ABSTRACT

An impact absorbent pad, which is supported by the neckband of a helmet shell against the base of the skull of a wearer thereof to protect the wearer against serious injury by the rim of the helmet shell when the helmet shell is impacted from the rear. The impact absorbent pad is particularly useful in combination with helmet shells worn by parachutists.

3 Claims, 3 Drawing Figures
IMPACT ABSORBENT PAD FOR HELMET SHELL

The invention described herein may be manufactured, used, and licensed by or for the Government for governmental purposes without the payment to me of any royalty thereon.

BACKGROUND OF THE INVENTION

This invention relates to an impact absorbing pad for use in conjunction with the neckband of a helmet shell to prevent or minimize injury to the base of the skull of the wearer of a helmet when the helmet is subjected to impact from the rear.

The Armed Forces have for many years used helmets to protect the heads of soldiers against missiles, shrapnel, and the like. A helmet is usually made of a metal having high impact and ballistic resistance within which a helmet shell is worn, the helmet shell usually being made of relatively hard plastic, often reinforced with fiberglass. Inside of the helmet shell a helmet shell suspension is mounted. The helmet shell suspension is made of flexible webbing materials arranged to fit the crown of the head of the wearer of the helmet and thus keep the helmet shell spaced somewhat away from the head of the wearer. Usually there is a chin strap to be passed under the chin and fastened to the helmet shell suspension on both sides of the head to prevent the helmet shell from tilting backwards on the head. Also, there is a neckband which is fastened to the helmet shell suspension on both sides of the head and passes around the base of the skull in the rear, usually contacting the nape of the neck, and serving to prevent forward tilting of the helmet on the head. Such an arrangement is disclosed in U.S. Pat. No. 2,814,043 and will under most circumstances provide adequate protection for the head of the wearer. However, it has been found that in the case of parachute jumps occasionally a soldier lands off balance or may be dragged by a parachute and thrown to the ground with great force. If this occurs and the rear edges of the helmet shell or helmet are jammed against the neck and base of the skull, there is grave danger of severe or even fatal injury to the parachutist.

It is, therefore, an object of the invention to provide an impact absorbent pad for use with a helmet shell to provide protection to the nape area of the neck and the base of the skull against the effects of severe impacts on the rear portions and especially the rear rim of a helmet shell or helmet.

Other objects and advantages will be apparent from the following description of one embodiment of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

SUMMARY

The invention comprises an impact absorbing pad to be mounted on the neckband of a helmet shell suspension system so as to be held between the neckband and the area at the base of the skull of the wearer to prevent the back rim of the helmet shell or the back rim of the helmet from striking against the neck or base of the skull of the wearer with damaging force when the helmet and helmet shell are subjected to impact from the rear.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The drawing shows the preferred embodiment of the invention.

In the drawings:
FIG. 1 is a perspective view of an impact absorbing pad embodying the invention, the pad being viewed from a position to the rear and somewhat to the right side of the wearer if the pad were being worn in conjunction with a helmet shell.
FIG. 2 is a side elevational view of a helmet shell on the head of a wearer thereof, including an impact absorbing pad embodying the invention, the impact absorbing pad being viewed in perspective and from the left side of the wearer. The helmet shell suspension has been cut away except for the lower portion of the headband to which the neckband is attached, the neckband and a suspension strap supporting the impact absorbing pad against the base of the skull of the wearer.
FIG. 3 is a rear elevational view of a helmet shell as in FIG. 2 on the head of a wearer thereof, including the impact absorbing pad embodying the invention, the impact absorbing pad being viewed from the rear thereof. As in FIG. 2, the helmet shell suspension has been cut away except for the lower portion of the headband to which the neckband is attached on both sides of the helmet shell, the neckband and a suspension strap supporting the impact absorbing pad as in FIG. 2. Lower portions of the chin strap are also cut away for convenience.

Referring to the drawing, wherein like characters designate like parts in all views, 10 designates generally the body of an impact absorbing pad embodying the invention. The impact absorbing pad, when in use, is generally in the shape of an inverted T. It comprises a fabric envelope 11 within which a T-shaped sheet of expanded closed cell cellular elastomeric material, such as material known as "Ensouite" and manufactured by Uniroyal, Inc., is inserted; and the fabric envelope is closed by a seam 12. The sheet of expanded closed cell cellular elastomeric material provides resiliency and impact absorption characteristics to the impact absorbing pad. Its thickness is such as to provide adequate cushioning for the nape of the neck and base of the skull of the wearer against impact by the lower rear rim 13 of the helmet shell 14 in the event of an incorrect parachute landing fall in which the back of the helmet would strike the ground jamming the rear rim of the helmet shell against the nape of the neck and base of the skull of the wearer. The impact absorbing pad is provided with two straps 15, usually made of webbing, sewn or otherwise attached to the envelope on the rear surface thereof and along the two side edges of the rear surface so as to form two substantially parallel spaced apart loops 16. Neckband 17 is flexible and usually made of webbing, is adjustable in length, is fastened to headband 18 by a rivet 19 on each side of the helmet shell, and is threaded through loops 16, providing support for the crossing portion 20 of the inverted T-shaped impact absorbing pad against the base of the skull of the wearer 21 of the helmet shell. A flexible suspension strap 22, preferably made of webbing, is attached at one end thereof to the neckband 17 approximately midway between the points of attachment of the neckband to the headband on the two sides of the helmet shell, passes upwardly across the base portion 23.
of the inverted T-shaped pad, and is attached at the other end thereof to the helmet shell by rivet 24. The suspension strap 22 provides additional support to the impact absorbing pad over that provided by the peripheral portion of the neckband. It also helps maintain the impact absorbing pad centered with respect to the rear of the skull of the wearer by cooperation with loops 16 since either of the two loops 16 is prevented from shifting past one of the edges of suspension strap 22. The loops 16 may be made wide enough or the suspension strap 22 may be made wide enough to prevent any possibility of the shifting of the impact absorbing pad along the neckband 17 and toward one side or the other of the head of the wearer. In any case, the loops 16 and the suspension strap 22 should be made wide enough to insure that the pad remains in close contact with the nape area, thus insuring that if the lower rear rim 13 of the helmet shell is forced in the direction of the skull and nape of the neck of the wearer, it will strike only the impact absorbing pad. Thus serious injury due to concussion at the base of the skull will be prevented when the impact absorbing pad is provided with a sufficiently thick sheet of expanded closed cell cellular elastomeric material within fabric envelope 11 and the pad is properly installed in cooperation with the neckband and the helmet shell, as illustrated in FIGS. 2 and 3. Chin strap 25 under normal conditions under which a helmet shell is worn prevents backward tilting of the helmet shell. However, it is unable to prevent the rear rim of the helmet shell from striking the nape area or base of the skull if the helmet and helmet shell are impacted with great force from the rear. The impact absorbing pad prevents severe damage under such circumstances.

The expanded closed cell cellular elastomeric material employed in the sheet inclosed within fabric envelope 11 may be produced in accordance with U.S. Pat. No. 2,570,182 or U.S. Pat. No. 2,788,333 or by other procedures known in the art for producing such impact absorbing materials. Although the invention has been described in terms of an impact absorbing pad comprising a fabric envelope inclosing an expanded closed cell cellular elastomeric material, which is the impact absorbing component of the pad, it is to be understood that other kinds of impact absorbing materials may be employed. The type of material and thickness, density, resilience, tensile strength and other properties will determine how effective the impact absorbing pad will be for protecting the neck and base of the skull of the wearer of the helmet shell. The important consideration is that the impact absorbing pad be sufficiently thick and be made of materials which will prevent transmission of enough force to the nape of the neck and the base of the skull through the rear rim of the helmet shell or of the helmet to cause injury to the wearer of the helmet. The particular hazards to which the wearer will be exposed will determine in large measure the materials of construction and thickness required in the impact absorbing pad, parachutists requiring greater impact protection in the area of the base of the skull than foot soldiers, in general.

The impact absorbing pad of the invention is particularly useful in conjunction with conventional neckbands used with helmet shells, thus obviating the making of special neckbands for use by members of the Armed Forces who are likely to be exposed to such hazards as the sudden and forceful jamming of a narrow rear rim or edge of a helmet shell or helmet against the nape and base of the skull areas in case of a fall involving striking the back of the helmet shell or helmet against a relatively unyielding surface.

The impact absorbing pad is most useful in combination with parachutists' helmets, but it is not intended that its use should be so limited since it would be useful with any type of helmet or helmet shell which is made of hard or rigid materials. The impact absorbing pad has proven very effective in preventing serious injuries to the skulls and necks of a large number of parachutists who have worn such impact absorbing pads. It will be understood that various changes in the details, materials and arrangements of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art, within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. In combination, a protective helmet comprising a substantially rigid shell and a webbing type suspension system mounted therein for supporting said helmet on the head of a wearer thereof, an impact absorbing pad comprising a body member having the configuration of an inverted T when said impact absorbing pad is in an operative position, said impact absorbing pad being disposed against the head of the wearer of said helmet over the nape area and the base of the skull when in an operative position, an adjustable neckband adapted to overlie the rear of the crossing portion of the inverted T-shaped body member and to support said impact absorbing pad horizontally, said neckband being adjustably attached at each of the two ends thereof to said webbing type suspension at spaced apart points, a suspension strap attached at one end thereof to said neckband at a point approximately midway between said two ends of said neckband and attached at the other end thereof to the inner surface of the rear portion of said rigid shell, said suspension strap being adapted to support said neckband in a vertical direction and to overlie the rear of the base portion of said inverted T-shaped body member and to support the base portion of said inverted T-shaped body member vertically and to hold said base portion against the nape area and the base of the skull of the wearer when said impact absorbing pad and said suspension strap are in operative positions, and means carried by said body member for detachably mounting said impact absorbing pad on said neckband when said impact absorbing pad is in an operative position, whereby said neckband and said suspension strap maintain said impact absorbing pad disposed against the nape area and the base of the skull of the wearer so that said impact absorbing pad prevents impact of the lower rear rim of said rigid shell against the nape or base of the skull of the wearer when the lower rear rim of said rigid shell is forced in the direction of the nape and base of the skull of the wearer.

2. The combination according to claim 1, wherein said body member comprises a T-shaped piece of expanded closed cell cellular elastomeric impact absorbing material encased in a flexible T-shaped envelope, said means for detachably mounting said impact absorbing pad on said neckband being carried by said flexible T-shaped envelope.

3. The combination according to claim 2, wherein said flexible T-shaped envelope is formed of a fabric material and said means for mounting said impact absorbing pad on said neckband comprise two fabric loops attached to said crossing portion of said envelope in substantially parallel spaced apart relation, said fabric loops being adapted for threading said neckband therethrough.