In a vehicle seat air conditioning system, when air blows, discomfort in seating caused by the presence of an air-blowing unit is reduced and a depression is nearly avoided in the surface cover material. The system utilizes a surface cover material, a cushion member positioned on a backsides of the surface cover material, an air-blowing hole penetrating through the thickness of said cushion member, an air-blowing unit positioned on a backsides of said cushion member to supply air to said air-blowing hole, and a support portion, which is integral with the cushion member and that supports the surface cover material, provided in a position of said air-blowing hole. The size of an air-blowing hole proximate to the support portion is smaller than the size of an air-blowing hole proximate said air-blowing unit.
FIG. 3A

FIG. 3B

FIG. 4

AIR QUANTITY (m³/h)

EXAMPLE X (NARROWED HOLE)
EXAMPLE Y (EMBODIMENT OF FIG. 3)
EXAMPLE Z (THROUGH HOLE)
VEHICLE SEAT AIR CONDITIONING SYSTEM

CROSS REFERENCE TO RELATED APPLICATION


BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to an air conditioning system located within a vehicle seat. Furthermore, the invention is applicable to an air conditioning system with a dynamic pressure type air blower.

[0004] 2. Description of the Related Art

[0005] Various kinds of conventional vehicle seat air conditioning systems have been suggested. One such air conditioning system has an air-blowing hole through which conditioned air is made to flow through the bottom seat cushion, that is, through the thickness of the cushion member, and an air-blowing unit is integrally attached with a cover member being inserted to the air-blowing hole from the passenger side of the cushion.

[0006] There is a plurality of small holes in the center of the cover member. When the air-blowing unit is driven to rotate, air is made to flow into the air-blowing hole in the cushion member, passed through the small holes in the cover member and an air passageway in the seat, and blown out from a blowing opening formed at the surface of the cover material (for example, see Japanese Patent Laid-Open Publication No. 2001-190358).

[0007] According to the disclosure of the document, the air-blowing unit is supported elastically at the seat. However, the air-blowing unit is provided in the seat such that the cover member, which is a part of the air-blowing unit, is directly in abutment against the back side of the surface cover material against which a passenger’s back rests. Here, the cover member provided to integrally attach and support the air-blowing fan must be formed as a rigid member. Consequently, the passenger may be aware of the presence of the cover member and feel uncomfortable while seated.

SUMMARY OF THE INVENTION

[0008] Embodiments of the present invention are directed to the above disadvantage and it is therefore an object of the embodiments to reduce the discomfort of the seated passenger by the presence of the air-blowing unit in the vehicle seat.

[0009] In order to achieve the above described object, a vehicle seat air conditioning system according to a first aspect of the present invention includes a surface cover material (16) forming a surface against which a passenger rests, a cushion member (30) positioned on the back side of the surface cover material (16) to provide a cushioning function for the passenger, an air-blowing hole (31) that penetrates through the cushion member (30) in the thickness direction, and an air-blowing unit (14) positioned on the back side of the cushion member (30) to supply air to the air-blowing hole (31). In a position of the air-blowing hole (31) on the side of the surface cover material (16), a support portion (31b) that supports the surface cover material (16) is provided, the size of the air-blowing hole on the side of the support portion (31b) is smaller than the size of the air-blowing hole (31) on the side of the air-blowing unit, and the support portion (31b) is formed integrally with the cushion member (30).

[0010] In this way, in the air-blowing hole (31), the support portion (31b) is integrally formed with the cushion member (30), and therefore a cushioning function is provided for the passenger. Furthermore, a rigid cover member is not provided at the end of the air-blowing hole (31) on the side of the surface cover material (16). Therefore, a passenger can be comfortably seated without being aware of the presence of the cover member.

[0011] Furthermore, in an attempt to solve the disadvantage associated with the conventional device, the inventors examined an example provided with a through hole having a cross-sectional area approximately equal to that of the air-blowing fan (21) in the air blowing casing (20) according to the first embodiment over the entire axial length of the cushion member (30) instead of using the support portion (31b). A dent was made in the surface cover material (16), which was and is not preferable in terms of design.

[0012] According to the first aspect of the invention, however, the support portion (31b) to support the surface cover material (16) is provided in a location of the air-blowing hole (31) on the side of the surface cover material (16). Therefore, such an undesirable dent in terms of design is not made in the surface cover material (16) if the air-blowing hole (31) is of a large size.

[0013] According to a second aspect of the present invention, in the vehicle seat air conditioning system according to the first aspect, in a position of the air-blowing hole (31) on the side of the surface cover material (16), a plurality of hole portions (31a) are defined by the support portion (31b), and the cross-sectional area of each of the hole portions (31a) is smaller than the cross-sectional area of the air-blowing hole (31) on the side of the air-blowing unit. In this way, the plurality of hole portions (31a) may be provided and the dent as described above can effectively be prevented from being made.

[0014] According to a third aspect of the present invention, in the vehicle seat air conditioning system according to the first aspect, only a single hole portion (31a) is defined by the support portion (31b) in a position of the air-blowing hole (31) on the side of the surface cover material (16). The cross-sectional area of the single hole portion (31a) is smaller than the cross-sectional area of the air-blowing hole (31) on the side of the air-blowing unit. In this way, only the single hole portion (31a) may be formed and the above-described dent can effectively be prevented from being made.

[0015] According to a fourth aspect of the present invention, in the vehicle seat air conditioning system according to the second aspect, the entire outer periphery of the plurality of hole portions (31a) is larger than the outer periphery of the air-blowing hole (31) on the side of the air-blowing unit, and the plurality of hole portions (31a) are provided to expand outwardly. In this way, the hole portions (31a) are provided to expand more outwardly than the outer periphery
of the air-blowing hole (31), and therefore the total opening area of the hole portions (31a) can be increased. ConsequentLy, if the cross-sectional area of the air distribution groove (33) is reduced, the communication portion between the hole portions (31a) and the air distribution groove (33) is increased, so that air flow resistance by the air-blowing unit (14) can be reduced.

[0016] According to a fifth aspect of the present invention, in the vehicle seat air conditioning system according to any one of the first to fourth aspects, the thickness (12) of the support portion (31b) in the airflow direction is 10% to 70% of the thickness (M) of the cushion member (30). The inventors have confirmed that when the size (12) of the support portion (31b) in the airflow direction is 80% or more of the thickness (M) of the cushion member (30), the support portion (31b) interferes with the air-blowing unit (14) as a passenger is seated. It has also been confirmed that when the percentage is not more than 10%, the support portion (31b) does not interfere with the air-blowing unit (14) but the support portion (31b) has reduced strength.

[0017] In this way, according to the fifth aspect, when the size (N2) of the support portion (31b) in the airflow direction is 10% to 70% of the thickness (M) of the cushion member (30), the strength of the support (31b) portion can be maintained while the support portion (31b) can be prevented from interfering with the air-blowing unit (14). According to a sixth aspect of the present invention, in the vehicle seat air conditioning system according to any one of the first to fifth aspects, the cross-sectional area of the air-blowing hole (31) on the side of the air-blowing unit (14) is approximately equal to or larger than the blade size (12) of the air-blowing fan (21) that supplies air in the air-blowing unit (14).

[0018] In this way, the cross-sectional area of the air-blowing hole (31) on the side of the air-blowing unit (14) is approximately equal to or larger than the blade size of the air-blowing fan. Therefore, the airflow resistance by the air-blowing unit (14) can be reduced.

[0019] According to a seventh aspect of the present invention, in the vehicle seat air conditioning system according to any one of the first to sixth aspects, an electric heater (18) is provided on the back side of the surface cover material (16). In this way, the surface cover material (16) can be warmed in winter, and warm air heated by the electric heater (18) may be discharged from the surface cover material. This provides comfortable and effective heating through the seat.

[0020] According to an eighth aspect of the present invention, in the vehicle seat air conditioning system according to any one of the first to seventh aspects, a protrusion (30b) that protrudes toward the air-blowing unit (14) from the opening of the air-blowing hole (31) for the entire circumference is provided on the back side of the cushion member (30), and an air outlet portion (15) to let out air supplied from the air-blowing unit (14) is fitted to the protrusion (30b). In this way, the air-blowing unit (14) is fitted to the protrusion (30b), and therefore air supplied by the air-blowing unit (14) can be prevented from leaking. In a ninth aspect of the present invention, said surface cover material (16) is provided at a surface of a seat backrest portion that supports a back of the passenger, and said backrest portion includes said cushion member placed on the back side of said surface cover material (16).

[0021] The parenthesized numerals accompanying the foregoing individual means correspond with those of the detailed description. Further areas of applicability of the present invention will become apparent from the detailed description provided hereinafter. It should be understood that the detailed description and specific examples, while indicating the preferred embodiment of the invention, are intended for purposes of illustration only and are not intended to limit the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The present invention will become more fully understood from the detailed description and the accompanying drawings, wherein:

[0023] FIG. 1 is a perspective view generally showing how an air-blowing unit according to a first embodiment of the invention is mounted in a vehicle seat;

[0024] FIG. 2 is an enlarged cross-sectional view showing how the air-blowing unit is mounted in a seat backrest portion according to the first embodiment;

[0025] FIG. 3A is a cross-sectional view of an air-blowing hole taken in the axial direction according to the first embodiment;

[0026] FIG. 3B is a view taken in the direction of arrow IIIB in FIG. 3A;

[0027] FIG. 4 shows the airflow rate of the air-blowing holes;

[0028] FIG. 5 is a cross-sectional view showing how an air-blowing unit is mounted in a seat backrest portion according to a second embodiment;

[0029] FIG. 6 is a view of a hole portion and a distribution groove according to a third embodiment;

[0030] FIG. 7A is a cross-sectional view of an air-blowing hole taken in the axial direction according to a fourth embodiment;

[0031] FIG. 7B is a view as seen in the direction of arrows VIIIIB in FIG. 7A;

[0032] FIG. 8A is a cross-sectional view of an air-blowing hole taken in the axial direction according to a fifth embodiment;

[0033] FIG. 8B is a view as seen in the direction of arrows VIIIIB in FIG. 8A;

[0034] FIG. 9A is a cross-sectional view of an air-blowing hole taken in the axial direction according to a sixth embodiment;

[0035] FIG. 9B is a view as seen in the direction of arrows IXB in FIG. 9A;

[0036] FIG. 10A is a cross-sectional view of an air-blowing hole taken along line XA-XA in FIG. 10B according to a seventh embodiment;

[0037] FIG. 10B is a view as seen in the direction of arrows XB in FIG. 10A;

[0038] FIG. 11A is a cross-sectional view of an air-blowing hole taken in the axial direction according to an eighth embodiment;

[0039] FIG. 11B is a view as seen in the direction of arrows XIIIB in FIG. 11A;
[0040] FIG. 12A is a cross-sectional view of an air-blowing hole taken in the axial direction according to a ninth embodiment; and

[0041] FIG. 12B is a view as seen in the direction of arrows XII in FIG. 12A.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0042] The following description of the preferred embodiments is merely exemplary in nature and is in no way intended to limit the invention, its application, or uses.

FIRST EMBODIMENT

[0043] A vehicle seat air conditioning system according to a first embodiment of the invention is applied to a seat backrest portion 12. FIG. 1 shows the general structure of a vehicle seat 10 according to the first embodiment, more specifically, a bucket seat for a driver or a passenger in the front of a vehicle.

[0044] The vehicle seat 10 includes a seat cushion portion 11 to support the buttocks of a passenger, and a seat backrest portion 12 that supports the back of the passenger. The seat cushion portion 11 and the seat backrest portion 12 store first and second air-blowing units 13 and 14, respectively.

[0045] The second air-blowing unit 14 has an air inlet (not shown) in a lower side position of the seat backrest portion 12 and draws air from inside the compartment through the air inlet. Then, air (conditioned air) is made to flow through an air passageway 15 inside the seat backrest portion 12 and discharged from air-blowing openings 17, which are made of a plurality of small holes provided in the surface cover material 16 of the seat backrest portion 12, in the direction of the arrows toward the body of the passenger.

[0046] In the seat backrest portion 12, an electric heater 18 is provided on the back side of the surface cover material 16. The electric heater 18 is made up of a wire-shaped electric resistor provided in a zigzag manner in a wide area of the seat backrest portion 12 against which the passenger rests.

[0047] Note that the first air-blowing unit 13 can function in the same manner as the above. An interior air conditioning unit 19 is provided, for example, inside the instrument panel (not shown) in the front part of the compartment. Conditioned air blown from the interior air conditioning unit 19 air conditions the inside of the compartment. Therefore, the first and second air-blowing units 13 and 14 can blow conditioned air inside the compartment.

[0048] Now, how the second air-blowing unit 14 is provided in the seat backrest portion 12 will be described in conjunction with FIG. 2. As shown in FIG. 2, the second air-blowing unit 14 is in communication with the air passageway 15 in the seat backrest portion 12.

[0049] The second air-blowing unit 14 has a frame-shaped, air-blowing casing 20 whose outer shape is rectangular. The air-blowing casing 20 is provided with an axial flow type, air-blowing fan 21. The air-blowing fan 21 is rotatably provided to supply air from the back side to the front side of the vehicle.

[0050] An attachment bracket member 23, to mount the second air-blowing unit 14 to a wire-shaped seat spring 22, has a rectangular frame member 25 that is larger than the rectangular frame member 24 of the air blowing casing 20. An inlet duct portion 26 leading into the seat is integrally formed with the frame member 25. The tip end of the inlet duct portion 26 on the vehicle front side is about half as high as the frame member 25, in the vertical direction of the vehicle, as shown in FIG. 2. Note that in FIG. 2, in the attachment bracket member 23, only the inlet duct portion 26 is shown in cross section. At the surfaces where the frame member 24 of the air blowing casing 20 and the frame member 25 of the attachment bracket member 23 face each other, flexible members 27, 28 are attached by an adhesive or the like.

[0051] When the second air-blowing unit 14 is mounted, the wire-shaped seat spring 22 is held between the flexible member 27 for the frame member 24 in the air blowing casing 20 and the flexible member 28 for the frame member 25 in the attachment bracket member 23. In this state, the air blowing casing 20 and the attachment bracket member 23 are joined together through bolts (not shown). In this way, the second air-blowing unit 14 is entirely supported by the wire-shaped seat spring 22 in a displacable manner in the front-rear direction of the vehicle. The flexible members 27, 28 both absorb the torsion of the seat spring 22 and serve to reduce the vibration of the second air-blowing unit 14 and to prevent air from leaking.

[0052] Now, the internal structure of the seat backrest portion 12 will briefly be described in conjunction with FIG. 2. A cover pad portion 29 and a cushion member 30 are placed upon each other on the back side of the surface cover material 16. The cover pad material 16 is typically made of leather or fabric (a generic term for any textile) according to the seat design. The cover pad portion 29 and the cushion member 30 are each made of an elastically extensible material. The cover pad portion 29 is, for example, made of an elastic resin member such as a closed cell type, polyurethane foam. The cushion member 30 having a thickness (for example about 40 mm) sufficiently larger than that of the cover pad portion 29 particularly provides the seat with a cushioning function. Meanwhile, the cushion member 30 is made of, for example, an elastic resin material such as an open cell type, polyurethane foam. The wire-shaped seat spring 22 of a steel spring material having a circular section is provided to extend in the width (horizontal) direction of the vehicle in a position more on the vehicle rear side (on the back side of the surface cover material 16) than the cushion member 30. In this way, the air blowing casing 20 can be supported elastically in the displacable manner.

[0053] The inlet duct portion 26 is formed integrally with the attachment bracket member 23. Now, how the inlet duct portion 26 and the air passageway 15 (FIG. 1) inside the seat backrest portion 12 communicate will be described in conjunction with FIG. 2. There is an air-blowing hole 31 penetrating through the cushion member 30 in the thickness direction. A seat member 32 to prevent air leakage from the air blowing casing 20 is provided between the back side end surface 30a of the cushion member 30 positioned on the rear side of the vehicle and the frame member 25. The inlet duct portion 26 is then inserted in the air-blowing hole 31.

[0054] The inlet duct portion 26 protrudes from the end surface of the frame member 25 of the attachment bracket member 23 toward the front side of the vehicle for a
prescribed size N (for example, about 10 mm to 15 mm). The thickness M of the cushion member 30 in the front-rear direction of the vehicle is, for example, about 40 mm, which is sufficiently larger than the size N of the part of the inlet duct portion 26 protruding toward the vehicle front side. Therefore, the feel of the seat backrest portion 12 against the back of a passenger is not worsened by the protrusion of the inlet duct portion 26.

[0055] An air distribution groove 33 in communication with the air-blowing hole 31 is formed at the front surface of the cushion member 30 with respect to the front of the vehicle. The air distribution groove 33 is provided to distribute conditioned air from the air-blowing hole 31 in a wide area of the seat backrest portion 12 against which the passenger rests. Therefore, as shown in FIG. 2, the air distribution groove 33 branches from the position of the air-blowing hole 31 to extend upwardly and downwardly, that is, in the vertical direction with respect to the vehicle.

[0056] The cover pad portion 29, which is positioned more toward the vehicle front side than the cushion member 30, has a number of communication holes 34 along the distribution groove 33 that are in communication with the air distribution groove 33. The surface cover material 16 positioned on the front side of the cover pad portion 29 has a number of small holes having a very small diameter (for example, about 0.8 mm to 1 mm), which form the blowing openings 17 in FIG. 1. Therefore, conditioned air in the air distribution groove 33 is passed through the communication holes 34 to reach the back side of the surface cover material 16, and then permitted to blow from the number of blowing openings 17 at the surface cover material 16 as if to wrap around a passenger’s body.

[0057] An electric heater 18 is provided between the surface cover material 16 and the cover pad portion 29, and therefore in winter, the electric heater 18 can be turned on to directly warm the surface cover material 16. In addition, conditioned air, upon reaching the backside of the surface cover material 16, can be heated by the electric heater 18, and the heated air (warm air) may be blown around the body of the passenger. As can be understood from the foregoing description, the air passageway 15 shown in FIG. 1 is formed by the air-blowing hole 31, the air distribution groove 33, and the communication holes 34.

[0058] Now, the shape of the air-blowing hole 31, an essential element of the invention, will be described. FIG. 3A is a cross-sectional view taken in the front-rear direction of the vehicle near the air-blowing hole 31 in the cushion member 30, and FIG. 3B is a view seen in the direction of arrow IIIB in FIG. 3A.

[0059] As shown in FIGS. 3A and 3B, the air-blowing hole 31 is formed to have an area approximately equal to the cross-sectional area of the air-blowing fan 21, calculated based upon the blade size. A support portion 31b to support the surface cover material 16 is provided in the vicinity of the air-blowing hole 31 on the side of the surface cover material 16. This is because a high power, dynamic pressure type, air blower necessary for making a passenger feel sufficient air flow from the vehicle seat must have a large fan blade size. A large air-blowing hole 31 must be provided in the cushion member 30 to mount such a blower in the vehicle seat, and the support portion 31b must be provided to prevent the surface cover material 16 from being dented. Note that the support portion 31b is integrally formed with the cushion member 30, and a plurality of holes, more specifically, three sector-shaped holes 31a, are defined by the support portion 31b.

[0060] Meanwhile, in FIG. 4, the ordinate indicates the air quantity (volume/hour) in the air blowing casing 20, and the abscissa indicates three examples of the air-blowing hole 31. In the example X, the inlet duct portion 26 of the air blowing casing 20 is narrowed with respect to the width of the vehicle, and the blowing hole 31 is narrowed in the width-wise direction of the vehicle, similar to the inlet duct portion 26. The example Y is based on an embodiment of the invention. In example Z, the hole is a through hole having a cross-sectional area approximately equal to the cross-sectional area of the blowing fan 21 calculated based on the blade size for the entire axial length.

[0061] The specific shape of example Y will be described. In FIGS. 3A and 3B, the outer diameter D1 is φ90 mm, and in the axial size of the air-blowing hole 31, the size L1 from the back side end surface 30a to the support portion 31b is 25 mm, the axial size L2 of the support portion 31b is 15 mm, and the width size L3 of the support portion 31b is 10 mm.

[0062] In this arrangement, for each of the air-blowing holes 31 having the shapes of the examples Y and Z, the air quantity in the air blowing casing 20 is large, while the air quantity for example X is small. When the air blowing casing 20 was visually inspected in its stationary state, there was no dent in examples X and Y, but a dent was found in example Z. Consequently, it has been found that, in the example according to an embodiment of the invention, a dent is not made when a passenger is seated, and the air quantity in the air blowing casing 20 is large.

[0063] Note that the inventors have confirmed from experiments and examination that when the size L2 of the support portion 31b in the air flow direction is 80% or more of the thickness M of the cushion member 30 in FIG. 2, the support portion 31b interferes with the air-blowing unit 14 as a passenger is seated. It has also been confirmed that when the percentage is not more than 10%, the support portion 31b does not interfere with the air-blowing unit 14 but has reduced strength.

[0064] Now, the above function and effects according to the first embodiment will be summarized.

[0065] (1) The use of the support portion 31b formed integrally with the cushion member 30 removes the necessity of a rigid cover member. Therefore, a passenger does not feel discomfort that would otherwise be caused in seating because of the presence of the cover member.

[0066] (2) The cross-sectional area of the air-blowing hole 31 is approximately equal to or larger than the blade size D2 of the air-blowing fan 21. Therefore, when air is blown by the second air-blowing unit 14, the airflow resistance can be reduced, which secures the air blowing performance.

[0067] (3) The cross-sectional area of each of the hole portions 31a is smaller than the cross-sectional area of the air blowing hole 31, and there are a number of such hole portions. Therefore, the strength of the support portion 31b can be maintained, while the airflow resistance can be restrained.
(4) The electric heater 18 is provided on the back side of the surface cover material 16, so that the surface cover material 16 can be warmed by the electric heater 18 in winter, and warm air heated by the electric heater 18 can be discharged from the surface cover material. This provides comfortable and effective heating through the seat.

SECOND EMBODIMENT

[0069] According to the first embodiment, the air blowing casing 20 and the attachment bracket member 23 at which the inlet duct portion 26 is provided are joined together with bolts (not shown). Then, the inlet duct portion 26 is inserted into the air-blowing hole 31. Meanwhile, according to a second embodiment, as shown in FIG. 5, in place of the attachment bracket member 23, an air outlet portion 35 provided with holes in the center for supplying air is used. On the backside of the cushion member 30, a protrusion 30b protruding toward the air-blowing unit 14 is provided over the entire circumference from the opening of the air-blowing hole 31. The air outlet portion 35 is fitted with the protrusion 30b. In this manner, the second air-blowing unit 14 is inserted as it is surrounded by the protrusion portion 30b, and therefore air blown from the second air-blowing unit 14 is kept from leaking through the air-blowing hole 31.

THIRD EMBODIMENT

[0070] As shown in FIG. 6, the hole portions 31a may be a plurality of triangular shapes. The hole portions 31a are in communication with the air distribution groove 33.

FOURTH EMBODIMENT

[0071] As shown in FIG. 7B, the hole portions in the cushion member 30 may be a plurality of circles when seen in the direction of arrows VIII B in FIG. 7A.

FIFTH EMBODIMENT

[0072] As shown in FIG. 8B, the hole portions in the cushion member 30 may be a plurality of rectangular shapes when seen in the direction of arrows VIII B in FIG. 8A.

SIXTH EMBODIMENT

[0073] As shown in FIG. 9B, the hole portions in the cushion member 30 may be provided to expand outwardly from the outer periphery of the air-blowing hole 31 when seen in the direction of arrows IX B in FIG. 9A.

[0074] In this way, the total opening area of the hole portions 31a may be increased. Consequently, even if the cross-sectional area of the air distribution groove 33 is reduced, the communication portion between the hole portions 31a and the air distribution groove 33 is increased, and therefore the air flow resistance by the air-blowing unit 14 can be reduced.

SEVENTH EMBODIMENT

[0075] As shown in FIG. 10B, the hole portions in the cushion member 30 may be a plurality of circular shapes when seen in the direction of arrows XB in FIG. 10A. As shown in FIG. 10B, the end surface 31c of the axial end surfaces of the support portion 31b on the side of the air blowing casing 20 may be formed into a round shape. This is because the air blowing speed is higher on the outer side than on the central side of the air-blowing hole 31 when the air-blowing fan 21 is driven to rotate.

EIGHTH EMBODIMENT

[0076] As shown in FIG. 11B, the hole portion in the cushion member 30 may have a circular shape when seen in the direction of arrows XIB in FIG. 11A.

NINTH EMBODIMENT

[0077] As shown in FIG. 12B, the hole portion in the cushion member 30 may have a shape formed by two sector shapes connected in the center and facing each other with their circular parts on the outer side when seen in the direction of arrows XIB in FIG. 12A.

OTHER EMBODIMENTS

[0078] According to the first embodiment, the cushion member 30 of the seat backrest portion 12 is provided with the air-blowing hole 31 and the support portion 31b to connect the air blowing casing 20. Meanwhile, the seat cushion portion 11 may be provided with the same structure.

[0079] The shape of the hole portion 31a is not limited to those described in conjunction with the third to eighth embodiments. A net type member that has a prescribed thickness through which air from the air blowing casing 20 passes may be provided between the cover pad portion 29 and the support portion 31b of the cushion member 30. In this way, the air distribution effect before and after the cover pad 29 increases, which can reduce the airflow resistance.

[0080] The description of the invention is merely exemplary in nature and, thus, variations that do not depart from the gist of the invention are intended to be within the scope of the invention. Such variations are not to be regarded as a departure from the spirit and scope of the invention.

What is claimed is:

1. A vehicle seat air conditioning system, comprising:
   a surface cover material forming a surface against which a passenger contacts;
   a cushion member positioned on a side of said surface cover material to function as cushioning for a passenger, wherein said cushion member defines an air-blowing hole penetrating through said cushion member in a cushion thickness direction; and
   an air-blowing unit positioned on a side of said cushion member to supply air to said air-blowing hole, wherein in a position of said air-blowing hole on a side of said surface cover material, a support portion that supports said surface cover material is provided,
   a size of the air-blowing hole on a side of the support portion is smaller than a size of the air-blowing hole on a side of said air-blowing unit, and
   said support portion is formed integrally with said cushion member.

2. The vehicle seat air conditioning system according to claim 1, wherein
   in a position of said air-blowing hole on the side of said surface cover material, a plurality of hole portions are defined by said support portion, and a cross-sectional...
area of each said hole portion is smaller than a cross-sectional area of the air-blowing hole on the side of said air-blowing unit.

3. The vehicle seat air conditioning system according to claim 1, wherein

only a single hole portion is defined by said support portion in a position of said air-blowing hole on the side of said surface cover material, and a cross-sectional area of said single hole portion is smaller than a cross-sectional area of the air-blowing hole on the side of said air-blowing unit.

4. The vehicle seat air conditioning system according to claim 2, wherein

an entire outer periphery of said plurality of hole portions is larger than an outer periphery of the air-blowing hole on the side of said air-blowing unit, and said plurality of hole portions are provided to expand outwardly.

5. The vehicle seat air conditioning system according to claim 1, wherein

a thickness size of said support portion in an air flow direction is 10% to 70% of a thickness size of said cushion member.

6. The vehicle seat air conditioning system according to claim 1, wherein

a cross-sectional area of the air-blowing hole on the side of said air-blowing unit is approximately equal to or larger than a blade size of the air-blowing fan that supplies air in said air-blowing unit.

7. The vehicle seat air conditioning system according to claim 1, wherein

an electric heater is provided on the back side of said surface cover material.

8. The vehicle seat air conditioning system according to claim 1, wherein

a protrusion protruding toward said air-blowing unit from the opening of the air-blowing hole for the entire circumference is provided on the back side of said cushion member, and

an air outlet portion to let out air supplied from said air-blowing unit is fitted to said protrusion.

9. The vehicle seat air conditioning system according to claim 1, wherein

said surface cover material is provided at a surface of a seat backrest portion that supports a back of the passenger, and

said backrest portion includes said cushion member placed on the back side of said surface cover material.

* * * * *