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(54) Air treatment and ventilation device

(57) An air treatment and ventilation device (1) comprises a supply-air channel (2), a cooling/heating element (3) for treatment of room air, a mixing chamber (4) for treated air and supply air and air outlets (5, 6) from the device into the surroundings, whereby supply air is adapted to be supplied to the mixing chamber via discharge holes (7, 8) in the wall of the supply-air channel (2). The invention is characterized in that the discharge holes (7, 8) have an adjustable area for setting the desired supply-air flow.

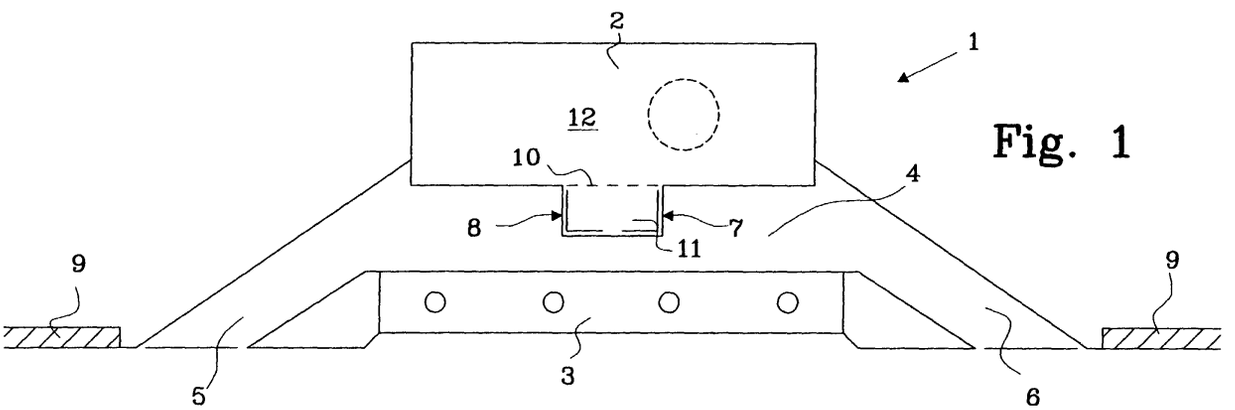

Fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to an air treatment and ventilation device in accordance with the preamble to claim 1.

DESCRIPTION OF BACKGROUND ART

[0002] A device as mentioned above is, for example, described in DE-A1-33 21 612, which relates to an air treatment device, in which the supply air, by ejector effect, draws room air through a cooling element and into the device. The outlet from the device is arranged on a level with, or essentially immediately below, the level of a false ceiling, on a level with which the lower limiting surfaces of the device occur.

[0003] One problem with devices according to the prior art is that, if a regulation of the cooling capacity is desired, the flow of cooling agent in the cooling element is changed via a control valve. Thus, the user is reduced to possibilities of adjustment which, in practice, are relatively insensitive, which entails correspondingly less advantageous results as regards the influence on the air temperature and the climate in the room.

OBJECT AND MOST IMPORTANT CHARACTERISTICS OF THE INVENTION

[0004] It is an object of the present invention to suggest a device of the kind mentioned in the introductory part of the description, which solves the problems of the prior art and which enables more sensitive and more exact adjustment of the air treatment and ventilation device.

[0005] This object is achieved by the characteristic feature described in the characterizing portion of claim 1.

[0006] In this way, an air treatment and ventilation device may be individually adjusted, in an advantageous manner, to obtain a more precise room temperature and room climate without having to influence the supply-air feed. Since the adjustment occurs at the "end" of the supply-air channel, namely in the very discharge holes, a possibility of achieving fine adjustment, also in the case of small volumes of supply air, is obtained in an advantageous manner, which would otherwise be difficult to obtain if, for example, which is usual, a damper in the supply-air conduit were to be controlled.

[0007] Additional advantages are obtained by the characteristic features of the independent claims.

[0008] By arranging an air-permeable wall between the inlet section and outlet section of the supply-air channel, an advantageous reduction of noise is obtained.

[0009] It is preferred that the discharge holes should be in the form of first recesses arranged in a wall of the supply-air channel, which recesses, in cooperation with other recesses arranged in at least one displaceable control panel making contact with this wall. In this way, simple adjustability is achieved by quite simply displacing the control panel in the direction of a larger or smaller hole area for achieving the desired flow of supply air.

[0010] In particular, it is preferred that both the first and the second recesses should be in the form of elongated slots, which provides a particularly good possibility of sensitive adjustability.

[0011] Further, it is preferred that the discharge holes should be arranged in two groups, which are essentially laterally directed in separate directions. This makes possible manufacture of a device with a particularly low height of building and discharge in two directions.

[0012] According to this aspect, it is preferred that each group should be individually adjustable, which entails an advantage since a laterally directed discharge may be individually adapted to the placement of the device in the room, whereby, for example, placement near a wall requires less discharge power towards the wall and greater discharge power away from the wall.

[0013] It is preferred that the control panels should be accessible via an operating portion, which, for example, by engagement with a simple tool, is utilized for displacement of the control panels and hence adjustment of the device.

[0014] The invention also enables automatic control in response to sensed air parameters in the room. To this end, the control panels may be displaceable by means of motors, which are controlled by a control unit. In this way, the device may be controlled on the basis of sensed temperature, air humidity, the need of ventilation and so on, but, of course, also according to other parameters influencing the air in the room.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The invention will now be explained in greater detail by means of embodiments and with reference to the accompanying drawings, wherein

Figure 1 shows, in a cross-section view, the principle of a device according to the invention,

Figure 2 shows a detailed view of the outlet section of the supply-air channel with discharge holes,

Figure 3 shows a detailed view of discharge holes in a device according to the invention, and

Figure 4 shows a detailed view, upside down in relation to that in Figure 1, of operating portions for control panels in a device according to the invention.

DESCRIPTION OF EMBODIMENTS

[0016] The air treatment and ventilation device 1 shown in Figure 1 comprises a supply-air channel 2, a cooling/heating element 3, a mixing chamber 4 and air outlets from the device into the surroundings 5 and 6. In operation, air is supplied through the channel 2 into the mixing chamber 4 through the discharge holes indicated by 7 and 8. By ejector effect, the air, which emanates from the discharge holes 7 and 8, will create a sub-atmospheric pressure in the mixing chamber 4, which sucks room air from below through the element 3 and into the mixing chamber 4. To the extent that the element 3 is traversed by a cooling agent, the passing room air will be cooled. Alternatively, of course, the element 3 may be traversed by a heating agent, whereby the traversed air will instead be heated.

[0017] In the mixing chamber, fresh supply air and treated room air are mixed and pass, in a manner known per se, through the outlets 5 and 6 to flow essentially parallel to the false ceiling 9. The supply-air channel 2 comprises an inlet section 12 and an outlet section 11, the latter comprising the discharge holes 7 and 8.

[0018] The inlet section 12 and the outlet section 11 are separated by an air-permeable wall, such as a perforated plate, which entails a significant noise reduction of the device since an equalization of the air flow between these sections, and hence a resultant reduction of the highest air velocities to lower noise levels, are obtained.

[0019] Figure 2 shows the outlet section 11 in more detail, the perforated plate 10 being removed. Here the outlet section has an extended U-shape with low legs and a wide web, and on each leg a group of recesses 13 is arranged, which are in the form of elongated slot-shaped apertures longitudinally aligned on the leg mentioned. The discharge holes will here be directed such that supply air is blown out in directions straight from each other.

[0020] Inside the outlet section 11, two longitudinally displaceable control panels 14 and 15, respectively, with an L-shaped cross section, are arranged, each panel exhibiting corresponding recesses 16 arranged in the same way as the recesses 13 and aligned therewith. In this way, the areas of the discharge holes may be adjusted from a maximum size, when the holes 13 and 16 are fully aligned with each other, in principle in a stepless manner, to a position where the holes 16 are covered by the spaces between the holes 13 and vice versa and thus the supply of air is shut off. The control panels 14 and 15 are fixed in a suitable way so as to be displaceable, for example by a set of engagement elements 17 distributed along the length of the outlet section 11.

[0021] Figure 3 shows in more detail two discharge holes adjusted for a relatively small area, about 25 % of the maximum area, by an adequate displacement of the control panel in question and hence the recesses 16 in relation to the recesses 13.

[0022] Figure 4 shows two operating portions 18 and 19 associated with the control panels 14 and 15, respectively. The operating portions consist of one leg of the L-shaped control panel, the other leg comprising the recesses 16. In their simplest form, the operating portions exhibit holes 20 for engagement with a simple tool, such as a screwdriver, which may be used for displacing the respective control panel. This is done in a preferred manner in operation of the device by an operator quite simply displacing these control panels from below the installed device, in particular quite simply by inserting the screwdriver into the respective holes 20 and while supporting the screwdriver against a portion of the element 3 (see Figure 1). By the principle shown, the air flow may be controlled in a simple manner such that different air flows are obtained in different lateral directions of the device. In an alternative embodiment, the operating portions exhibit grooves or ridges for engagement with a tool. In this connection, also a counter-support portion for the tool may be arranged adjacent to the operating portions. Such a counter-support portion suitably exhibits a hole to be able to offer counter support for adjustment in both directions of an operating portion.

[0023] The invention may be varied within the scope of the appended claims and, as an example, the device may have a different design as regards the relative placement of the supply-air channel, the mixing chamber and the cooling element. In one variant, the device is arranged freely suspended without any connection to a false ceiling. In that case, it is suitable for the device to be designed, in principle, upside down in relation to the device shown in Figure 1, that is, with the element on the upper side. It is also fully possible to place the device alongside, or recessed in, a room wall.

[0024] Further, the recesses as well as the arrangement for obtaining adjustability of the area may have a different design. As an example, the control panels need not have holes 16 identical with the holes 13 of the supply-air channel. It is sufficient that they occur covering the portions which are displaceable in relation to the recesses.

[0025] The device may also be designed without an air-permeable wall 10 for noise reduction.

[0026] Automatic control may be achieved by causing a motor, which is controlled by a control unit, to displace the control panels in response to, for example, a sensed air temperature.

[0027] The material in the device is suitably substantially steel sheet, aluminium or an aluminium alloy. The device is well suited for manufacture by conventional methods for sheet-metal working.

Claims

1. An air treatment and ventilation device (1) comprising a supply-air channel (2), a cooling/heating element (3) for treatment of room air, a mixing chamber

(4) for treated air and supply air as well as air outlets (5, 6) from the device into the surroundings, wherein supply air is adapted to be supplied to the mixing chamber via discharge holes (7, 8) in the wall of the supply-air channel (2), **characterised in that** the discharge holes (7, 8) have an adjustable area for setting the desired supply-air flow.

2. A device according to claim 1, **characterised in that** the supply-air channel (2) has an inlet section (12) for supply of air and an outlet section (11) provided with the discharge holes (7, 8).

3. A device according to claim 1 or 2, **characterised in that** the outlet section (11) is separated from the inlet section (12) by an air-permeable wall (10).

4. A device according to claim 1, 2 or 3, **characterised in that** the discharge holes (7, 8) consist of first recesses, (13) arranged in a wall of the supply-air channel (2), in cooperation with second recesses (16) arranged in at least one displaceable control panel (14, 15) making contact with said wall.

5. A device according to claim 4, **characterised in that** the first and/or the second recesses (13, 16) are in the form of elongated slots.

6. A device according to claim 4 or 5, **characterised in that** the discharge holes (7, 8) consist of two groups, which are essentially laterally directed in different directions.

7. A device according to claim 6, **characterised in that** each group is assigned at least one control panel (14, 15) to allow individual control.

8. A device according to any of claims 4-6, **characterised in that** each control panel (14, 15) exhibits an operating portion (18, 19) which is accessible from the outside of the device.

9. A device according to claim 8, **characterised in that** each control panel (14, 15) is located internally of the supply-air channel (2) and that the associated operating portion (18, 19) projects, essentially sealed, therefrom.

10. A device according to any of claims 4-9, **characterised in that** the displacement movement for each control panel (14, 15) is program-controlled by an air parameter-sensing computer.

11. A device according to any of the preceding claims, **characterised in that** the cooling/heating element (3) is arranged substantially along a limiting surface of the device.

12. A device according to any of the preceding claims, **characterised in that** the mixing chamber (4) is arranged above the cooling/heating element (3), as viewed in the position of use.

13. A device according to any of the preceding claims, **characterised in that** the supply-air channel (2) is arranged above the mixing chamber (4), as viewed in the position of use.

14. A device according to any of claims 1-11, **characterised in that** the mixing chamber (4) is arranged below the cooling/heating element (3), as viewed in the position of use.

15. A device according to claim 14, **characterised in that** the supply-air channel (2) is arranged below the mixing chamber (4), as viewed in the position of use.

16. A device according to any of the preceding claims, **characterised in that** the principal material in the device (1) is steel sheet, aluminium or an aluminium alloy.

17. A device according to any of the preceding claims, **characterised in that** it is arranged for insertion with a lower surface substantially on a level with a false ceiling (9) of a room.

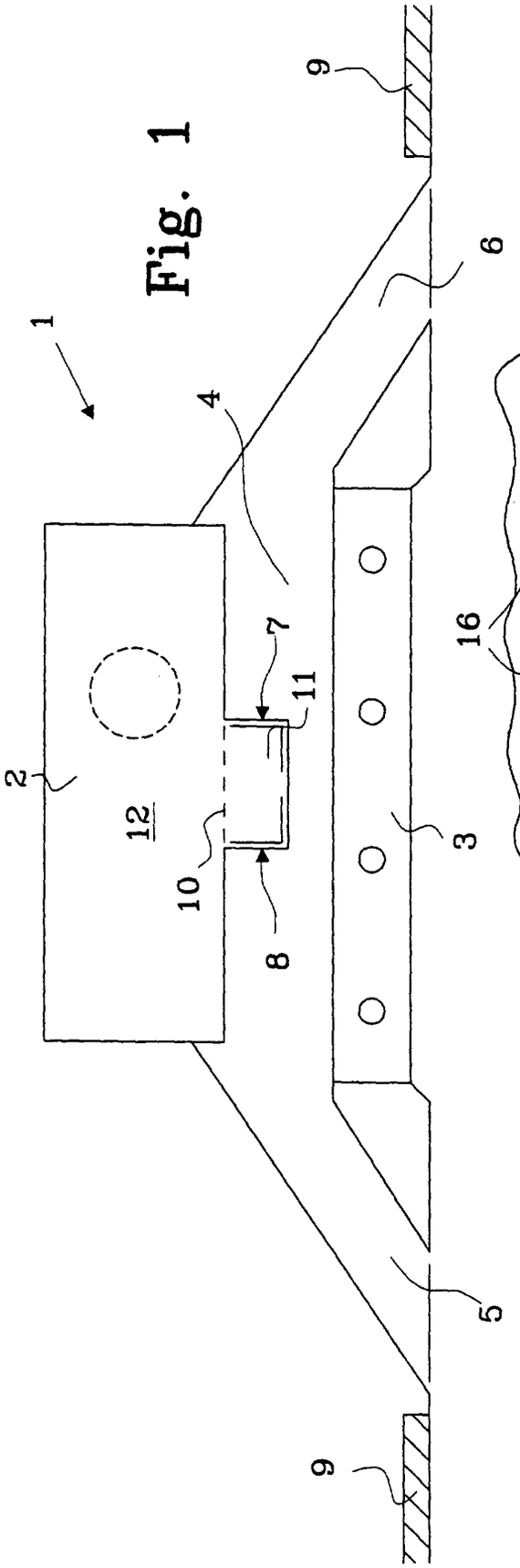

Fig. 1

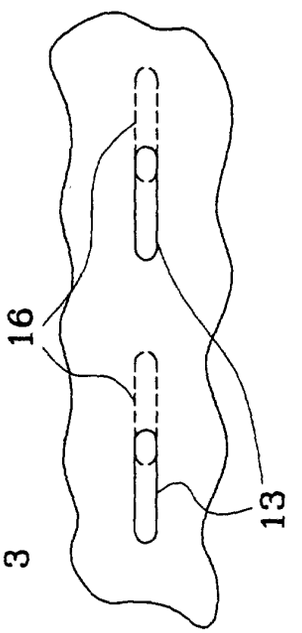

Fig. 3

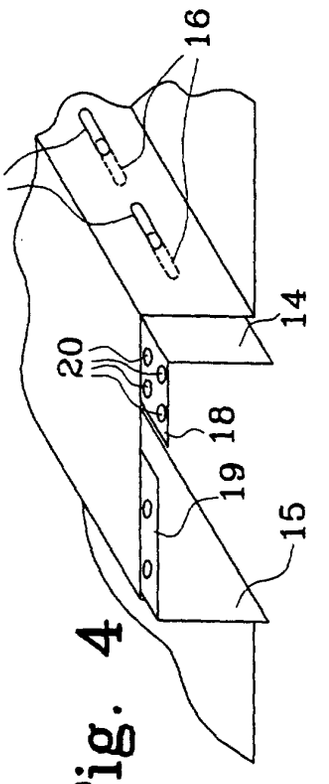

Fig. 4

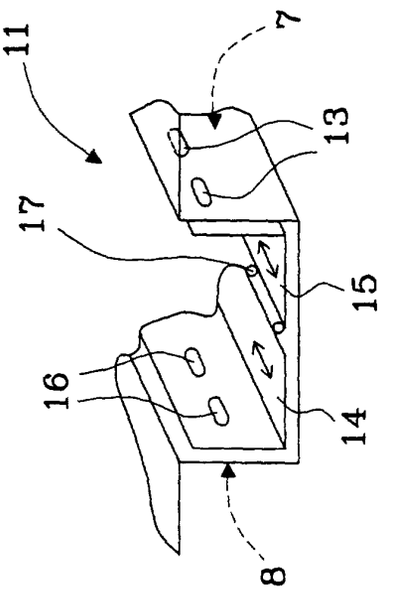

Fig. 2