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D. J. VOSS
SAFETY HELMET

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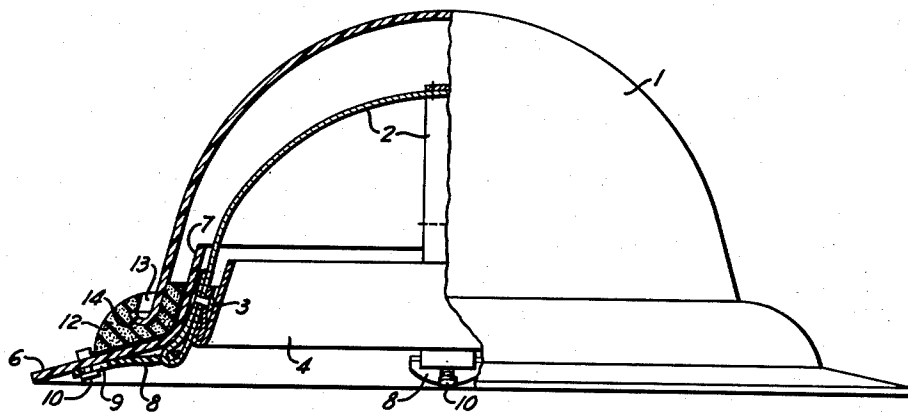


Fig. 1

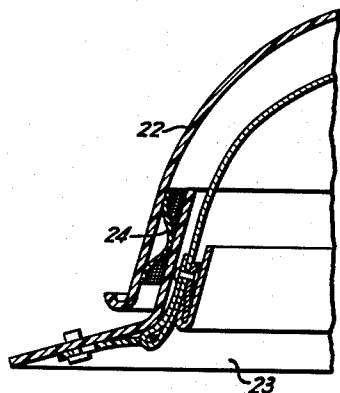


Fig. 3

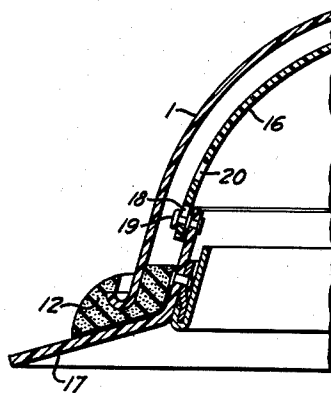


Fig. 2

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SAFETY HELMET

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3 Claims. (Cl. 2—3)

This invention relates to helmets such as are worn by industrial workers.

It is among the objects of this invention to provide a protective helmet which will effectively absorb energy directed against it from the top, sides, front or back; which has easily replaceable parts; which utilize a single size, shape and design crown for different size heads; and which is of simple construction.

In accordance with this invention, a rigid brim is supported by the lower part of a cradle which fits over the head. A rigid crown covers the cradle and is spaced from it. The brim extends laterally away from the cradle beneath the crown and supports permanently distortable means. The lower part of the crown is supported by the distortable means to hold the crown in place. When during use the crown accidentally receives an impact of sufficient force, the distortable means will be distorted permanently, and in distorting will absorb energy and thereby absorb the shock of the impact. Preferably, the distortable means takes the form of a ring encircling the brim and secured to it.

The invention is illustrated in the accompanying drawings; in which

Fig. 1 is a side view, half in vertical section, of my helmet; and

Figs. 2 and 3 are fragmentary vertical sections through helmets illustrating modifications of this invention.

Referring to Fig. 1 of the drawings, the crown 1 of the helmet may be made of any material that will give it the necessary strength and rigidity, either metal or a molded composition. Such crowns are well known and are generally surrounded by an integral inclined brim, but in this case the crown has no such brim. Inside the crown there is a cradle, which may be formed from straps 2 that pass over the head. The straps may be connected together at the top in any desired manner. The lower ends of the straps are turned back upon themselves and fastened with rivets 3 to form loops. The rivets also extend through the outer portion of a headband 4 that fits around the head.

It is a feature of this invention that the cradle straps support a rigid brim that is separate from the crown. The brim has a laterally projecting lower portion 6, and preferably an integral inner portion 7 extending up between the cradle and the surrounding crown. The loops in the lower ends of the straps pass through slots in relatively stiff retaining members 8 engaging the lower surface of the brim. Each of these retaining members has a keyhole slot 9 in its outer end that receives a stud 10 anchored in the brim. Consequently, the brim is supported around the head by the cradle.

Another feature of the invention is that the brim supports permanently distortable means, which in turn supports the crown so that the shock of a blow against the crown will be absorbed by the distortable means. The distortable means is shown as a ring 12 of crushable brittle material, which is cemented or otherwise secured to the upper surface of the brim. The top of this shock

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absorbing material is provided with an annular groove 13 that receives the lower edge of the crown to support it and hold it in place. The material extends up between the crown and the upper portion of the brim and thereby spaces them apart. The lower edge 14 of the crown is curled outward so that a curved surface of considerable area will seat against the bottom of the groove. By undercutting the outer wall of the groove a little, the edge of the crown can snap out into the undercut and thereby lock the crown in place. The material of the shock absorbing ring is hard and strong enough to offer considerable resistance to movement of the crown toward the brim, but the ring will break or collapse and be crushed by the crown when enough force is applied, without attempting to return to its original shape as rubber would do. Cellular cellulose acetate or expanded thermoplastic vinyl resin, for example, are suitable.

It will be seen that whether the crown receives a blow from the top, either side or the front or back, the force will be transmitted to the crushable ring. If the force is sufficient to cause the crown to crush the ring, the energy thus absorbed will greatly reduce the shock of the impact before it can reach the brim and be transmitted through the cradle to the head.

Another advantage of this invention is that all crowns can be made the same size and shape, but the brims can be made in different sizes for different size heads. It is considerably cheaper to make different size brims than different size crowns. The shock absorbing rings will generally be made in a standard size to fit the smallest brim. For larger brims, the inside of a ring can easily be ground away to enlarge the ring.

In the modification shown in Fig. 2, the cradle 16 is not connected to the lower portion of the brim 17, but directly to the upper portion. For this purpose the cradle preferably is formed from a plastic and is provided in its lower ends with keyhole slots 18 that receive studs 19 projecting from the upper end of the brim. By providing the cradle with additional slots 20 at a higher elevation, the distance from the bottom of the brim to the top of the cradle can be reduced for low heads of low crown height.

In the embodiment of the invention shown in Fig. 3, there is no crushable ring of shock absorbing material. Instead, the crown 22 is supported and spaced from the separate brim 23 by a continuous or discontinuous strip 24 of material secured to both in any suitable way, such as by cementing. The strip is folded or bent lengthwise along its center so that its edges can be secured to the crown and its central portion to the upper part of the brim. Of course, the strip could be turned around without affecting its usefulness. The strip is made of permanently stretchable or elongatable material that will absorb energy as it is lengthened. For example, it can be made of undrawn plastic material, such as nylon. Or, it can take the form of woven material in which the threads are connected at their intersections by a binding composition that will rupture when a predetermined tensile force is applied. Such a material is disclosed in the copending patent application of Voss and Theodore, Serial Number 662,500, filed May 29, 1957, now Patent No. 2,921,318, granted January 19, 1960. If the crown receives a blow above a predetermined value, it will stretch the strip 24 downward. In elongating, the strip will absorb energy and thereby reduce the shock reaching the brim.

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,

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the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A safety helmet comprising a cradle adapted to fit over the head and be supported thereby, a rigid brim supported by the lower part of the cradle and extending laterally away from it, a ring of crushable brittle material secured to the top of the brim around the cradle, and a rigid crown covering the cradle and spaced from it and the brim, the lower edge of the crown being located above said laterally extending brim, said ring being formed to support the crown and hold it in place, whereby when in use the crown accidentally receives an impact of sufficient force said ring will be crushed and the shock of said impact thereby reduced.

2. A safety helmet comprising a cradle adapted to fit over the head and be supported thereby, a rigid brim supported by the lower part of the cradle and extending laterally away from it, a ring of crushable brittle material secured to the top of the brim around the cradle, and a rigid crown covering the cradle and spaced from it and the brim, the lower edge of the crown being located above said laterally extending brim, the top of the ring being provided with an annular recess receiving the bottom of the crown and holding it in place, whereby when in use the crown accidentally receives an impact of sufficient force said ring will be crushed and the shock of said impact thereby reduced.

3. A safety helmet comprising a cradle adapted to fit over the head and be supported thereby, a rigid brim

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supported by the lower part of the cradle and extending laterally away from it, permanently distortable means secured to the top of the laterally projecting portion of the brim around the cradle, and a rigid crown covering the cradle and spaced from it and the brim, the brim having an integral inner portion extending upwardly from the inner edge of its laterally projecting portion and spaced by said distortable means from said crown, the lower edge of the crown being located above said laterally extending brim, and the lower part of the crown being connected with and supported by said distortable means to hold the crown in place, whereby when in use the crown accidentally receives an impact of sufficient force, said means will be distorted permanently and while distorting will absorb energy from said force and thereby absorb the shock of said impact.

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