

[54] **HOCKEY HELMET**

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[22] Filed: **Feb. 5, 1973**

[21] Appl. No.: **329,320**

Related U.S. Application Data

[63] Continuation of Ser. No. 216,633, Jan. 10, 1972,
abandoned.

[52] U.S. Cl. 2/3 R

[51] Int. Cl. A42b 3/00

[58] Field of Search 2/3 R, 3 A, 3 B,
2/3 C, 6

[56]

References Cited

UNITED STATES PATENTS

2,634,415	4/1953	Turner et al.	2/3 R
3,087,166	4/1963	Howard	2/3 R
3,237,202	3/1966	Aileo	2/6
3,273,162	9/1966	Andrews	2/3 R
3,274,612	9/1966	Merriam	2/3 R
3,629,864	12/1971	Latina	2/3 A

2,081,335 5/1937 Levinson 2/3 R

FOREIGN PATENTS OR APPLICATIONS

730,337 3/1966 Canada 2/3 R

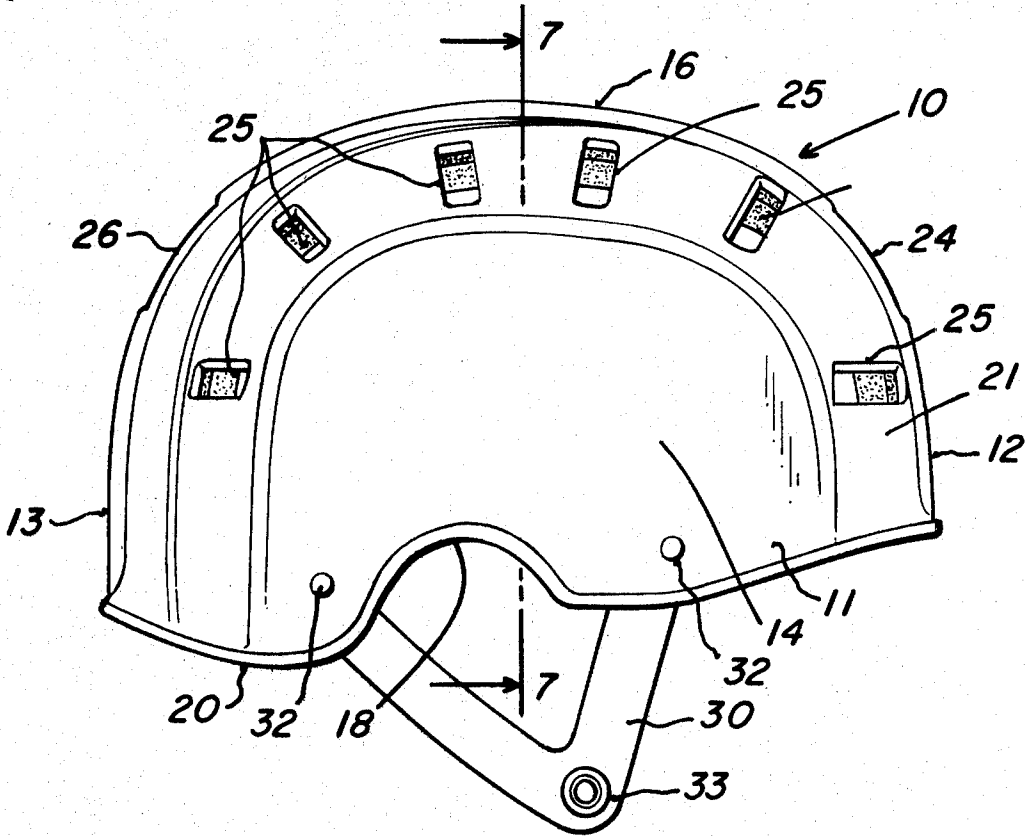
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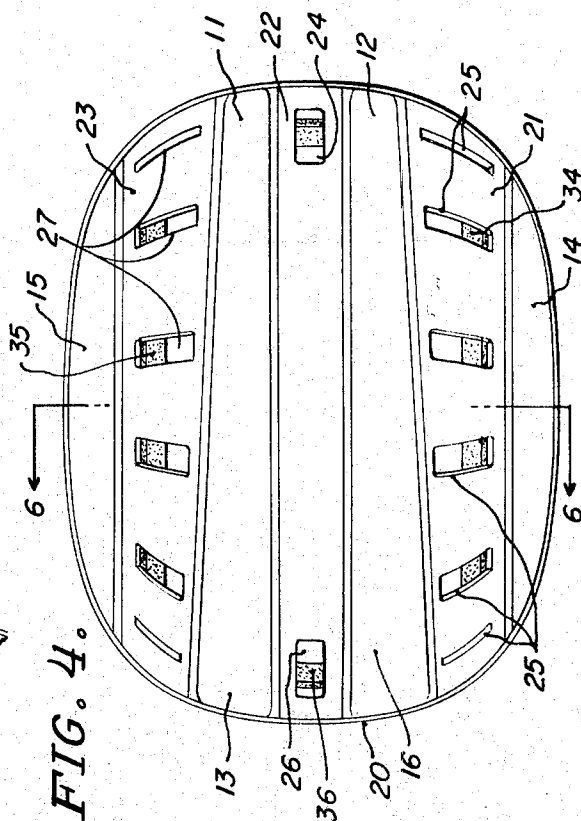
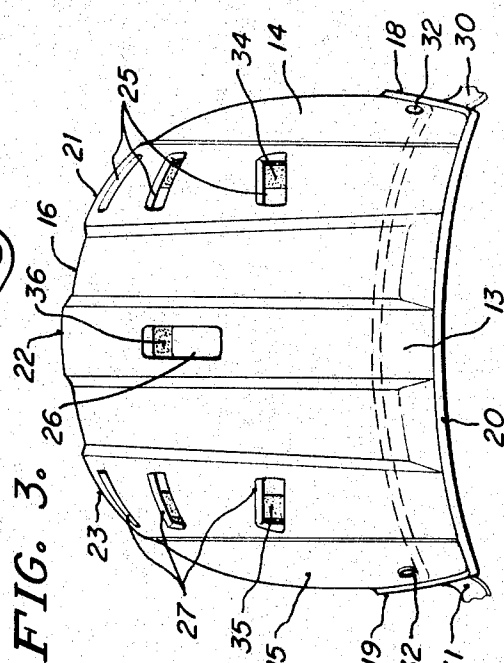
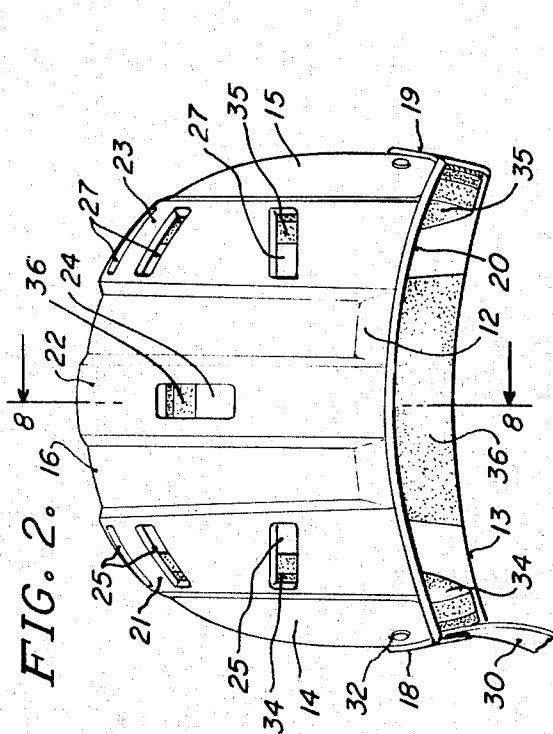
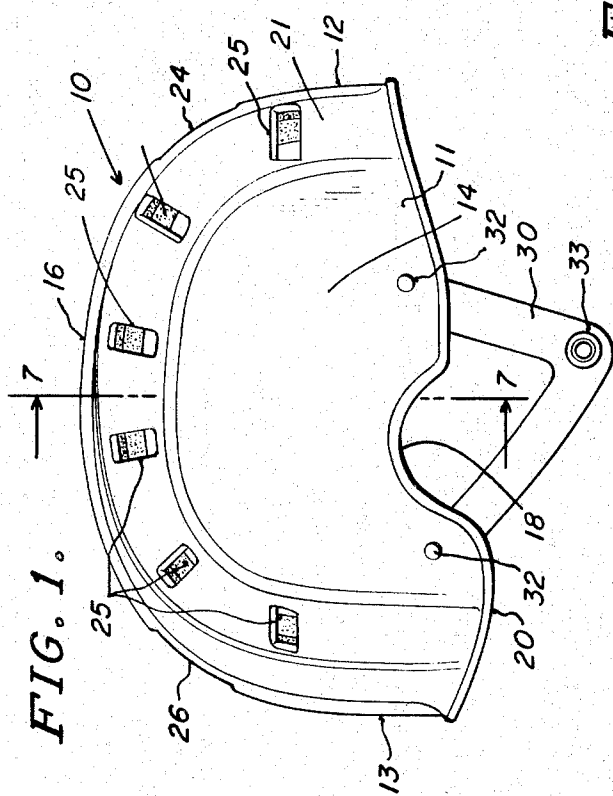
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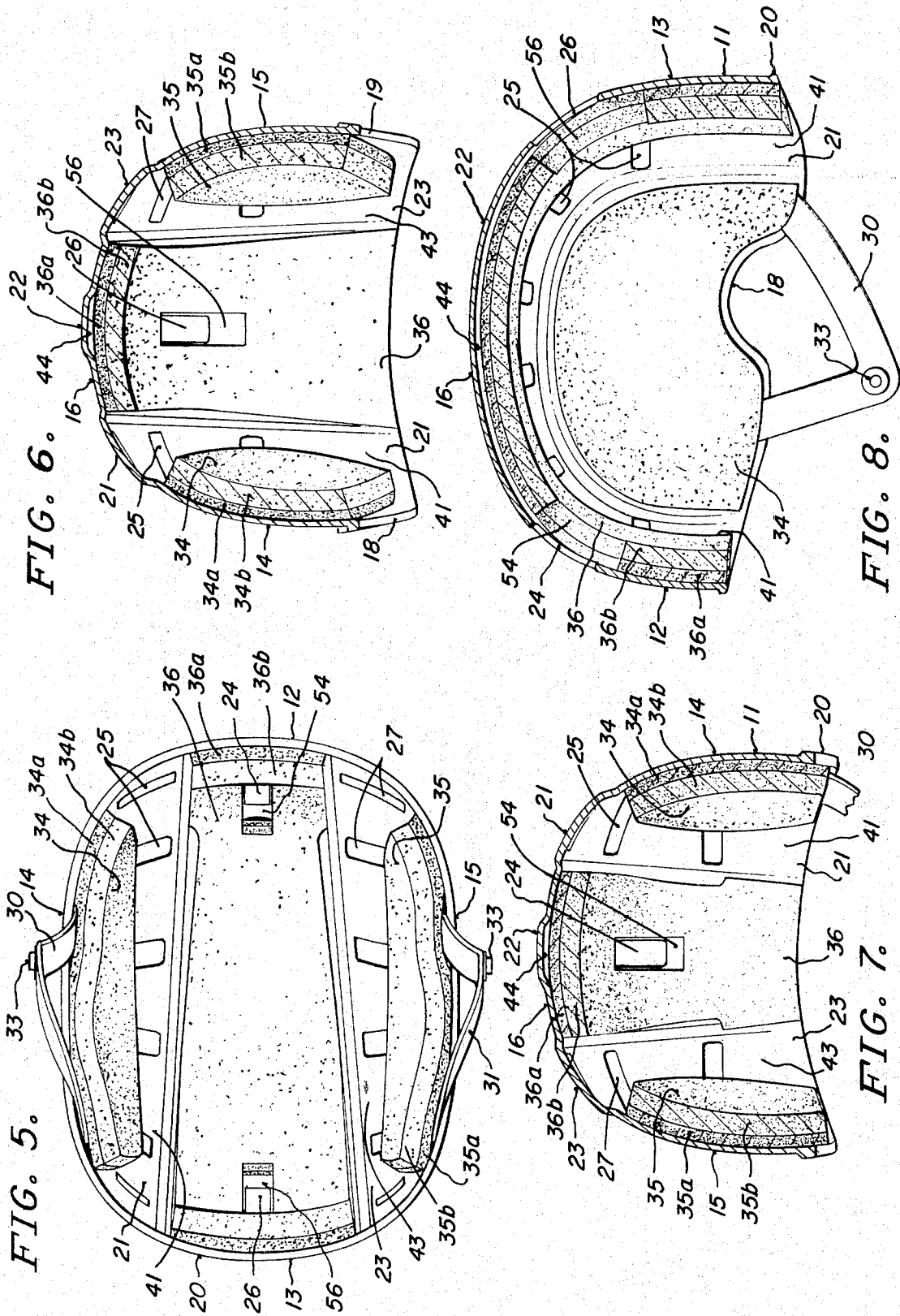
ABSTRACT

A hockey helmet is disclosed in which an outer shell is formed of lightweight material generally by injection molding with three protective ribs extending longitudinally over the top of the helmet, the two outer ribs having openings formed therein. The openings progressively decrease in area as they extend from the front to the back of the helmet. The inside of the helmet has three protective pads secured to the inside of the outer protective shell so that a pair of passages are formed in cooperation with the ribs in cooling the upper part of the head of the wearer. The central pad covers the central rib and forms an air cushion for the top of the head of the wearer.

12 Claims, 8 Drawing Figures







HOCKEY HELMET

This is a continuation, Ser. No. 216,633, filed Jan. 10, 1972, now abandoned.

This invention relates to the field of helmets, and more particularly to hockey helmets to be worn on the head of the wearer.

Continuing emphasis has been placed upon the safety of the participants in various types of sports, and particularly those in which physical contact is made between the participants. It is generally recognized that there have been various improvements made in certain fields, for instance, in football in attempting to devise a protective helmet that will give the player maximum protection while at the same time providing maximum dexterity of the player, and with a minimum of hindrance to the player's ability through the use of the helmet. In the game of hockey, it has generally been recognized that a helmet is most desirable to protect the head from blows due to falling, or being struck through body contact, skates, or the stick or hockey puck. While the general padding worn by a skater does not hinder his movements, it has generally been considered by most hockey players that helmets have been a hindrance in obstructing their vision and they quite often are fabricated of materials which are heavy enough to cause discomfort. Perhaps one of the most annoying features of most hockey helmets that are designed to give good protection to the head, is the lack of adequate cooling for the upper part of the head. Thus where a player is actively participating and the head is perspiring, the helmet generally increases the problem and because of the moisture which finds its way to the pads and straps of a helmet, the helmet becomes slippery with respect to the head and tends to move around on the head adding further discomfort and annoyance for the player.

The present invention is directed to a lightweight helmet which is generally formed of a high-impact plastic which may be injection molded to form the outer shell of the helmet. The helmet has the upper portion thereof formed with three ribs which are extended outwardly from the helmet, the two outer ribs having a plurality of elongated openings which are transversely oriented. The elongated openings diminish in size as the openings extend from the front to the back of the helmet. Internally, three pads are secured to the helmet in such a manner as to form a pair of passages or channels which permit the air to flow over the top of the head and escape through other openings so that cooling is provided for the helmet. The padding is generally formed of a sponge rubber layer which has secured thereto some form of polyurethane, vinyl chloride, polyethylene, or some other form of foam material. Therefore, the combination just described provides a helmet which is not only highly protective, but is lightweight and provides adequate cooling for the wearer.

It is therefore a general object of the invention to provide an improvement in protective helmets for use in contact sports such as hockey, lacrosse, skating, where the wearer is running or skating to impart substantial movement of the body in the game or activity.

It is yet another object of this invention to provide a helmet of lightweight material with padding in such a combination that the structure provides adequate cooling for the wearer.

It is still another object of this invention to provide an outer shell for a protective helmet that is strengthened and contains cooling characteristics.

It is still a further object of this invention to provide elongated openings and pads in a helmet to cooperate with each other and form air passages or channels for cooling.

It is still another object of this invention to provide a helmet having good cooling characteristics which are not disturbed by the thickness of the pads used therewith.

These and other objects and advantages of the invention will more fully appear from the following description, made in connection with the accompanying drawings, wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

FIG. 1 is a side elevational view of the invention as seen from the right side;

FIG. 2 is a front elevational view of the invention;

FIG. 3 is a rear elevational view of the invention;

FIG. 4 is a top plan view of the invention;

FIG. 5 is a bottom plan view of the invention;

FIG. 6 is a sectional view of the helmet taken along Lines 6—6 of FIG. 4;

FIG. 7 is a sectional view the helmet looking forward along the Lines 7—7 of FIG. 1; and

FIG. 8 is a sectional view of the invention taken along Lines 8—8 of FIG. 2.

Helmets of the type found to have deficiencies such as enumerated earlier are disclosed in U.S. Letters Pat. Nos. 3,087,166, 3,105,240 and 3,274,612 for example. A helmet 10 is formed by having an outer shell 11 formed by a molding process such as injection molding, the helmet having a semi-ovoidal shape which is larger than the head of the wearer. The outer shell 11 is formed from a front member 12, a back member 13, a pair of side members 14 and 15, and a top member 16 joining the other members. Front member 12 extends downwardly and terminates transversely above the eye level of the wearer, while back member 13 extends at least as low as the front member and generally extends transversely to a lower position than that of the front member. Rear member 13 extends low enough to insure that the sub-occipital bone at the back of the wearer's head is adequately protected as well as the lower portion of the head and upper neck region. The side members are formed from an uninterrupted material, that is, the sides are not split in any manner in which they may be forced together or extended to change the size or shape of the outer shell 11. The side members include a pair of relieved portions 18 and 19 which are adapted to extend above the ears of the wearer. Top member 16 joins the front, back and two side members, all of the members being formed of substantially a single and uniform thickness with the exception of a bead 20 which extends around the lower portion of the helmet to provide an edge which is less subject to causing injury to an opposing player or the wearer, as well as provide additional strengthening at the very edge of the helmet which aids in preventing any cracking of the material. The outer shell 11 is generally formed of a high-impact plastic material. Top member 16 has three ribs 21, 22 and 23. The ribs are formed in an outwardly direction and extend generally longitudinally from the front member 12 to back member 13. A plurality of elongated openings 25 are formed in rib 21, the first opening being substantially in a horizontal or transverse position at the lower portion of front member 12 and extending towards rear member 13. The openings

are formed with smooth substantially rectangular openings in rib 21 and the area of the elongated openings becomes progressively smaller in going from the front to the back of the outer shell.

In a like manner, a plurality of elongated openings 27 are formed in rib 23. Ribs 21 and 23 containing openings 25 and 27 respectively also progressively narrow from the front to the back of the outer shell 11 and ribs 21 and 23 diverge from the front to the back of the outer shell 11. (See FIG. 4 in particular) Rib 22 is a central rib which is disposed substantially equal distance between outer ribs 21 and 23 and has a pair of elongated openings 24 and 26 formed respectively in the front member and rear member of rib 22 in the same manner as described for openings 25 and 27, the exception being that openings 24 and 26 are at substantially right angles to those in the outer ribs. Opening 24 is formed in rib 22 at a location slightly above the first of the transverse openings 25 and 27 and opening 26 is formed at a location slightly above the transverse position of openings 25 and 27 in the back members.

As can be seen in the several figures each of the side ribs 21 and 23 have a plurality of openings, which openings are spaced along the rib and comprise approximately 10 percent of the area of the ribs in that portion of the helmet between the forehead of the user and the suboccipital bone region.

A pair of straps 30 and 31 are formed in a V-shape and are secured to side members 14 and 15 by suitable means such as rivets 42. Straps 30 extend downwardly to a position below the ears so that the ears are avoided by strap 30 and a snap fastener 33 is formed at the bottom of the V-shaped member and is adapted to be connected to a mating snap fastener which is secured to a chin strap or strap to be passed under the chin to insure that the helmet may not be knocked from the head. (Not shown)

A pair of side pads 34 and 35 are secured to the inside of side members 14 and 15 respectively by suitable means such as cement. A central elongated pad 36 is secured on the inside to front member 12, top member 16, and back member 13 by suitable means such as a cement or adhesive. The side pads 34 and 35 and central pad 36 are adapted to engage the head of the wearer and may be formed in various thicknesses to accommodate different sized heads. Each of pads 34, 35 and 36 are formed from a sponge rubber layer 34a, 35a and 36a and a foam material 34b, 35b, and 36b. The two parts of each pad are cemented together by appropriate adhesives which are well known.

Side pads 34 and 35 have their upper edge adjacent and conforming to the most lateral edges of ribs 21 and 23 respectively which may be described generally as an arcuate shape and is best shown in FIG. 8.

Central elongated pad 36 has its outer periphery extending transversely between the closest lateral edges of ribs 21 and 23 in such a manner that a pair of passages 41 and 43 are formed respectively between pads 34 and 36 and 35 and 36. As the wearer moves through the course of the game by running or skating, air enters openings 25 and 27 and is channeled through passages 41 and 43 over the head of the wearer. It will also be noted that central elongated pad 36 is cemented to outer shell 11 below openings 24 and 26 and may be cemented around the edge of openings 24 and 26 at the upper portion thereof. By not cementing the top portion of pad 36, an air space 44 is formed between the

pad 36 and the upper part of rib 22. Thus the primary purpose of openings 24 and 26 are to provide ventilation for the helmet at those locations. To provide the maximum cushioning effect, pads 34a, 35a, and 36a are generally formed from a higher density material than the other portion of the pads 34b, 35b and 36b. It will of course be understood that a pair of openings 54 and 56 are formed respectively in central pad 36 to communicate with openings 24 and 26 of the outer shell 11.

From the disclosure presented herein it will be seen that a disclosure has been made of a helmet which may be worn in contact sports or athletics in which there is provided a helmet of light weight construction, which provides maximum protection through the use of the ribbed construction across the top and front and back members. By the use of proper padding, one of the greatest disadvantages of wearing helmets is overcome by providing adequate ventilation for the wearer when the wearer is moving, thus providing cooling through the channels which are formed between the pads in the helmet. By changing the thickness of the inner portion such as 34b, 35b and 36b of the side and central pads respectively, the helmet may be adopted for various size heads with a minimum amount of fitting. The elongated holes are formed in the outer shell through the use of molding and thus when the outer shell is created, additional stress points are eliminated which are generally formed in conventional structures through some cutting process to form the holes. It will of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of the invention which consists of the matter shown and described herein and set forth in the appended claims.

What is claimed is:

1. In a protective helmet for use by an ambulatory wearer having an outer semi-ovoidal shaped shell adapted to fit loosely over the head of the wearer in spatial conformity therewith said shell comprising:

- a. a front member extending downwardly and terminating transversely above the eye level of the wearer;
- b. a back member extending downwardly and terminating generally transversely at least as low as said front member;
- c. a pair of side members being formed of uninterrupted material joining said front and back members and including relieved portions adapted to extend above the ears of the wearer; and
- d. a top member joining said front, back and two side members, said members being formed as a unitary plastic body of uniform thickness, said top member having a plurality of outwardly directed ribs extending generally longitudinally from said front member to said back member, at least one of said plurality of ribs containing a plurality of smooth molded openings free of stress points disposed along said rib, said openings having an area of about 10% of the area of said rib between the forehead of the user and the suboccipital region, said openings constructed and arranged to provide a significant flow of air therethrough when the wearer is in motion.

2. The structure as defined in claim 1 wherein at least the outermost of said plurality of ribs containing said plurality of openings progressively narrow from the front to the back of said shell.

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3. The structure as defined in claim 2 wherein said plurality of ribs includes a central rib disposed equal distance between a pair of outer ribs having said openings therein, said openings being elongated and having the largest dimension thereof extending transversely across said ribs, and said outer ribs diverging from the front to the back of the shell.

4. A protection helmet for use by an ambulatory wearer comprising:

- a. an outer semi-ovoidal shaped shell of substantially uniform thickness adapted to fit loosely over the head of the wearer in spatial conformity therewith having a front, back and two side members joined by a top member, said front member extending downwardly and terminating transversely above the eye level of the wearer, said back member extending downwardly and terminating generally transversely at least as low as said front member, said side members being formed of uninterrupted material joining said front and back members and including a relieved portion adapted to extend above the ears of the wearer, and said top member having a plurality of outwardly directed ribs extending generally longitudinally from said front member to said back member, at least one of said plurality of ribs containing a plurality of openings disposed along said rib and formed therethrough;
- b. a pair of side pads secured on the inside to said side members and adapted to engage the sides of the head of the wearer, said pads each having an upper edge adjacent and conforming to the most lateral edges of said plurality of ribs; and
- c. a central elongated pad secured on the inside to said front, top, and back members and adapted to engage the front, top and back of the head of the wearer, said central pad having a pair of edges spaced from and extending transversely between the innermost lateral edges of said side pads, said ribs and openings therein and said adjacent pad

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edges forming passages for movement of air over the head of the wearer.

5. The structure as defined in claim 4 including:

- d. a pair of strap members secured to said side members and adapted to extend under the ears of the wearer and be interconnected by a chin strap.

6. The structure as defined in claim 4 wherein said pads are formed from a plurality of distinct materials secured to each other in laminate arrangements, the material in contact with said outer shell having the highest density.

7. The structure as defined in claim 4 wherein said plurality of ribs includes a central rib disposed equal distance between a pair of outer ribs having said openings therein, said central elongated pad spanning said central rib and having its peripheral portions cemented to said outer shell thereby forming an air space between said central rib and said central pad.

8. The structure as defined in claim 7 wherein said plurality of ribs have elongated openings therein and said plurality of elongated openings have the largest dimension of said openings extending transversely across said ribs and progressively narrow from the front to the back of said outer shell.

9. The structure as defined in claim 7 wherein said central rib includes an opening at the front and back of said outer shell extending therethrough and through said central pad providing ventilation to the head of the wearer.

10. The structure as defined in claim 7 wherein said openings are of an elongated configuration.

11. The structure as defined in claim 2 wherein said openings are elongated and the area thereof progressively decreases from the front to the back of said shell.

12. The structure as defined in claim 1 wherein the area of said openings progressively decreases from the front to the back of said shell.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,783,450 Dated January 8, 1974

Inventor(s) William Raymond O'Connor

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 30: "Claim 7" should be --Claim 1--

Signed and sealed this 30th day of July 1974.

(SEAL)
Attest:

McCOY M GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents