Hockey helmet having an inflatable bladder

A hockey helmet (10) for receiving a head of a wearer, the head having a crown region (CR), left and right temple regions (LT,RT), left and right side regions (LS,RS) and an occipital region (OC). The hockey helmet (10) comprises a front portion (18) facing the crown region (CR) and the left and right temple regions (LT,RT) of the head and a rear portion (20) facing the left and right side regions (LS,RS) and the occipital region (OC) of the head. The hockey helmet (10) also comprises an inflatable bladder (50) mounted on the rear portion and adjacent to the occipital region (OC) of the head. The inflatable bladder (50) is capable of applying pressure on the occipital region (OC) of the head for urging the front portion (18) of the hockey helmet (10) towards the crown region (CR) of the head when the helmet (10) is placed on the head.

FIG. 5
Description

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.

Background of the invention

[0002] German Utility Model GM 77 29 063 issued on December 29, 1977 relates to a protective helmet. The helmet comprises a shell, an insulating layer, a soft lining and inflatable air cushions located between the insulating layer and lining, these air cushions being connected with each other by air tubes. The helmet also comprises a bellows, a check valve and an actuation element.

[0003] U.S. Patent No. 5,083,320 issued to Halstead on January 28, 1992 relates to a protective helmet with a self-contained air pump. The helmet comprises a liner having a plurality of inflatable air compartments, the air compartments being interconnected by a number of air channels. The helmet also comprises an air pump.

[0004] PCT Application WO 93/01732 published on February 4, 1993 relates to a helmet retention system comprising an air bladder that is inflatable by a pump.

[0005] Against this background, there is a need in the industry for a helmet that provides a better fitting on the head of the wearer.

Summary of the invention

[0006] 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.

[0007] 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.

[0008] 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.
ventilation apertures 26. Ventilation apertures 26 provide the added comfort of allowing air to circulate around the head of the wearer.

[0013] 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.

[0014] 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 34OC, a left side portion 34LS and a right side portion 34RS (see Fig. 7).

[0015] 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.

[0016] 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. Patent 5,956,776 of Bauer Nike Hockey Inc. issued on September 28, 1999 can be used without departing from the spirit of the invention.

[0017] 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.

[0018] 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.

[0019] 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 50OC 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 50OC, without any side chambers.

[0020] A pump 54 is connected to the inflatable bladder 50, the pump 54 being in fluid communication with the occipital chamber 50OC 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 50OC for deflating the inflatable bladder 50. The release valve 60 may be mounted instead on one of the side chambers 50LS, 50RS.

[0021] 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.

[0022] 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.

[0023] 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.

[0024] Referring to Figure 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.

[0025] 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.

Claims

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 5, 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.