June 11, 1963 H. W. AUSTIN 3,092,837

HELMET SHELL SUSPENSION WITH ADJUSTABLE HEIGHT SWEAT BAND

Original Filed Nov. 26, 1958 2 Sheets-Sheet 1

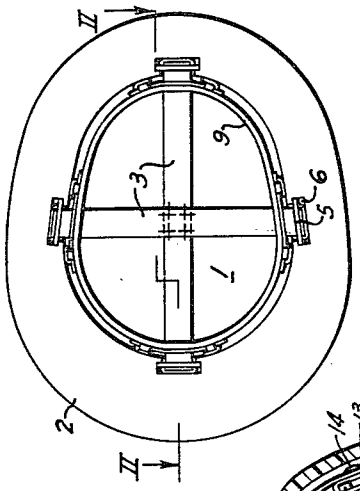


Fig. 1

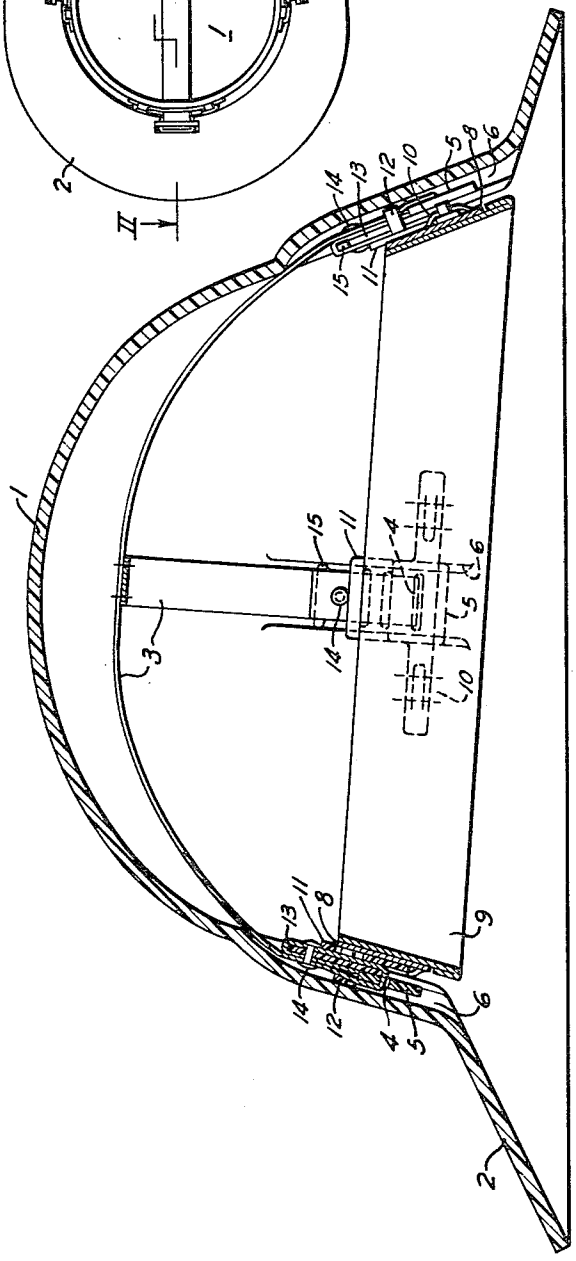


Fig. 2

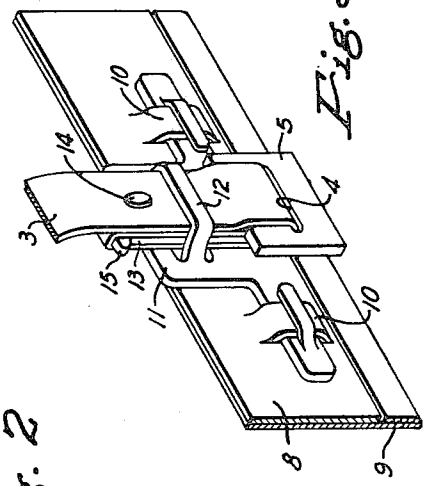


Fig. 3

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HELMET SHELL SUSPENSION WITH ADJUSTABLE HEIGHT SWEAT BAND

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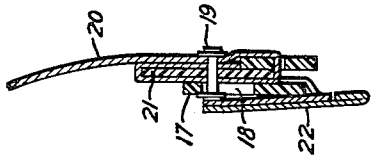


Fig. 5

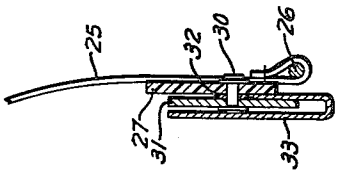


Fig. 7

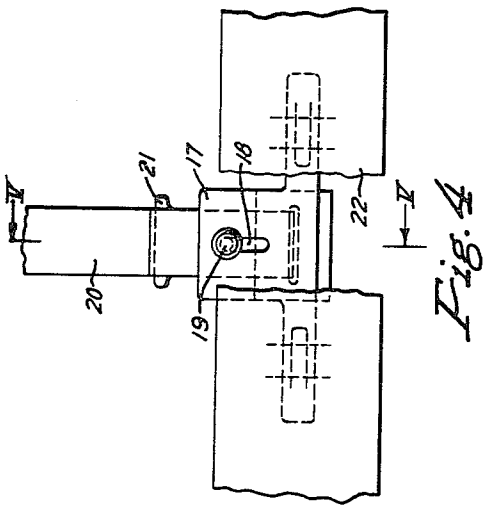


Fig. 4

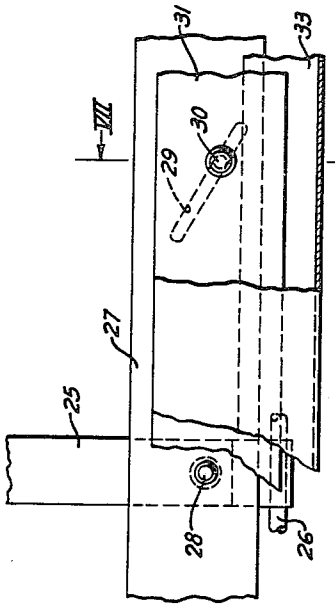


Fig. 6

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HELMET SHELL SUSPENSION WITH ADJUSTABLE HEIGHT SWEAT BAND

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Original application Nov. 26, 1958, Ser. No. 776,615, now Patent No. 3,020,551, dated Feb. 13, 1962. Divided and this application Aug. 31, 1961, Ser. No. 135,288

4 Claims. (Cl. 2—3)

This invention relates to suspensions for protective helmet shells, and more particularly to those equipped with sweat bands that can be adjusted vertically in the suspensions. This application is a division of my copending patent application Serial Number 776,615, filed November 26, 1958, now Patent No. 3,020,551, granted February 13, 1962.

One of the factors that determines the amount of protection provided by a protective hat or helmet is the space or clearance between the top of the wearer's head and the inside of the helmet shell. The greater this distance, the greater the protection because there is less likelihood of the shell being driven down against the head by an impact against the shell. The usual helmet suspension, which fits over the head and supports the helmet, has a lace at the top of its cradle so that the suspension can be adjusted to fit heads of different crown heights. Thus, a person with a high crown lengthens the lace so that his head will extend farther up into the helmet, while a person with a low crown shortens the lace to reduce the height of the suspension. An objection to this manner of adjustment is that a person with a high crown may let out the cradle adjustment lace to the point where the top of his head will practically touch the top of the helmet shell. On the other hand, if the suspension is not adjustable in height the sweat band may ride too high on the head of a person with a high crown and too low around the head of a person with a low crown.

It is among the objects of this invention to provide a hat suspension, in which the crown clearance at the top remains constant, and in which the sweat band can be moved manually up and down in the lower part of the head cradle to permit that band to be adjusted vertically.

The invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a bottom or inside view of a helmet;

FIG. 2 is an enlarged longitudinal section taken on the line II—II of FIG. 1;

FIG. 3 is a fragmentary isometric view of a connection between a cradle strap and the headband;

FIG. 4 is a fragmentary side view of a headband, showing a modified manner of supporting it;

FIG. 5 is a vertical section taken on the line V—V of FIG. 4; and

FIGS. 6 and 7 are views similar to FIGS. 4 and 5, respectively, of a further embodiment of the invention.

Referring to FIGS. 1 and 2 of the drawings, the rigid shell of a protective hat or helmet has a dome-shaped crown 1 surrounded at its bottom by an integral brim 2. Inside of the shell there is a suspension, by which the shell is supported and held in position on the head of a wearer. The suspension includes a head-receiving cradle formed from straps 3 of any suitable material which extend across the top of the head. The lower ends of the straps may be fastened in any suitable manner to the lower part of the shell in order to support it. For example, the lower ends of the straps may be looped through slots 4 in rigid rectangular anchors 5 that are slipped up into centrally slotted pockets 6 molded into the side wall of the shell.

Disposed inside the lower portion of the cradle is a headband, generally consisting of a backing band 8 and a

sweat band 9. The backing band is a relatively stiff strip of material which is flexible enough to conform to the contour of a head, but stiff enough to avoid flexing or curling vertically. The sweat band is a softer strip of material that has one edge secured in any suitable manner to the outer surface of the backing band. The sweat band extends below the backing band and then is folded up across its inner surface.

As shown in FIG. 3, the backing band is provided at opposite edges of each strap with two pairs of vertical slits to form a pair of vertical loops 10 which receive the opposite ends of a head-band supporting member 11. This member is strong and relatively stiff, most suitably being made from a synthetic plastic. The central portion of the supporting member extends upwardly along the inner surface of the lower portion of the adjoining strap and is provided with a pair of horizontal slots to form a horizontal loop 12 between them. This loop extends tightly around the looped lower portion of the strap in firm frictional engagement with it. To keep the strap from bending into the supporting member opening formed by the outstruck loop 12, it is desirable to insert a stiffening member in the strap loop. This stiffening member may be a flat plate 13 that is held in place by a rivet 14 through it and the adjoining layers of the strap. The upper end of the plate can be provided with laterally projecting ears 15 that will limit the distance the supporting member can be moved up the strap.

To adjust the headband vertically in the head cradle, the supporting members 11 are slid up or down on the cradle straps. The friction between the supporting members and the straps is sufficient to hold the headband at any desired level, because there is very little force tending to move the headband up or down while the helmet is on the head. With this construction the headband can be adjusted to the proper height for the head on which the helmet is being worn. Of course, the circumference of the headband can be adjusted in any well-known manner if desired.

In the modification shown in FIGS. 4 and 5 the headband supporting member 17 is provided with a vertical slot 18, through which a stud 19 extends. The stud also extends through the adjoining portion of the cradle strap 20 and the stiffening member 21 in the strap loop. The heads of the stud overlap the outer surface of the strap and the inner surface of the supporting member and press that member and the strap tightly together. Nevertheless, if it is desired to change the elevation of the headband 22 in the cradle, the supporting member can be slid up or down the strap because the vertical slot 18 will permit such movement. The frictional engagement between the supporting member and the strap will hold the former in any position to which it has been adjusted.

In the embodiment of the invention shown in FIGS. 6 and 7 the lower ends of the cradle straps 25 can be connected to a helmet shell in the same way as those just described, or they can be provided with loops that receive a lace 26 that extends in and out of the shell through holes at circumferentially spaced points in a well-known manner. The lower ends of the straps are connected by a relatively stiff band 27 attached to them by rivets 28 or the like. Between the straps the band is provided with parallel slots 29 that receive studs 30 projecting from the backing band 31 of a headband. A washer 32 may be mounted on each stud between the two bands. A sweat band 33 is fastened to the outer surface of the backing band below the studs and extends around its lower edge and up across its inner surface. The slots extend up and down, preferably at an inclination. Of course, they are all inclined in the same direction. With inclined slots there is less chance of the headband slipping vertically in the cradle than if the slots were

vertical, especially since the headband cannot move up or down without simultaneously rotating in the cradle. To adjust the height of the headband in the cradle, the headband is rotated, whereupon the studs will have to slide up or down in the inclined slots and thereby cause the headband to move vertically. Friction between the relatively sliding surfaces will hold the headband in any desired position.

I claim:

1. A helmet shell suspension comprising a plurality of straps forming a head-receiving cradle member having its lower part formed for attachment to a helmet shell to support the shell, a headband member disposed inside the lower part of the cradle member, headband supporting means disposed between said members and connected to one of them and provided with slots extending up and down, and studs secured to the other member and extending through said slots to hold it tightly against the slotted means but permitting relative manual up and down movement of said other member and slotted means in frictional engagement to adjust the headband member bodily vertically in the cradle member.

2. A helmet shell suspension comprising a head-receiving cradle having its lower part formed for attachment to a helmet shell to support the shell, a headband disposed inside the lower part of the cradle, and headband-supporting means between the cradle and headband and provided with slots extending up and down, the cradle including studs extending through the slots and holding said means tightly against it but permiting said means to be moved manually up and down in frictional engagement with the cradle, whereby the headband can be bodily adjusted vertically in the cradle.

3. A helmet shell suspension comprising a head-receiving cradle including at its bottom as a part thereof a relatively stiff band provided with circumferentilaly spaced slots extending up and down, means fastened to the lower part of the cradle adapted to attach it to a helmet shell to support the shell, a headband entirely disposed inside said cradle band, and studs mounted in the headband and extending through said slots for pressing said bands tightly together but permiting the headband to be bodily moved manually up and down in the cradle to change the elevation of the headband therein.

4. A helmet shell suspension according to claim 3, in which all of said slots are inclined in the same direction

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