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J. H. HOPPER

3,566,409

VENTILATED BUMP HAT

Filed Nov. 8, 1966

FIG-6

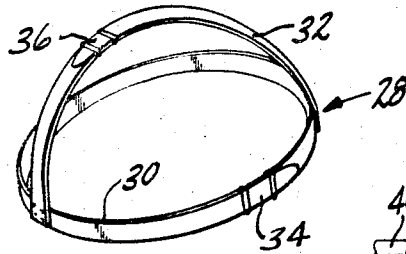


FIG-4

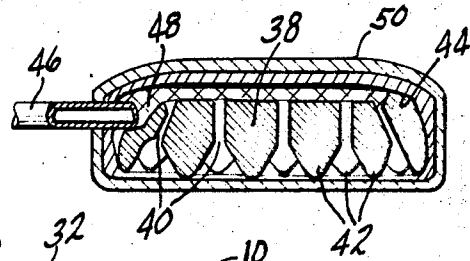
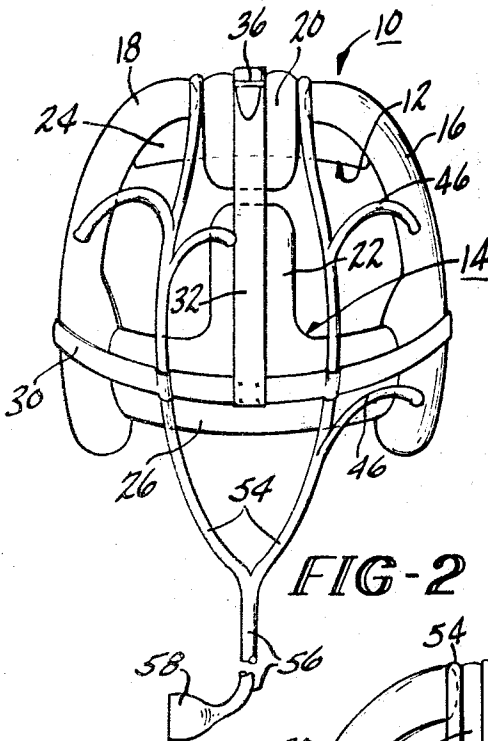


FIG-2

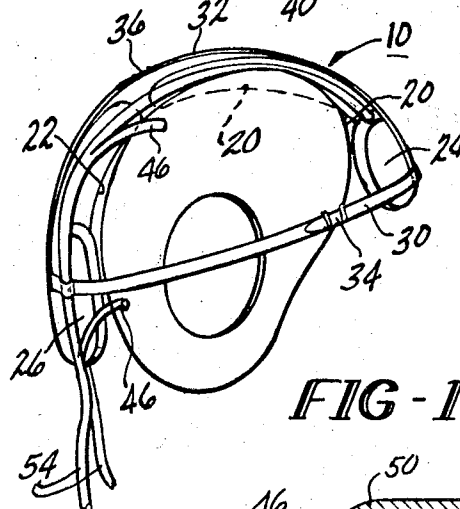


FIG-1

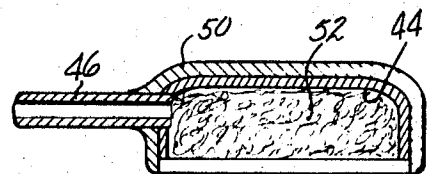


FIG-5

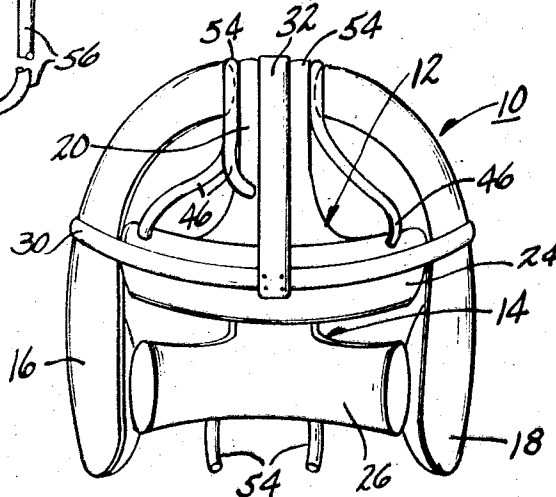


FIG-3

INVENTOR:
JAMES H. HOPPER
BY *Steward F. Steward*
his Attorney

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3,566,409

VENTILATED BUMP HAT

James H. Hopper, Hazardville, Conn., assignor to
United Aircraft Corporation, East Hartford, Conn.

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5 Claims

ABSTRACT OF THE DISCLOSURE

A protective headgear device to be worn over extended periods of time by persons, particularly occupants of moving vehicles, subject to head injuries caused by bumping against surrounding objects, compartment walls, etc., wherein the device is provided with forced air ventilation to decrease discomfort resulting from constant wear of the headgear.

The invention described herein was made in the performance of work under a NASA contract and is subject to the provision of Section 305 of the National Aeronautic and Space Act of 1958, Public Law 85-568 (72 Stat. 435; USC 2457).

This invention pertains to a protective device to be worn on the head by persons exposed to head injuries caused by bumping against surrounding objects. It is more particularly directed to a ventilated bump hat for protection against accidental contact of the head of the wearer with surrounding objects as the wearer moves about within a confined space, or because of sudden changes of direction or speed of a moving vehicle in which the wearer is an occupant.

The general object of the invention is the provision of a head protector of low weight and small size such that it may be worn for extended periods of time without tiring or irritating the wearer. It is a further object to provide a head protector which is not cumbersome and does not interfere with normal functions and maneuverability of the wearer. Since the hat is intended as a constant-wear garment, that is, one to be worn for protracted periods of time which may be on the order of hours or even days, it is an object of the invention to provide a device of the type indicated which affords good ventilation to the areas of the head enclosed by the bump hat, in order to increase the comfort of the wearer and reduce perspiration and resulting skin irritation. To this end, it is an object of the invention to provide a ventilated bump hat which may be connected to a source of ventilating air under pressure and which will then distribute the ventilating air to areas of the head covered by the hat. It is a still further object of the invention to provide a protective headgear device which will afford maximum protection to critical areas of the skull while leaving portions uncovered, whereby to reduce the weight of the hat and also to further increase the comfort of the wearer by permitting maximum free circulation of ambient air to as much of the surface of the head as possible. Accordingly it is an object of the invention to provide protective headgear which is discontinuous in its coverage of the head of the wearer yet adequately protects the head against injury due to bumping against surrounding objects.

The ventilated hat of this invention is particularly useful to occupants of moving vehicles, but finds use also in static applications, more particularly in industrial fields, for personnel exposed for substantial periods of time to hazards of head injury. Some of the more important applications of the hat are encountered by persons en-

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gaged in space flight or conventional aircraft operation or, for example, in military tank operation.

The bump hat of the invention is not a protective helmet in the usual sense of a device which totally encloses the head of the wearer, but may be worn in connection with such a totally enclosing helmet as a liner therefor if so desired. Rather, the hat is intended for protection of the wearer's head against accidental contact with a wall of a compartment in which he is located, or equipment mounted in such compartment, should the occupant fall or be caused suddenly to change position or move about as a result of change of speed or direction of the vehicle, or as the result of movement of the occupant about a crowded compartment in the performance of normal duties.

Various proposals for protective helmets or other headgear, both with and without provision for ventilation, have been made heretofore, but these have not been intended for wear over substantial periods of time on the order of hours or even days as is expressly here contemplated. Accordingly such earlier devices have failed to provide the comfort, low encumbrance and high protective characteristics desired in head gear for use in the type of situation hereinabove mentioned.

In brief, the bump hat of the present invention achieves the foregoing objectives by means of a construction comprising a plurality of soft, resilient pad members which overlie the important, critical areas of the human skull without completely enclosing the head of the wearer.

These pad members are interconnected to provide a totally flexible soft protective grid for placement on the head of the wearer, and wherein provision is incorporated for ducting ventilating air from a central source under pressure to the various pad members and directing that air toward the surface of the wearer's head, thereby minimizing contact of the pad members against the head of the wearer and providing flow of air from beneath the pad members at the surface of the wearer's head in order to reduce perspiration which contact of the pads with the head of the wearer normally produces.

The invention is illustrated more particularly by a specific embodiment disclosed in the accompanying drawings and described in detail hereinafter. In the drawings,

FIGS. 1, 2 and 3 are, respectively, views in side, rear and front elevation of a bump hat embodying the present invention;

FIGS. 4 and 5 are views in cross-section of alternative constructions of pad members used in forming the cushioning elements of the hat; and

FIG. 6 is a perspective view in side elevation of a web comprising a grid-forming means for interconnecting the several pad members and maintaining them in their respective positions relative to the head of the wearer.

The construction of the ventilated bump hat is generally apparent from FIGS. 1, 2 and 3 of the drawings. As there appears, the hat 10 comprises four pad members 12, 14, 16 and 18 corresponding roughly to the frontal, occipital, and right and left temporal areas of the human head.

Pad members 12 and 14 are roughly T-shape in planar projection, with the leg portions 20, 22, respectively, of pad members arranged end-to-end and extending in opposite directions over the crown of the hat. The cross-head portions 24, 26, respectively, of pad members 12, 14, are thus disposed circumferentially of the hat in the general regions of the frontal and occipital areas of the head.

The two side or temporal pad members 16, 18, are

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generally of oval shape in planar projection, forming large earflaps disposed intermediate the extremities of members 12 and 14. In addition to protecting the temporal areas of the head, pad members 16, 18, are curved centrally inwardly adjacent the upper edges thereof to cooperate with the leg members 20, 22 of members 12, 14, to protect the parietal areas of the head.

This arrangement still leaves substantial areas of the head uncovered but protected against injury arising from contact of the head accidentally against surrounding walls, equipment, etc., as previously mentioned. The remaining open areas between the protective pads thus do not expose the head of the wearer unnecessarily while affording free circulation of ambient air to such areas of the head. The comfort of the wearer is thus increased, and the weight of the protective headgear is minimized.

The several protective pad members 12, 14, 16 and 18 are retained in their respective portions by a soft, flexible web 28, as seen more particularly in FIG. 6, to which the pads are secured as by stitching or suitable adhesive to provide a grid-like construction. Web 28 comprises a circumferential headband 30 and a semi-circular crown strap 32 joined at its opposite ends to headband 30. Each of the web members 30, 32, is provided with adjusting means 34, 36, respectively, to shorten or lengthen the web members in order to secure a proper fit of the bump hat 10 on the wearer.

Alternative detailed constructions of the padding sections are illustrated in FIGS. 4 and 5 but both forms employ a relatively thick, soft spongy rubber or synthetic elastomeric material which comprises the main body portion of the pad.

With reference more particularly first of all to the construction shown in FIG. 4, the body 38 of the pad is formed of molded rubber or synthetic elastomeric material provided with preformed passageways 40 extending transversely through the body. At the surface of body 38 which is to be disposed adjacent the head of the wearer, a plurality of projections or fingers 42 are formed and the passageways 40 open onto that face intermediate these fingers. Body 38 of the pad is enclosed by an airtight envelope 44 on all of its surfaces except that to be disposed adjacent the head of the wearer and a flexible ventilating duct 46 passes through a wall of envelope 44 into a distribution chamber 48 overlying the back of body 38 and communicating with the several passageways 40. Distribution chamber 48 may take the form of a standard air distributing device of the type commercially available under the tradename "Trilock" manufactured by the U.S. Rubber Company. Finally, an outer casing 50 of some air pervious fabric material, preferably having a pile or nap such as fleece for greater comfort of the wearer, completely encloses the pad member.

In the alternative pad construction illustrated in FIG. 5, the body portion 52 is shown as being formed of a slow-recovery, open-cell foamed plastic material of a type commercially available under the tradename "Nopco Foam F-506," manufactured by Nopco Chemical Company, Newark, N.J. The body 52 of the pad is again enclosed in an airtight seal or envelope 44 which surrounds the body 52 except at the surface which is to be adjacent the wearer. Since the body 52 of the pad in this instance is of open-cell construction, ventilating duct 46 discharges directly into it and the air is distributed throughout the pad, flowing out through the multitude of passages provided by the open-cell construction at the exposed surface of the pad. Again an outer casing 50 is used to enclose the pad member, similar to that already discussed in connection with FIG. 4. A slight variation of construction is illustrated in FIG. 5 wherein the pad is not covered by the outer casing 50 at the undersurface; however the casing could obviously enclose that face of the pad as well, assuming the material of which the casing is formed is adequately pervious to air.

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Each of the pad members of the bump is supplied with ventilating air by ducts 46 leading from branch ducts 54 which in turn are branches of a main duct 56. Ducts 54, 56 constitute a manifold system for supplying ventilating air from a source (not shown) under positive pressure to which the wearer makes connection by suitable plug means 58 of known construction. Ducts 46, 54, 56 are preferably formed of light plastic tubing which is soft and flexible. The various duct members are secured to the pad members and to the integrating web 28 at appropriate points along their extent to keep them from becoming entangled with external objects or interfering with the wearer.

The bump hat may be worn with an outer helmet for complete coverage of the head where this is necessary, which usually is for intervals of relatively short time. The outer helmet, being cumbersome and confining and hence uncomfortable, may then be removed while still retaining for the wearer the protection against bumping of his head that may occur at any time during sustained periods of aircraft flight or space travel, for example.

Modifications of the specifically illustrated embodiment of the bump hat here described will immediately be apparent and it is to be understood of course that such modifications as come within the scope and equivalency range of the appended claims are intended to be covered hereby.

What is claimed is:

1. A ventilated bump hat for the protection of a person's head during extended periods of wear, said bump hat comprising

(a) a plurality of pad members formed to overlie portions of the frontal, parietal, occipital and temporal areas of the wearer's head;

(b) soft flexible joining means forming an interconnected grid of said pad members to retain them in their respective positions about the wearer's head;

(c) flexible ducts joined, respectively, at one end to said pad members and at the other to an air supply manifold to provide ventilating air passages from said manifold to each of said pad members;

each of said pad members comprising a body of soft but resilient material formed to provide air passages throughout its extent, and sealing means on said pad members enclosing all surfaces thereof except the surface to be disposed adjacent the wearer's head, whereby to prevent escape of air from the pad members except at such adjacent surface, said air ducts passing through said sealing means and making an air-tight seal therewith in each of the respective pad members.

2. A ventilated bump hat as defined in claim 1, wherein said pad members include two pads roughly T-shape in plan, disposed with the leg portions thereof end-to-end and extending away from each other over the crown of the hat, with the crosshead portions of said two pads extending circumferentially of the hat to overlie portions of the frontal, occipital and parietal areas of the wearer's head, and other pad members of roughly oval shape at opposite sides of the hat intermediate said T-shape pad members to overlie portions of the temporal and parietal areas of the wearer's head.

3. A ventilated bump hat as defined in claim 1, wherein said pad members are formed of open-cell resilient material, and said flexible joining means interconnecting said members is a webbing extending circumferentially of and over the crown of said hat, to which webbing said pad members are secured.

4. A ventilated bump hat as defined in claim 1, wherein said pad members are formed of soft, spongy material having open passageways preformed therein leading from the terminus of the respective air ducts and opening onto the surface of the pad facing the wearer's head.

5. The combination as defined in claim 4, wherein said pads are formed to provide a multi-fingered surface adjacent the wearer's head, and said preformed passage-

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ways open onto said surface intermediate the fingers thereof.

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JAMES R. BOLER, Primary Examiner

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