A vehicle seat has a cushion in which a ventilation layer for ventilating the cushion is integrated. At least one radial fan is integrated at a front end of the ventilation layer.
VEHICLE SEAT WITH A VENTILATION DEVICE

CROSS REFERENCE TO RELATED APPLICATIONS


BACKGROUND AND SUMMARY OF THE INVENTION

[0002] The present invention relates to a vehicle seat with a ventilation device.

[0003] It is sufficiently known from the prior art to provide vehicle seats with heating means and ventilation devices in order to increase the comfort for the vehicle occupants.

[0004] For example, it is known to conduct hot air through a vehicle seat, in particular the backrest, in order to control the temperature of that region of the vehicle seat with which the vehicle occupant is in contact, in accordance with the requirements desired by the vehicle occupant.

[0005] For this purpose, air is sucked up generally from the rear side of the vehicle seat by means of a fan and pressed into the seat via air passages and air-guiding layers provided in the vehicle seat and/or the backrest.

[0006] A device of this type is known, for example, from German Patent DE 103 19 148 B3. In this device, a fan sucks up air through an air-guiding layer and air passages through openings which are located at the upper edge and at the lower edge of the rear side of the backrest.

[0007] German utility model DE 202 19 7 33 U1 discloses a ventilation device for the seat surface of a vehicle seat. In this ventilation device, a radial ventilator is arranged below the seat cushion at a certain distance from the lower side of the seat cushion. This radial ventilator sucks up air between the lower side of the seat cushion, as a rule a cushion shell, and a suction opening, which is opposite the seat cushion, of the radial fan and conducts the air via a bellows-type connection to an air-guiding passage system which is integrated in the seat cushion and is intended for distributing the air provided for ventilation. This device is affected by the disadvantage that the free space below the vehicle seat is limited and therefore the arrangement of the radial fan is subject to certain restrictions. Furthermore, a vehicle seat of this type cannot be entirely lowered in order to be adjusted to the needs above all of vehicle occupants of considerable height.

[0008] For these reasons, it has been provided to integrate a ventilator directly into the vehicle seat, as is known, for example, from German Patent DE 198 04 100 C1. In this patent, at least one fan device is integrated in a ventilation layer both of the seat surface of the seat cushion and of the backrest of the vehicle seat, the fan device sucking up ventilation air from the lower side and/or the rear side and conducting the air both radially on both sides and also partially axially into the ventilation layer before it leaves the ventilation layer again via air outlet openings.

[0009] Ventilation layers of this type are generally composed of a large-mesh spacer knit, for example of open foams, nonwovens, rubberized hair or the like, which provides a certain amount of counterpressure to the introduced air, which counterpressure has to be overcome by the fan device.

[0010] This counterpressure correspondingly increases if air is blown into the ventilation layer in a plurality of radial and, if appropriate, axial directions, as is the case in the previously described prior art. As a result of this, either a plurality of ventilators have to be used in order to provide the necessary ventilator power for the ventilation layer, or a relatively large ventilator is necessary, which causes considerable noise and vibration.

[0011] Proceeding therefrom, it is an object of the present invention, in the case of a vehicle seat of the type mentioned above, to improve the efficiency and rapidity of the seat ventilation and to permit as compact a constructional form of the vehicle seat as possible while providing ventilation which vibrates as little as possible.

[0012] This and other objects and advantages are achieved by exemplary embodiments of the present invention in which at least one radial fan is integrated in the ventilation layer, the radial fan being provided at one end of the ventilation layer in such a manner that the radial fan introduces the air, which has been sucked up by it axially via an air suction opening, radially only into the front side of the ventilation layer. In other words, the radial fan only blasts out the ventilation air in one direction.

[0013] Owing to the fact that the radial ventilator only blasts the air out radially in one direction, a much higher build-up of pressure can be brought about. In association therewith, fans which are smaller in terms of their dimensions or fewer ventilators can be used. As a rule, just a single radial fan suffices in order to realize the necessary ventilation comfort. The radial fan is furthermore distinguished by the advantage that it takes up little construction space and operates with very little vibration.

[0014] According to the invention, the ventilation layer has at least one air outlet opening. In one embodiment, the air suction opening for the at least one radial fan is located on the same side as the air outlet opening while, in another embodiment, the air suction opening is located on the opposite side.

[0015] According to the invention, it is provided that the height of the housing of the radial fan is at least the same height as the height of the ventilation layer, but may be of smaller dimensions than the latter. By this means, the radial fan can be better integrated in the ventilation layer.

[0016] In an exemplary embodiment of the present invention, a plurality of radial fans (e.g., two) are arranged parallel to one another at the front end of a ventilation layer. This enables the building up of a uniform, approximately laminar flow which is conducted uniformly through the ventilation layer, which results in better removal of temperature and moisture from the seat cushion.

[0017] The invention will now be explained in more detail with reference to the exemplary embodiments illustrated in the attached drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. 1 shows, schematically, a cross-sectional illustration through a seat surface of a vehicle seat; and

[0019] FIG. 2 shows, schematically in plan view and in cross section, a second exemplary embodiment according to the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

[0020] FIG. 1 shows the cross section through a seat cushion 1 of a vehicle seat. The construction shown in FIG. 1 can be used equally for the backrest of a vehicle seat of this type.
The seat cushion 1 includes an upper seat surface 2 which is covered by a seat cover 3. A perforated foam insert 4, if appropriate with integrated seat heating, is located below the seat cover 3.

A foam pad 5 is provided opposite the foam insert 4, the foam pads being supported on a spring core or on a sheet-metal shell 6 of the vehicle seat.

A ventilation layer 7 which is constructed from a coarse spacer knit 8, for example rubberized hair, is provided between the upper foam insert 4 and the lower foam pad 5.

A radial fan 9 is embedded at the front end of the ventilation layer 7.

The radial fan 9 sucks up ventilation air via an air suction opening 10 and conducts the air through the ventilation layer 7 until the air can leave the ventilation layer 7 again via an air outlet opening 11, as reproduced by the flow arrows by way of example.

FIG. 2 shows, by way of example, a second exemplary embodiment of the invention.

Two radial fans 9 are arranged parallel to each other at the front end of the ventilation layer 7. As can be seen by way of example with reference to the flow arrows, the radial fans 9 blow the ventilation air through the ventilation layer 7 in a parallel and virtually laminar manner. This brings about a substantially more effective removal of the temperature and moisture, with air swirling being substantially reduced by the air being blown out only in one direction. In a corresponding manner, the ventilation layer 7 in this embodiment has two air outlet openings 11.

The foregoing disclosure has been set forth merely to illustrate the invention and is not intended to be limiting. Since modifications of the disclosed embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the invention should be construed to include everything within the scope of the appended claims and equivalents thereof.

1. A vehicle seat with a cushion which is integrated in at least one of a seat part and a backrest of the vehicle seat and has an air-guiding ventilation layer in which a fan device for blowing air into the ventilation layer is integrated, wherein the fan device comprises at least one radial fan which is arranged at a front end of the ventilation layer.

2. The vehicle seat as claimed in claim 1, wherein: the ventilation layer has at least one air outlet opening; and an air suction opening for the radial fan is provided in a side of the cushion having the air outlet opening.

3. The vehicle seat as claimed in claim 5, wherein: the ventilation layer has at least one air outlet opening; and an air suction opening for the radial fan is provided in a side of the cushion lying opposite the side which has the air outlet opening.

4. The vehicle seat as claimed in claim 5, wherein the height of the radial fan is smaller than the height of the ventilation layer.

5. The vehicle seat as claimed in claim 6, wherein the height of the radial fan is smaller than the height of the ventilation layer.

6. The vehicle seat as claimed in claim 5, wherein: the ventilation layer has at least one air outlet opening; and an air suction opening for the radial fan is provided in a side of the cushion having the air outlet opening.

7. The vehicle seat as claimed in claim 5, wherein: the ventilation layer has at least one air outlet opening; and an air suction opening for the radial fan is provided in a side of the cushion lying opposite the side which has the air outlet opening.

8. The vehicle seat as claimed in claim 5, wherein the height of the radial fan is smaller than the height of the ventilation layer.

9. The vehicle seat as claimed in claim 6, wherein the height of the radial fan is smaller than the height of the ventilation layer.

10. The vehicle seat as claimed in claim 7, wherein the height of the radial fan is smaller than the height of the ventilation layer.

11. A vehicle seat comprising: a cushion integrated in at least one of a seat part and a backrest part of the vehicle seat, said cushion including an air-guiding ventilation layer; a fan device for blowing air into the air-guiding ventilation layer, said fan device being integrated into the air-guiding ventilation layer; wherein the fan device includes at least one radial fan arranged at a front end of the air-guiding ventilation layer.

12. The vehicle seat as claimed in claim 11, wherein: the ventilation layer has at least one air outlet opening; and an air suction opening for the radial fan is provided in a side of the cushion lying opposite the side which has the air outlet opening.

13. The vehicle seat as claimed in claim 11, wherein: the ventilation layer has at least one air outlet opening; and an air suction opening for the radial fan is provided in a side of the cushion having the air outlet opening.

14. The vehicle seat as claimed in claim 11, wherein the height of the radial fan is smaller than the height of the ventilation layer.

15. The vehicle seat as claimed in claim 12, wherein the height of the radial fan is smaller than the height of the ventilation layer.

16. The vehicle seat as claimed in claim 13, wherein the height of the radial fan is smaller than the height of the ventilation layer.

* * * * *