

[54] **SHOCK ABSORBING SAFETY HELMET**

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[58] Field of Search ..... 2/3 R, 3 A, 3 B,  
2/3 C, 6, 5; 24/222

[56] **References Cited**

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[57]

**ABSTRACT**

A shock absorbing safety or protective helmet of the hard-hat type having a head engaging suspension system which is removably interconnectable in the helmet, including free crossed crown straps, a detachable size adjustable headband and nape strap, and a detachable soft pliable sweatband, the entire suspension system being mountable by suspension lugs at the free ends of the crossed straps, the lugs having lateral side shear pins and being slidably suspended in holders on the interior of the helmet shell, the lugs and shear pins serving to resiliently resist seating of the lugs in the holders and thereby increase absorption of impact shocks on the helmet.

**9 Claims, 5 Drawing Figures**

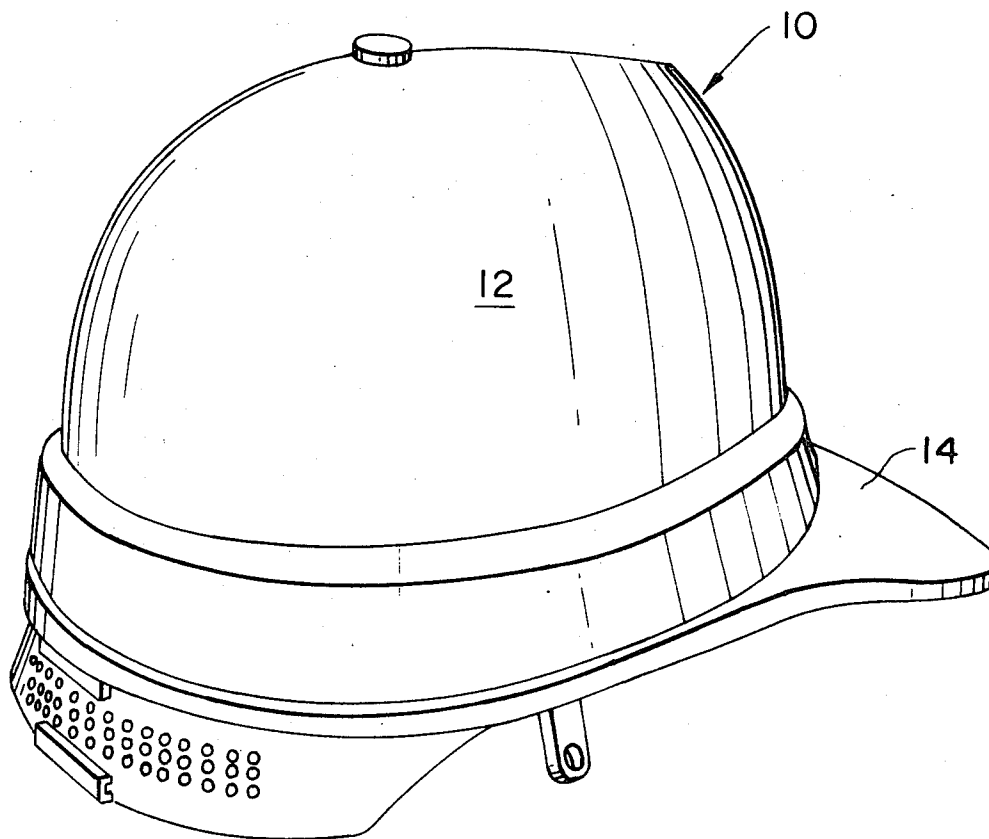


FIG. 1

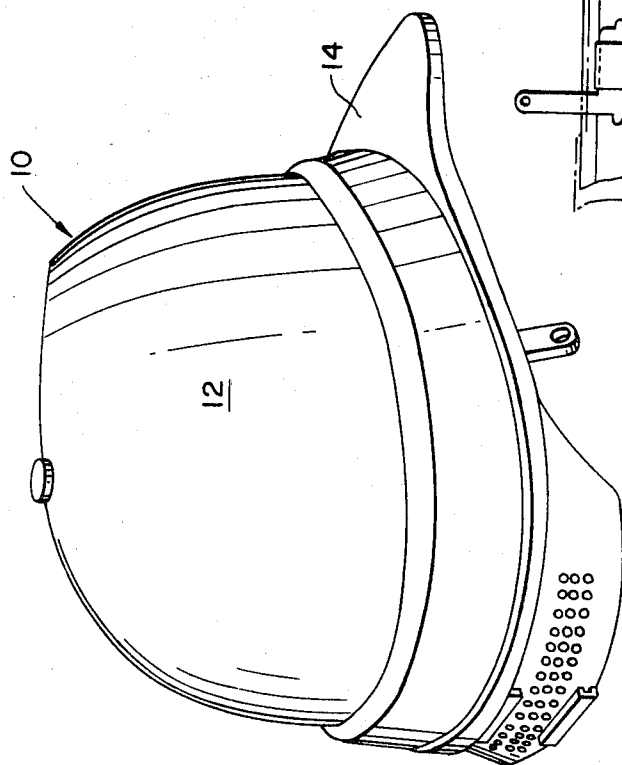


FIG. 2

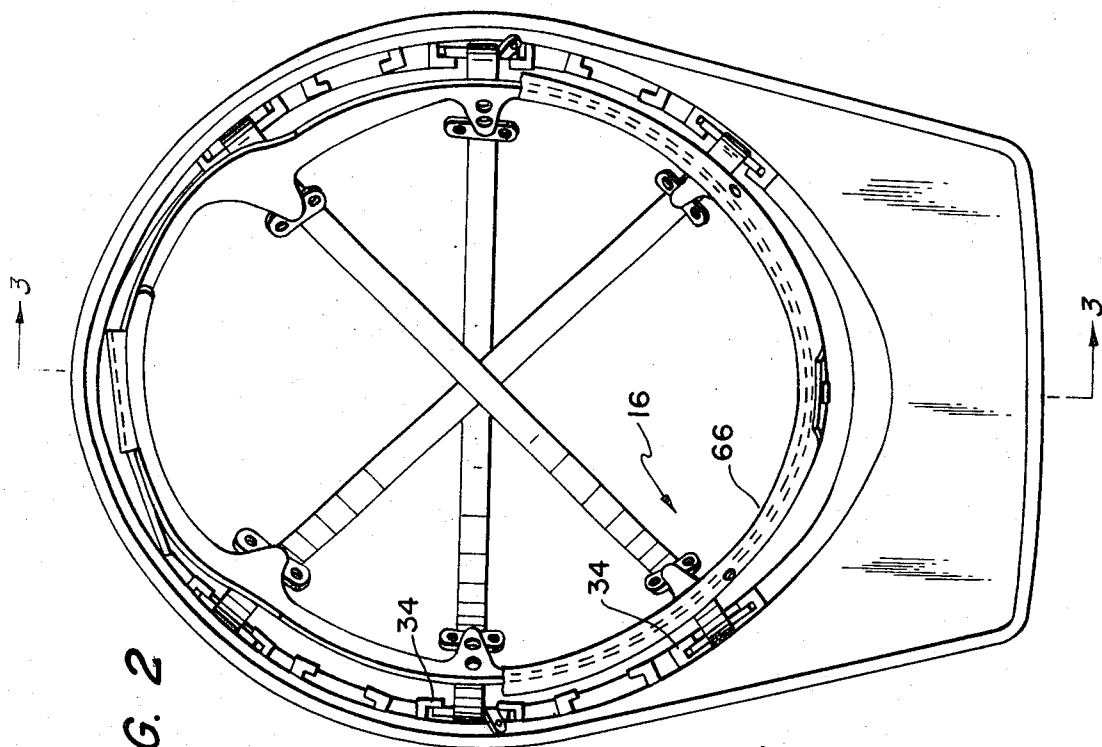
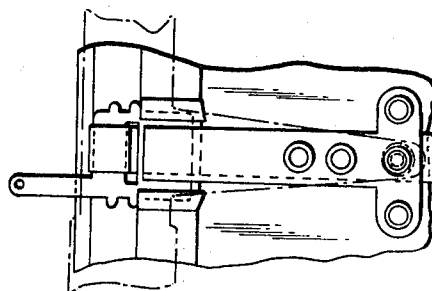


FIG. 5



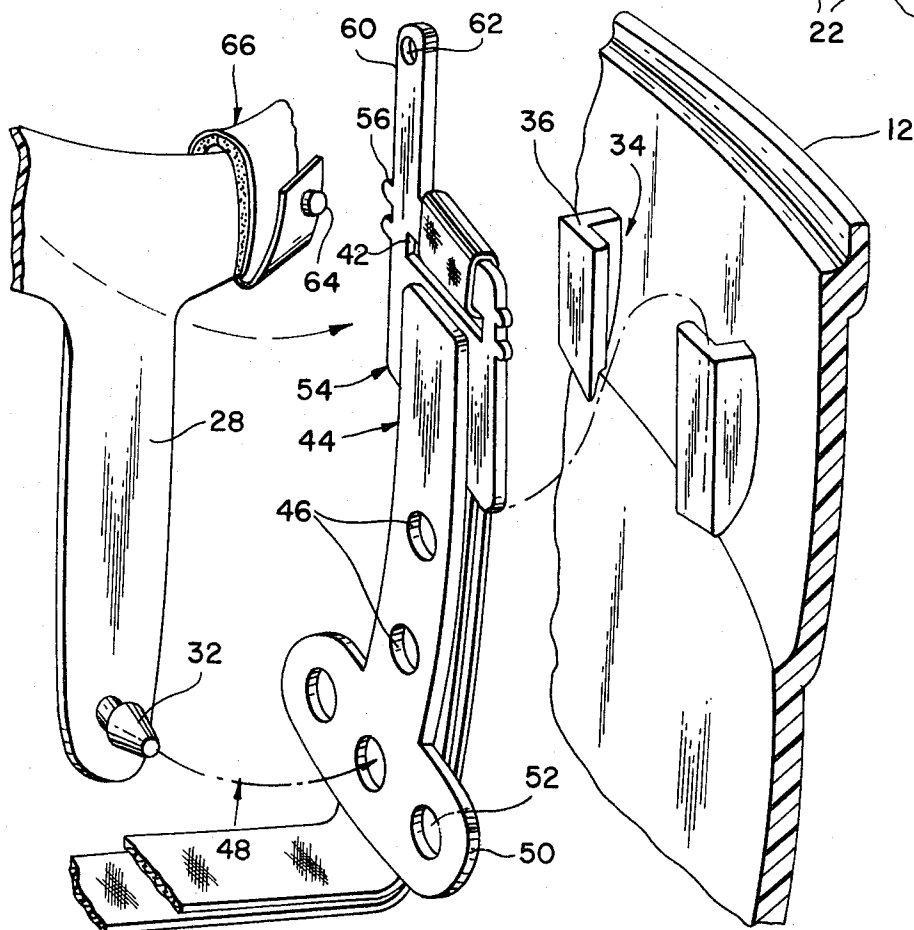
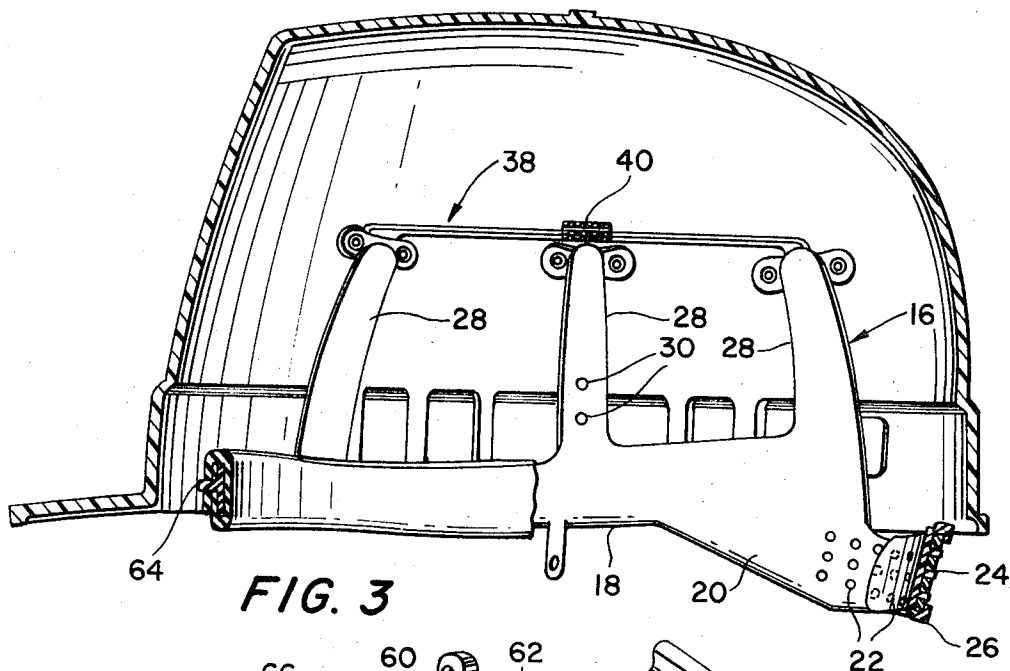


FIG. 4

## SHOCK ABSORBING SAFETY HELMET

### BACKGROUND OF THE INVENTION

The development of specifications for industrial protective helmets for the protection of heads of workers, and the meeting of these specifications by manufacturers have met a long-felt need. The safety requirements are promulgated in, for example, GGG-H-142G (Construction Workers Helmet), electric requirements of EE1 specification AP-1 and the American National Standard Institute ANSI Z89.1-1969 Class A & C and ANSI Z 89.2-1971 Class B.

The present invention pertains to a shock absorbing safety helmet which meets the aforesaid requirements and standards.

### BRIEF DESCRIPTION OF THE INVENTION

The present invention, in addition to meeting the established specifications for industrial protective helmets as in the foregoing standards, additionally provides protective helmets which provide adequate protection against the hazards for which they are designed and are reasonably comfortable when worn under designated conditions. The helmets do not unduly interfere with the movements of the wearer, are durable, capable of being disinfected and are easy to clean. The helmet consists essentially of a shell and suspension system of appropriate material, the suspension including a headband, sweatband, crown straps and nape strap with adjustable features.

The present invention is directed primarily to a head engaging suspension system which is removably interconnectable in the helmet and includes free crossed crown straps, a detachable size adjustable headband and nape strap, and a detachable soft pliable sweatband, the entire suspension system being mountable by suspension lugs at the free ends of the crossed straps. The suspension lugs have shear pins on lateral sides thereof with the suspension lugs being adapted for slidable suspension or support in holders on the interior of the helmet shell. The shear pins normally maintain the suspension lug spaced from the bottom of the holder, the space providing a clearance for the lug to seat itself when the helmet is subjected to impact. When an object is dropped on the helmet, the lug is subjected to a downward pull into the holder. This pull shears the pins on each suspension lug and causes the lug to travel downwardly in the holder and finally seat itself in the bottom of the holder. The resistance of the shear pins and the resistance of the lugs travelling downward in the holders absorbs some of the impact thereby providing a "shock absorber" aspect.

Additional features, objects and advantages of the invention will be more readily apparent from the following detailed description of an embodiment thereof when taken together with the accompanying drawings, in which:

FIG. 1 is a perspective view of the helmet of the present invention;

FIG. 2 is a bottom plan view of the helmet showing the underside of the suspension system;

FIG. 3 is a sectional view taken on line 3-3 of FIG. 2.

FIG. 4 is an exploded fragmentary view of the shock absorbing suspension mounting means; and

FIG. 5 is an assembled view of the elements of FIG. 4.

Referring now in detail to the drawings, a safety helmet in accordance with the invention generally designated 10 includes a shell 12 and brim 14 extending therefrom. The shell and brim are preferably molded from sturdy, high-density polyethylene resin that will not crack, split, warp or chip. The material is unaffected by low temperatures and chemicals and resists abrasions. The helmet has clean lines and a smooth dome that serves to deflect falling objects and prevent concentrated impact.

A suspension system generally indicated at 16 is mounted in the interior of shell 12 and, in a usual manner, is adapted to engaging the head of a user of the safety helmet. The suspension system includes a headband 18 and an integral nape strap 20 which depends downwardly and is adapted for maintaining a worn helmet against displacement from the head of a user. One free end of the headband, in the area of the nape strap, includes a plurality of holes or openings 22 and the opposite free end includes a plurality of lugs or projections 24, which are selectively engageable in various sets of the holes 22 for securement of the headband to an adjusted size on the head of a user. A buckle 26 consisting of spaced intumed ears is provided on that end of the headband having lugs 24 thereon and serves to frictionally engage and retain the opposed free headband end in the adjusted mating position of the lugs in the openings.

The headband further includes a plurality of upstanding legs 28, which in the embodiment shown are six in number and serve to accommodate and provide a six point suspension system. The legs 28 are provided with openings 30 which can serve for attachment of accessories, such as head caps or the like. In the embodiment shown, these openings 30 are provided in only the opposed lateral or side legs. The upper inner ends of the legs 28 are provided with stepped lugs or projections 32.

The interior of the shell 12 is provided with a plurality of spaced holders or pockets 34 for engagement of the suspension system and in number are commensurate with the number of suspension points or straps. In the shown embodiment, only those holders are utilized which are required for a six point suspension. The pockets or holders are formed by intumed opposed ears 36 and are molded in the shell molding process. The six point suspension system as shown includes three sets of nylon straps which are arranged in a free crossing relationship at 40, in the embodiment shown each of the strap sets consisting of a double layer connected at the free ends thereof. The nylon straps pass through slots 42 provided in legs or arms 44 which constitute suspension lugs for the helmet. The suspension lugs include a plurality of spaced openings or holes 46 for interengaging with the stepped lugs 32 of upstanding legs 28 for adjustably interconnecting the suspension lugs and straps with legs 28 as indicated by the broken line and arrow 48 in FIG. 4. Laterally extending portions 50, with holes 52, can be provided for accessory or adjustable attachment purposes.

The suspension lugs per se 54 consist of generally rectangular end portions on legs or arms 44 and include a plurality of shear pins 56 which are outwardly directed. The lateral dimensions of lug 54 and the interior of holders or pockets 34 are such that a resilient binding and sliding fit is created between the pockets and the lugs. The shear pins normally maintain the sus-

pension lug spaced from the bottom of the holder as shown in FIG. 5 at 58. This space provides a clearance for the lug to seat itself when the helmet is subjected to impact. When an object is dropped on the helmet, the lug is subjected to a downward pull into the holder and this pull shears the pins on each suspension lug and causes the lug to travel downwardly in the holder and finally seat itself in the bottom of the holder. The resistance of the shear pins and the resistance of the lug travelling downward in the holders absorbs some of the impact and provides a shock absorber end result. The material of the lugs and shear pins preferably is of a relatively soft, pliable and shearable material, such as plastic or the like. A tab 60 extends from lug 54 and has a hole 62 for attachment of a chin strap or the like.

The forward portion of headband 18 is provided with lugs or projections 64 adapted for removably mounting the sweatband 66 which preferably consists of a soft, pliable plastic material in sheet form with a foam material backing. The lugs engage through spaced openings in the material of the sweatband which is folded around the headband. The sweatband can be adjusted to fit various head sizes.

Manifestly, minor details of the invention can be varied without departing from the spirit and scope thereof as defined in and limited solely by the appended claims.

I claim:

1. A shock absorbing safety helmet comprising:

A. a shell;

B. a head engaging suspension system removably interconnectable in the interior of said shell;

C. attachment means for said suspension system including:

i. holders in the interior of said shell;

ii. suspension lugs on said suspension system engageable in said holders;

iii. shear pins on side edges of said suspension lugs, normally spacing said suspension lugs above the bottoms of said holders; and

iv. said suspension lugs and said shear pins resiliently resisting seating of said suspension lugs in said holders under impact shocks to the helmet and serving as impact shock absorbers.

2. A shock absorbing safety helmet as claimed in claim 1, said suspension system including a plurality of free crossed straps, said suspension lugs being attached to the free ends of said straps, a headband, said suspension lugs being removably attachable to said headband.

3. A shock absorbing safety helmet as claimed in

claim 2, said straps being nylon tapes.

4. A shock absorbing safety helmet as claimed in claim 2, said headband having upstanding lugs thereon, arms interconnecting at one end thereof with the ends of said straps and having a plurality of connector openings spacedly disposed therein, and an attachment lug on said legs for adjustably interconnecting said legs and said arms through coaction of said lug and connector openings for size adjustment.

5. A shock absorbing safety helmet as claimed in claim 4, said headband including a forward portion and a rear portion, said rear portion including overlapping relatively adjusting interconnecting free ends and said rear portion being configured and constituting a nape strap adapted for firmly engaging said helmet on a user's head.

6. A shock absorbing safety helmet as claimed in claim 5, one said free end of said headband including a plurality of sets of holes therein, the other said free end including a plurality of spaced lugs interengageable in said holes for selective length adjustment of the headband size, said latter free end further including buckle means adapted for slidably engaging with the first said free end of said headband for maintaining adjusted interconnection between said free ends.

7. A shock absorbing safety helmet as claimed in claim 6, the forward portion of said headband having forwardly directed lugs thereon, a sweatband consisting of soft resilient material with openings therethrough and being engaged about said front portion of said headband with the openings removably attaching said sweatband to said headband.

8. A shock absorbing safety helmet as claimed in claim 1, said holders being open ended restricted bottom slots, said suspension lugs being of resilient material and having a resilient frictional sliding fit in said holders, said shear pins extending from opposite side edges and spaced from the bottom edge of said lugs, said shear pins projecting beyond the interior side limits of said holders and normally maintaining said suspension lugs spaced above the bottoms of said holders.

9. A shock absorbing safety helmet as claimed in claim 2, said straps being three in number and said suspension constituting a six-point suspension with suspension lugs being attached to the six free ends of said straps and said holders being six in number and spaced about the inner periphery of said shell.

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