

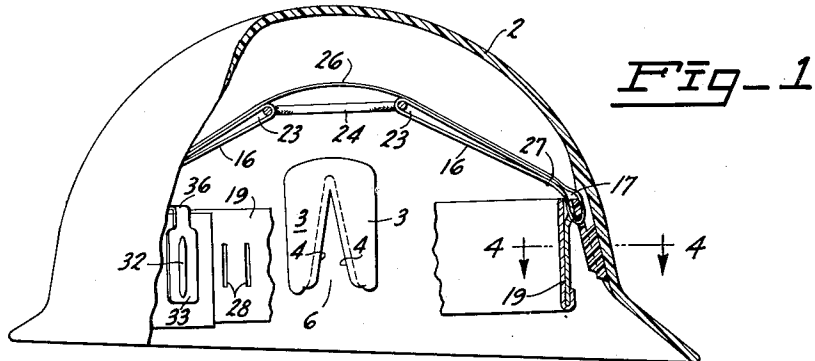
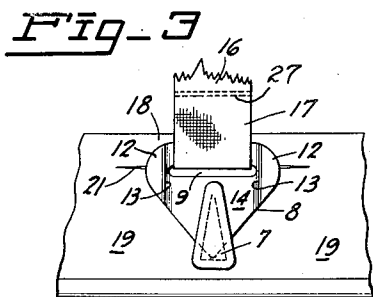
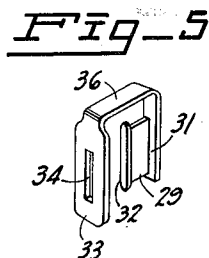
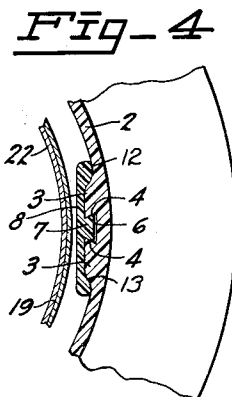
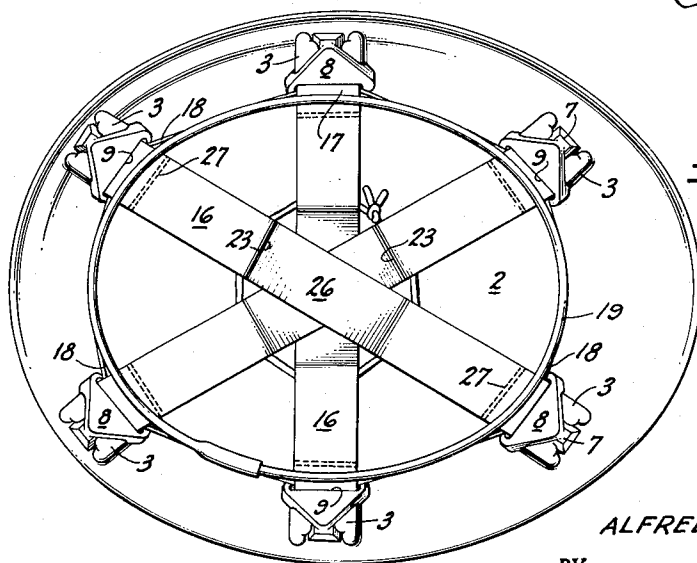
June 26, 1962

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3,040,329

SAFETY HAT SUSPENSION HARNESS

Filed July 20, 1959



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3,040,329

SAFETY HAT SUSPENSION HARNESS

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Filed July 20, 1959, Ser. No. 828,177

4 Claims. (Cl. 2—3)

My invention relates to safety hats; and the principal object of the invention is to provide a hat body with a suspension harness coacting under a blow on the hat body so that the force of the blow is resiliently absorbed and distributed and the damaging effect of a sudden impact avoided.

Another object is the avoidance of cumbersome and metallic fittings between the harness and the hat body so that blows having a large laterally directed component cannot cause head wounds by penetration of such fittings, and are absorbed and distributed by broad surfaces of the harness and adjacent areas of the hat crown.

Another object is the provision of an interlocking device between hat body and harness characterized by easy engaging and disengaging, but which under the impact of a blow on the hat body becomes progressively tighter, thus acting as a progressively applied brake in absorbing the kinetic energy of the blow.

Another object is the provision of a suspension harness having adjustable headstraps and fixed or auxiliary headstraps forming a backstop between the crown of the hat and the adjustable headstraps.

Still another object is the provision of a safety hat of excellent dielectric properties and in which no metal is included.

Other objects will be brought out in the following description of the invention. I do not limit myself to the showing made by said description and the drawings, since I may use variant forms of the invention within the scope of the appended claims.

Referring to the drawings:

FIG. 1 is a side elevation of my safety hat, portions being broken away to disclose underlying parts.

FIG. 2 is a plan view showing the interior of the hat and illustrating the adjustable and fixed sets of headstraps.

FIG. 3 is a fragment in elevation, showing the lower end of a supporting headstrap secured to a wedge and the mounting strip of the sweatband. The direction of the view is horizontally toward the center of the suspension harness.

FIG. 4 is a portion of my hat in horizontal section, the plane of section being indicated by the line 4—4 of FIG. 1.

FIG. 5 is a perspective view of the sizing fastener which secures the ends of the sweatband together.

All views are drawn to a scale approximately 1/2 actual size.

The embodiment of my invention herein described is achieved by a molded plastic hat body having predetermined qualities of tensile, impact and shear strength, elasticity and flexibility, in combination with a suspension harness including two sets of supporting or headstraps and a sweatband. Flat interlocking wedge and socket parts are arranged between the sweatband and the lower portion of the hat crown. The socket part is disposed on the crown and is molded integrally therewith, having flat inner surfaces extending only slightly within the sweep of the inner surface of the crown at its juncture with the brim.

The sweatband which lies just within the crown prefer-

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ably comprises two thicknesses of material, the inner one in direct engagement with the head of the wearer, and the outer one constituting a mounting band to which the ends of the supporting headstraps are made fast. Secured in the end of each supporting or headstrap is a flat two-way or dovetail wedge block seated in its complementary companion socket. The wedge block is readily engaged in and disengaged from its socket, but even the light weight of the hat body seats and locks the parts securely together. Any pressure or blow on the hat, results in two distinct movements of the wedge block in its complementary socket, both tending to tighten the connection and impose a progressively severe braking action on, or resistance to the force or energy of the pressure or blow which must be absorbed or dissipated.

A blow of given intensity taken directly on the head may inflict a serious or mortal injury. The same blow received on my hat while in place on the head may do little more than jar the wearer, because movement of the hat relative to the head is met by a rapidly increasing resistance offered by the engagement of a plurality of two-way wedges in complementary sockets spaced around the crown of the hat, and the resilient resistance offered by the crown to flexure or bucking between the sockets.

My harness of course provides the resilient or elastic flexing and cushioning inherently present in fabric and leather tapes and sweatbands, but these are not enough to absorb the major force of a blow which may crush through the hat body and expend its final energy in a mortal injury. Nor are heavy pads or cushions between sweatband and crown effective in preventing the transmission of shock from hat to head. Analysis of injuries received by the wearers of cushioned hats showed to everyone's surprise, that with the displacement and deformation of the cushioning means, there was an immediate rebound in the opposite direction with aggravation, not lessening, of the injury.

My invention provides means for interposing automatically applied braking resistance with substantially no rebound, between the hat body and the head, so that a major part of the energy of the blow is dissipated in overcoming this frictional resistance of engaging two-way wedge parts; and the impact of the remaining energy distributed around and over the entire upper area of the head above the sweatband with relative slowness compared to the sharp and sudden impact of a direct blow.

My safety hat comprises a hat body of which the main portion is the crown 2. Preferably the hat is molded of one of the nylons or other synthetic resinous material which has the desired qualities of resilience and flexure, and integrally formed with the crown wall along its lower margin are a plurality of pairs of flat lugs 3 extending into the cavity of the crown a small amount, which only about doubles the thickness of the wall at that point. The reason for the low, flat quality of the lugs is to preserve a substantially even sweep around the inner surface of the crown, so that in the event accidental means drives the hat laterally against the head of the wearer, there are no projections to add penetration wounds to the blow.

The lugs 3 are disposed at the inside lower edge of the crown and extend upwardly in it, with their adjacent edges 4 undercut and diverging downwardly to provide a shallow dovetail socket 6 constituting a fixed fastener element in which a wedge block 7 constituting a detachable fastener element of complementary shape interlocks.

The wedge block is molded of nylon or other suitable synthetic resin and has an integral back plate 8 extending

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from its upper or smaller end. The back plate is substantially triangular and is provided with a slot 9 perpendicular to the long axis of the wedge block and parallel to one edge of the back plate. Raised integral pads 12 at opposite ends of the slot 9 are provided with inner edges 13 complementary to the outer edges of the lugs 3 and provide a guide for engaging the wedge block in the socket. The pads 12 also impinge against the inner surface of the crown so as to insure clearance between the central portion 14 of the back plate and the crown. The pads also cause the central portion of the back plate to be slightly flexed so that even when the headgear is not being worn there is a resiliently applied force tending to retain the wedge block and socket in engagement.

The detachable fastener elements, each comprised of integral wedge block and back plate, are suspended from a headstrap assembly formed from a plurality of nylon headstraps 16, each provided with a loop 17 at one end engaging the slot 9 on an associated fastener. Each loop 17 also encloses a relatively narrow section or strip 18, separated from the mounting band 19 along its upper margin by the longitudinal slits 21. The mounting band is the outer layer of the two-layer sweatband, the inner layer 22 of which directly engages the head of the wearer.

At their other ends the headstraps are doubled back to provide loops 23, which are gathered together and secured by the adjustable tie cord 24. Drawing the cord tighter draws the looped ends together, causing the safety hat to sit higher on the wearer's head, while lengthening the cord permits the loops to spread out, thus lowering the hat around the wearer's head.

To insure that the wearer is adequately protected in the event one of the adjustable headstraps 16 breaks, or for some other reason the hat is driven downwardly upon the head of the wearer, auxiliary headstraps 26 are provided interposed between the primary or adjustable headstraps and the crown. The auxiliary headstraps are preferably continuous with the adjustable headstraps, and extend therefrom in a manner to directly connect diametrically opposed detachable fastener elements without the interposition of adjusting means. The auxiliary straps thus extend continuously all the way across the crown, and constitute a second or auxiliary cradle or backstop which becomes effective in the event of rupture of the adjustable headstraps. The auxiliary headstraps also define the maximum limit of adjustability of the adjustable headstraps. This position of the adjustable headstraps brings the crown into close proximity with the wearer's skull, and it is important that in this position the adjustable headstraps or cradle be reinforced by the auxiliary headstraps. This arrangement of main and auxiliary headstraps is best shown in FIG. 1, which illustrates how doubling the nylon headstraps back upon themselves at each end and stitching as at 27, forms both loops 17 and 23 of opposite adjustable headstraps and the associated auxiliary headstrap in only two operations and from a single length of strip material.

Means are provided at each end of the mounting band 19 for adjusting the size of the sweatband so that the hat may be comfortably fitted to heads of different size. Extending across the middle portion of each end of the mounting strip are a series of spaced parallel slits 28, so that the slits may be brought into register for different head sizes. When so registered the slits are threaded through with the elongated stud 29 formed on the tab 31 and having a head 32, pointed at each end to facilitate its penetration through the slit layers of strip. The head is then interlocked with the tab 33 on the opposite side of the sweatband, and in which there is an elongated eye 34. The relatively stiff and thick stud and eye tabs are connected by the thin and flexible tie 36, all being molded from nylon or other suitable synthetic resin in a single piece. When in position to hold the sweatband at the desired size the tie 36 extends around the edges of the sweatband as shown in FIG. 1.

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It is noted that if the hat is subjected to a blow while being worn, there is a two-way movement of the wedge block in its socket, because the long edges of the wedge are both undercut and tapered. One movement caused by the undercut edge tends to bury the block deeper in the socket, and the other, caused by the taper tends to push the block further toward the small end of the socket, so that the greater the blow, the tighter the securement between the wedge block and the crown.

While the extent of such relative movement between the parts is small, it is of extreme importance because the resistance is applied with a force which rises rapidly to maximum and with no tendency whatever to bounce back suddenly, thus having the effect of a friction brake applied with rapidly increasing pressure. The flexed and deformed nylon in the engaging parts as well as in the adjacent material will of course recover shape after being stressed, but such recovery is not instantaneous, and it does not cause or contribute to a reactive bounce.

I claim:

1. In a safety hat having a crown, a plurality of sockets constituting fixed fastener elements formed by pairs of lugs integrally molded with the crown around the lower part thereof, the lugs of each pair along their adjacent edges being beveled to provide an undercut and the undercut edges diverging downwardly, a detachable fastener element including a dovetail wedge block and spaced pads having lateral edges with the outer edges of said block and the lateral edges of said pads being complementarily formed respectively to the inner and outer edges of the lugs and detachably engaged therewith, a headstrap in the crown connected at its lower end to an associated detachable fastener, and a sweatband to which each headstrap is connected.

2. The combination according to claim 1, in which said detachable fastener includes a slotted central plate portion integrally connecting the spaced pads and said wedge block, and the lower end of the headstrap is looped to engage the slot in the detachable fastener element.

3. In a safety hat having a crown and a plurality of fixed fastener elements arranged in opposed pairs in the crown around the lower part thereof a suspension harness comprising a detachable fastener element engageable with each fixed fastener element on the crown, a plurality of primary headstraps each connected at one end to an associated detachable fastener element and at its other end adjustably connected to corresponding ends of the other adjustable headstraps, and a plurality of auxiliary headstraps interconnecting opposed spaced pairs of said detachable fastener elements and interposed between said primary headstraps and said crown, one of said auxiliary headstraps and a pair of said primary headstraps being formed from a unitary length of material passed through a pair of opposed detachable fastener elements and provided with terminal loops constituting a pair of said primary headstraps.

4. In a safety hat having a crown and a plurality of fixed fastener elements in the crown around the lower part thereof, a suspension harness including a pair of oppositely disposed detachable fastener elements engageable with opposed fixed fastener elements in the crown, a pair of adjustable headstraps each comprising a closed loop attached at one end to an associated detachable fastener element and having its other end spaced from the corresponding end of the other headstrap, means adjustably interconnecting the spaced ends of the adjustable headstraps, and an auxiliary non-adjustable headstrap interconnecting the detachable fastener elements and secured to each loop adjacent the detachable fastener element, the pairs of adjustable headstraps and the associated non-adjustable headstrap are integrally continuous and folded into operative sections and means adjacent each fastener element for securing the sections of folded strap together.

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