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(54) **HOCKEY HELMET COMPRISING AN INFLATABLE BLADDER**

Publication Classification

(76) Inventors: **Bertrand Racine**, Portland, OR (US);
Jacques Durocher, St-Jerome (CA)

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Correspondence Address:
SMART & BIGGAR
Suite 3400
1000 De la Gauchetiere Street West
Montreal, QC H3B 4W5 (CA)

(57) **ABSTRACT**

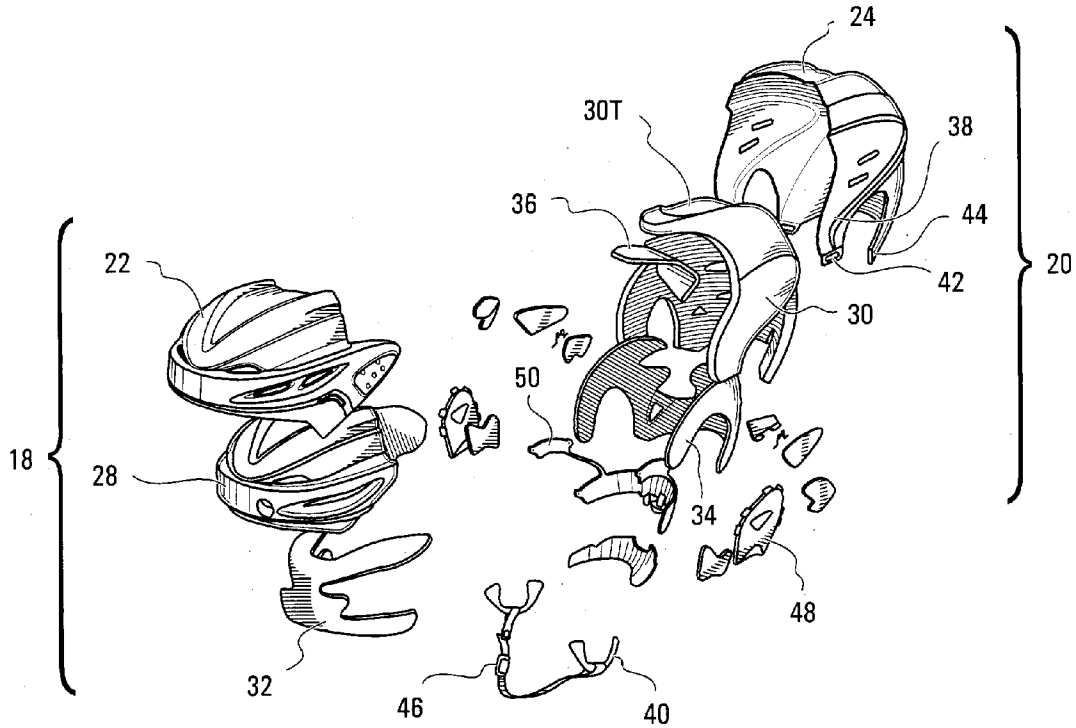
A hockey helmet for receiving a head of a wearer, the head having a crown region, left and right temple regions, left and right side regions and an occipital region. The hockey helmet comprises a front portion facing the crown region and the left and right temple regions of the head and a rear portion facing the left and right side regions and the occipital region of the head. The hockey helmet also comprises an inflatable bladder mounted on the rear portion and adjacent to the occipital region of the head. The inflatable bladder is capable of applying pressure on the occipital region of the head for urging the front portion of the hockey helmet towards the crown region of the head when the helmet is placed on the head.

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Dec. 21, 2001 (CA) 2,365,894



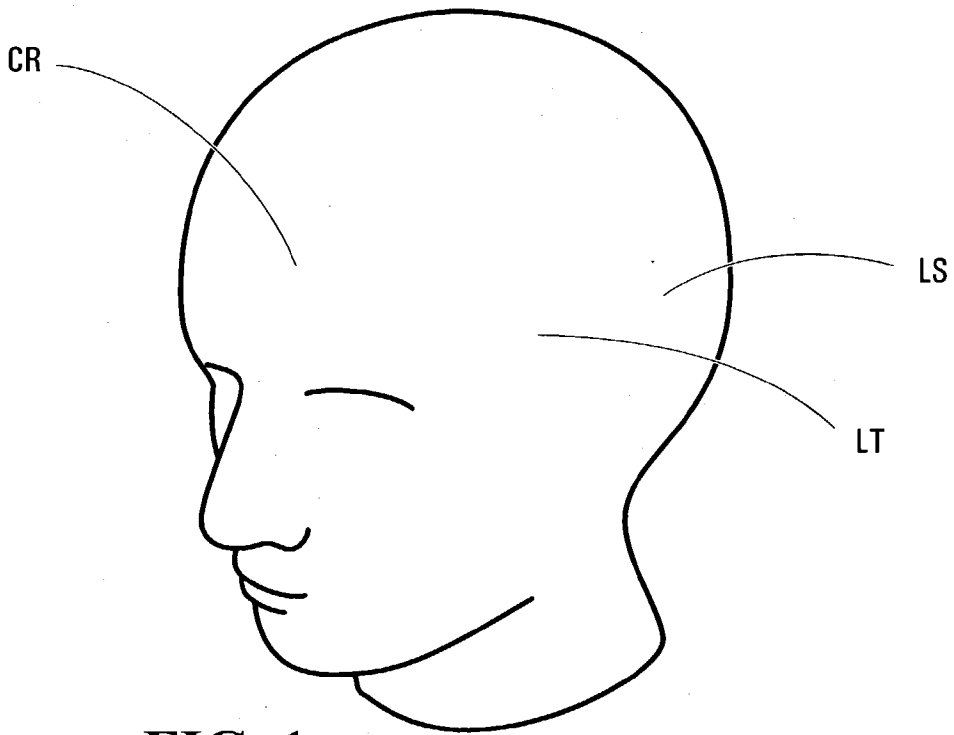


FIG. 1

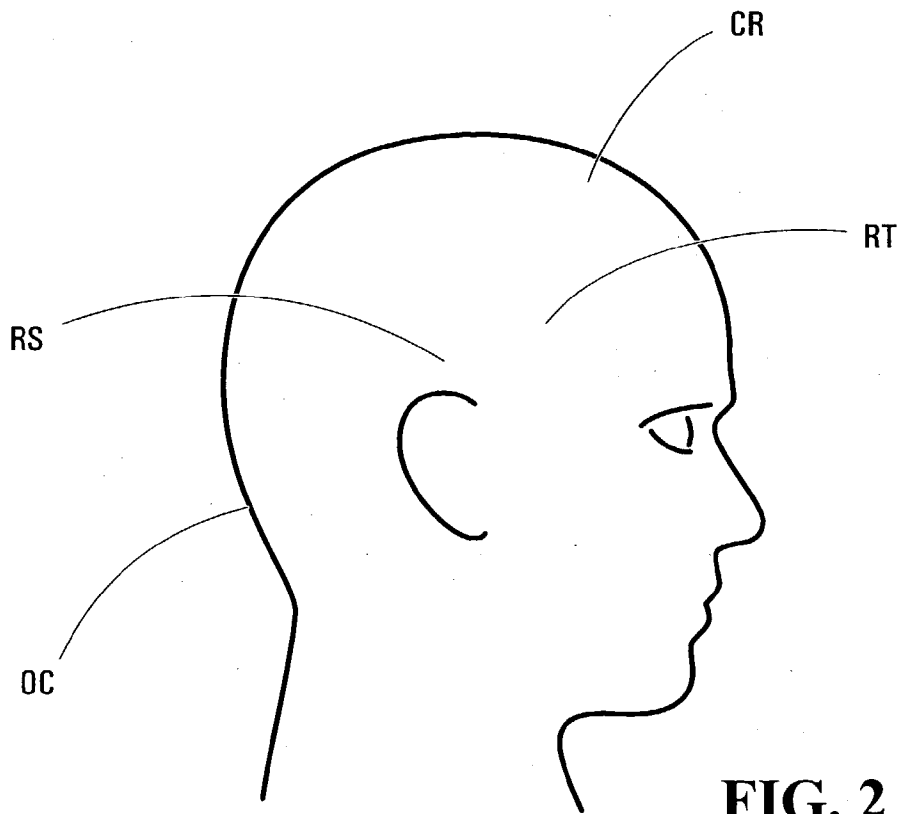


FIG. 2

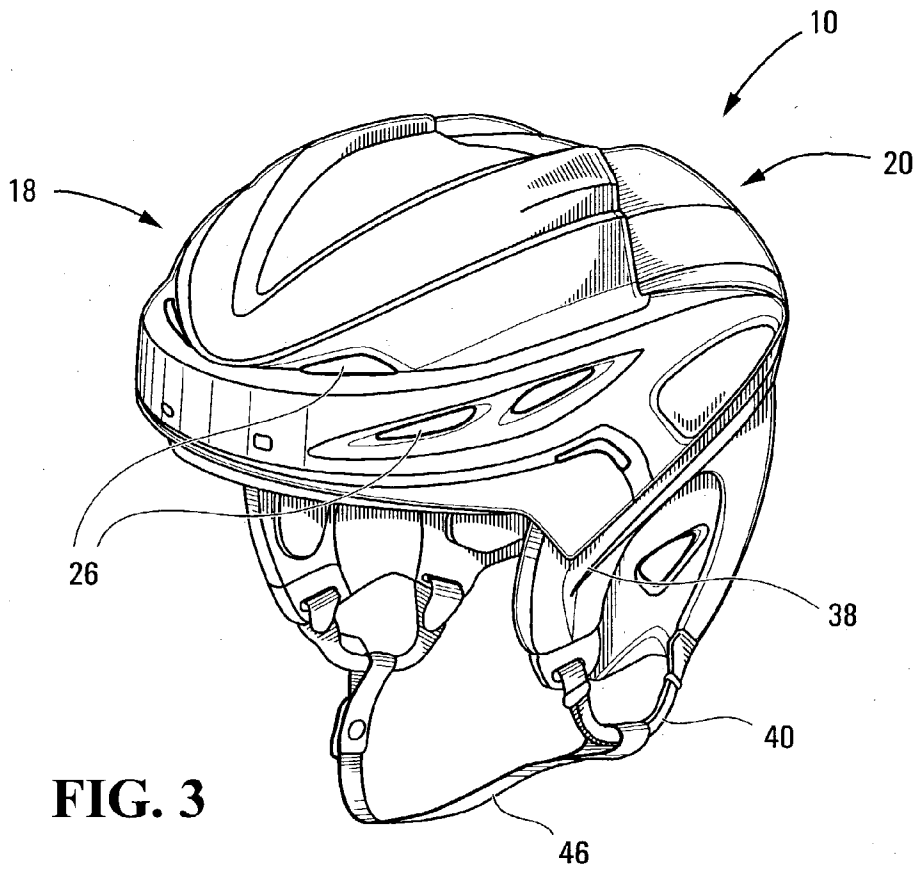


FIG. 3

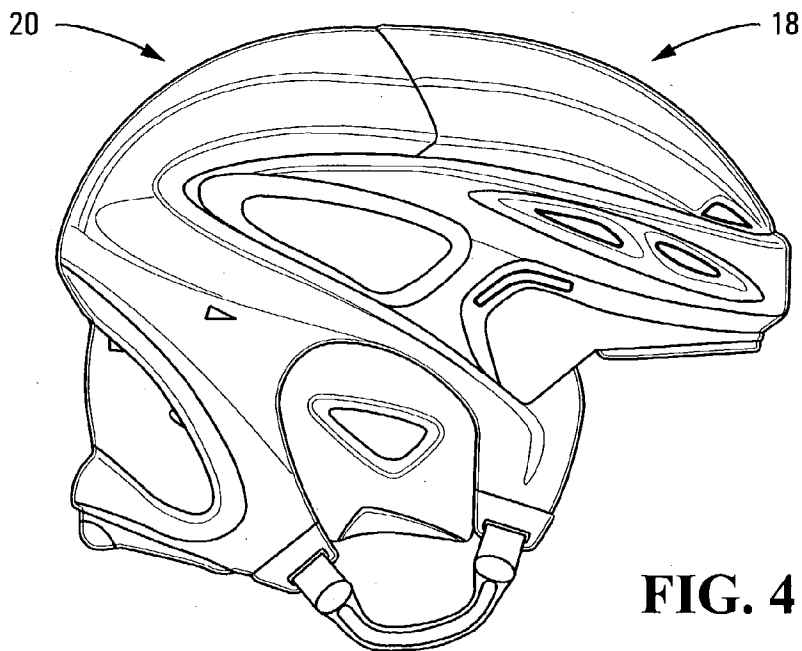


FIG. 4

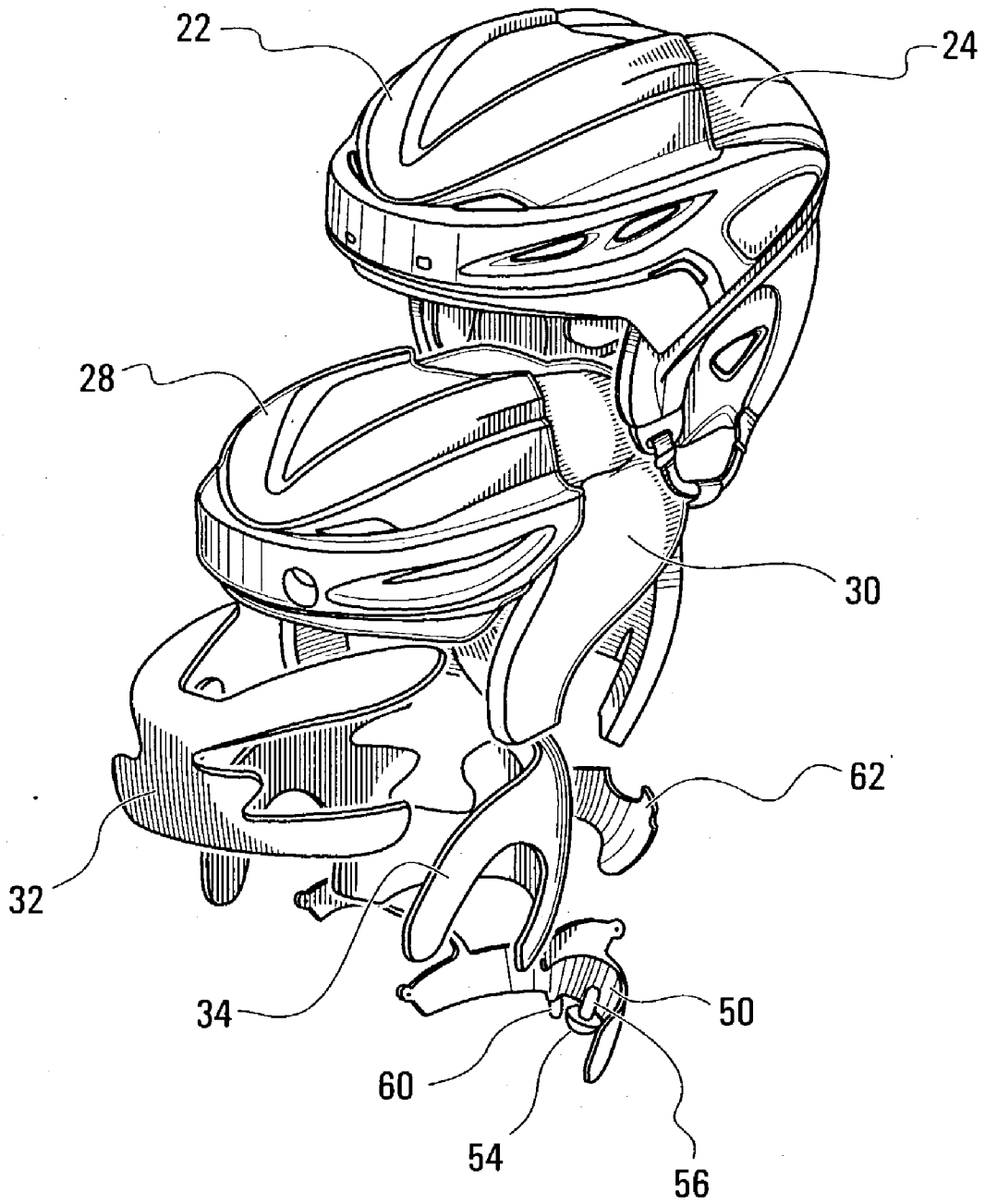


FIG. 5

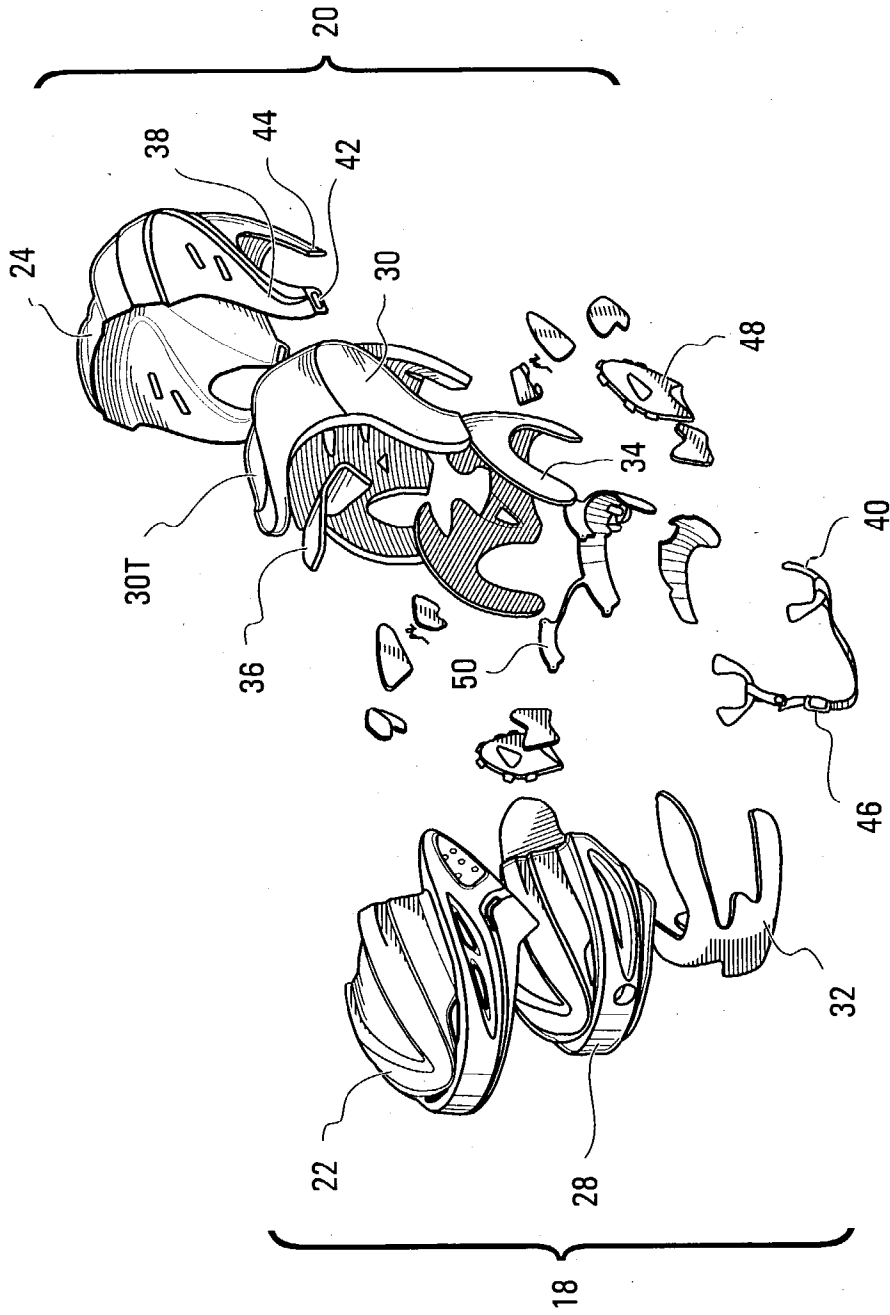


FIG. 6

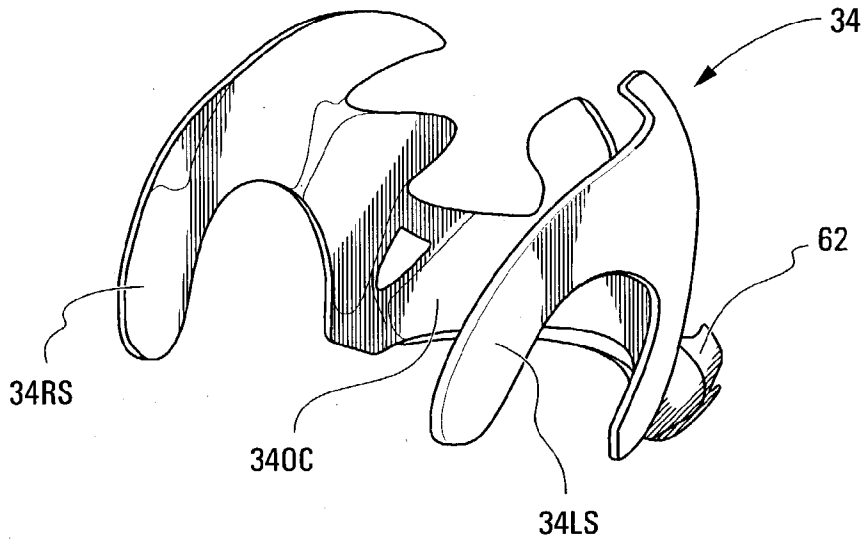


FIG. 7

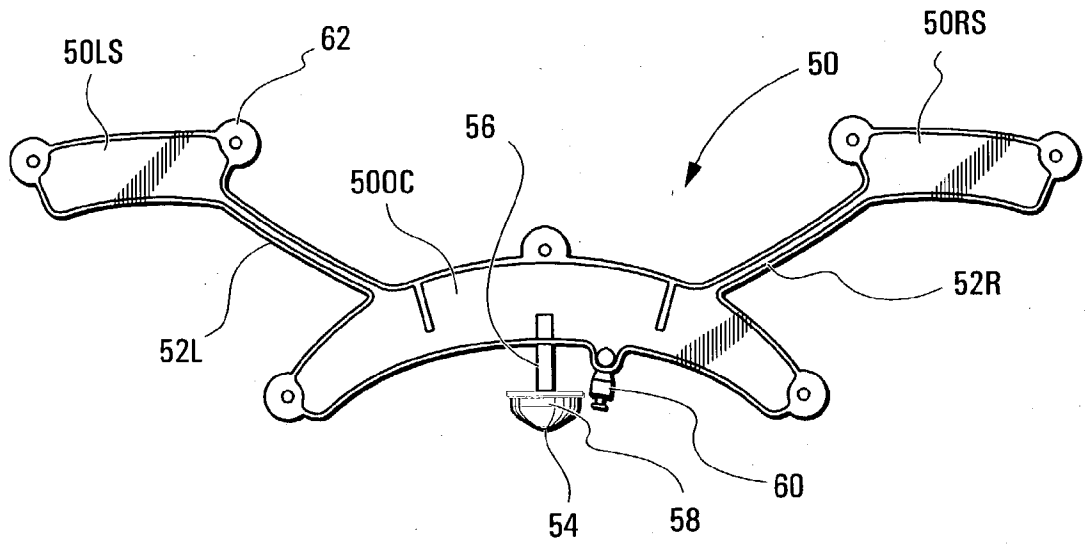


FIG. 8

HOCKEY HELMET COMPRISING AN INFLATABLE BLADDER

FIELD OF THE INVENTION

[0001] The present invention relates to a hockey helmet with an inflatable bladder designed to improve the fit of the helmet on the head of the wearer.

SUMMARY OF THE INVENTION

[0002] As embodied and broadly described herein, the present invention provides a hockey helmet for receiving a head of a wearer. The head has a crown region, left and right temple regions, left and right side regions and an occipital region. The hockey helmet comprises a front portion facing the crown region and the left and right temple regions of the head and a rear portion facing left and right side regions and the occipital region of the head. The hockey helmet also comprises an inflatable bladder mounted on its rear portion and adjacent to the occipital region of the head. The inflatable bladder applies pressure on the occipital region of the head for urging the front portion of the hockey helmet towards the crown region of the head when the helmet is placed on the head.

[0003] The use of an inflatable bladder that is located adjacent the occipital region of the head improves the fit of the helmet on the head of the wearer by urging the helmet against the crown region of the head.

[0004] In a non-limiting example of implementation, the helmet also includes a pump for inflating the bladder. Alternatively, the bladder may be designed to be inflated by an external pump that is separate from the helmet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] A detailed description of the embodiments of the present invention is provided herein below, by way of example only, with reference to the accompanying drawings, in which:

[0006] FIG. 1 is a perspective view of a head of a wearer;

[0007] FIG. 2 is a right side elevational view of the head of the wearer of FIG. 1;

[0008] FIG. 3 is a perspective view of a hockey helmet constructed in accordance with an embodiment of the invention;

[0009] FIG. 4 is a right side elevational view of the hockey helmet of FIG. 3;

[0010] FIG. 5 is an exploded perspective view of the hockey helmet of FIG. 3;

[0011] FIG. 6 is a more detailed exploded perspective view of the hockey helmet of FIG. 3;

[0012] FIG. 7 is a perspective view of a rear padding section and a pump cover of the hockey helmet of FIG. 3; and

[0013] FIG. 8 is an elevation view of an inflatable bladder with a pump of the hockey helmet of FIG. 3.

[0014] In the drawings, embodiments of the invention are illustrated by way of examples. It is to be expressly understood that the description and drawings are only for the

purpose of illustration and are an aid for understanding. They are not intended to be a definition of the limits of the invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS OF THE INVENTION

[0015] FIGS. 1 and 2 illustrate a head of a wearer. The head comprises a crown region CR, left and right temple regions LT, RT, left and right side regions LS, RS and an occipital region OC. Left and right side regions LS, RS are approximately located above the ears of the wearer. Occipital region OC substantially corresponds to the region under the occipital protuberance of the head.

[0016] Shown in FIGS. 3 to 8 is a hockey helmet 10 having a front portion 18 and a rear portion 20 interconnected together. Front and rear portions 18, 20 comprise respective front shell 22 and rear shell 24. Front shell 22 and rear shell 24 may be made of a relatively rigid material, such as NYLON, polycarbonate materials, thermoplastics, or thermosetting resins or any other suitable material. Front shell 22 includes a plurality of ventilation apertures 26. Ventilation apertures 26 provide the added comfort of allowing air to circulate around the head of the wearer.

[0017] The front shell 22 and rear shell 24 overlay respective front and rear inner pads 28 and 30. Both front and rear inner pads 28, 30 are integrally formed. The front and rear inner pads 28,30 have three-dimensional configurations that match the three-dimensional configurations of the respective front and rear shells 22, 24, and are attached to the inner surfaces of the front and rear shells 22, 24 by any suitable means, such as adhesives or mechanical fasteners. In this fashion, the front and rear shells 22, 24 can mechanically interlock with the respective front and rear inner pads 28, 30. Alternatively, the front and rear inner pads 28,30 may be made of separate components applied at specific locations of the inner surfaces of the front and rear shells 22, 24 and attached to the front and rear shells 22, 24 in any suitable way.

[0018] Front and rear inner pads 28, 30 are made of shock absorbing material such as expanded polypropylene (EPP). Other materials can also be used without departing from the spirit of the invention. Rear inner pad 30 comprises a top portion 30T extending over the top of the head of the wearer. The inner surface of front inner pad 28 is covered with a front comfort liner 32 and the inner surface of rear inner pad 30 is covered with a rear comfort liner 34 and a top comfort liner 36. Front comfort liner 32 and rear and top comfort liners 34, 36 entirely cover the inner surfaces of front and rear inner pads 28, 30 respectively. Rear comfort liner 34 comprises an occipital portion 340C, a left side portion 34LS and a right side portion 34RS (see FIG. 7).

[0019] Helmet 10 also comprises two downwardly extending sides 38 that extend along the sides of the wearer's face in front of the ears. Sides 38 provide additional protection to the sides of the head of the wearer, and further provide a useful location for connecting ear loops 40. At the base of sides 38 are apertures 42 (only left side 38 shows aperture 42) to which ear loops 40 connects. The other end of each ear loop 40 connects into an aperture 44 located on the base of rear shell 24. A chinstrap 46 is adapted to be attached to each ear loops 40, so that when it is secured beneath the chin of the wearer, helmet 10 is maintained onto the head of the

wearer. If desired the helmet **10** may be provided with ear covers **48** for protecting the ears of the wearer.

[0020] The front and rear portions **18**, **20** can move one with relation to the other so as to adjust the size of the head receiving cavity of the helmet **10**. Locking mechanisms retain the front and rear portions **18**, **20** in the position selected by the wearer. Any suitable type of locking mechanisms such as the one described in U.S. Pat. No. 5,956,776 of Bauer Nike Hockey Inc. issued on Sep. 28, 1999 can be used without departing from the spirit of the invention.

[0021] In operation, a wearer who puts on the helmet **10** and realizes that it is too large or too small, does not need to remove helmet the **10** to adjust it. The wearer must simply release the locking devices expand or contract the size of helmet **10** by displacing the front and the rear portion **18**, **20** in relation to each other in the appropriate direction.

[0022] Alternatively, helmet **10** may comprise a non-adjustable one-piece shell covering a one-piece inner pad and a one-piece comfort liner. In another possible variant, the helmet **10** may comprise separate front and rear portions **18**, **20** that are connected to one another in any suitable way but not adjustable one relative to the other.

[0023] Helmet **10** further comprises an inflatable bladder **50** mounted between rear comfort liner **34** and rear pad **30**. Inflatable bladder **50** has an occipital chamber **500C** in fluid communication with left and right side chambers **50LS**, **50RS** through respective left and right air channels **52L**, **52R**. In a possible variant, the inflatable bladder **50** may only comprise the occipital chamber **500C**, without any side chambers.

[0024] A pump **54** is connected to the inflatable bladder **50**, the pump **54** being in fluid communication with the occipital chamber **500C** through a tube **56**. Alternatively, the pump **54** may be connected to left or right side chambers **50LS**, **50RS**. The pump **54** is manually operated by pressing on a bellows **58** that forces air in the inflatable bladder via the tube **56** containing a one-way valve (not shown). The one-way valve prevents air from the inflatable bladder **50** to escape via the tube **56**. The number of pump cycles applied to the bellows **58** determines the degree of inflation of the inflatable bladder **50**. Inflatable bladder **50** also comprises a release valve **60** mounted on the occipital chamber **500C** for deflating the inflatable bladder **50**. The release valve **60** may be mounted instead on one of the side chambers **50LS**, **50RS**.

[0025] Helmet **10** also comprises a protective cover **62** that covers the pump **54** and release valve **60**. Cover **62** is mounted to rear inner pad **30** and/or rear comfort liner **34**. The cover **62** is sufficiently flexible to allow the wearer to depress the bellows **58** and operate the release valve **60** through the cover **62**. More particularly, the cover **62** may be made of material sufficiently flexible that can be easily deformed by finger pressure. Alternatively, the cover **62** may be made of relatively rigid material, that cannot be deformed by finger pressure but it includes regions that register with the bellows **58** and the release valve **60** that are more flexible. Flexibility may be imparted to the selected regions by reducing the thickness of the material in those regions, or adding structural features that increase the flexibility without thickness reductions. Examples of such structural features include flexure enhancing hinges or folds.

[0026] When inflated, inflatable bladder **50** applies pressure upon the occipital region **OC** and the left and right side regions **LS**, **RS** of the head of the wearer. The pressure tends to urge the front portion **18** of the helmet **10** toward the crown region **CR** of the head. Moreover, the left and the right side chambers **50LS**, **50RS** of the inflatable bladder **50** apply pressure on the corresponding parts of the head such as to laterally stabilize the helmet **10**. Accordingly, the occipital part of the inflatable bladder **50** tends to urge the helmet **10** against the crown region **CR** of the head. Depending on how tightly the head of the wearer fits in the head receiving cavity of the helmet **10**, the pressure applied by the occipital part of the inflatable bladder **50** may induce a slight movement of the helmet **10** toward the back of the head, necessary to seat the front portion **18** of the helmet **10** against the crown region **CR** of the head. At the same time, the side chambers **50LS**, **50RS** of the inflatable bladder **50** apply pressure on both side region **LS**, **RS** of the head and stabilize the helmet **10** laterally.

[0027] The degree of pressure applied by the inflatable bladder **50** is controlled by the amount of air pumped in the inflatable bladder **50** by the wearer. If the amount of pressure is too high, air can be released by operating the release valve **60**.

[0028] Referring to **FIG. 8**, inflatable bladder **50** comprises several affixing members **62** for affixing inflatable bladder **50** to the outer surface of rear comfort liner **34**. The affixing members include apertures through which suitable fasteners can be inserted. Alternatively, adhesive, VELCRO or stitches may be used to secure the inflatable bladder **50** to the rear comfort liner **34**. Inflatable bladder **50** is thus mounted between rear comfort liner **34** and rear inner pad **30** and can expand therebetween in order to apply pressure upon the occipital region **OC** and left and right side regions **LS**, **RS** of the head.

[0029] The above description of the embodiments should not be interpreted in a limiting manner since other variations, modifications and refinements are possible within the spirit and scope of the present invention. The scope of the invention is defined in the appended claims and their equivalents.

The embodiments of the invention for which an exclusive privilege or property is claimed are defined as follows:

1. A hockey helmet for receiving a head of a wearer, the head having a crown region, left and right temple regions, left and right side regions and an occipital region, said helmet comprising:

- (a) a front portion for facing the crown region and the left and right temple regions of the head;
- (b) a rear portion for facing the left and right side regions and the occipital region of the head; and
- (c) an inflatable bladder on said rear portion and adjacent to the occipital region of the head when said hockey helmet is placed on the head, said inflatable bladder being capable of applying pressure upon the occipital region of the head for urging said front portion towards the crown region of the head.

2. A hockey helmet as defined in claim 1 further comprising a pump in fluid communication with said inflatable bladder, said pump being operable by the wearer for inflating said inflatable bladder.

3. A hockey helmet as defined in claim 2, wherein said inflatable bladder comprises an occipital chamber and left and right side chambers, said occipital chamber facing the occipital region of the head and said left and right side chambers facing the left and side regions of the head respectively when said helmet is placed on the head.

4. A hockey helmet as defined in claim 3, wherein said occipital chamber is in fluid communication with said left and right side chambers.

5. A hockey helmet as defined in claim 4, wherein said pump includes a manually compressible bellows for pumping air in said inflatable bladder.

6. A hockey helmet as defined in claim 4, wherein said pump includes a one way valve to prevent air in said inflatable bladder to escape via said pump.

7. A hockey helmet as defined in claim 5, wherein said front portion and said rear portion comprise respective front and rear shells.

8. A hockey helmet as defined in claim 7 further comprising a front inner pad on said front shell and a rear inner pad on said rear shell.

9. A hockey helmet as defined in claim 8 further comprising a rear comfort liner on said rear inner pad.

10. A hockey helmet as defined in claim 9, wherein said inflatable bladder is mounted between said rear comfort liner and said rear inner pad.

11. A hockey helmet as defined in claim 6, wherein said inflatable bladder comprises a release valve for discharging air from said inflatable bladder.

12. A hockey helmet as defined in claim 11, wherein said release valve is mounted on said occipital chamber.

13. A hockey helmet as defined in claim 11 further comprising a cover covering said pump and said release valve.

14. A hockey helmet as defined in claim 13, wherein said cover is flexible for allowing the wearer to operate either one of said pump and said release valve through said cover.

15. A hockey helmet as defined in claim 8 further comprising a front comfort liner on said front inner pad.

16. A hockey helmet as defined in claim 6, wherein said front portion is movable relative to said rear portion for allowing size adjustment of said helmet.

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