A ventilated seat-and-backrest structure comprises articulated seat and backrest structures, each comprising a frame, a mesh stretched across the frame to form a surface for supporting a sitter, two or more bow-shaped support members fixed at their ends to the frame and disposed away from the mesh and toward an existing seat with back on which the entire structure is placed, and a base plate secured to the support members and adapted to bear against the seat or its back and thereby to distribute thereover loads transmitted from the support members, the backrest structure being pivotally foldable over the seat structure.

10 Claims, 9 Drawing Figures
VENTILATED SEAT-AND-BACKREST STRUCTURE FOR PLACEMENT ON EXISTING SEAT

BACKGROUND OF THE INVENTION

This invention relates generally to meshed wickerwork or cradle structures and to chairs and seats. More particularly, the invention relates to a ventilated seat-and-backrest structure for detachably mounting on a conventional seat with back and for supporting one person (or more persons depending on the design) in spaced apart state relative to the conventional seat with back thereby to enable air to circulate between the person (or persons) and the seat with back and thereby to lessen discomfort due to atmospheric heat and humidity.

It is well known that, in a hot and humid atmosphere, a person in that atmosphere experiences minimum discomfort under the circumstances when circulating air is permitted to reach all parts of the outer surface of his body and experiences increasing discomfort as that surface is increasingly shielded from circulating air as when he sits on and leans back on a seat and seat back of air-imperious surface. For this reason, many chairs are made with open-frame backs and seats, and particularly chairs for use in hot climates are often of extremely open-framed design as in wicker chairs. In upholstery also, considerable thought is given to this problem, even for seats to be used in temperate climates.

Under certain circumstances, however, a seat and back must be used under different climate conditions. For example, an automobile is often used in extremely cold and extremely hot atmospheres. An automobile seat is ordinarily upholstered with a covering material which is imperious or almost fully imperious to air. While such a material is suitable and comfortable for use in cold weather, it is highly uncomfortable in hot weather unless an air-cooling device is installed in the vehicle.

For driving in hot weather, seat covers made of a relatively "cool" material such as woven red matting to be placed over a conventional seat and back have heretofore been used. These seat covers, while having certain advantageous features such as protection of the original, factory-upholstered cover and facility in cleaning, are not entirely satisfactory principally because circulating air cannot reach the parts of the passengers in contact with the seat and back since these seat covers are merely laid flat on the original seat cover without any appreciable space therebetwehen for free circulation of air.

As means for affording comfort in hot weather, particularly in automobiles, meshed wickerwork backrests which are placed in contact with the backs of car seats are known. A backrest of this type has a relatively rigid frame supporting a woven mesh structure, frequently of the outer part of rattan, tightly strung on the frame, which has short struts or skid-like parts for contacting and resting against the car seat back thereby for form a space between the mesh structure and the car seat back.

A backrest of this type is generally used without a like seat structure but, in some instances, it is used in conjunction with a like meshed structure placed on the car seat. Such backrests and meshed seat structures have not been fully satisfactory because of insufficient durability and the possibility of their damaging the original car seat and back because of concentration of loads thereon due to lack of means of distributing these loads. Such damage tends to be serious in the case of the seat structure, which receives greater loads than the backrest. The bouncing motions of a vehicle also aggravate this damage.

Another difficulty is that the backrest and seat structure are not joined together in many cases. In other instances they are joined but are not satisfactorily connected, whereby they tend to slip or be displaced independently of each other and to cause discomfort and unlenessiness particularly in a vehicle.

Principally for these reasons, only backrests of this type are frequently used without seats. Accordingly, this is but a half measure which does not alleviate the hot and stickly discomfort at the "seat of the pants" and the underside of the thighs.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a new and improved seat-and-backrest structure of the ventilated type referred to above which is not accompanied by the difficulties encountered heretofore.

More specifically, an object of the invention is to provide a seat-and-backrest structure of strong yet light construction wherein a backrest structure is detachably hinged to a seat structure, whereby the backrest structure can be pivotally folded over the seat.

Another object of the invention is to provide a structure of the above stated character in which the principal parts thereof can be readily disassembled by hand without tools for compact stowage thereof.

Still another object of the invention is to provide a structure of the above stated character in which the parts thereof to contact and bear against the existing seat and back are adapted to distribute loads over the seat and back thereby to prevent damage thereto.

According to this invention in a broad aspect thereof, briefly summarized, there is provided a ventilated seat-and-backrest structure comprising articulated seat and backrest structures, each comprising a frame, a mesh stretched across the frame to form a surface for supporting a sitter, two or more bow-shaped support members fixed at their ends to the frame and disposed away from the mesh and toward an existing seat with back on which the seat-and-backrest structure is placed, and base support means secured to the support members and adapted to bear against the seat or its back and thereby to distribute thereover loads transmitted from the support members, the backrest structure being hinged at its lower part to the rear part of the seat structure whereby it is pivotally foldable over the seat structure.

The nature, utility, and details of this invention will be more clearly apparent from the following detailed description with respect to preferred embodiments of the invention when read in conjunction with the accompanying drawings, throughout which like parts are designated by like reference numbers.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a perspective view, with parts cut away, showing one example of an articulated ventilated cradle structure according to this invention;
FIG. 2 is a right side elevation, in vertical section, showing two positions of the backrest of the structure shown in FIG. 1;

FIG. 3 is a section taken along the plane indicated by line III—III in FIG. 2 and viewed in the arrow direction;

FIG. 4 is an enlarged, fragmentary perspective view showing one example of the manner in which a base plate is detachably fixed to a transverse skid member;

FIG. 5 is a fragmentary, perspective view showing one example of the manner in which the backrest is hinged to the seat structure by a detachable articulated joint;

FIG. 6 is a perspective view, with parts cut away, showing another example of a base plate of a type which is fixedly and integrally secured to support members;

FIG. 7 is a perspective view, with parts out away, showing the seat structure of still another example of the invention;

FIG. 8 is a right side elevation, in vertical section, showing the seat structure shown in FIG. 7 assembled with a backrest; and

FIG. 9 is a fragmentary perspective view showing the manner in which the backrest of the structure shown in FIGS. 7 and 8 is hinged to the seat structure by a detachable articulated joint.

DETAILED DESCRIPTION

In the first example of the ventilated cradle structure of this invention as illustrated in FIGS. 1 through 5, the entire structure comprises, broadly divided, a seat structure 1 and a backrest structure 2.

The seat structure 1 comprises, essentially, a seat frame 3 of a substantially rectangular shape with rounded corners in plan view, a netting or mesh 4 woven from synthetic resin material and stretched fully across the seat frame 3 to form a seat surface for directly supporting a person seated thereon, a pair of transverse members 5 and 6 disposed below the frame 3 and mesh 4 parallelly and spaced apart relative to each other and fixed at their ends to the lateral side parts of the seat frame 3, and a substantially rectangular base plate 7 provided with perforations or openings 8 and secured by clip fasteners 9, 9a to the lower surfaces of the transverse members 5 and 6. All outer parts of the frame 3 and transverse members 5 and 6 are completely covered with a tape of synthetic resin wound helically therearound. The purposes of this covering are protection of the frame 3 and members 5 and 6, aesthetic external appearance, and protection of clothing, body parts, and other objects from chafing which would otherwise be caused by the bare metal.

The seat frame 3 is formed from a high-strength material such as a steel bar or tube, preferably of circular cross section. The transverse members 5 and 6 have a bowed shape with convex substantially straight-line sides directed downward and thereby resemble skids resting on the base plate 7. These transverse members 5 and 6 are also made of a high-strength material such as a steel bar or tube. While the cross section of each of these members 5 and 6 may be suitably selected, that in the illustrated example is substantially rectangular with rounded corners. The frame 3 is provided on its rear side part near the left and right ends thereof with short tubes 10a and 10 fixed thereto, for example, by welding and wound with the tape material used to cover the frame 3. These tubes 10a and 10 constitute gudgeons for hinging of the backrest structure 2 as described hereinafter.

The base plate 7 is made of a strong yet flexible material such as a strong flexible synthetic resin plate and is of sufficient size for good distribution of the load transmitted thereby to a conventional seat 25, on which the base plate 7 directly rests. The shape, dimensions, and number of the openings 8 may be suitably selected as long as the function of the base plate 7 of load distribution is not impaired. This base plate 7 is secured to the transverse members 5 and 6 by fasteners 9, 9a, which are similar to fasteners 19, 19a described hereinafter.

The backrest structure 2 is very similar in construction to the seat structure 1 and comprises a backrest frame 13 similar to the seat frame 3, a netting or mesh 14 similar to the mesh 4, vertical members 15 and 16 similar to the transverse members 5 and 6, and a back plate 17 similar to the base plate 7, this base plate 17 having openings 18 and secured by fasteners 19, 19a to the rear surfaces of the vertical members 15 and 16. This backrest structure is further provided with a transverse member 20 of bow shape fixed at its two ends to the frame 13 and secured to the base plate 17 by fasteners 21, 21a similar to the fasteners 9, 9a and 19, 19a, downwardly extended ends 11, 11a of the bottom side part of the frame 13, which ends are respectively provided with outwardly bent extremities 12, 12a constituting pinte pins for fitting into the above mentioned gudgeons 10, 10a, and a fasten able strap 22 with a fastening hook 23 for securing the backrest structure 2 to the conventional back 26 of the seat 25.

A feature of the cradle structure of this invention, particularly in the instant example thereof, is that the principal parts thereof are detachably assembled and can be readily disassembled and reassembled by hand without any tools. More particularly, the backrest structure 2 is detachably connected to the seat structure 1, and the base plates 7 and 17 are detachably secured respectively to the transverse members 5 and 6 and to the vertical members 15 and 16 and the transverse member 20.

For this purpose, the above mentioned extended ends 11, 11a of the backrest frame 13 in their normal free states are spaced apart by a distance such that they must be forced toward each other as indicated by arrows in FIG. 5 so that the extreme tips of their pinte pins 12 and 12a will clear the inner rims of the gudgeons 10 and 10a for insertion thereinto or extraction therefrom during assembly or disassembly.

The base plates 7 and 17 are detachably secured to the transverse members 5 and 6 and to the vertical members 15 and 16 and transverse member 20, respectively, by pairs of fasteners such as the pair 19 and 19a. While these fasteners may be separately fabricated fasteners which are secured to their respective base plates, those in this example are formed integrally with the base plates from flap-like parts cut out therefrom.

The fastener 19a and one side is of a trough-like shape comprising a web part projecting perpendicularly from the base plate 17 and a bent flange part projecting parallelly to the base plate from the outer end of the web part. The vertical member 16 more fits into the trough of this fastener 19a. On the other hand, the
other fastener 19 has a similar trough-like shape but has an additional flange bent back toward the base plate 17 from the outer end of the first flange, whereby there is formed a fastener which almost completely encompasses the vertical member 19 fitted therein except for a narrow slit.

The base plate 17 is secured onto the vertical members 15 and 16 by elastically bending the base plate until the fasteners 19 and 19a can be fitted and snapped thereon. The other pairs of fasteners 19, 19a and 9, 9a are similarly constructed and used.

Another feature of the ventilated cradle structure of this invention is the provision of hinged means such as the pintles 12 and 12a pivotally inserted in the gudgeons 10 and 10a, respectively. By this hinge means, the backrest structure 2 can be folded forward over the seat structure 1 into relatively compact form for temporary storage. This feature is almost a necessity in the case of a front seat of a two-door automobile of the coupe type wherein the seat back is folded forward to permit persons to enter and leave the rear compartment.

In another example of the ventilated cradle structure according to this invention, each of the base plates of the seat structure and the backrest structure is integrally fixed to its respective support members at the time of fabrication. This state of attachment of the base plate is illustrated in FIG. 6 with respect to the base plate 17a of the backrest structure. The base plate 17a in this arrangement may be fabricated from a hard synthetic resin.

In still another example of the ventilated cradle structure of this invention as illustrated in FIGS. 7, 8, and 9, a pallet member 37 made of a soft, elastic material such as a formed plastic is used instead of a base plate. This pallet member 37 is stretched between the front side part and the rear side part of the seat frame 33 and is not fixed to the transverse members 35 and 36. A fabric sheet 41 interposed between the transverse members 35 and 36 and the pallet member 37 is also stretched between the front and rear parts of the seat frame 33.

Another feature of this example is that the angle between the pintles 12 and 12a differs slightly from the angle between the gudgeons 10 and 10a as indicated in FIG. 9. Accordingly, the pintles 12 and 12a are twisted slightly into alignment with the gudgeons 10 and 10a when being inserted into the seat, whereby the extensions 11 and 11a are subjected continually to an elastic torsional strain, which produces a spring force urging the backrest structure to pivot rearward about the pintles 12 and 12a.

I claim:

1. A ventilated seat-and-backrest structure for placement on a seat with back, said structure comprising:
   a seat structure (1) which comprises
   a seat frame (3),
   a seat mesh (4) stretched across said seat frame to form a seating surface,
   a plurality of support members (5, 6) of bowed shape fixed at their ends to the seat frame and disposed below and spaced apart from said seat mesh, and
   a base support structure (7) secured to the lower surfaces of said support members and functioning, when placed on said seat, to distribute, over
   the seat, loads transmitted from the support members;
   a backrest structure (2) which comprises
   a backrest frame (13),
   a back mesh (14) stretched across said backrest frame to form a backresting surface, a plurality of back support members (15, 16, 20) of bowed shape fixed at their ends to the backrest frame and disposed to the rear of and spaced apart from said back mesh, and
   a back support structure (17) secured to the rear surfaces of said back support members and functioning, when placed against said back, to distribute, over the back, loads transmitted from the back support members; and
   hinge means (10, 12, 10a, 12a) detachably and pivotally connecting the lower part of the backrest structure to the rear part of the seat structure and thereby enabling the backrest structure to be pivotally folded over the seat structure, said seat-and-backrest structure functioning to support at least one person seated thereon in a ventilated state wherein atmospheric air can freely circulate to all parts of the person's body contacting said structure.

2. A ventilated seat-and-backrest structure as set forth in claim 1 in which said base support structure and said back support structure are secured to their respective support members by detachable fastening means such that said structures can be readily secured to and detached from said support members by hand without tools.

3. A ventilated seat-and-backrest structure as set forth in claim 1 in which said base and back support structures are fixedly and integrally secured to their respective support members at the time of fabrication thereof.

4. A ventilated seat-and-backrest structure as set forth in claim 1 in which said base and back support structures are respectively base plates having perforations and made of a relatively flexible material.

5. A ventilated seat-and-backrest structure as set forth in claim 1 in which said base support member is a pallet member (37) made of a soft, elastic material, preferably a foamed plastic material, and a fabric sheet (41) is interposed between the pallet member and the support members, the pallet member and the fabric sheet being stretched across the seat frame and being fixed at their edges to the front and rear parts of the seat frame.

6. A ventilated seat-and-backrest structure as set forth in claim 1 in which hinge means comprises gudgeons (10, 10a) fixed to the rear part of the seat frame at spaced apart positions and pintles (12, 12a) projecting substantially transversely from spaced part leg members (11, 11a) extending downward from and integrally fixed to the lower part of the backrest frame, said pintles being adapted to fit rotatably in respective gudgeons, said leg members being elastically deflected to enable the pintles to be thus fitted into the gudgeons, whereby the pintles are held in the resulting fitted state by the elastic spring force of the leg members.

7. A ventilated seat-and-backrest structure as set forth in claim 6 in which the pintles in free state are purposely misaligned relative to the gudgeons, whereby, when the pintles are coercively fitted into the gudgeons, a spring moment urging the backrest struc-
ture to pivot rearward and away from the seat structure is produced.

8. A ventilated seat-and-backrest structure as set forth in claim 1 in which the outer parts of the seat and backrest frames, the support members, and the back support members are covered with a smooth protective covering.

9. A ventilated seat-and-backrest structure as set forth in claim 1 in which the backrest structure is provided with means (22) for detachably securing the backrest structure to the back of the existing seat.

10. A ventilated seat-and-backrest structure as set forth in claim 1 which is adapted to support a plurality of sitters.

* * * * *

3,804,462