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(54) Front piece, ventilating apparatus and method for converting a ventilating apparatus

(57) The invention relates to a front piece (4) for a ventilating apparatus arranged for ventilation of a room. The front piece screens off air-supply means in the ventilating apparatus from the room.

The front piece (4) is at its lower part provided with a outlet opening (16) communicating with the room and at its upper part with an inlet opening (15) communicating with the air supply means. The front piece further includes vertical plates (10,11) forming an air-flow duct between them.

The object of the invention is to provide a front piece that results in a more favourable air-flow picture from the ventilation aspect.

According to the invention therefore an air-guidance element is provided at the outlet opening (16) and includes a strip (22) arranged along the lower edge of the second panel, which strip forms an angle of 30°-60° with this panel.

The invention also relates to a ventilating apparatus provided with such a front piece and to a method for converting a ventilating apparatus. In accordance with the method an existing front piece is removed and replaced with a front piece as claimed.

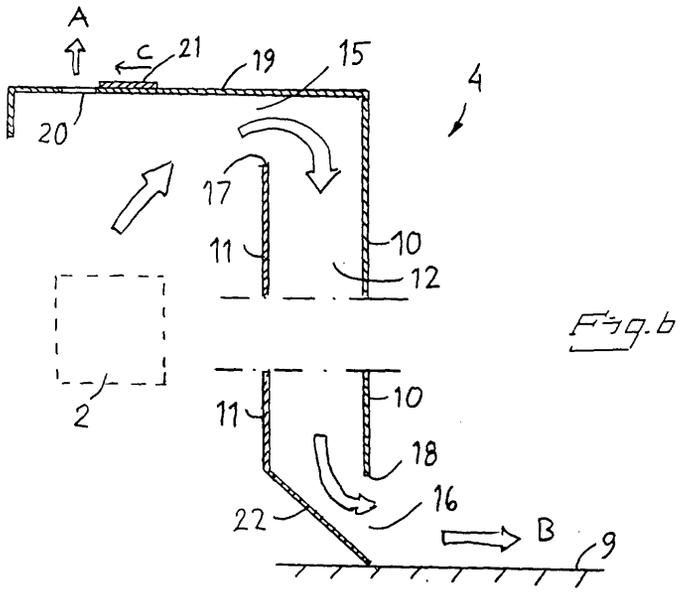

Fig. 6

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Description

Technical field

[0001] The present invention relates in a first aspect to a front piece of the type described in the preamble to claim 1, in a second aspect to a ventilating apparatus of the type described in the preamble to claim 7, and in a third aspect to a method of the type described in claim 8.

Background art

[0002] To ventilate rooms in buildings it is usual to arrange a ventilating apparatus below one or more of the windows. The ventilating apparatus supplies the room with fresh air. The apparatus comprises air-supply means. In its simplest form it consists of a duct with outlets where the air comes directly from the air outside or via a centrally located air-treating unit. The air-supply means may also consist of a fan. It may also be provided with air-treating components for cooling, heating, moistening and/or drying the air locally. The present invention is applicable irrespective of which of these treatments the air is subjected to and regardless of whether the treatment is performed locally in the apparatus or centrally.

[0003] The air flowing from the apparatus is usually conducted from the apparatus into the room through an opening, possibly provided with dampers, arranged at its upper side. The air flows upwardly past the window pane, thereby preventing cold draught. A drawback with this type of conventional arrangement is that it results in air circulation that is not optimal from the ventilation point of view.

[0004] For attaining a more advantageous air circulation it is earlier known, e.g. through US 5851144 and DE 2263617 to provide an apparatus of this kind with a front piece designed such that the air flow from the apparatus occurs at the lower part of the front piece.

[0005] Although the devices disclosed in said patent disclosures partly overcomes the drawbacks mentioned above related to conventional arrangements some deficiencies still remain for achieving an optimal flow pattern.

[0006] A problem with these thus is that they do not attain an outflow that is distinctly directed parallel to the floor.

Description of the invention

[0007] Against this background the object of the present invention is to endeavour to avoid said drawback and thus achieve improved air circulation from the ventilation point of view, and allows the out flowing air to flow parallel to the floor and thereby reaches as far as possible in the room before it rises upwards.

[0008] In the first aspect of the invention this object is achieved by a front piece of the type described in the preamble to claim 1 comprising the special features defined in the characterizing part of the claim.

[0009] The invention is based on the realization that an air-flow pattern that is favourable from the ventilation point of view can be achieved if the air from the ventilating apparatus is initially caused to flow along the floor. Thanks to the inclined air-guidance element the downwardly directed air flow through the air-guidance means can be deflected in controlled manner when it is to pass through the outlet opening, thereby acquiring a direction that as far as possible gives a flow of air along the floor. By an angle in the defined interval the flow will be substantially parallel to the floor and where an angle of $45° \pm 5°$ is optimal.

[0010] In accordance with a preferred embodiment of the invention the outlet and inlet openings are located at the lower and upper edges, respectively, of the panels, the lower edge of one panel forming a part of the limiting edge of the outlet opening and the upper edge of the other panel forming a part of the limiting edge of the inlet opening. Thanks to this arrangement of the inlet and outlet openings, a maximally favourable air flow is obtained through the air-guidance means. Local unevenness in flow speed will to a great extent be evened out so that a broad and substantially laminar outflow is obtained.

[0011] In accordance with yet another preferred embodiment the front piece comprises a substantially horizontal air-screening panel located at its upper part. This is a convenient way of preventing the air from flowing upwards instead of down through the outlet opening. In certain cases it may be advantageous to provide an air damper in this air-screening panel. The need for being able to deflect a certain amount of air to flow upwardly in order to avoid cold draught, if desired, is thus satisfied. This therefore constitutes another preferred embodiment of the invention. The damper is suitably adjustable to allow a certain proportion of the air to flow upwards or to completely cut off this upward flow.

[0012] The advantageous embodiments of the front piece claimed are defined in the sub-claims dependent on claim 1.

[0013] The object of the invention from the second aspect has been achieved by a ventilating apparatus of the type described in the preamble to claim 7 comprising the special features defined in the characterizing part of this claim. A ventilating apparatus provided with such a front piece offers advantages equivalent to those listed above with regard to the front piece claimed and the preferred embodiments thereof.

[0014] In a third aspect of the invention the object has been achieved by a method comprising the special measures defined in claim 8.

[0015] The method claimed enables existing ventilating apparatus with an unfavourable outflow of air from the ventilation point of view to be converted in a simple manner so that the advantages of the claimed front piece can also be exploited in these apparatus.

[0016] The invention will be described in more detail in the following detailed description of embodiments thereof proposed by way of example, and with reference to the accompanying drawings.

Brief description of the drawings

[0017]

Figure 1 illustrates a conventional ventilating apparatus with the front piece removed.

Figure 2 illustrates the ventilating apparatus of Figure 1 with a conventional front piece fitted.

Figure 3 illustrates the ventilating apparatus of Figure 1 with a front piece in accordance with the presented invention fitted.

Figure 4 illustrates the air-flow pattern in a room equipped with a device in accordance with the invention.

Figure 5 is a view in perspective of a front piece in accordance with the invention.

Figure 6 is a vertical section through the front piece of Figure 5.

[0018] Figure 1 shows a ventilating apparatus 1 of conventional type which is suitable for application of a front piece in accordance with the invention. The apparatus 1 includes air-treating components 2. An air duct 3 is arranged to supply air from a central treating plant to the air-treating components 2. As mentioned in the introduction, these may be of more or less sophisticated type. However, the air-treating components do not constitute any central aspect of the present invention and a more detailed description thereof is therefore unnecessary.

[0019] Figure 2 shows the ventilating apparatus of Figure 1 built in behind a front piece 104 of conventional type. The air from the apparatus is conducted out through an outlet 105 in a horizontal cover plate 107 above the apparatus. The arrangement allow all air to be blown out into the room along the window 106, as indicated by arrows A.

[0020] In equivalent manner to Figure 2, Figure 3 shows a ventilating apparatus enclosed by a front piece 4 in accordance with the invention. In the same way as in the conventional embodiment shown in Figure 2, a horizontal cover plate 7 is arranged above the apparatus, in which an outlet 5 is provided. The front piece 4 is provided at the bottom with an outlet opening 16. All, or at least most of the supply air is blown out through this outlet opening 16 in an air flow B that travels along the floor 9. The front piece 4 is also provided with a device (not visible in the drawing) that permits some of the supply air to be blown out through the upwardly directed outlet 5. This device is explained in more detail with reference to Figure 6. The outlet opening 16 is formed by an elongate slot running parallel to the floor and limited at the top by the lower edge 18 of a first panel 10 of the front piece 4.

[0021] In the case of the front piece shown in Figure 3 an air flow of the type illustrated in Figure 4 is achieved in the room. As mentioned, most of the air B flows along the floor and gradually rises towards the ceiling towards an exhaust valve provided. The whole room will thus be efficiently ventilated, resulting in increased comfort for the people in it. Some of the air A may optionally be caused to flow upwards along the window.

[0022] Figure 5 shows a front piece 4 in accordance with the invention, in perspective. The front piece can most simply be described as a double-walled unit open both at the top and the bottom. It thus comprises a first panel 10 facing the room, and a second panel 11 facing the apparatus. The panels 10,11 are rectangular, flat and parallel to each other and form a gap 12 between them constituting an air-flow duct. The panels 10 and 11 are joined together by vertical side walls 13 and 14 arranged at the side edges. In certain cases it may be advisable to arrange a vertical partition in the middle of the front piece in order to reinforce the front piece. Several such partitions may be arranged if the piece is very long. In principle the panels may also be reinforced using elements at various points between them. The front piece 4 is provided with an inlet opening 15 at the top and an outlet opening 16 at the bottom. Their arrangement is explained in more detail with reference to Figure 6. The front piece is provided at the top with a horizontal screening panel 19 joined at right angles to the upper edge of the first panel 10. The screening panel 19 extends in over the area where the ventilating apparatus is located when the front piece is fitted. A number of ventilation holes 20 are provided in the screening panel to permit some of the air to flow upwardly and out through the outlet 5 shown in Figure 3.

[0023] Figure 6 shows more clearly how the inlet and outlet openings are arranged. The outlet opening 16 is formed between the lower edge 18 of the first panel 10 facing the room, and a strip 22 secured along the lower edge of the second panel 11 facing the apparatus 2. The strip 22 and the second panel 11 are suitably made in one piece that has been bent to form the strip. In the example shown in the drawing the angle is 45° but it may be larger or smaller than that. The strip 22 contributes to reinforcing the panel. The inlet opening 15 is formed between the upper edge 17 of the second panel 11 and the screening panel 19 which is secured to the first panel 10 and is suitably made in one piece therewith. In the example illustrated in Figure 6 the ventilation holes 20 in the screening panel are provided with a damper 21, symbolised in the figure by a strip 21 displaceable in the direction of the arrow C to partially or entirely cover the holes 20 as required. During operation an air flow is obtained through the front piece as indicated by the arrows. When the damper 21 is placed so that the ventilation openings 20 are fully or partially open, a small amount of air will flow out through them as indicated by the arrow A. As should be evident the

screening panel may alternatively be provided with ventilation holes without a damper, or may entirely lack ventilation holes.

[0024] The front piece in accordance with the invention is naturally designed having dimensions that are standardised to fit existing apparatus. It is thus easy to convert these in order to exploit the advantages of the invention. To achieve this the existing front piece 104 is first removed from an arrangement as shown in Figure 2. A front piece of the type illustrated in Figures 5 and 6 is then fitted so that an arrangement as shown in Figure 3 is achieved and an air-flow pattern as shown in Figure 4. In the case of new installation a complete ventilating apparatus, including the front piece as described in the invention can be supplied.

Claims

1. Front piece (4) for a ventilating apparatus arranged for ventilation of a room, which front piece screens off air-supply means in the ventilating apparatus from the room and which includes

   - an outlet opening (16) located at the lower part of the front piece and communicating with the room,
   - an inlet opening (15) located at the upper part of the front piece and communicating with the air-supply means,
   - a first panel (10) facing the room and a second panel (11) facing the air-supply means, both of said panels (10, 11) being substantially vertical and forming an air-flow duct (12) between them,

   characterized in that an air-guidance element (22) is arranged at the outlet opening, which air-guidance element (22) comprises a strip arranged along the lower edge of the second panel and forming an angle of 30°-60° with the second panel (11).

2. A front piece as claimed in claim 1, **characterized in that** the panels (10, 11) are substantially flat and substantially parallel to each other.

3. A front piece as claimed in either of claims 1 and 2, **characterized in that** the inlet opening (15) is located at the upper edge of the panels (10,11), **in that** the upper edge (17) of the second panel (11) forms a part of the limiting edge of the inlet opening (15), **in that** the outlet opening (16) is located at the lower edge of the panels (10, 11) and **in that** the lower edge (18) of the first panel (10) forms a part of the limiting edge of the outlet opening (16).

4. A front piece as claimed in any one of claims 1-3, **characterized in that** it comprises a substantially horizontal air-screening panel (19) located at its upper part.

5. A front piece as claimed in claim 4 **characterized in that** the substantially horizontal air-screening panel (19) is provided with air damper (20).

6. A front piece as claimed in claim 5, **characterized in that** the air damper (20) is adjustable (21) between a closed and a fully open position.

7. A ventilating apparatus for ventilation of a room arranged for fitting below a window and comprising a front piece, which front piece screens off air-supply means in the ventilating apparatus from the room and includes

   - an outlet opening (16) located at the lower part of the front piece and communicating with the room,
   - an inlet opening (15) located at the upper part of the front piece and communicating with the air-supply means,
   - a first panel (10) facing the room and a second panel (11) facing the air-supply means, both of said panels (10, 11) being substantially vertical and forming an air-flow duct (12) between them,

   characterized in that an air-guidance element (22) is arranged at the outlet opening, which air-guidance element (22) comprises a strip arranged along the lower edge of the second panel and forming an angle of 30°-60° with the second panel (11).

8. A method for converting a ventilating apparatus provided with a front piece for ventilation of a room, which front piece screens off air-supply means in the ventilating apparatus from the room, the method includes demounting and removing existing front piece and replacing it with a front piece, which front piece includes

   - an outlet opening (16) located at the lower part of the front piece and communicating with the room,
   - an inlet opening (15) located at the upper part of the front piece and communicating with the air-supply means,
   - a first panel (10) facing the room and a second panel (11) facing the air-supply means, both of said panels (10, 11) being substantially vertical

and forming an air-flow duct (12) between them,

- an air-guidance element (22) arranged at the outlet opening, which air-guidance element (22) comprises a strip arranged along the lower edge of the second panel and forming an angle of 30°-60° with the second panel (11).

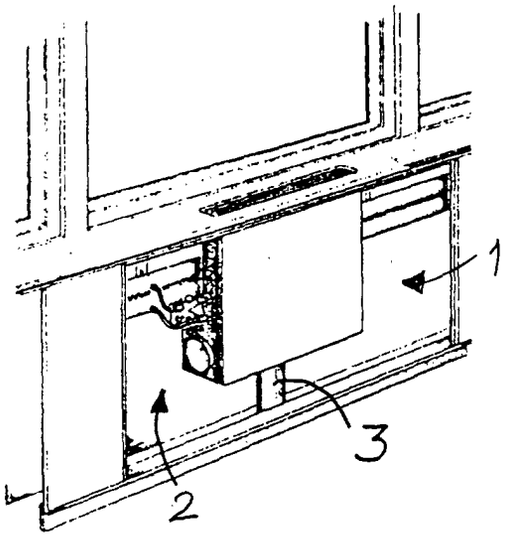


Fig. 1

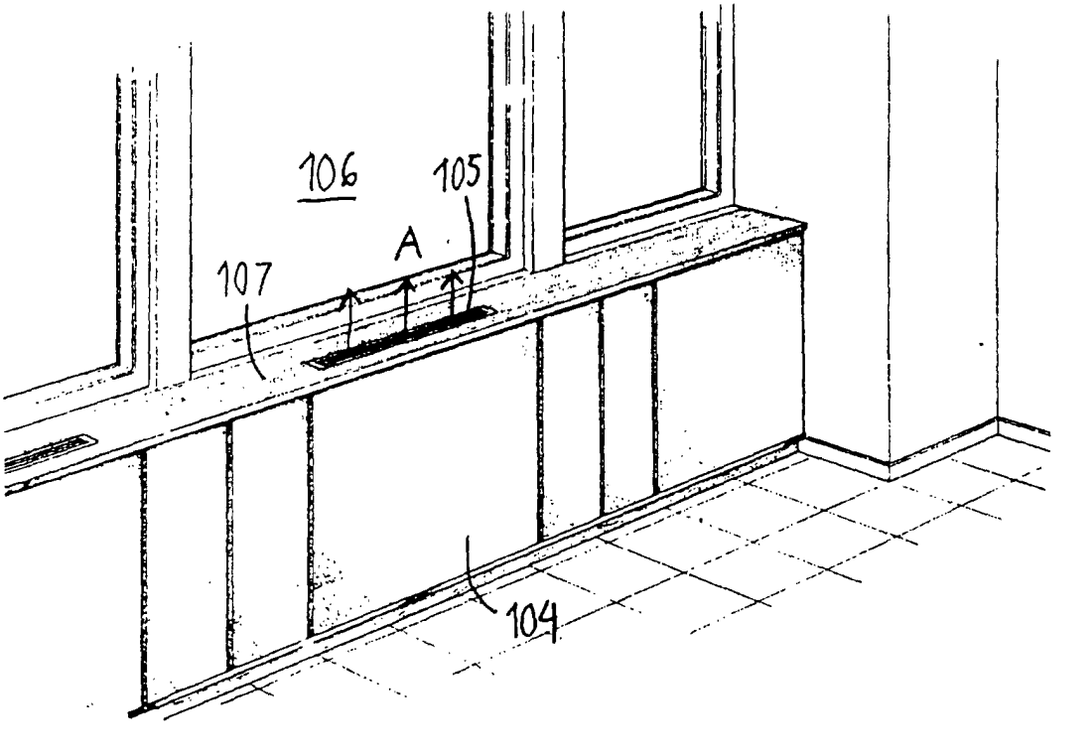


Fig. 2

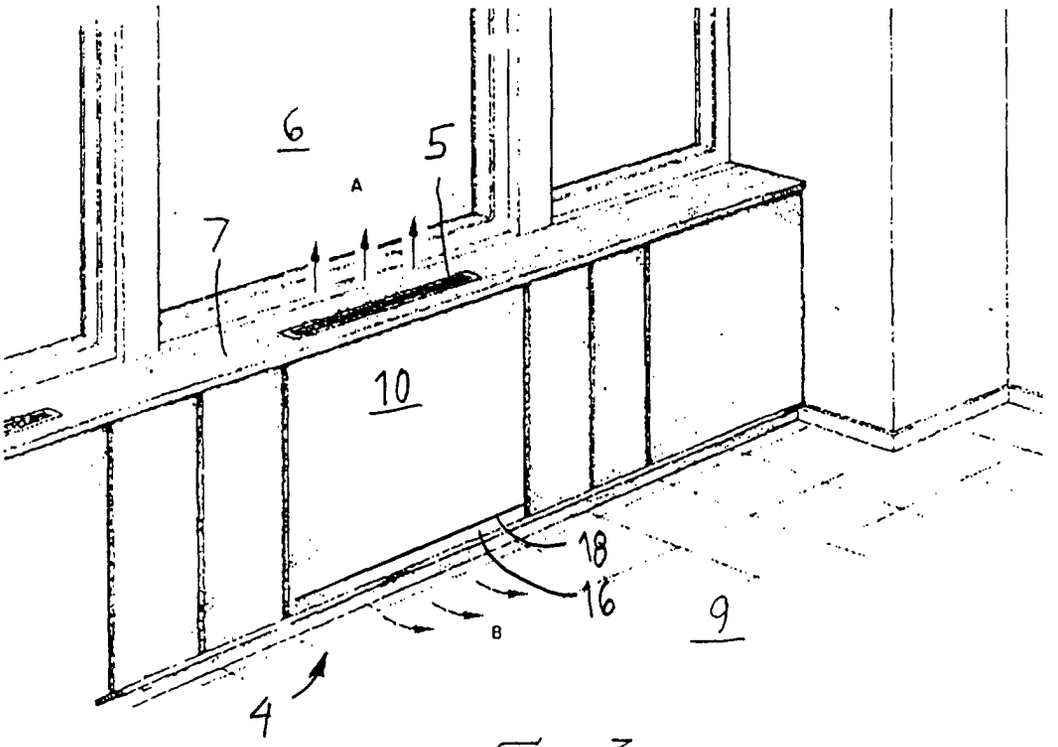


Fig.3

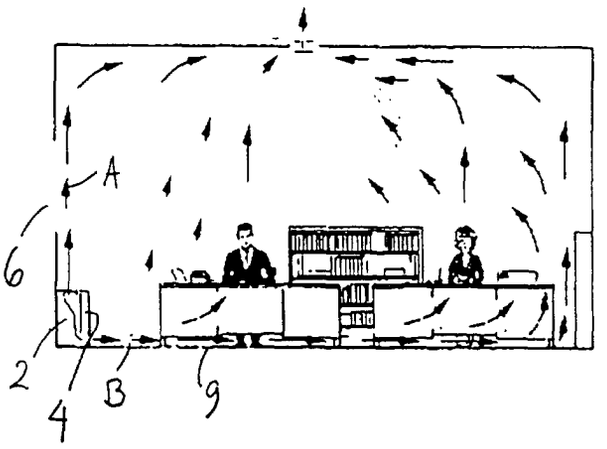
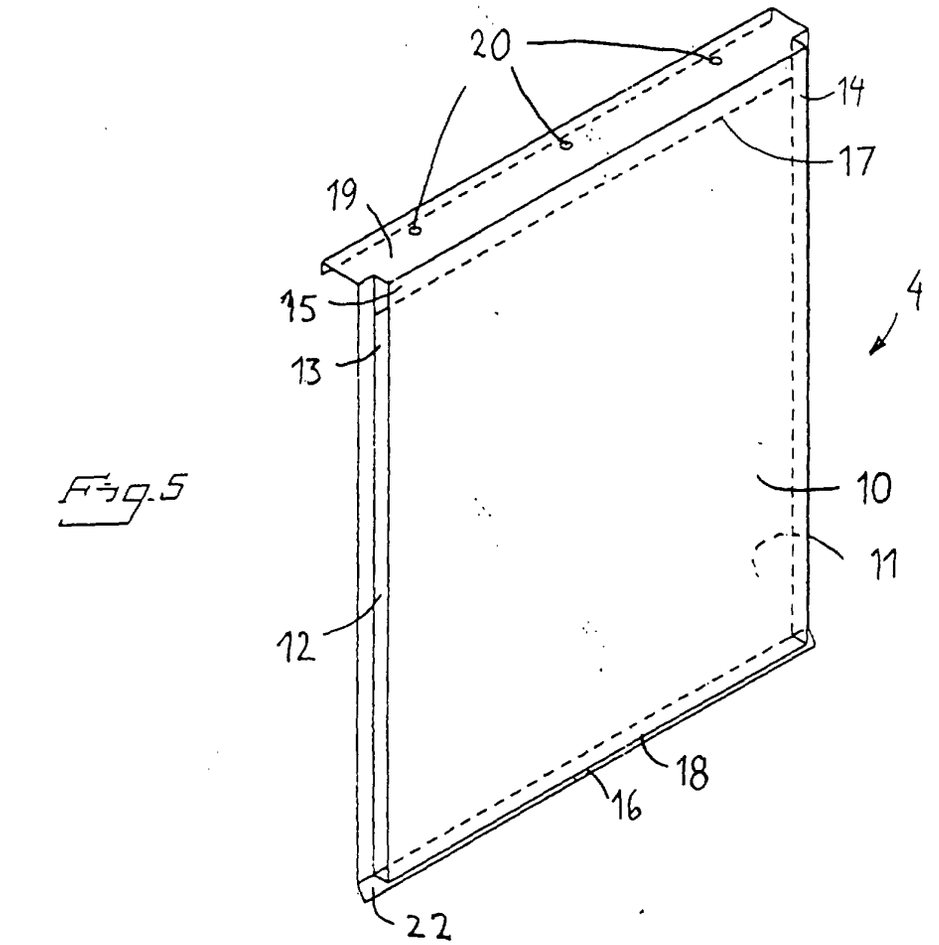


Fig.4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22

Fig.5

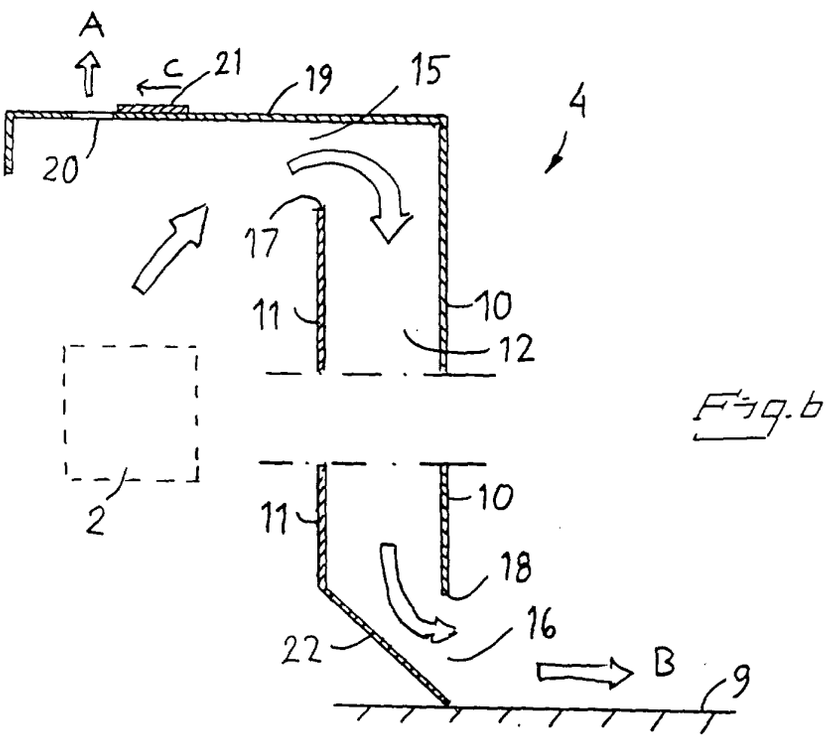
A
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Fig.6