

- [54] **VEHICLE SEATS**
- [75] **Inventor: Sydney Desmond Fenton,**
Lancashire, England
- [73] **Assignee: Storey Brothers and Company**
Limited, Lancaster, England
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- [58] **Field of Search..... 5/347, 348, 351;**
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- [56] **References Cited**
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 3,506,308 4/1970 Fenton..... 297/453
 3,137,523 6/1964 Karner..... 297/453 X

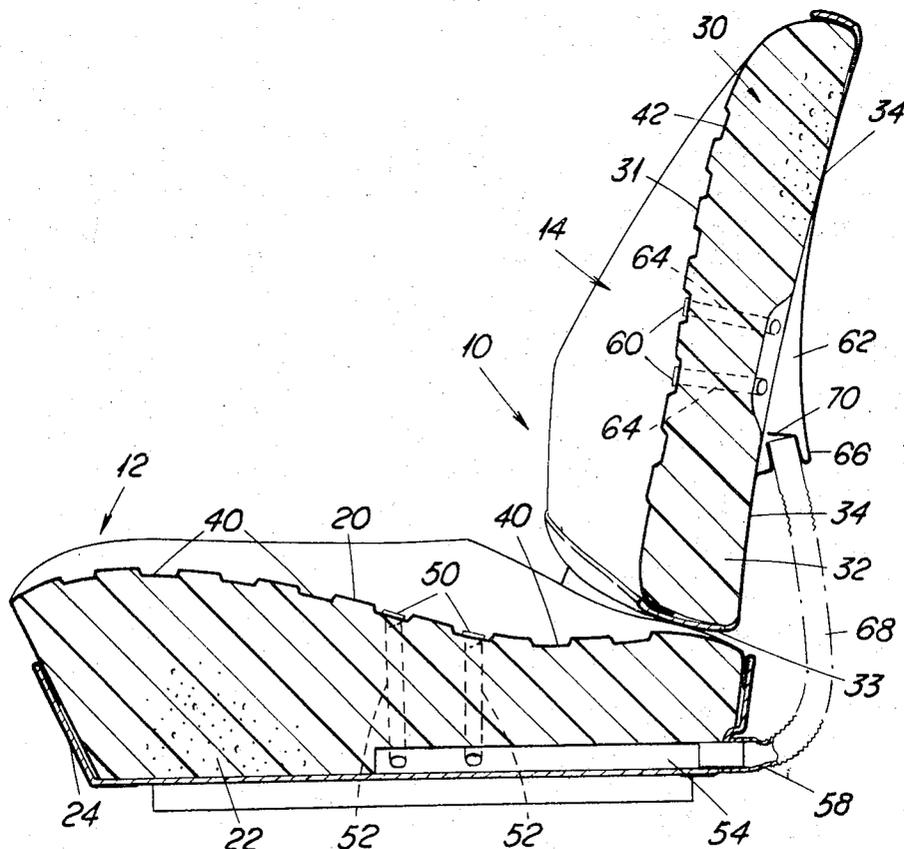
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Primary Examiner—Casmir A. Nunberg
Attorney—William D. Hall et al.

[57] **ABSTRACT**

When vehicle seats are covered with a synthetic plastics material there are problems in hot weather because they do not soak up perspiration as would natural leather. On long journeys or on hot days, therefore, passengers clothes in contact with such seat coverings tend to become wet with perspiration. This is mitigated according to the invention by using the seat cushion as a pump which expels air as it is depressed by the movements caused by the person sitting on the seat or vehicle movements and the expelled air is forced out through the front face of the back rest of the seat. Air is also sucked in through the top face of the seat cushion at times when the seat cushion becomes less depressed. In this way a flow of air is provided between the passenger and the seat which removes perspiration.

11 Claims, 3 Drawing Figures



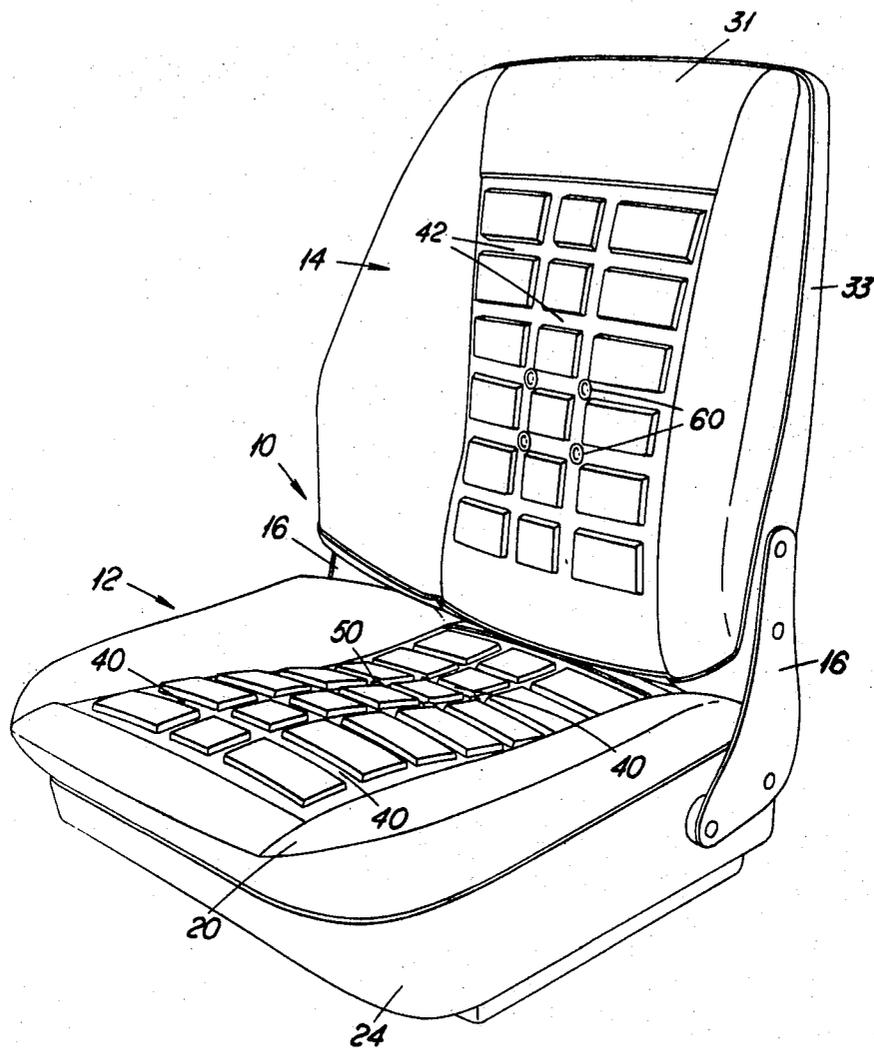


Fig. 1.

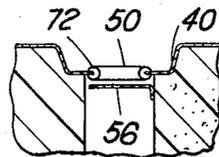
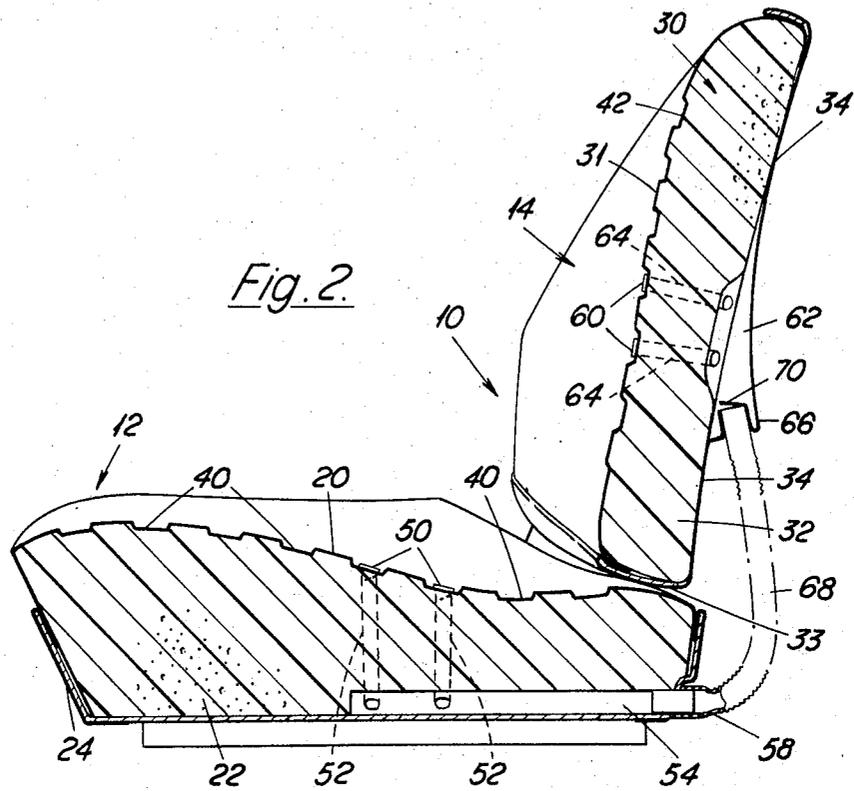


Fig. 3.

VEHICLE SEATS

This invention relates to vehicle seats, particularly car seats.

BACKGROUND OF THE INVENTION

Except on very expensive cars, the seat coverings are generally made from synthetic plastics sheeting or leathercloth. This leads to difficulty, particularly in hot weather, because these synthetic materials do not absorb and soak up perspiration like real leather seat coverings would do.

It is therefor, desirable to arrange for the removal of perspiration when the seat coverings are made of synthetic materials.

The seat covering itself can be given a deep embossment or channels may be provided in the shape of the seats. These expedients give a reasonable amount of ventilation over the surface of the seat covering in the regions in contact with the body of the person sitting on the seat. Even in temperate climates, however, these expedients are not sufficient to prevent areas of the clothes in contact with the seat from becoming wet and sticky on hot days or on long journeys.

In our U. S. Pat. No. 3,506,308 we have described a car seat which comprises a cover of synthetic plastics sheet material over a resilient filling carried on a rigid frame or base, the sheet material of the cover having small perforations therethrough at least some of which are in communication with pump means, the pump means comprising a plurality of bellows fitted within the filling, the outlets of the bellows being in communication with one or more perforations through the covers so that vibrations and similar movements occurring during motion of the vehicle and/or body movements of a person sitting on the seat cause changes in the volumes of the bellows thereby causing air to be pumped through the perforations in communication with the bellows. The pumping action caused by body movements and movements of the car substantially increases the amount of ventilation and so keeps the person sitting on the seat cooler and drier.

While these small bellows work excellently in the cushion of the seat they are not always as satisfactory when, incorporated in the back rest or squab of the seat because the back rest tends to be subjected to fewer and smaller compression movements than the seat cushion. Therefore, the clothes on the back of the person sitting on the seat still tend to become wet with perspiration, most of which occurs in the lumbar regions.

It is therefore an object of the invention to improve the comfort of seats covered with synthetic materials.

BRIEF DESCRIPTION OF THE INVENTION

According to the invention, therefore, there is provided a vehicle seat in which air is arranged to be displaced from the cushion or part or parts of it when the cushion is depressed, and the displaced air is arranged to be conveyed to and expelled from the surface of the back rest or squab of the seat, at least part of the air required to replace the displaced air being sucked in through the upper face of the seat cushion when this is subjected to decreases in depression.

In this way one can provide roughly equal ventilation of the back rest and seat cushion of the seat and so improve the comfort of the person sitting on the seat.

Although it is not essential, it is preferred to ensure that the air passes almost entirely from the seat cushion to the back rest and this pumping action can best be achieved by providing suitable valves to prevent substantial egress of air from the top surface of the seat cushion and substantial return of air from the back rest to the seat cushion.

The seat cushion can be provided with one or more individual bellows similar to those shown and described in our U.S. Pat. No. 3,506,308 which are arranged to suck air in through small holes in the upper surface of the cushion, suitable ducts being provided to transmit the air to be expelled at the back rest of the seat.

Preferably, however, the whole seat cushion acts as the pump or bellows member since then even very slight depression of the top surface of the seat cushion will then displace a comparatively large volume of air. For example, if the seat cushion has a surface area of 400 square inches, e.g., 20 inches by 20 inches, and its whole surface is depressed by as little as one-sixteenth inch, the volume of air displaced is 25 cubic inches.

The seat can be of any convenient construction. Preferably however, the cover for the seat cushion pad back rest have both been made by vacuum forming, for example, by the method described in our copending United Kingdom Pat. No. 1,232,381. Preferably, the covers formed in this way have then been filed with a foamable mixture, e.g. a polyurethane foam, which is foamed in situ so becoming bonded to the cover, the foam being of the open-celled type so that air can be displaced from the foam when the seat cushion is compressed.

Desirably a number of small holes, e.g. four, are provided in the upper surface of the seat cushion through which air can be sucked as the cushion becomes less depressed due to body movements or jolts caused by the motion of the car. These holes are desirably near the centre of the area in contact with the body of the person on the seat and coincide with a number of elongated depressions or recesses, preferably interconnected, in the shape of the upper surface of the seat cushion which provide a network of passages extending over the region of the cushion in contact with the person and along which air can pass to the holes when someone is sitting on the seat.

The back rest of the seat is also preferably provided with similar vent holes coinciding with elongated depressions or recesses so that the air expelled through these holes is spread over the area of the face of the back rest of the seat in contact with the person sitting on the seat.

BRIEF DESCRIPTION OF THE DRAWINGS

A car seat in accordance with the invention will now be described, by way of example, with reference to the accompanying drawings, in which :

FIG. 1 is a perspective view of the seat according to the invention;

FIG. 2 is an upright cross-section taken centrally of the seat; and

FIG. 3 is an enlarged sectional detail.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The car seat 10 shown in the drawings has a seat cushion 12 and a back rest or squab 14 joined to one another by metal plates 16.

The seat cushion 12 consists of a cover 20 of an embossed plasticized polyvinyl chloride in which has been foamed in situ an open-celled polyurethane foam 22. This seat cushion 12 has been made in the manner described in our United Kingdom Pat. No. 1,232,381. This cushion 12 sits in a metal frame 24.

The back rest or squab 14 comprises of a padded cushion 30 consisting of a cover 31 and padding foam 32 and is of similar construction to the seat cushion 12, a surrounding metal frame 33, and a rear sealing sheet 34 of embossed plasticized polyvinyl chloride welded to the shaped cover 31.

The top face of the cushion 12 has formed in it a number of channels 40 which are arranged in a criss-cross pattern. These channels 40 are formed in the area which will normally be in contact with a person sitting on the seat 10 so as to ensure excellent ventilation in that area between the person and the cover. Similarly, the front face of the cushion 30 has formed in its face similar channels 42, again formed in a criss-cross pattern in the area likely to be in contact with a person sitting on the seat 10.

Four holes 50 are provided through the cover 20 at the junction of transverse extending channels 40 and below these holes are passages 52 through the foam 22 leading to a common passage 54. Immediately below the holes 50, are hinged flaps 56 (FIG. 3) which act as non-return valves and so ensure that air only passes in through the holes 50. The common passage 54 leads to an outlet 58 from the seat cushion 12.

Similarly four holes 60 are provided through the cover 31 at the junction of transverse extending channels 42 and between these holes 60 and a common passage 62 are small passages 64. The common passage 62 has an inlet 66 and joining this inlet 66 and the outlet 50 from the seat cushion is a length of flexible tubing 68. To ensure the non-return of air from the back rest to the seat cushion 12, a hinged flap valve 70 is provided across the inlet 66.

Brass eyelets 72 define the holes 50 and 60 to prevent tearing of the covers 20 and 31.

As will be appreciated any body movement or jolting caused by the motion of the car when a person is sitting on the seat 10 will cause a varying depression of the seat cushion 12. This will cause changes in its volume.

As its volume decreases, air is expelled through the tubing 68 to the back rest 14, the flaps 56 substantially preventing expulsion of air through the holes 50. The air passing to the back rest 14 is expelled through the holes 60 and the passes along the passages formed between the back of the person and the channels 42. This air helps to cool the person and the seat and also removes perspiration so reducing or preventing the person's clothes from becoming wet and sticky.

As the volume of the seat cushion 12 again increases, air is sucked in through the holes 50, the flap valve 70 preventing the return of air from the back rest. The air sucked in through the holes 50 passes along the passages defined between the person on the seat and the channels 40, so helping to cool the person and the seat and also removing perspiration.

It is found that the flaps 56 and flap valve 70 are not always necessary.

The covers 20 and 31 are also preferably deeply embossed so improving the comfort of the seat.

As will be appreciated the seat according to the invention is simple and relatively cheap to construct. Ex-

cellent ventilation of the areas of the seat in contact with the person on the seat is achieved, however, so ensuring that the perspiration is removed. This makes the seats comfortable in hot weather and a long journeys, even though the covers 30 and 31 are not formed of leather.

A latitude of modification, change and substitution is intended in the foregoing disclosure and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

I claim:

1. A vehicle seat comprising:

- a. a resilient seat cushion having a top face on which a passenger sits,
- b. a resilient back rest having a front face arranged to support the back of a passenger sitting on said seat cushion,
- c. air inlet means through the said top face of said seat cushion,
- d. air outlet means from said seat cushion through which air is expelled when said top face is depressed,
- e. at least one air outlet means through said front face of said back rest,
- f. means for conducting air expelled from said air outlet means from said seat cushion to said air outlet through said front face of said back rest.

2. A vehicle seat according to claim 1 further comprising non return valve means to prevent substantial egress of air from said top face of said seat cushion and substantial return of air from said back rest to said seat cushion.

3. A vehicle seat according to claim 2 further comprising at least one bellows unit positioned within said seat cushion, each bellows unit having an air inlet in communication with a small hole through said top face of said seat cushion, and an air outlet in communication with said means for the passage of air to said back rest.

4. A vehicle seat according to claim 1 in which said seat cushion comprises a shaped cover of synthetic plastics material, a resilient fill of open-celled foam material, and a number of small holes in said top face of said seat cushion, whereby depression of said top face causes air to be expelled from said foam through said air outlet means.

5. A vehicle seat according to claim 4 further comprising passages through said foam leading from said small holes, a common passage to which said passages through said foam lead, flap valves immediately below said small holes to prevent expulsion of air through said holes, said common passage leading to said air outlet means from said seat cushion.

6. A vehicle according to claim 5 further comprising elongated depressions in said top face of said seat cushion, said small holes being in alignment with said elongated depressions.

7. A vehicle seat according to claim 5 in which said elongated depressions are interconnected.

8. A vehicle seat according to claim 6 further comprising elongated depressions in said front face of said seat cushion and small holes through said front face in alignment with said depressions, said small holes con-

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stituting said air outlets through said front face of said back rest.

9. A vehicle seat according to claim 8 in which said back rest comprises a shaped cover of synthetic plastics material, a resilient interior covered by said shaped cover, and passages through said resilient interior leading to said small holes through said front face of said back rest, a common passage leading from said air outlet means from said seat cover to said passages through said resilient interior.

10. A vehicle seat according to claim 9 further comprising a flap valve in said common passage to prevent substantial return of air from said back rest to said seat cushion.

11. A vehicle seat comprising:

- a. a resilient seat cushion having a top face on which a passenger sits,
- b. a shaped covering for said cushion made of synthetic plastics material,
- c. an open-celled resilient foam within said shaped covering,
- d. a number of small holes in said top face of said shaped covering,
- e. passages through said resilient foam leading from said small holes,

- f. flap valves positioned in said passages immediately below said small holes,
- g. a common passage to which said passages lead said common passage having an air outlet,
- h. a resilient back rest having a front face arranged to support the back of a passenger sitting on said seat cushion,
- i. a shaped covering for said back rest made of synthetic plastics material,
- j. a resilient filling within said shaped covering for said back rest,
- k. a number of holes through said shaped covering for said back rest,
- l. a number of passages through said resilient filling leading to said small holes,
- m. a common passage from which said number of passages lead, said common passages having an air inlet,
- n. a pipe joining said air inlet of said common passage and said air outlet from said common passage, and
- o. a flap valve arranged to allow flow through said pipe solely in the direction from said seat cushion to said back rest.

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