The present invention provides an apparatus for mounting a thermoelectric device in a thermo-regulatable vehicle seat incorporating a lumbar support device. The thermoelectric device is mounted to a seat back load support structure which is affixed to a rear portion of the seat back cushion by a mounting bracket such that the entire upper and lower end portion of the seat back cushion can move forward and backward with the lumbar support device in position.
STRUCTURE FOR MOUNTING THERMOELECTRIC DEVICE OF VENTILATION SEAT FOR VEHICLE

CROSS-REFERENCE TO RELATED APPLICATION


BACKGROUND OF THE INVENTION

[0002] (a) Field of the Invention
[0003] The present invention relates to a structure for mounting a thermoelectric device and a vehicle seat comprising same.
[0004] (b) Description of the Related Art
[0005] Ventilated vehicle seats can serve to improve seat climate comfort, such as upon entry into a parked vehicle under prolonged exposure to the sun or cold temperatures as well as during long drives.
[0006] Most conventional vehicle seats are adjustable in various modes, e.g. horizontal, vertical, and tilt. A typical vehicle seat includes a seat back, which has incorporated therein a seat back frame, a headrest at the upper portion of the seat back, and a device for adjusting the seat back.
[0007] To comfortably and stably support an occupant’s back and to lessen the oscillating movements to the seat back, conventional vehicle seats provide a damping device and a lumbar support device within the seat back. Others also provide a thermoelectric device which draws air from within the vehicle compartment using one or a plurality of blowers mounted in the lower portion of a vehicle seat cushion, heats or cools the air, and then blows the air out through the seat surface.
[0008] When a conventional lumbar support device is integrated into a heating/cooling ventilated seat of conventional design, the lumbar plate tends to push against the lower portion of the seat back cushion when the lumbar support device is operated, thereby resulting in forward protrusion in the lower portion of the seat back cushion. In operation, the thermoelectric device, which is mounted to the seat back cushion by a mounting bracket, moves together with the seat back cushion.
[0009] A seat back load support structure, which is typically installed within the seat back to support the load of the seat back cushion. The seat back load support structure of the prior art, which is typically installed on a wire lattice structure and mounted between the seat back cushion and the thermoelectric device, remains relatively fixed in position even as the lumbar support device, which adjusts the position of the seat back cushion, is moved. Consequently, the seat back load support structure hinders movement of the thermoelectric device and causes the lower portion of the seat back cushion to be pushed forward. As the thermoelectric device is hindered in movement by the seat back load support structure, the thermoelectric device in turn hinders movement of the seat back cushion, which is controlled by the lumbar support device. The upper portion of the seat back cushion forms a disjointed contour in the seat back, thereby causing discomfort to the seated occupant.

SUMMARY OF THE INVENTION

[0010] Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 shows an apparatus useful for mounting a thermoelectric device in a temperature-regulatable ventilated vehicle seat according to an exemplary embodiment of the invention.
[0012] FIG. 2 and FIG. 3 are depict the respective states before and after operation of a lumbar support in an apparatus for mounting a thermoelectric device in a ventilated vehicle seat according to an exemplary embodiment of the invention.
[0013] FIG. 4 shows the operational state of a seat back cushion when a lumbar support operates in an apparatus for mounting a thermoelectric device in a temperature-regulatable ventilated vehicle seat according to an exemplary embodiment of the invention.

<Description of Reference Numerals Indicating Primary Elements in the Drawings>

| 1: heating/cooling ventilation seat | 3: seat back | 5: seat back cushion | 7: seat back load support structure | 10: thermoelectric device | 11: air outlet |
| 12: mounting bracket | 20: lumbar support device | 21: lumbar plate | 30: blowers |
DETAILED DESCRIPTION OF THE EMBODIMENTS

[0018] An exemplary embodiment of the present invention will hereinafter be described in detail with reference to the accompanying drawings.

[0019] Referring to the exemplary embodiment in FIG. 1, a thermoelectric device 10 in a heating/cooling ventilated seat 1 is mounted to an insert formed behind a seat back cushion 5. In an exemplary embodiment of the invention, the thermoelectric device 10 is mounted to a seat back load support structure 7, a wire lattice structure disposed behind the seat back cushion 5, by a mounting bracket 12.

[0020] With the thermoelectric device 10 mounted to the seat back load support structure 7 which is disposed behind the seat back cushion 5 rather than directly to the seat back cushion 5, the entire upper and lower portion of the seat back cushion 5 can freely move forward and backward with the lumbar support device 20 in position. A more natural and comfortable contour of the seat back can thus be achieved to support the occupant of the vehicle.

[0021] When seat back cushion 5 freely moves forward with the lumbar support device 20 in operation, air outlet 11 of the thermoelectric device 10 has a tendency of disassociating from the seat back cushion 5, resulting in a leaking of heated or cooled air and lowering the efficiency of thermo-regulation. In exemplary embodiments of the invention, a bellows 30 is positioned between a surface of the seat back cushion 5 and the air outlet 11 to remedy this problem.

[0022] An exemplary design is illustrated in FIGS. 2 and 3, which depict the respective states of the seat back cushion 5 before and after the lumbar support device 20 is activated. FIG. 2 shows the state before the lumbar support device 20 operates, and in this state, the air outlet 11 of the thermoelectric device 10, which is mounted to the seat back load support structure 7, is positioned near the surface of the seat back cushion 5, and the bellows 30 is disposed in a folded state between the air outlet 11 and the surface of the seat back cushion 5.

[0023] FIG. 3 shows the state after activation of the lumbar support device 20. In this state, since the seat back cushion 5 protrudes forward so as to cover the body of an occupant, the air outlet 11 of the thermoelectric device 10 is relatively far apart from the surface of the seat back cushion 5, so that sides of the bellows 30 which is positioned between the air outlet 11 and the surface of the seat back cushion 5 are elastically extended in a linear direction, thereby compensating for the gap between the air outlet 11 and the surface of the seat back cushion 5.

[0024] As another illustration, in the case where the lumbar support device 20 is integrated into a heating/cooling vehicle ventilated seat 1, if a lumbar plate 21 pushes the seat back cushion 5 forward while the lumbar support device 20 is in operation, the gap between the seat back cushion 5 and the thermoelectric device 10 which is fixed to the seat back load support structure 7 within the seat back 3 would widen and the bellows 30 mounted therebetween become extended. In this manner, a better seal is achieved between the air outlet 11 and the seat back cushion 5, trapping in the heated or cooled air and raising the heating/cooling efficiency.

[0025] Those skilled in the art will appreciate that the conceptions and specific embodiments disclosed in the foregoing description may be readily utilized as a basis for modifying or designing other embodiments for carrying out the same purposes of the present invention. Those skilled in the art will also appreciate that such equivalent embodiments do not depart from the spirit and scope of the invention as set forth herein.

What is claimed is:

1. A apparatus for mounting a thermoelectric device in a heating/cooling ventilation vehicle seat comprising:
   a lumbar support device mounted inside a seat back; a thermoelectric device mounted to a seat back load support structure which is operably fixed to a rear portion of a seat back cushion by a mounting bracket such that an entire upper and lower end portion of the seat back cushion can move on a substantially horizontal axis.

2. The apparatus of claim 1, further comprising a bellows disposed between the seat back cushion and an air outlet of the thermoelectric device such that the seat back cushion and the air outlet are substantially connected to one another.

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