Oct. 5, 1971 S. J. MOLITORIS 3,609,765

PROTECTIVE HELMET HEAD SUSPENSION

Filed Dec. 17, 1969 2 Sheets-Sheet 1

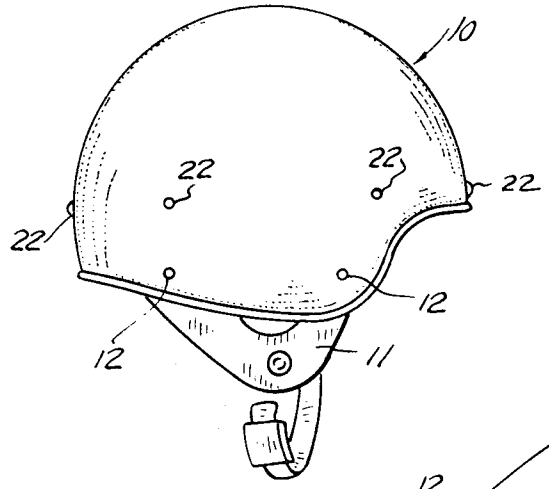


FIG. 1

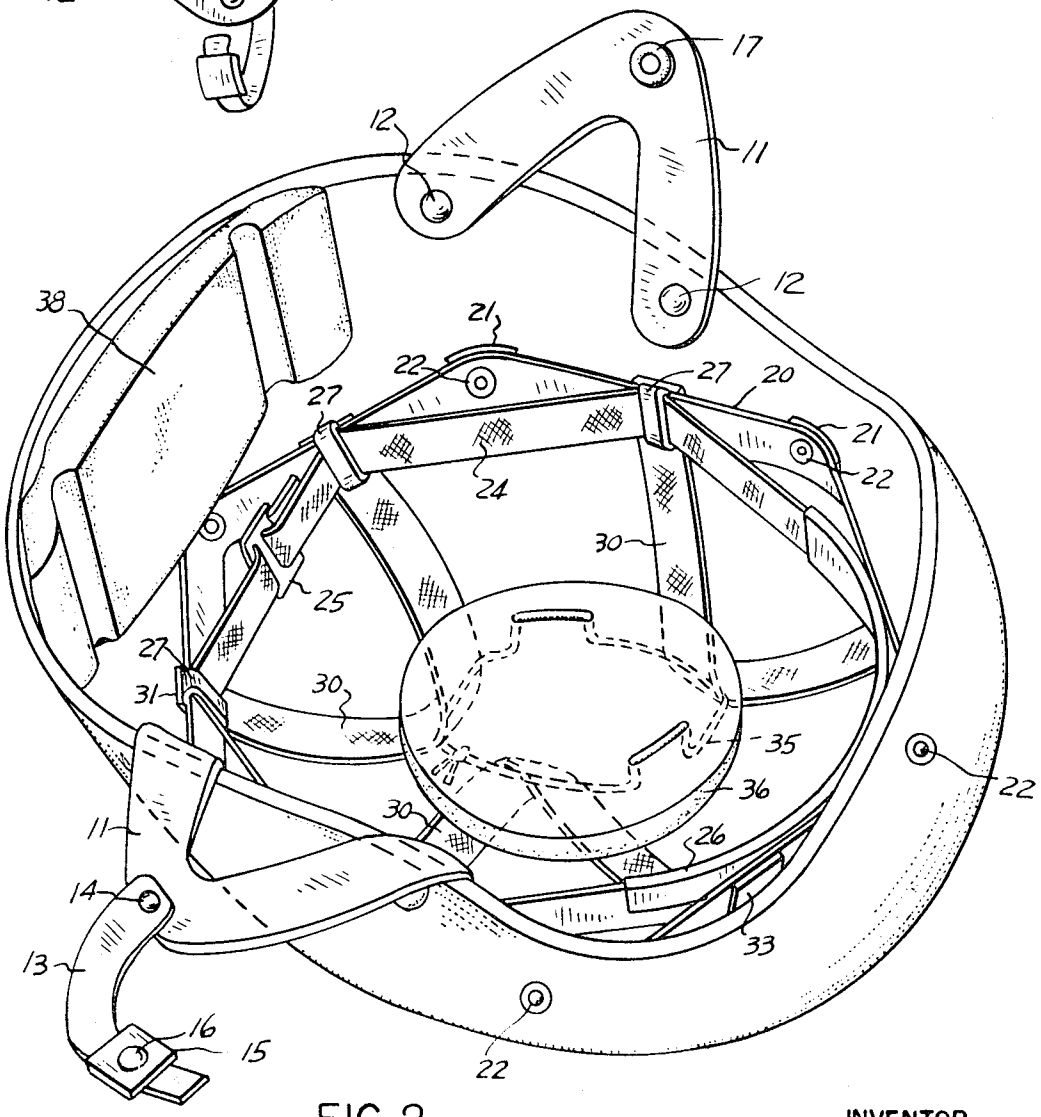


FIG. 2

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FIG. 3

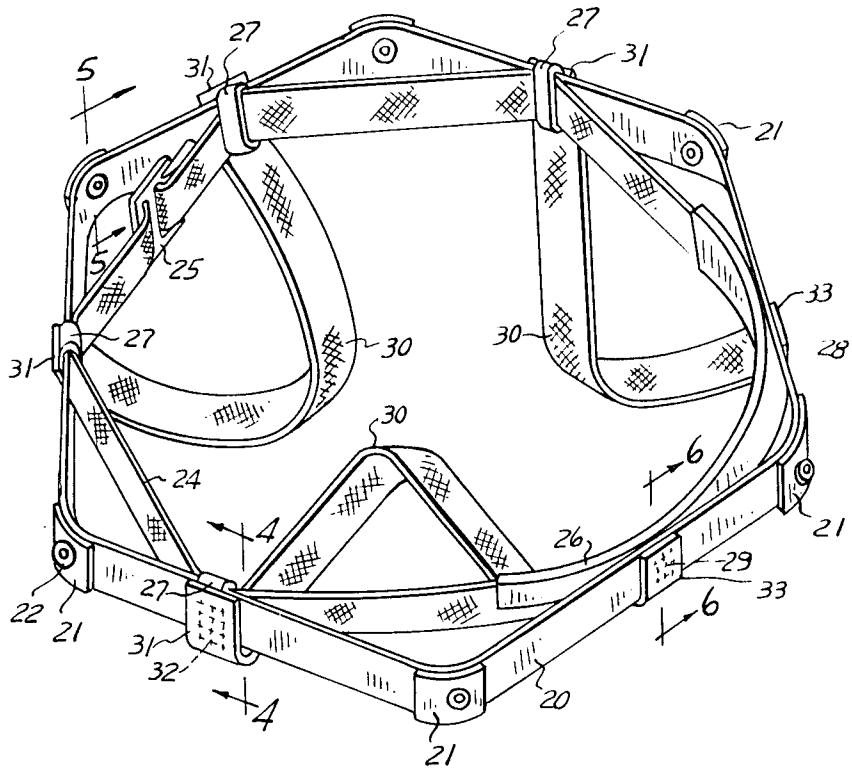


FIG. 4

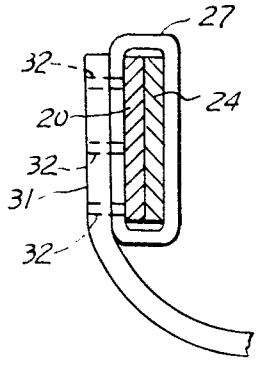


FIG. 5

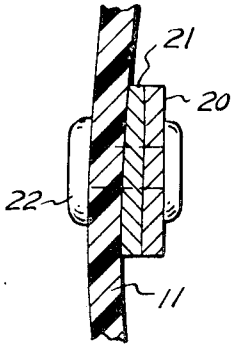
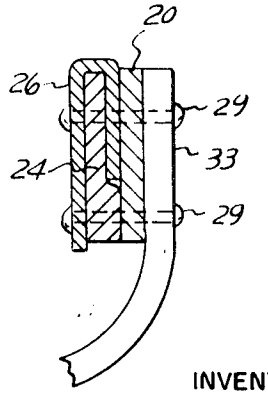


FIG. 6



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PROTECTIVE HELMET HEAD SUSPENSION

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Int. Cl. A42b 3/00
U.S. Cl. 2—3 A 1 Claim

ABSTRACT OF THE DISCLOSURE

A size adjustable suspension for protective helmets, formed of a horizontal outer band arranged within the helmet shell and fixedly secured thereto at the front, rear and two spaced size points to form a roughly hexagonal shape. An adjustable in length inner band secured to the outer band between its points of securement to the shell, with the side and rear securing means being in the form of loops through which the band extends. The lower ends of overhead looped suspension straps are connected to the loops so that the inner band may be adjusted for wearer head sizes.

BACKGROUND OF INVENTION

The invention herein relates to an improved head suspension used for helmets designed to protect against relatively low impacts, as for example, athletic type helmets used in football, skiing and the like or so-called "hard hat" type helmets. These types of helmets are characterized generally by having a hard outer shell and a suspension for positioning the shell upon the wearer's head with no additional energy absorbing liners or structure within the shell.

In such types of helmets, it is desirable to provide a suspension having an adjustable head band for adjusting to the wearer's head size, and in addition to have some sort of means to absorb or reduce the amount of impact energy transmitted to the wearer's head.

Prior devices of this character have been either relatively expensive, uncomfortable to wear, difficult to adjust or too limited in energy absorbing ability. Thus, the invention herein relates to an improved suspension which to a considerable extent reduces the prior drawbacks.

SUMMARY OF INVENTION

In essence, the improved suspension herein comprises an outer band secured at the front, rear and two side points of each side of the helmet shell and surrounding an inner band, which forms the head or sweat band secured to the outer band by means of loops located between the points of securement to the shell, with the inner band being adjustable in length. Overhead suspension straps are also secured to the loops so that the inner band can be easily adjusted in length and thereby automatically adjust the fit of the suspension to the wearer's head.

Preferably, the inner band is stitched or otherwise fixedly secured to the outer band at the forward points of securement, wherein the entire suspension, due to the relative give or stretching of the inner and outer bands and the overhead bands, tends to absorb considerable impact energy.

Summarizing, the improvement contemplates fixedly securing the inner band to the outer band at two forward points and slidably connecting the bands together at four remaining points, with each of the points of connection being approximately midway between points of permanent securement between the outer band and the shell. With this, a simple buckle or the like may be used for adjusting the length of the inner band. Hence, the overall construction is relatively inexpensive, easily adjusted, comfortable to wear and will tend to absorb considerable impact energy applied to the helmet shell.

These and other objects and advantages of this invention will become apparent upon reading the following description, of which the attached drawings form a part.

DESCRIPTION OF DRAWINGS

FIG. 1 is an elevational view of a protective helmet.

FIG. 2 is an enlarged, perspective view of the helmet, but turned upside down so as to look into the suspension fastened therein.

FIG. 3 is a perspective view of the suspension, per se, but again turned upside down.

FIG. 4 is an enlarged cross-sectional view taken in the direction of arrows **4**—**4** of FIG. 3.

FIG. 5 is an enlarged cross-sectional view taken in the direction of arrows **5**—**5** of FIG. 3 and

FIG. 6 is an enlarged cross-sectional view taken in the direction of arrows **6**—**6** of FIG. 3.

DETAILED DESCRIPTION

FIGS. 1 and 2 illustrate a protective helmet formed of a conventional type hard shell **10** and having V-shaped side retaining straps **11**, each secured by rivets **12** to the opposite sides of the shell. A chin strap **13** is fastened by a suitable fastening device such as a rivet **14** to one of the retaining straps. A conventional buckle **15** is fastened to the chin strap and is provided with a snap fastener **16** for engaging a snap fastener half **17** on the opposite retaining strap. The shape of the shell and the construction of the retaining straps may be varied, and form no part of the invention herein.

The suspension includes a non-adjustable outer band **20** formed of a ribbon of a conventional type woven or plastic strapping. Small size reinforcing tabs **21**, which may be formed as the same material as the band, are secured at spaced locations upon the outer band and then the outer band and reinforcing tabs together are secured to the shell **10** by means of rivets **22** or other suitable mechanical fasteners. As can be seen in the drawings, the outer band is secured to the front and rear of the shell and to two spaced side points at each side of the shell making a six point connection which provides a generally hexagonal shape.

An inner band **24** is arranged within the outer band, the inner band being provided with a length adjusting, conventional buckle **25** or similar mechanical adjustment. For comfort, a sweat band covering **26**, formed of sheet plastic or leather or the like is secured to the front portion of the inner band.

The inner band is secured to the outer band by means of four loops **27** located at the rear and sides of the shell and by fixed connections formed by stitches **29** or the like, at the front of the shell on opposite sides of the front rivet. Both the inner and outer bands are slidable relative to the loops **27** (see FIG. 4).

Overhead suspension straps **30** are formed with ends **31** secured to the loops **27** by means of stitches **32**, with the two forward overhead straps having their forward ends **33** secured in place by the above mentioned stitches **29**. These overhead straps are gathered together and secured together by means of conventional tie string **35** which preferably is threaded through a thick, resilient type crown pad **36** for resting upon the top of the wearer's head.

A suitable rear neck pad **38** may be provided within the shell to cushion the wearer's neck and base of his skull.

OPERATION

In operation, the wearer adjusts the length of the inner band **24** by manipulating the portion of the band passing through the buckle **25** so as to comfortably encircle his

head. The inner band slides relative to the outer band through the loops **27** and the position of the loops may be also moved so that they are generally, but not necessarily exactly, around the middle distance between each pair of rivets **21**. This quickly and simply adjusts the head size of the suspension. Further adjustments may be made by tightening or loosening the tie string, that is, adjusting the position of its knot.

In the case of impact to the shell, the loops, band lengths between the loops and band lengths between the rivets **21** tend to stretch or move so as to reduce the transmission of energy of the impact to the wearer's head.

Having fully described an operative embodiment of this invention, I now claim:

1. A head suspension construction in a helmet formed of an inverted, roughly bowl-shaped shell, having front, rear and side portions, comprising:

a thin, narrow, flexible, approximately horizontally arranged outer band located within the shell and fixedly secured thereto at the front, rear and two spaced points at each side of the shell to form a roughly hexagonal shape;

a flexible inner head band of adjustable length located within said outer band and fixedly anchored thereto at points approximately midway between the front point of attachment and each of the respective forwardmost side points of attachment of said outer band to the shell;

said inner head band being further attached to said outer band by means of slidable connections located approximately at each of the four remaining midpoints between the respective points of attachment of said outer band to the shell, each of said slidable connections comprising a loop through which both said inner head band and said outer band can freely slide; and

a series of overhead looped straps, two of said straps each having one outer end anchored to the respective fixed anchor points of said inner head band, the remaining outer ends of said series of straps being secured to said loops for slidable movement therewith, the inner ends of said straps being adjustably connected together for resting upon the crown of a wearer's head and supporting the helmet thereon.

References Cited

UNITED STATES PATENTS

2,371,712 3/1945 School et al. ---------- 2—3

FOREIGN PATENTS

1,215,217 11/1957 France ---------- 2—3

JAMES R. BOLER, Primary Examiner