A helmet includes a shell with an impact resistant exterior surface formed by an upper shell and a rear shell. The upper shell is shaped to protect a top portion of a wearer's head, the rear shell shaped to protect an occipital portion of the wearer's head. A headset assembly, attached to the shell, includes dual ear cups rotatable about an axis that is above the wearer's ears when the helmet is worn. The ear cups have at least the following positions: an extended position to cover the wearer's ears, and a retracted position substantially abutting both upper and rear shell to the rear of the wearer's ears. The ear cups are shaped so that they form a surface substantially flush with the exterior surface while the ear cups are in the retracted position.
Fig. 9
PROTECTIVE HELMET WITH FLUSH PIVOTING EAR CUPS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to safety helmets. More particularly, the invention concerns a helmet with ear cups that pivot into a position that is flush with the helmet, generally above and behind the wearer's ears.

2. Description of the Related Art

Today, there is a vast array of safety equipment available to workers. Steel-toed boots protect the feet from heavy weights or impact. Fire and heat resistant clothing helps protect the body against flame. Eye goggles and face shields ward off debris and bright light to protect the eyes.

Probably one of the most common items of safety equipment is a helmet or "hard hat." These are frequently used by construction workers, building inspectors, shipbuilders, factory workers, and others. However, conventional hard hats typically leave the wearer's ears exposed and vulnerable to impact damage. Of course, some people use ear plugs to protect their hearing, but this still leaves their ears unprotected from possible impact. Other people might use aftermarket ear muffes to protect against hearing loss, and this might provide some incidental protection against impact injury to the ears. However, aftermarket ear muffes can be difficult to wear with a conventional hard hat. There are some products with integrated hard hat and ear muffes, but these typically protrude from the helmet in some direction, and necessitate an irregular outer surface of the helmet. Therefore, they are vulnerable to snagging on wiring, insulation, vehicle interior, brush, and other features of the wearer's work environment.

Thus, when selecting a safety helmet and ear protection there are many different tradeoffs. Further complicating this, certain users might wish to listen to audio signals while using a safety helmet. Yet, finding an audio system that is compatible with the helmet and ear protection can be difficult or impossible.

Consequently, known safety helmets are not completely adequate for some applications due to certain unsolved problems.

SUMMARY OF THE INVENTION

A helmet includes a shell with an impact resistant exterior surface formed by an upper shell and a rear shell. The upper shell is shaped to protect a top portion of a wearer's head, the rear shell shaped to protect an occipital portion of the wearer's head. A headset assembly, attached to the shell, includes dual ear cups rotatable about an axis that is above the wearer's ears when the helmet is worn. The ear cups have at least the following positions: an extended position to cover the wearer's ears, and a retracted position substantially abutting both upper and rear shell aft of the wearer's ears. The ear cups are shaped so that they form a surface substantially flush with the exterior surface while the ear cups are in the retracted position.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a right side plan view of a safety helmet.

FIG. 2 is a left side plan view of the safety helmet.

FIGS. 3A-3B are a rear views of the safety helmet.

FIG. 4 is an exploded top perspective view of the safety helmet.

FIG. 5A is a partial, top perspective view of the safety helmet.

FIG. 5B is a partial, bottom oblique view of the safety helmet.

FIG. 6 is a perspective view of a headband assembly.

FIG. 7 is an exploded view of a headset assembly.

FIGS. 8A-8B are perspective views of an eye shield guide and eye shield guide, respectively.

FIG. 9 is a perspective view of a rear shell and lens.

FIG. 10 is an underside perspective view of an electronics module.

DETAILED DESCRIPTION

The nature, objectives, and advantages of the invention will become more apparent to those skilled in the art after considering the following detailed description in connection with the accompanying drawings.

Hardware Components & Interconnections

Overall Structure

One aspect of the present disclosure concerns a safety helmet. Although the safety helmet may be embodied by various hardware components and interconnections, FIG. 1 shows one specific example in the form of helmet 100.

Broadly, the helmet 100 comprises a safety helmet with ear cups that pivot between an extended position and a retracted position that is flush with the helmet, generally above (and also behind) the person's ears. Although not part of the helmet 100, a wearer 150 is shown for reference and perspective.

The helmet 100 includes a front end 102 and a rear end 104. One part of the helmet is a rigid upper shell 105 to protect the wearer's head from impact injury. The upper shell 150 is made of a suitable material for this purpose, such as polycarbonate or another suitable reinforced or non-reinforced material.

Within the upper shell 105 are defined a number of vents 124, which in the illustrated example comprise aero-dynamic channels with apertures leading to the interior of the helmet 100. The vents 124 permit air exchange between the wearer's head and outside the helmet without taking rain in.

The helmet 100 is shaped to form a visor 106, which protrudes well forward of the wearer's face. The visor 106 affords some protection of the wearer's face from sun, rain, and falling debris. Integral with a lower side of the visor 106 is an arc-shaped front lens 108, which protects a multiple beam light (not shown in this view) such as an LED array. FIG. 1 reveals a portion of an eye shield 107 (in retracted position). The shield 107 is illustrated and described in greater detail below.
At the rear 104 of the helmet 100, there is a rear shell 110 and a curved rear lens 114. Within the rear shell 110, there is an electrical connector (not visible in FIG. 1) for attaching electronic equipment of the helmet 100 to various off-helmet electrical equipment. Components at the rear 104 of the helmet are described in greater detail below.

The helmet 100 also includes ear cups, one 116a of which is visible in the view of FIG. 1. The ear cups pivot about respective axes, such as the axis 120 of the ear cup 116a. The ear cups are held in a retracted position, to the rear of the wearer’s ears (e.g., 152) by one of various mechanisms described below. In the illustrated example, there is a friction fit between the ear cup 116a and an engaging feature 118 of a frame (not shown). The frame is illustrated and discussed in greater detail below. In their retracted position, the ear cups are substantially flush with the upper/rear shells 105/110, and more particularly, they present a surface that is substantially continuous with the arc and shape of the rear shell 110 and upper shell 105. By minimizing any protrusion from the helmet, the ear cups present a contiguous part of the helmet when retracted.

FIG. 2 shows the helmet 100 from the wearer’s left side. This view demonstrates some of the helmet 100’s movable parts. Namely, the eye shield 107 and an ear cup 116a are shown in their respective, extended positions.

FIGS. 3A-3B show the helmet 100 in rear view, in two different configurations. In one configuration (302, FIG. 3A), ear cups 116a-116b are extended. In another configuration (304, FIG. 3B), the ear cups 116a-116b are retracted. Both configurations 302-304 illustrate the rear 104 of the helmet, including features such as the rear lens 114 and rear shell 110.

FIG. 4 shows an exploded view of the helmet 100 to better illustrate the individual pieces’ shapes and interconnections. Optionally, the helmet 100 includes vent plugs 412. In one example, the vent plugs 412 include apertures (not shown) that are pressed over studs (not shown) protruding from the shell 105’s inner surface (i.e., the surface toward the wearer). In this example, the vent plugs are secured in place with Tinnerman clips. Of course, other means of attachment may also be employed such as shape fit, fasteners, clips, glue, press fit, screws, rivets, etc. Each vent plug 412 comprises an elastomeric member with protrusions shaped to fit inside corresponding holes of the vents 124. While the helmet 100 is not being worn, the wearer can insert/remove the vent plugs 412 into/from the vents 124 by bendably manipulating the plugs 412.

Beneath the shell 105 is a frame 408. The frame 408 serves as a common attachment point for the upper shell 105, rear shell 110, rear lens 114, front lens 108, and other components described below.

A number of additional components are coupled to the frame 408. One such component is the connector 112. The connector 112 comprises an electrical coupling for electrically attaching helmet electronics (described below) to off-helmet electrical equipment. In one example, the connector is a six position IEEE 1394 receptacle such as Molex part 53984-0611. In the illustrated embodiment, the connector 112 is mounted to a printed circuit board (PCB), which is attached to the frame 408.

The connector 112 is coupled to other electrical components aboard the helmet 100, as described in greater detail below. Some of these components include an electronics module and headset assembly, and these may be electrically coupled to the connector 112 by one or more wiring harnesses, electrical buses, PCB traces, wires, Bluetooth or other wireless links, etc. The connector 112 may be removably engaged with another connector (not shown), electrically attached to various off-helmet components. Some examples of these off-helmet components include a listen-only audio source such as a flash-memory based music player (such as MP3, iPod, etc.), AM/FM or satellite radio, CD player, etc. Another example is a two-way transceiver, such as a wireless phone, two-way radio, etc. As still another example, off-helmet components may include an antenna, pack of one or more rechargeable or disposable batteries, etc. In the illustrated example, the connector 112 is compatible with a six position IEEE 1394 plug (not shown) such as a Tyco part 787950-1. This female plug is compatible with a male counterpart attached via cabling (not shown) to the off-helmet electronics. At a remote end of this cabling, there may be one or more 2.5 mm jacks to interface with audio equipment, cell phones, etc.

Another component attached to the frame 408 is the electronics module 406. Among other components, the module 406 includes a source of light that projects through the front lens 108 when the module 406 is mounted to the frame 408. Thus, in the finished helmet 100, the module 406 and lens 108 are built into the visor 106 of FIG. 1. The module 406 is mounted to the top side of the frame 408, as viewed in FIG. 4.

Another component, attached to the frame 408, is an eye shield guide 402. The guide 402 provides a base for sliding movement of the eye shield 107, defines full up and down travel, and removably secures the shield 107 in a user selected position. The guide 402 and its attachment to the frame 408 are described in greater detail below.

Another component, attached to the frame 408 is a headset assembly 430. Primary components of the headset assembly are the ear cups 116a-116b and the band 413, to which the ear cups 116a-116b are mounted. The assembly 430 and its attachment to the upper shell 105 are described below.

Still another component of the helmet 100 is the headband assembly 414. The assembly 414 provides an adjustable harness to provide a snug fit to the wearer’s head, which supports the helmet 100 during use. The assembly 414 mounts to the frame 408 by four supports 416-419. The assembly 414 and its attachment to the frame 408 are discussed below.

FIGS. 5A-5B illustrate some of the components of FIG. 4 in assembled form. Namely, FIG. 5A shows a top perspective view of the frame 408, headband assembly 414, supports 416-419, eye shield guide 402 (with eye shield 107 removed), and electronics module 406. FIG. 5B shows a bottom oblique view of the helmet 100, where the following components are visible: the frame 408, headband assembly 414, lens 108, guide 402, eye shield 107, support 416, ear cups 116a-116b, rear shell 110, vent plugs 412, connector 112, and upper shell 105.

Headband Assembly

FIG. 6 shows the headband assembly 414 in greater detail. As mentioned above, the headband assembly 414
provides an adjustable harness so that the wearer’s head can comfortable and securely support the helmet 100. In one example, the assembly 414 includes a headband base 602 coupled to crisscrossing straps 610, 612. The straps 610, 612, in one example, comprise nylon webbing. The base 602 includes mechanism 614 to adjust the base to fit different head sizes.

[0040] In the illustrated example, the headband assembly 414 is attached to the base 408 at the supports 416-419. More particularly, the supports 416-419 are attached by fasteners, clips, glue, press fit, screws, rivets, detent or other shape fit, etc. The headset assembly 430 attaches to the shell 105 as discussed above. The base 408 attaches to the shell 105 by fasteners, clips, ultrasonic bonding, glue, press fit, screws, rivets, detent or other shape fit, etc. Thus, in the final construction, the headset assembly 430 is positioned over the headband assembly 414, permitting the assembly 414 to comfortably direct the weight of the helmet 100 upon the wearer’s head.

Headset Assembly

[0041] FIG. 7 shows the headset assembly 430 in greater detail. Broadly, the assembly 430 includes the ear cups 116a-116b, which pivotally attach to the band 413. The band 413 includes studs 704 about which the ear cups 116a-116b are free to rotate, as discussed below. In one example, the band 413 is made of spring steel, and the studs 704 include Press-in studs such as PEM part THFS-632-6. The band 413 also includes holes 724 for use in attaching the band 413 to the upper shell 105. For example, the band 413 may be screwed or riveted to the shell 105 via holes 724. In a different example, the holes 724 may receive barbed studs (not shown) projecting from the shell 105, in order to secure the band 413 to the shell 105. Of course, other arrangements may be used such as fasteners, clips, glue, press fit, shape fit, etc.

[0042] Each ear cup is comprised of an ear pad 710, inner shell 712, acoustic foam 714, and outer shell 716. The shells 712, 716 comprise plastic or another material providing suitable protective strength and light weight. In one example, the shells 712, 716 are bonded to each other using ultrasonic welding, solvent bond, epoxy, or other permanent seal. In one example, the ear cushion 710 comprises water impenetrable material such as Gore-Tex® material surrounding padding of neoprene foam. In another example, the ear cushions 710 are gel or foam filled plastic or another durable yet soft material to provide cushioning between the wearer’s head and the assembly 430.

[0043] Each inner shell 712 includes a pivot housing 723 to permit free rotation of the respective ear cup about an axis 722 through the pivot housing 723. In one example, each pivot housing 723 is implemented by a drilled or tooled or vacuum molded hole the shell 712. A stud 704 protrudes through each such hole, enabling the ear cup can to pivot about this hole. The ear cups 116a-116b are held in place by fasteners 706, such as nuts with spring steel washers, and the fasteners 706 are cosmetically disguised by caps 708. As an alternative, the pivot housings 723 may be implemented by other arrangements such as bearings, bushings, axles, etc. Furthermore, instead of permitting free rotation of the ear cups 116a-116b about their respective studs 704, the pivot housings 723 and/or studs 704 may be defined to provide rotation under friction, ratcheting movement, detent holding ear cups in position until forcibly overcome, etc.

[0044] Each inner shell 712 further includes a tab 720 designed to interact with a corresponding engaging feature 118 of the frame 408, which is most clearly shown in FIGS. 1, 2, and 4A. In this example, the point of rotation of the ear cups 116a-116b is defined relative the frame 408 so that increasing movement of the ear cups 116a-116b into their stowed position places the tabs 720 into increasingly firm contact with their respective engaging features 118. This holds the ear cups 116a-116b firmly in place by friction between the tabs 720 and engaging features 118. Further force applied to the ear cups 116a-116b in this direction more firmly engages the ear cups with the frame. Alternatively, the helmet 100 may employ other means to hold the ear cups 116a-116b in place, such as springs, snaps, hooks, clips, magnets, etc.

[0045] The foam 714 comprises acoustically absorbent material such as that typically used in conventional and industrial headsets. The outer shell 716 includes a speaker assembly 718 electrically coupled to the connector 112. One example of the speakers is a circumaural type speaker.

Eye Shield and Guide

[0046] FIG. 8A-8B highlight the guide 402 and eye shield 107, respectively. In one embodiment, the shield 107 is made of a clear or intentionally tinted material that meets or exceeds OSHA, UL, and/or CSA requirements for safety glasses. For example, the shield 107 may be made of polycarbonate, acrylic, or another suitable material. The guide 402 is made of a material suitable to provide self-lubrication e.g. nylons and others.

[0047] Although the shield 107 and guide 402 are shown separately, the shield rides in a path defined and limited by the guide 402. When coupled to the guide 402, the shield 107 is slidable in generally upward and downward movements, allowing the wearer to retract and extend the shield (respectively).

[0048] The shield 107 includes a number of features that help establish and limit its position with respect to the rest of the helmet 100. In this respect, the shield 107 includes down catches 810. Each catch 810 includes a protrusion that engages a corresponding feature of the guide 402 to stop extension of the shield 107. Positioning notches 812 are defined in the shield 812 to engage a corresponding pawl of the guide 402 and thereby hold the shield 107 one of these positions under adjustment by the wearer. Channels 814 defined in the shield 107 engage corresponding features of the guide 402 to help stop retraction of the shield 107.

[0049] The guide 402 includes foldover flaps 808 defining slide slots 809 that receive and accommodate the shield 107. Up stops 802 stop retraction of the shield 107 by engaging the channels 814. The stops 802 include protrusions that are biased toward the shield 107 by their size, position, and the natural springiness of the guide 402 material. Pedestals 804 are provided for mounting of the guide 402 to the frame 408 by barbed studs, fasteners, clips, glue, press fit, screws, rivets, detent or other shape fit, etc. A pawl 806 engages with the positioning notches 812 to hold the shield 107 in place, or releasably permit the extension or retraction of the shield 107 when the wearer applies sufficient force to slide the shield 107 and thereby disengage and reengage the pawl 806 from the notches 812 one at a time. Notches 807 are engaged by the down catches 810 to stop extension of the shield 107.
Alternatively, the notches 807 may be omitted, with the upper edge of the guide 402 serving to engage the down catches 810, albeit at an earlier point than the notches 807 would, and thereby not permitting as much down travel.

Rear Panel & Lens

[0050] FIG. 9 shows the rear shell 110 and lens 114 in greater detail. In the rear shell, a notch 902 is defined to accommodate the connector 112, which is attached to the frame 408 as shown above. Aligners 910 permit the shell 110 to be accurately positioned with respect to the frame 408. As shown, each of the aligners 910 is a base with a hole defined therein. Mounting to the frame 408 occurs by the aligner hole’s receipt of a screw, rivet, barbed stud, or other fastener. Alternatively, another means of securing may be used such as glue, ultrasonic bonding, clips, etc.

[0051] The shell 110 bears attachment pegs 904 shaped to engage corresponding holes 906 in the rear lens 114 and thereby secure the lens relative to the shell 110. The shell 110 and lens 114 may be attached by a press fit between the pegs 904 and holes 906 and/or additional means such as ultrasonic welding, solvent bond, epoxy, etc. Along these lines, the lens 114 includes knobs 908 to affix the lens 114 with respect to the frame 408.

[0052] A number of rear-facing light sources (not shown) may be attached to the frame 408 at a suitable position to be aligned with the lens 114. For example, the electronics module 406 may comprise a light source of type T1 may be used. Or, instead of multiple light sources, a single light may be used with beam splitters, lenses, or other modification. These light sources serve a safety function, to make the wearer more visible to people behind him/her. Optionally, the rear-facing light sources may be red in color, or use a blinking pattern. The light sources receive power from the electronics module 406 via one or more wiring harnesses, electrical buses, PCB traces, wires, Bluetooth or other wireless links, etc.

[0053] As an alternative to the rear shell 110 and lens 114 that are separate from the upper shell 105 as illustrated, these features may be integral with the upper shell 105, thereby forming a larger, contiguous combined upper/rear shell.

Electronics Module

[0054] FIG. 10 shows the electronics module 406 in greater detail. As mentioned above, the electronics module 406 includes a source of light that projects through the front lens 108 when the module 406 is mounted to the frame 408. In one example, the module 406 may be mounted to the frame 408 by fasteners, clips, glue, screws, rivets, detent or other shape fit, etc. In the finished helmet 100, the module 406 and lens 108 are built into the visor 106 of FIG. 1.

[0055] One example of the module 406 includes an array of LEDs 1002 mounted to a printed circuit board 1003. In the illustrated example, six white LEDs of type T1-3/4 may be used. The LEDs 1002 may be aimed in the same direction (as shown), or at various angles to enhance the overall presentation of light around the wearer’s workspace. Optionally, the LEDs 1002 may even be distributed to provide peripheral lighting in addition to straight-ahead illumination respective to the wearer’s face and normal field of view. Instead of multiple separate beams (as shown), the same or similar effect may be accomplished with beam splitters, lenses, etc.

[0056] The module 406 may include further electronics. In one example, the module 406 includes brown microphones 1004 enabling the wearer of the helmet 100 to conduct hands free communications utilizing an off-helmet audio module coupled to the connector 112. As an example, 6 mm directional microphones may be used to effectively define a “beam” of heightened sound reception aimed at the site of an average wearer’s mouth. The microphones 1004 may include a moisture barrier, such as GORE-TEX® or a similar material.

[0057] As shown, the module 406 also includes a photo sensor 1008, such as a Perkin Elmer part A9060. Optionally, circuitry of the board 1003 may automatically activate the LEDs 1002 and/or the rear light when the sensor 1008 finds that ambient light is less than a given threshold.

[0058] In order to provide more intelligence functionality, the helmet 100, the module 406 may also accommodate various circuitry in the form of discrete circuit elements, integrated circuits, ASICs, and the like. For example, the module 406 may include a Forthems brand FM1072LP chips in order to aid processing of audio signals received at the microphones 1004, prevent feedback between the microphone and speakers, etc. As a further example, the module 406 may include circuitry to convert mobile phone signals to a speakerphone and headset function for send and receive, and to provide a stereo amplifier for the speakers 718.

[0059] The module 406 further includes hand-operated dual switches 1006, such as E-Switch part EG2305A. The dual switches 1006 may be attached to permit the wearer to selectively deactivate the LEDs 1002, rear light, microphones 1004, and/or other electronic equipment.

[0060] Optionally, through the switches 1006 or on-board circuitry, the module 406 may automatically or manually adjust the volume of the ear cup speakers. For instance, the module 406 may utilize a softer volume while the ear cups are extended, and use a louder “speakerphone” volume while the ear cups are retracted. As a more particular example of the automatic embodiment, the ear cups 116a-116b may actuate a switch mounted to the frame 408 or other structure, where this switch is activated by a raised feature of one or both ear cups 116a-116b close to the pivot point when ear cups are extended. Without any intended limitation, some specific examples of this raised feature include one or both of the tabs 730-731 (FIG. 7). In this example, the switch is de-activated when the ear cups are retracted, and activated when the ear cups are extended. In one example, the switch connects the speakers to different amplifier circuitry depending upon whether the switch is activated or deactivated. In another example, the switch provides an input signal to a controller of the electronics module 406, which regulates volume accordingly.

Helmet Features

[0061] As described above, the helmet 100 offers a variety of useful features in one package. The helmet 100 provides MP3, CD player, radio, cell phone, two-way radio, or other audio to the wearer by virtue of the speaker assemblies 718 in ear cups 116a-116b. And, with the directional brow microphones 1004, the helmet 100 enables the wearer to conduct mobile, hands free speech through an attached, off-helmet wireless phone or two-way radio transceiver. Audio signals are conveyed to/from remote electronics by
the connector 112 and appropriate cabling (not shown). Moreover, the wearer’s eyes are protected by the retractable eye shield 107. To fully illuminate the wearer’s workspace with minimal intrusion, the front-facing light assembly 1002 is provided internal to the visor 106 and protected by a brow lens 108 that is flush with the visor 106. For added safety, the rear-facing light makes sure that the helmet is visible from behind. Furthermore, the ear cups 116a-116b are particularly convenient because they are retractable. Moreover, they are unlikely to catch on wiring, insulation, vehicle interior, brush, or other features of the wearer’s work environment, since the ear cups 116a-116b when retracted are flush with helmet’s exterior surface, namely, the upper shell 105 and the rear shell 110. Despite the collective benefit of these features, the helmet still provides significant utility if one or more of these are omitted.

Helmet Operation

[0062] In preparation for use of the helmet 100, the wearer uses the mechanism 614 to adjust the headband base 602. The wearer also couples the connector 112 to the desired electrical equipment, such as one-way or two-way audio equipment, battery pack, etc. When the wearer dons the helmet 100, the axis 722/120 is generally just above the wearer’s ears. Thus, the ear cups 116a-116b when retracted rest above and generally behind the wearer’s ears, flush with the outer surface of the shells 105, 110. The ear cups 116a-116b are secured in the stowed position by friction between the tab 720 of the headset assembly 430 and the engaging feature 118 of the frame 408. In this position, recognizing that the ear cups are stowed, the helmet 100 may automatically provide an increased “speaker phone” volume to the ear cup speakers.

[0063] When the helmet 100 is being worn, the wearer operates the switches 1006 to configure electrical features such as the front lights, rear lights, audio on/off, microphone mute, and the like. To extend the ear cups 116a-116b, the wearer applies downward force to the ear cups 116a-116b, which disengages the tabs 720 from the engaging features 118. The ear cups 116a-116b then hang in a free pivoting mode, or they may be held in place by a feature (not shown) such as a catch, detent, ratchet, clasp, etc. In this position, recognizing that the ear cups are extended, the helmet 100 may automatically select a decreased volume for ear cup speakers.

[0064] To retract the ear cups 116a-116b again, the wearer pivots the ear cups rearward, ultimately engaging the tabs 720 with the features 118. Greater force applied to the ear cups in this way more snugly engages them with the frame 408 in tighter fit.

Other Embodiments

[0065] While the foregoing disclosure shows a number of illustrative embodiments, it will be apparent to those skilled in the art that various changes and modifications can be made herein without departing from the scope of the invention as defined by the appended claims. Accordingly, the disclosed embodiment are representative of the subject matter which is broadly contemplated by the present invention, and the scope of the present invention fully encompasses other embodiments which may become obvious to those skilled in the art, and that the scope of the present invention is accordingly to be limited by nothing other than the appended claims.

What is claimed is:

1. A helmet, comprising:
   a shell comprising an impact resistant exterior surface formed by an upper shell and a rear shell, the upper shell shaped to protect a top portion of a wearer’s head, the rear shell shaped to protect an occipital portion of the wearer’s head;
   a headset assembly attached to the shell, comprising:
      dual ear cups rotatable about an axis that is above the wearer’s ears when the helmet is worn, the ear cups having at least the following positions: an extended position to cover a wearer’s ears, and a retracted position substantially abutting both upper and rear shell aft of the wearer’s ears;
      where the ear cups are shaped to form a surface substantially flush with the exterior surface while the ear cups are in the retracted position.

2. The helmet of claim 1, further comprising:
   an electrical connector configured for detachable electrical connection to off-helmet electronics;
   audio speakers installed in the ear cups, the speakers including signal inputs electrically coupled to the connector.
3. The helmet of claim 1, further comprising:
   a first electrical connector positioned proximate the rear shell;
   a second electrical connector, detachably coupled to the first electrical connector, the second electrical connector electrically attached via one or more cables to one or more electronic components located apart from the helmet;
   the electronic components including one or more batteries and an audio source;
   audio speakers installed in the ear cups, the speakers including signal inputs electrically coupled to the first connector.
4. The helmet of claim 3, where:
   the shell includes a rear end proximate the rear shell and a front end opposite the rear end, and the front end includes a narrowed extension providing a visor;
   the helmet further includes: audio speakers located in the ear cups, at least one hands-free microphone attached to the visor, at least one connector to electrically couple to a transceiver, and one or more links connecting the connector with the microphone and the speakers.
5. The helmet of claim 1, where:
   the shell includes a rear end proximate the rear shell and a front end opposite the rear end, and the front end includes a narrowed extension providing a visor;
   the helmet further includes: a light assembly internal to the visor and protected by a brow lens substantially flush with the visor.
6. The helmet of claim 1, where:
   the shell includes a rear end proximate the rear shell and a front end opposite the rear end, and the front end includes a narrowed extension providing a visor;
   the helmet further includes: an eye shield adjacent the front end, the eye shield being slidably retractable upwardly into the helmet.
7. The helmet of claim 1, further comprising:
   an internal frame coupled to the upper shell and rear shell;
   a headband assembly coupled to the frame;
   an eye shield;
   a guide connected to the frame and defining one or more slide slots to receive the eye shield and permit slidable retraction and extension of the eye shield relative to the guide;
   where one of the eye shield and guide include includes a pawl and the other of the eye shield and guide includes positioning notches, the pawl and notches positioned complimentarily to provide ratcheting adjustment of the eye shield in predefined positions affixed by engagement of the pawl and notches.
9. The helmet of claim 1, further comprising:
   an internal frame coupled to the upper shell and rear shell;
   a headband assembly coupled to the frame;
   an eye shield;
   guide means for facilitating slidable retraction and extension of the eye shield relative to the helmet;
   means for ratcheting adjustment of the eye shield in predefined positions.
10. The helmet of claim 1, where:
   the upper shell and rear shell are positioned to define a gap therebetween;
   the helmet further includes a rear-facing light assembly positioned to shine through the gap when illuminated, and a lens covering the gap and protecting the rear-facing light assembly.
11. The helmet of claim 1, further comprising:
   means for securing the ear cups in the retracted position.
12. The helmet of claim 1, further comprising:
   an internal frame coupled to the upper shell and rear shell;
   a headband assembly coupled to the frame;
   where the ear cups are shaped to engage the frame while in the retracted position, the engagement sufficient to removably secure the ear cups in the retracted position.
13. The helmet of claim 1, further comprising:
   a switch, responsive to position of the ear cups, to provide a higher volume to speakers in the ear cups when the ear cups are retracted and a lower volume to the speakers when the ear cups are extended.
14. The helmet of claim 1, further comprising:
   means for providing a higher volume at speakers in the ear cups when the ear cups are retracted and a lower volume when the ear cups are extended.
15. The helmet of claim 1, where:
   the shell includes a rear end proximate the rear shell and a front end opposite the rear end, and the front end of the shell includes a narrowed extension providing a visor;
   the helmet further comprises:
   at least one hands-free microphone attached to the visor;
   audio speakers installed in the ear cups;
   at least one connector to electrically couple to a transceiver;
   one or more links coupling the connector with the microphone and the speakers,
   adjacent the front end, an eye shield that is slidably retractable upwardly into the helmet,
   a light assembly internal to the visor and protected by a brow lens substantially flush with the visor.
16. A helmet, comprising:

- a shell comprising an impact resistant exterior surface to protect top and occipital portions of a wearer's head;
- a headset assembly attached to the shell, comprising:
  - dual ear cups rotatable about an axis that is substantially above the wearer's ears when the helmet is worn, the ear cups having at least the following positions: an extended position to cover a wearer's ears, and a retracted position substantially abutting both upper and rear shell aft of the wearer's ears;
- where the ear cups form a surface substantially flush with the exterior surface while the ear cups are retracted.

17. A helmet, comprising:

- a headband assembly to receive a helmet wearer's head;
- a frame coupled to the headband assembly;

- a shell comprising an impact resistant exterior surface formed by an upper shell and a rear shell separately coupled to the frame, the upper shell shaped to protect a top portion of a wearer's head, the rear shell shaped to protect an occipital portion of the wearer's head;
- a headset assembly attached to the shell, comprising:
  - dual ear cups rotatable about an axis that is substantially above the wearer's ears when the headband assembly receives the wearer's head, the ear cups having at least the following positions: an extended position to cover a wearer's ears, and a retracted position substantially abutting both upper and rear shell aft of the wearer's ears;
- where the ear cups are shaped so that to form a surface substantially flush with the exterior surface while the ear cups are in the retracted position.