PROTECTIVE HELMET WITH REMOVABLE SUSPENSION

Fig. 1

Fig. 2
PROTECTIVE HELMET WITH REMOVABLE SUSPENSION

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This invention relates to protective helmets, and more particularly to those that are supported on the head by means of a removable lining or suspension.

It is among the objects of this invention to provide a protective helmet, in which the suspension cradle straps are detachably connected to the helmet shell and headband in an improved manner, and in which the cradle can be moulded in one piece from a synthetic plastic.

In accordance with this invention, a rigid helmet shell that is adapted to fit over a head is provided around the inside of its lower portion with circumferentially spaced inwardly and downwardly opening recesses. Each recess has a top wall, and also side walls that converge toward the center of the shell. Projecting downward from the top wall of each recess is a pin that is removably received in a socket in a lug that fits in the recess. Head-crading straps are connected at their lower ends to the lugs and extend upwardly in the shell. Means are provided for connecting a headband to the straps, preferably tongues that extend downwardly from the sides of the straps near their lower ends. The lower end of each tongue is provided with a connecting member that extends through an opening in the adjoining headband. The straps, lugs and tongues may all be made in one piece from a molded plastic element.

The preferred embodiment of this invention is illustrated in the accompanying drawings, in which

FIG. 1 is a bottom view of my helmet;
FIG. 2 is a side view thereof, with part broken away;
FIG. 3 is an enlarged fragmentary view of the inside of the side wall of the shell;
FIG. 4 is a vertical section taken on the line IV—IV of FIG. 3;
FIG. 5 is a bottom view of the portion of the shell shown in FIG. 3;
FIG. 6 is an enlarged perspective view of the lower end portion of cradle strap;
FIG. 7 is a fragmentary side view of the inner side of the headband, with the sweatband broken away;
FIG. 8 is an enlarged vertical section taken on the line VIII—VIII of FIG. 7; and
FIG. 9 is a view similar to FIG. 7, but from the opposite side of the headband.

Referring to the drawings, a protective helmet may be made in the form of a hat or a cap. For the purpose of illustration, a cap is shown in FIGS. 1 and 2, the head-covering portion of which is a rigid shell 1 that may be advantageously formed from a suitable plastic, such as polyethylene, by injection molding. At circumferentially spaced points around the lower portion of the shell the wall of the shell is offset outwardly to form inside of the shell a plurality of circumferentially spaced pockets or recesses 2. Each recess opens inwardly and downwardly but has outer and upper walls and side walls 3. Each pair of side walls converge toward the center of the shell so that the recess has a dovetail shape in horizontal section. The sidewalls may also converge upwardly slightly.

Detachably connected with the shell at each recess is a cradle strap 4 that extends upwardly into the shell to form a part of the suspension, by which the shell is held in place on the head. The connection to the shell is effected by a lug 5 that is joined to the lower end of the strap and that has substantially the same shape as the recesses and fits snugly in one of them. Also, each lug is provided with a downwardly extending socket 6 (FIGS. 6 and 8) that receives a pin 7 the upper end of which may be integral with the upper wall of the recess containing the lug. It will be seen that the lugs can be inserted in and removed from the recesses only through their open bottoms. While the lugs are in the recesses they are wedged in place by the upward taper of the recesses.

Extending around the inside of the cradle at the bottom of the shell there is a headband which preferably is formed from a soft flexible sweatband 10 secured at its lower edge to the lower edge of an encircling reinforcing band 11. The latter can be made from a strip of extruded plastic if desired. The ends of the headband overlap at the back of the helmet and can be connected together in several different positions in a well-known manner to adjust the size of the headband. The reinforcing band is provided with slots 12 (FIGS. 7 and 9) extending lengthwise of the band beside the cradle straps. Connecting members are provided that extend through these slots and are secured to the lower ends of tongues 13 that hang down between the reinforcing band and sweatband from the inner sides of the cradle straps. Each connecting member preferably is a button-like element 14 that is spaced a short distance from the adjoining tongue 13 by a narrow integral web 15, as shown in FIG. 6. The web is the part that extends through a slot 12, with the button engaging the outer surface of the reinforcing band. By providing slots at different levels in the reinforcing band, the height of the sweatband relative to the helmet shell can be adjusted.

A feature of this invention is that the cradle straps, lugs, tongue and buttons can all be made in one piece from a suitable plastic, such as polyethylene, that is injection molded to form a suspension. Accordingly, the lower ends of the straps are integrally joined to the inner sides of the lugs, and the tongues have their upper ends integrally connected to the straps at the upper ends of the vertical slots 16 in the straps. The upper ends of the straps merge into an integral central portion 17 of the cradle for engaging the top of a head. This central portion is always spaced from the top of the shell to provide a safe clearance between the head and the shell.

Since the crown heights of some heads are less than others, provision is made for reducing the height of the cradle to keep the helmet from extending down too far on such heads. This is done by providing a pair of openings in each strap near its upper end, threading a lace 20 through all of these openings and then tying the ends of the lace together. By tightening the lace, the upper portions of the straps are pulled together and that reduces the height of the cradle. The strap openings may be formed by pairs of laterally spaced slits 21, in which case the portion of the strap at the outer side of each slit preferably is curved upwardly out of the plane of the strap so that a straight-through opening is formed above the straight strip of the strap between the slits. An arrangement prevents the straps from pinching the lace and keeping it from being drawn across the straps.

It will be seen that with this invention the cradle can be quickly and inexpensively made in a single molding operation. The main connection between the lugs and the shell is produced by the dovetail connection between the recesses and the lugs. However, since it might be possible for the lugs or the shell to give enough under high impact against the shell to permit the shell to be pulled away from the lugs, the pins 7 and sockets 6 are provided. They will prevent any such accidental separation because they lock the lugs against lateral displacement.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have
it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A protective helmet comprising a rigid shell adapted to fit over a head and provided around the inside of its lower portion with circumferentially spaced inwardly and downwardly opening recesses having top walls, each recess also having side walls converging toward the center of the shell, a pin projecting downward from the top wall of each recess, a lug fitting in each recess and provided with a socket removably receiving the pin in that recess, head-cradling straps connected at their lower ends to the lugs and extending up in the shell, a headband in the lower part of the shell, and means connecting the headband to said straps.

2. A protective helmet according to claim 1, in which said lugs and straps are integral.

3. A protective helmet comprising a rigid shell adapted to fit over a head and provided around the inside of its lower portion with circumferentially spaced inwardly and downwardly opening recesses having top walls, each recess also having side walls converging toward the center of the shell, a pin projecting downward from the top wall of each recess, a lug fitting in each recess and provided with a socket removably receiving the pin in that recess, head-cradling straps connected at their lower ends to the lugs and extending up in the shell, a tongue extending downward from the inner side of each strap near its lower end, the tongue being integral with and narrower than the strap, a headband beside said tongues provided with circumferentially spaced openings, and connecting members secured to the lower ends of said tongues and extending through said headband openings to connect the tongues and headband.

4. A protective helmet according to claim 3, in which said lugs, straps, tongues and connecting members are all a one-piece molded plastic element.

5. A protective helmet according to claim 4, in which said headband openings are circumferentially extending slots, and each of said connecting members is a button joined to the adjoining tongue by a web extending through one of the slots.

6. A protective helmet comprising a rigid shell adapted to fit over a head and provided around the inside of its lower portion with circumferentially spaced inwardly and downwardly opening recesses having top walls, each recess also having side walls converging toward the center of the shell, a pin projecting downward from the top wall of each recess, a lug fitting in each recess and provided with a socket removably receiving the pin in that recess, head-cradling straps of synthetic plastic connected at their lower ends to the lugs and extending up in the shell and connected together at their upper ends, a headband in the lower part of the shell, means connecting the headband to said straps; the upper portion of each strap being provided with a pair of laterally spaced slits extending lengthwise of the strap, the portion of the strap at the outer side of each slit being curved upwardly out of the plane of the strap, and an adjusting lace extending through all of said slits and having its ends tied together, the lace extending across the lower surface of each of said upwardly curved strap portions.

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