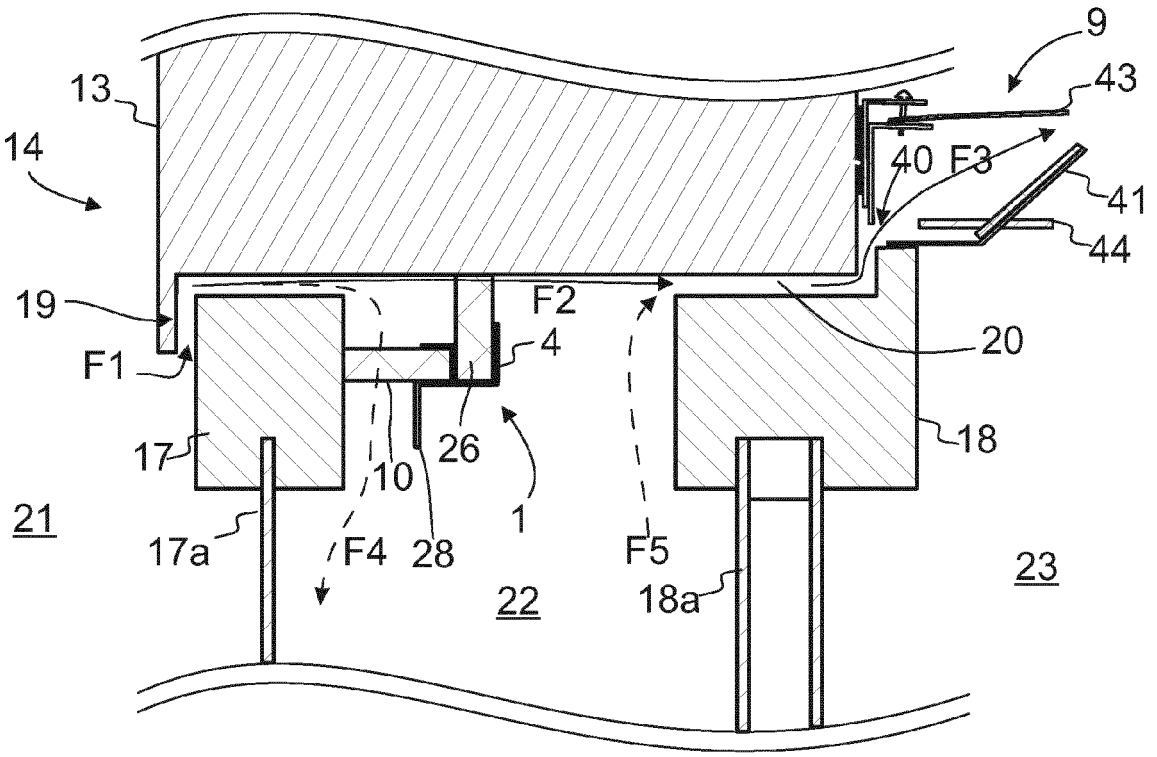
18a

Fig. 10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18a

Fig. 11

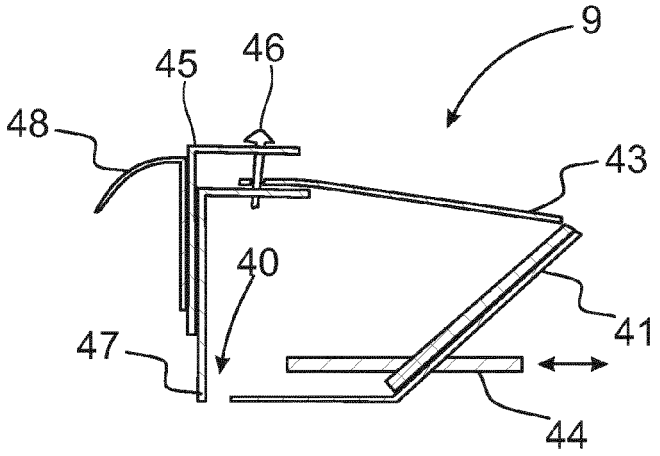
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Fig. 12

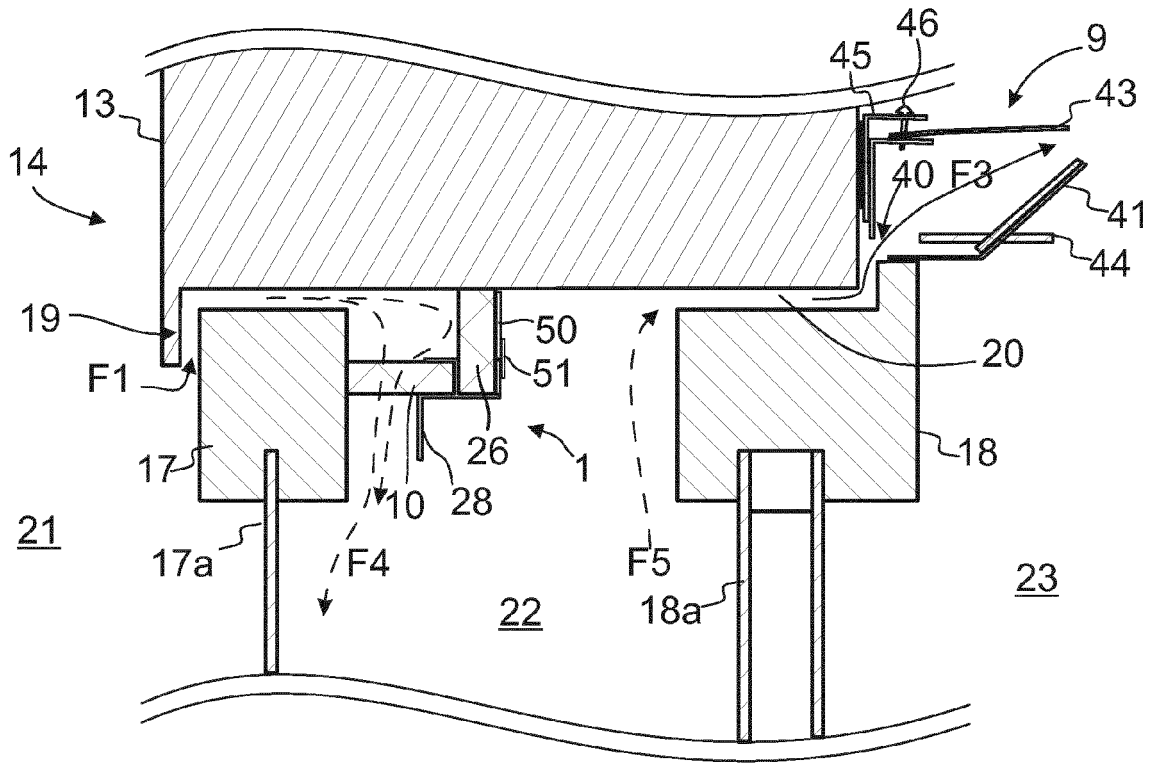

Fig. 13a

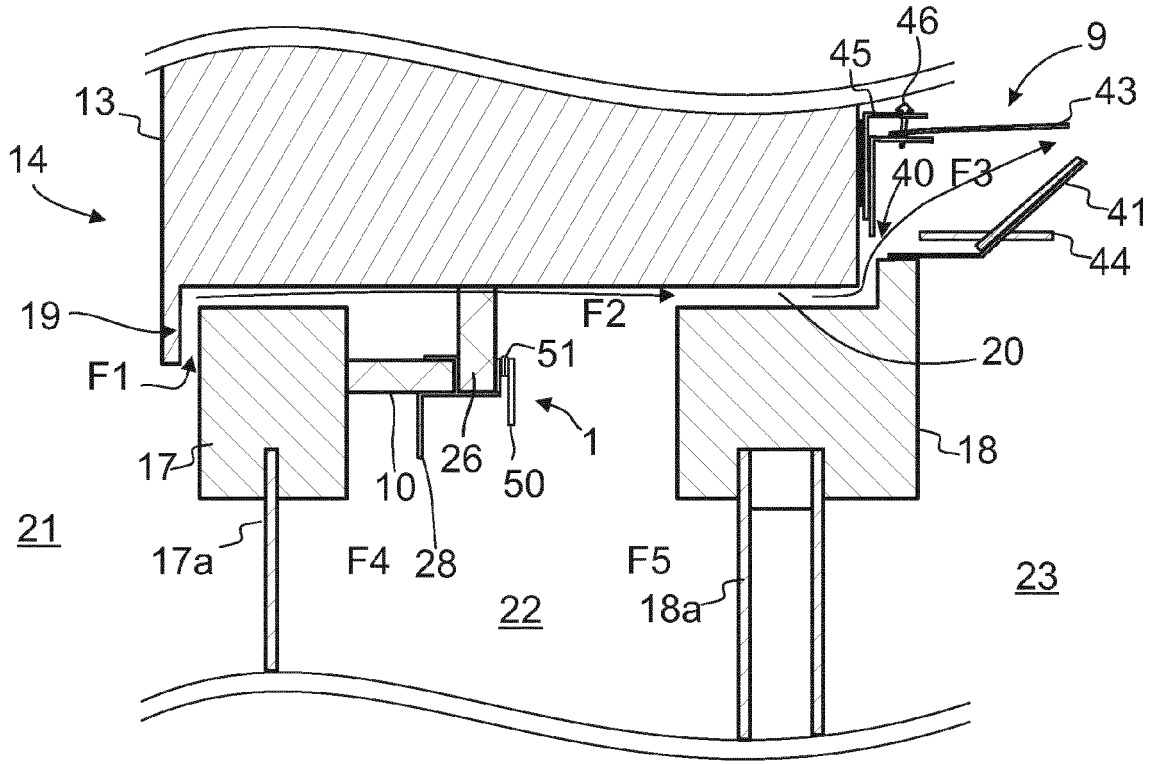

Fig. 13b

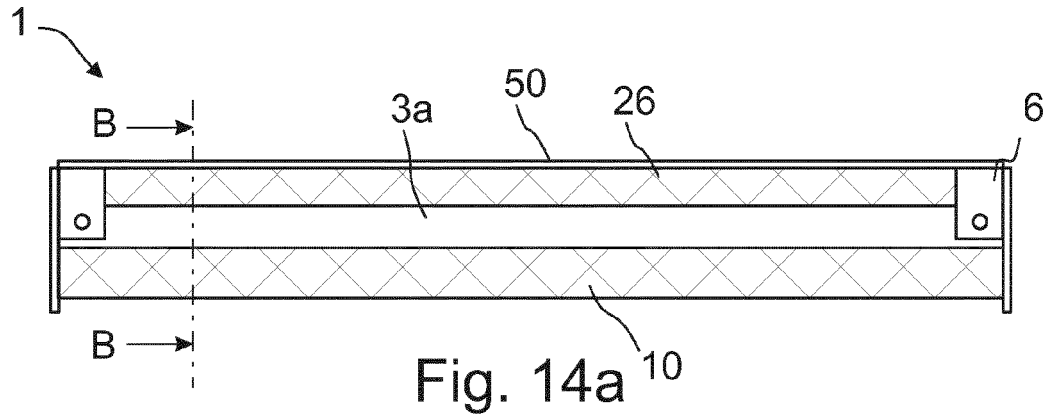

Fig. 14a

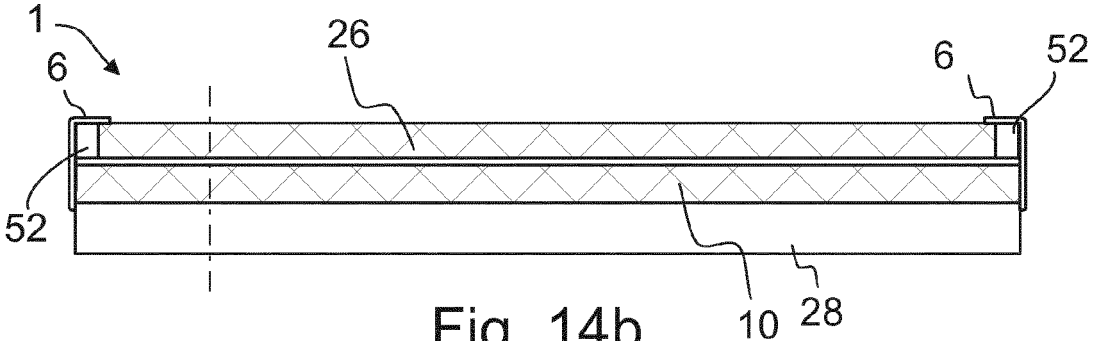

Fig. 14b

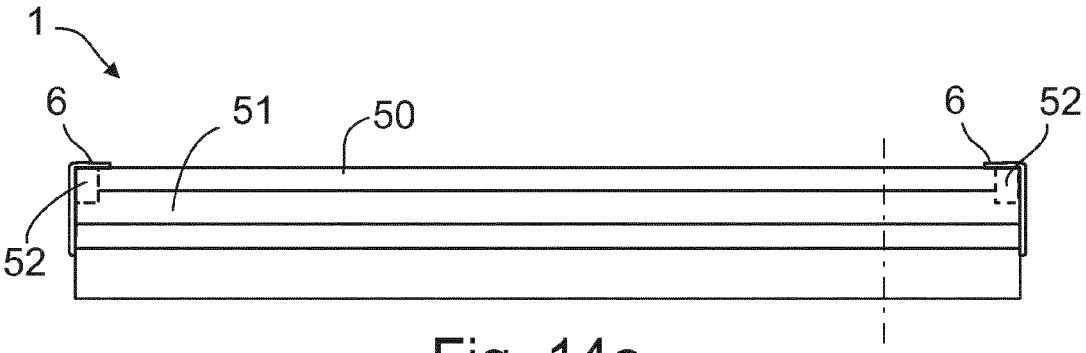

Fig. 14c

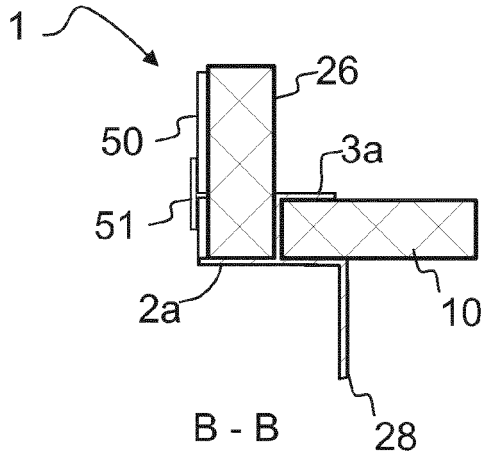

Fig. 14d

Europäisches Patentamt
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EUROPEAN SEARCH REPORT

Application Number
EP 14 19 3369

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	DE 197 51 959 A1 (HIRSCHFELDER CHRISTIAN [DE]) 2 June 1999 (1999-06-02) * figures 1,3 * * column 3, line 14 - column 4, line 16 * -----	1-3,6 4,5,7-11	INV. E06B7/02
X	DE 24 50 480 A1 (STRAUB THEODOR) 26 May 1976 (1976-05-26) * figures 3,4 * * page 9 - page 10 * -----	1-3	
X	DE 198 04 663 A1 (NIEMANN HANS DIETER [DE]) 1 July 1999 (1999-07-01) * figure 1 * * column 5, line 27 - column 6, line 4 * -----	1,2	

TECHNICAL FIELDS SEARCHED (IPC)

E06B
F24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 April 2015	Tänzler, Ansgar

CATEGORY OF CITED DOCUMENTS

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10-04-2015

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82