This invention relates to helmets for use by athletes in sports such as boxing, baseball, motorcycling and the like, and also adaptable in a somewhat modified form for use in playing the game of football. In its preferred form (not for football use) the helmet is provided with a visor for shading the eyes. The general object of the invention is to provide a helmet having an improved cushioned headband for attaching it to a wearer's head, the headband being adjustable for fitting heads of varying sizes within a selected range.

A specific object of the invention is to provide a helmet with an adjustable headband which normally maintains a fixed relation between the athlete's forehead and the tip of the visor so as to provide a predetermined fixed relation between the visor and the wearer's eyes. Further objects are to provide such a helmet, wherein:

(1) The headband can be adjusted to conform exactly to the shape of the wearer's head;

(2) When the helmet is being worn, it has freedom to float laterally and longitudinally with reference to the headband, swinging about a single point of attachment to the headband to the crown of the helmet;

(3) A cushioning pad is provided having portions interposed between the headband and the helmet shell, whereby the horizontal floating action of the shell, horizontal shock loads will be absorbed by compression of these interposed portions of the pad;

(4) The external surfaces of the helmet are smooth and substantially devoid of projecting rivet or bolt heads;

(5) Compressibility of the interposed pad portions accommodates expansion of the headband by adjustment to larger heads;

(6) The pad is held in position by its interfitting arrangement with the headband, yet is readily removably and replaceable;

(7) Means for adjusting the headband is disposed at the rear side of the helmet, so as to provide the fixed relation between the visor or front edge of the helmet and the athlete's forehead;

(8) The adjustment means is disposed internally of the helmet and is accessible through an aperture or apertures in the rear of the shell, thus making it possible to adjust the headband while the helmet is on the athlete's head.

Other objects and advantages will become apparent in the ensuing specification and appended drawing in which:

FIG. 1 is an inverted plan view of an athletic helmet embodying my invention;

FIG. 2 is a rear view thereof;

FIG. 3 is a broken-away front view, partially in elevation and partially in transverse cross-section through the center of the helmet;

FIG. 4 is a sectional view in the median longitudinal vertical plane of the helmet;

FIG. 5 is a detail sectional view of the headband adjustment means;

FIG. 6 is a plan view of the cushion pad component, dissociated from the helmet; and

FIG. 7 is a fragmentary transverse vertical sectional view of the helmet, looking forwardly, with the headband shown in rear elevation.

Referring now to the drawing in detail, I have shown therein, as an example of one form in which the invention may be embodied, an athletic helmet comprising generally a helmet shell A; an adjustable headband B adapted to encircle the head of a wearer for attaching the helmet thereto; and a cushioning lining C for protecting the wearer's head against direct contact with the yokes C and otherwise cushioning the connection between the helmet and the wearer's head.

Shell A is preferably of a strong, tough, synthetic plastic material such as the polycarbonate known commercially as "Lexan," or the acrylonitrile butadiene styrene known commercially as "Sicote." It is preferably of molded construction although it can be fabricated by heat-softhing and forming from sheet plastic material.

The shell A comprises an approximately hemispherical crown 10; a skirt 11 extended downwardly from the rearward portion of crown 10; ear flaps 12 extended downwardly from the respective side portions of crown 10 to a depth lower than the skirt 11; and a visor 13 formed as a downwardly extension of the forward portion of crown 10 and projected forwardly therefrom. In the rearward portion of the shell A, between the crown 10 and the skirt 11 is a window 14. Beneath the window 14, in the center of the skirt 11 is a notch 15 large enough to receive the thumb of a person operating the adjustment means of headband B. The window 14 is of sufficient dimension to provide ample room for reception of the fingers of such person, for manipulating the adjustment. In the ear flaps 12 are respective groups of apertures 16 arranged approximately in the centered relation therein and opposite the respective ears of the person wearing the helmet, for transmission of sound. The visor 13 projects forwardly a length considerably less than the length of the visor of a baseball cap and is arched downwardly and transversely so as to be substantially as strong and shock-resistant as the remaining portions of the lower perimeter of the helmet. Its lower edge is disposed in a position such that it will provide shade from the rays of light being faced by the wearer of the helmet, to an extent equivalent to the shading effect of a baseball visor.

Headband B comprises a band strap 21 of flexible strap material, preferably a strong, tough, plastic material, slightly plasticized for flexibility and toughness, such as nylon. It is in the form of a split oval ring having a continuous forward portion which is jacketed in a flat sleeve 22 of cushioning material such as fine-cell sponge rubber or polyurethane sponge for cushioning engagement against the forehead of the wearer; and overlapping rear end portions 23 which are snugly encased in and retained by a tubular housing 24 of the adjustment mechanism. The housing 24 is covered by a cushioning sleeve 25 for cushioning engagement with the back of the wearer's head. Sleeve 25 may be of the same material as forward cushioning sleeve 22.

The adjustment mechanism comprises an adjustment knob or wheel 26 (FIG. 5) having a knurled or knobbed periphery for non-slip engagement by the thumb and fingers of the user, and having an operating stud 27 protruding from its center through the overlapped ends 23 of band 21, through registering longitudinal slots 28 therein. The actuator 27 embodies a spur pinion meshing with rack teeth in band ends 23 so as to draw them together when the knob 26 is rotated in one direction and to spread them apart when the knob is rotated in the opposite direction. The rack teeth of one band end are disposed along one margin of one of the slots 28 and the teeth of the other band end are disposed along the opposite margin of the other slot, the slots being displaced to the extent of tooth depth.

Referring now to FIG. 2, it will be apparent that one side of knob 26 is exposed in the notch 15 and the
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opposite side of the knob is exposed in the window 14. Thus, it is possible for the wearer to adjust the head band from the rear of the helmet, reaching his thumb through notch 15 and his fingers though window 14 so as to engage the knob 26 between said band and said coverings, the notch 15 being sufficiently wide to accommodate lateral movement of the thumb in one direction while the fingers are shifted in the opposite direction for rotating the knob.

Headband B has an attachment yoke comprising a pair of straps 31 each having a lower end joined to a respective side member of the headband 21. The upper ends of straps 31 are overlapped as shown and are provided with a series of spaced apertures 33 arranged along the longitudinal axis thereof and adapted to receive a fastener stud 34 (FIG. 4) extended therethrough. Stud 34 is formed as an integral projection on shell A, and is headed (as by pressing a hot iron against its end) thereby securing the straps to the crown 10.

The invention utilizes only the connection to the center of crown 10 through stud 34 to provide a universally floating suspension for the headband B. The headband B is thus free for limited floating movement which is yieldingly opposed by cushioning action of the cushion C. C consists of a relatively thick (e.g.-1/2-inch-4 inch) sheet of sponge rubber or equivalent sponge plastic material such as polyurethane having a central portion 41 and respective forward and rear lobes 42 and 43 (FIG. 6) which are separated by T-slots 44, whereby the opposed circumferential extremities of the lobes 42 and 43 are provided with projecting tongues 45 and 46 which are tucked between the lower ends of respective straps 31 and the opposed areas of the shell crown 10 as shown in FIGS. 1 and 3. The forward lobe 42 is preferably offset inwardly at 47 from the respective tongues 46 so as to have an arcuate peripheral of reduced radius forming within the inner periphery of the cushion sleeve 22 as shown in FIG. 1. The rear lobe 43 is provided with a cut-out recess 48 to receive the knob 26, recess 48 being defined by a pair of tabs 49 which are circumferentially separated from the adjoining peripheral portions of lobe 43 by dart slots 50 cut radially into the lobe 43 from its margin. The tabs 49 are gripped between the respective ends of cushion sleeve 25 and the opposed areas of the rear skirt 11 of shell A, thus serving to tie the rearward portion of the cushion D to the rear of the helmet. In a similar manner, the forward tongues 46 of the respective sides of the pad D are confined between the respective sides 21 and shell A sufficiently to secure the end portions of tongues 46 which are tucked behind the end portions of sleeve 22, thus tying the respective sides of the pad D to the respective sides of the helmet.

In some instances the depth of the rear skirt 11 of shell A may be such that a window (e.g., similar to window 14, in inverted relation thereto) may be employed in lieu of notch 15.

I claim:

1. An athletic helmet comprising: a shell having a crown portion, a rear skirt and a pair of ear-covering side portions; an adjustable headband comprising a band generally oval configuration having overlapping end portions; attachment means secured to respective side portions of said band, said attachment means being anchored to the shell so as to provide a connection between the shell and said headband; and adjustment means coacting with the overlapped end portions of said band for adjusting the circumference of the band, said adjustment means disposed within the rear area of the helmet and operable for drawing said overlapped ends of the band together or spreading them apart depending upon the direction of rotation; said overlapped ends of the band being disposed in the rear of the shell, said adjustment means comprising a disc-like knob disposed between said overlapped ends and said skirt, said skirt being provided with an opening in its lower margin and with a window disposed above said notch, and said window and opening being in registering relation to upper and lower portions of said knob respectively.

2. An athletic helmet comprising: a shell having a crown portion, a rear skirt and a pair of ear-covering side portions; an adjustable headband comprising a band generally oval configuration having overlapping end portions; an attachment yoke comprising a central portion anchored to the crown to said shell and respective side straps extending downwardly adjacent the sides of said shell and normally spaced inwardly from the respective sides of said shell; cushioning means interposed between the respective sides of said shell and said headband in a manner to yieldingly permit horizontal float of said headband within said shell; and adjustment means comprising a knob of wheel form interposed between said overlapping rear ends of the band and said skirt and having a central portion cooperating with said overlapping ends to effect spreading thereof when rotated into one direction and to draw said overlapping ends together when rotated in the opposite direction; said skirt being provided with an opening in its lower central margin and with a window spaced above said opening, said opening and window being in registering relation to respective lower and upper portions of said knob whereby to provide access to the knob by the thumb and fingers of the wearer for actuating said knob.

3. An athletic helmet comprising: a shell having a crown portion, a rear skirt and a pair of ear-covering side portions; a headband of generally oval configuration having an attachment yoke comprising a central portion anchored to the crown of said shell and respective side straps extending downwardly adjacent the sides of the shell, and attached to respective side portions of said band, and normally spaced inwardly from said sides so as to permit lateral float of said headband within said shell; and a cushioning pad covering the inner surface of said helmet crown and interposed between the wearer's head and said crown when the helmet is worn; said cushioning pad having at respective sides thereof, projecting portions extending downwardly between said headband and the opposed areas of said shell and yieldingly cushioning said lateral float, the respective side portions of said pad being provided with T-slots including transverse head portions through which said straps extend with their lower portions projecting downwardly therefrom, said side portions being provided with opposed tongues projecting horizontally toward one another between said projecting lower portions of the straps and said shell, and said T-slot having a vertical leg defining a narrow space between the opposed ends of said tongues.

4. A helmet as defined in claim 3, wherein said cushioning means has at respective sides thereof, projecting portions extending downwardly between said headband and the opposed areas of said shell and yieldingly cushioning said horizontal float.

5. A helmet as defined in claim 3, wherein the respective side portions of said means are provided with T-slots including transverse head portions through which said straps extend with their lower portions projecting downwardly therefrom inwardly of said means, and wherein said side portions are provided with opposed tongues projecting horizontally toward one another between said projecting lower portions of said straps and said shell, said T-slot having a vertical leg defining a narrow space between the opposed ends of said tongues.

6. A helmet as defined in claim 3, including a transversely elongated cushion of flat-sleeve form surrounding the forward portion of said headband and engageable with the forehead of a wearer.

7. A helmet as defined in claim 3, including a transversely elongated cushion of flat-sleeve form surrounding the rear portion of the headband and engageable against the back of a wearer's head.

8. An athletic helmet comprising: a shell having a crown portion, a rear skirt and a pair of ear covering
side portions; a headband of generally oval configuration having an attachment yoke comprising a central portion anchored to the crown of said shell and respective side straps extending downwardly adjacent the sides of the shell, and attached to respective side portions of said band, and normally spaced inwardly from said sides so as to permit lateral float of said headband within said shell; and a cushioning pad covering the inner surface of said helmet crown and interposed between the wearer's head and said crown when the helmet is worn; said pad having a rearward portion of yoke form defining a notch of scallop form, respective sides of said yoke portion being separated by slots from adjacent side portions of said pad and being extended downwardly between the rear portion of said headband and said skirt; said band having overlapping rear end portions; and an adjustment knob received in said notch and having means coacting with said rear end portions for adjusting the circumference of said headband.

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