United States Patent [19]

Dickstein

[11] **3,711,864**

[45] **Jan. 23, 1973**

[54] PROTECTIVE HELMET STRUCTURE

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 77,516, Oct. 2, 1970, abandoned.

[52] **U.S. Cl.** ..... **2/3 R**
[51] **Int. Cl.** **A42b 3/00**
[58] **Field of Search** ..... 2/3 R, 3 A, 3 B, 3 C, 6

[56] **References Cited**

UNITED STATES PATENTS

3,127,615	4/1964	Aileo	2/3 R
3,137,859	6/1964	Zbikowski	2/3 R
3,389,405	6/1968	Fattori	2/3 R
3,430,260	3/1969	Johnson et al.	2/3 R

FOREIGN PATENTS OR APPLICATIONS

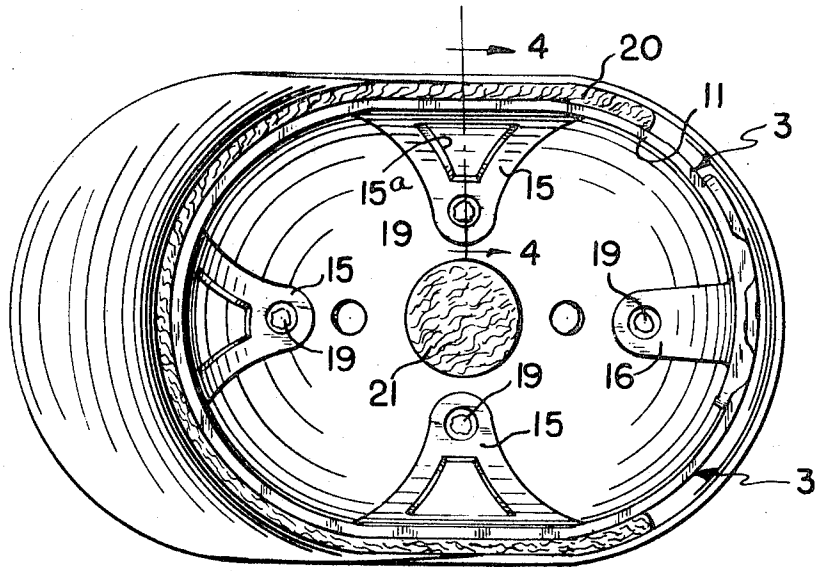
894,251	4/1962	Great Britain	2/3 R

Primary Examiner—James R. Boler
Attorney—George S. Baldwin et al.

[57] **ABSTRACT**

A protective helmet of hard thermoplastic synthetic resin is provided with a flexible harness having a sweatband strap extending around the inside of the crown at the lower edge of the crown with a plurality of integral projecting portions extending upwardly and inwardly from the strap toward the center of the crown. At the terminal end of each of the projecting portions there is provided an integral outwardly protruding generally cylindrical hollow cup which opens inwardly and which has a through opening in the bottom of the cup of a smaller diameter than the inside diameter of the cup. A plurality of inwardly extending studs integral with the crown pass, one through each of the openings of the cups. Friction may be relied upon to hold the cups in place or heat may be applied to the end of the stud inside of the receiving cup to expand the end of the stud and hold the harness more firmly to the helmet.

3 Claims, 5 Drawing Figures



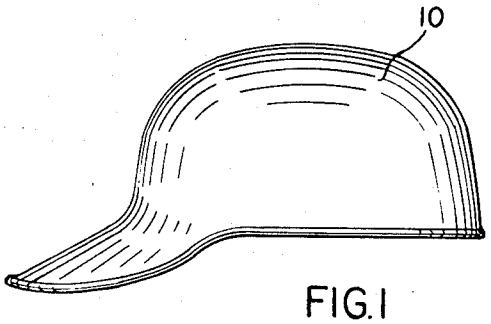


FIG.1

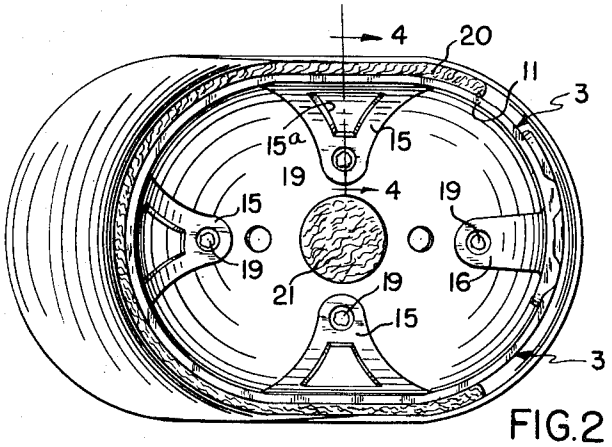


FIG.2

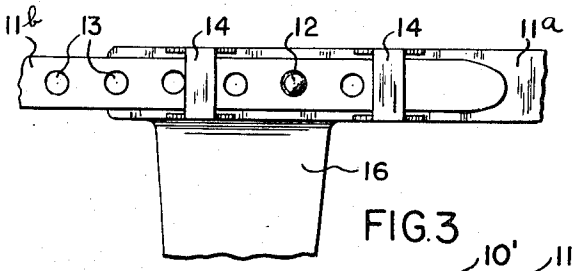


FIG.3

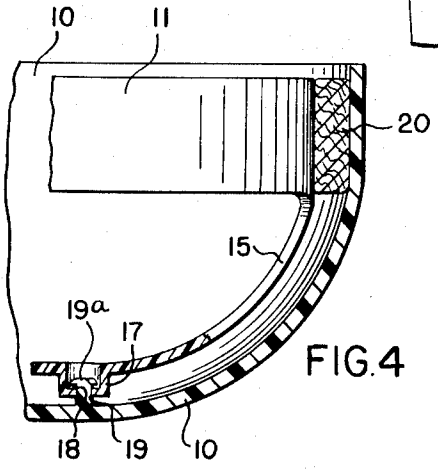


FIG.4

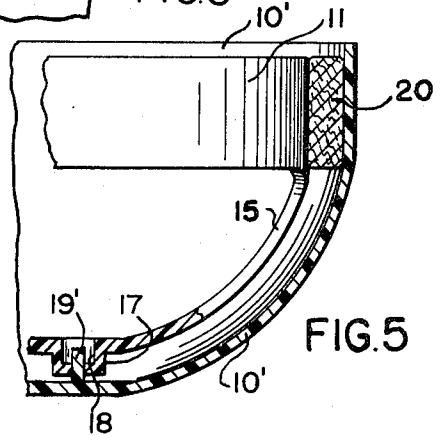


FIG.5

PROTECTIVE HELMET STRUCTURE

This application is a continuation-in-part of my pending application Ser. No. 77,516, filed Oct. 2, 1970, now abandoned.

An object of the present invention is to provide a cheap and easily constructed fastening for holding a protective harness inside of a hard hat helmet. Many such fastenings have been tried but either they were too expensive or they did not provide a satisfactory fastening.

Other objects and advantages of the present invention will be set forth in the specification and the accompanying drawings and the essential features thereof will be set forth in the appended claims.

In the drawings,

FIG. 1 is a side elevational view of a protective helmet with which this invention is used;

FIG. 2 is a bottom plan view, enlarged, of the helmet of FIG. 1 equipped with the protective harness of this invention;

FIG. 3 is a fragmental view of the adjustable portion of the headband strap, enlarged, taken generally along the line 3—3 of FIG. 2;

FIG. 4 is a fragmental sectional view, enlarged, taken along the line 4—4 of FIG. 2; while

FIG. 5 is a fragmental sectional view similar to FIG. 4 showing an alternative connection between the harness and the helmet.

A protective helmet, sometimes called a hard hat, is shown in FIG. 1 being constructed of thermoplastic synthetic resin material such as polypropylene or "-Cycolac", which is a high-impact, styrene-type, rigid, thermoplastic resin sold under that trademark by Marbon Chemical Company. Other similar hard thermoplastic resins might be used.

FIG. 2 shows a protective harness secured inside the crown portion **10** of the helmet shown in FIG. 1. This harness has a sweatband strap **11** extending entirely around the inside of the crown at approximately the height of the temples of the wearer. This harness is made of a flexible material, such as polyethylene. The strap is preferably made adjustable as shown in FIG. 3 by providing an outwardly extending button **12** on the band portion **11***a* and a plurality of through openings **13** on the band portion **11***b*, one of which is adapted to fit over the button **12**. Cross straps **14** are provided on the strap portion **11***a* under which the strap portion **11***b* is adapted to pass. The parts are so flexible that the strap portion **11***b* may be held under the cross portions **14** with any selected opening **13** in firm engagement on the button **12**.

The harness includes a plurality of integral projecting portions, three of which are indicated at **15** and one at **16**. The three portions **15** are alike being generally triangular in shape with a generally trapezoidal through opening **15***a* in each one. These projecting portions extend upwardly and inwardly from the strap **11** toward the center of the crown. As best shown in FIG. 4, the inner end of each of these projecting portions has an integral outwardly protruding generally cylindrical hollow cup **17** opening inwardly. There is a through opening **18** in the bottom of each of the cups of a diameter smaller than the inside diameter of the cup.

On the crown, there are a plurality of inwardly extending studs **19** integral with the crown portion **10**. Each of these studs is so positioned and of a size to pass through one of the openings **18** in one of the cups **17** when the harness is snugly assembled inside of the helmet in position for use. With all of the parts assembled in a position similar to that shown in FIG. 4, a heated tool is applied to the innermost end of each of the studs **19** so as to spread the thermoplastic material as shown at **19***a* to a size larger than the opening **18** so as to generally form a weld on the inside of the cup **17** so as to hold a member **15** or **16** firmly secured to the crown portion **10**. The fastening for the projecting member **16** is exactly like that shown for the member **15** in FIG. 4.

An alternative fastening is shown in FIG. 5. Here, everything is the same as discussed in connection with FIG. 4 except that the stud **19**, integral with the crown portion **10**, is left straight and cylindrical as molded and is not riveted at its end. The stud **19** here is a snug, frictional fit in the opening **18**, and, because each stud **19** is at an angle to the vertical when the helmet is on the head of the wearer, the harness is securely retained in the position shown.

In the case of both FIG. 4 and FIG. 5, the inner end of the stud **19** stops short of the planar edge of the associated cup **17** so that a blow on the helmet may cause a cup **17** to strike the head of the wearer, but the hard stud **19***a* or **19** will not strike his head.

Preferably, a protective padding strip of felt, foam rubber, or the like, is provided between the strap **11** and the helmet. This is shown at **20** and preferably is secured by adhesive to the outer face of the strap **11**.

Preferably also, a central protective pad of the same material is provided at **21** in the very center of the top of the crown of a thickness greater than the projecting length of the cups **17** so as to protect the head of the wearer from blows at this point.

What is claimed is:

1. A protective helmet of hard thermoplastic synthetic resin and a flexible protective harness inside thereof, said helmet having a crown portion, said harness having a sweatband strap extending around the inside of said crown at approximately the height of the temples of the wearer, said harness including a plurality of integral projecting portions extending upwardly and inwardly from said strap toward the center of said crown, the inner end of each of said projecting portions having an integral outwardly protruding generally cylindrical hollow cup opening inwardly, there being a through opening in the bottom of each said cup of a diameter smaller than the inside diameter of said cup, there being a plurality of inwardly extending studs integral with said crown, each of said studs being so positioned and of a size to pass through one of said through openings of one of said cups when said harness is snugly assembled inside of said helmet, and the inner end of each of said studs being expanded adjacent the inside of said cup bottom to a size larger than its associated through opening, whereby each of said harness projecting portions is firmly held in said helmet and each of said cups protects the head of the wearer against injury from its associated stud.

2. A protective helmet as defined in claim **1**, including a protective padding strip between said strap and said helmet and secured to the outer face of said strap.

3. A protective helmet of hard thermoplastic synthetic resin and a flexible protective harness inside thereof, said helmet having a crown portion, said har-

ness having a sweatband strap extending around the inside of said crown at approximately the height of the temples of the wearer, said harness including a plurality of integral projecting portions extending upwardly and inwardly from said strap toward the center of said crown, the inner end of each of said projecting portions having an integral outwardly protruding generally cylindrical hollow cup opening inwardly, there being a through opening in the bottom of each said cup of a diameter smaller than the inside diameter of said cup, there being a plurality of inwardly extending studs integral with said crown, each of said studs being so positioned and of a size to pass with friction through one of said through openings of one of said cups when said harness is snugly assembled inside of said helmet, each stud being positioned on said crown portion to lie at an angle to the vertical when the helmet is on the head of the wearer so that the associated cup will not slip off its stud, and the inner end of each of said studs stopping short of the planar edge of its associated cup, whereby each of said harness projecting portions is firmly held in said helmet and each of said cups protects the head of the wearer against injury from its associated stud.

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