

June 3, 1947.

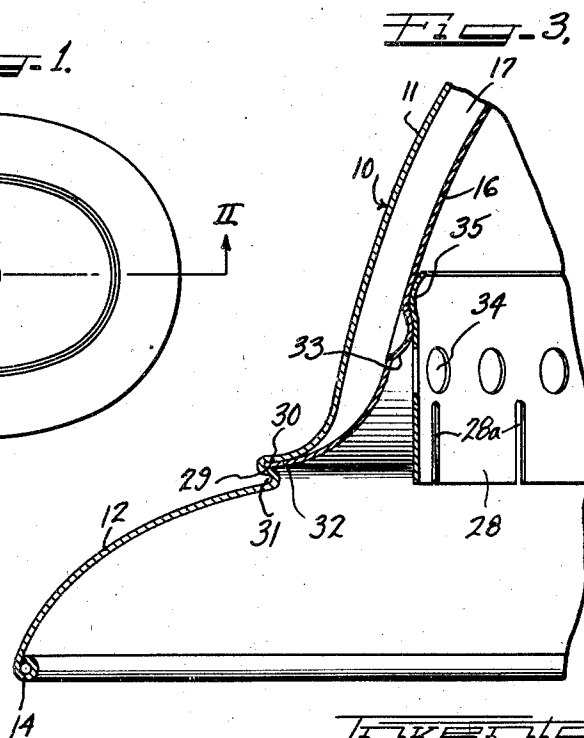
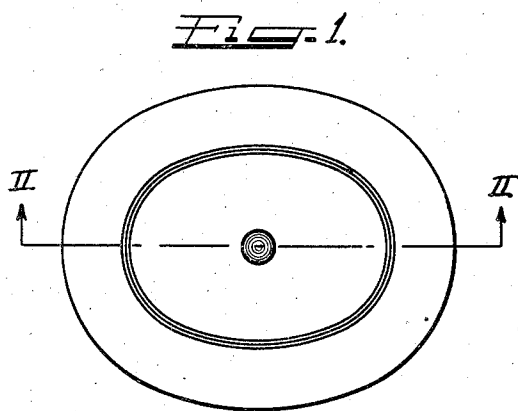
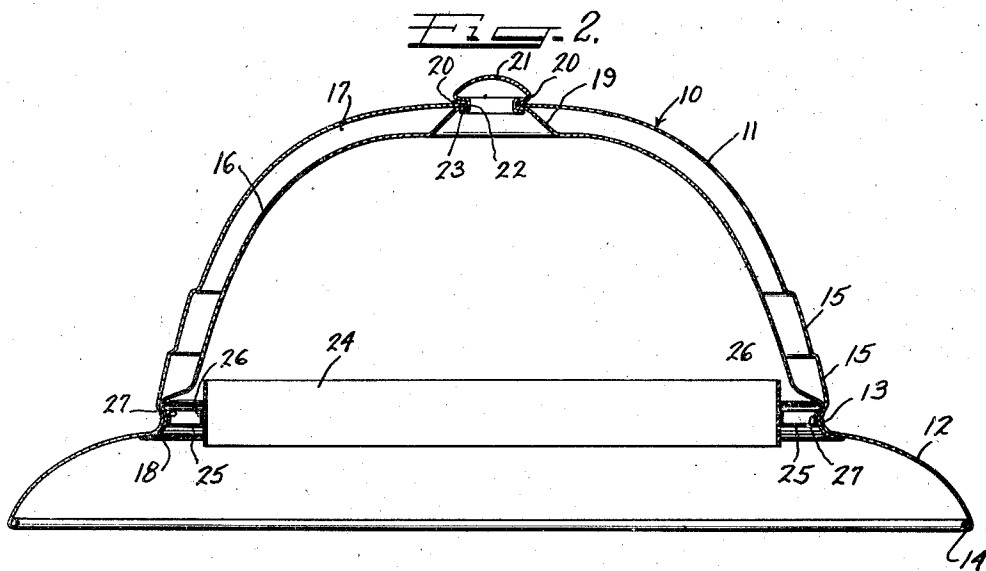
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2,421,633

HELMET CONSTRUCTION

Filed Jan. 8, 1943

2 Sheets-Sheet 1



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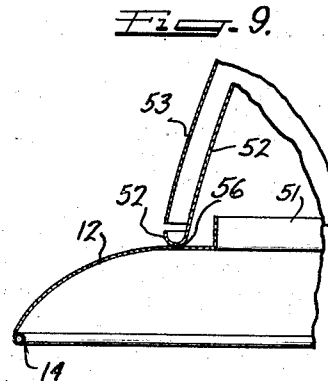
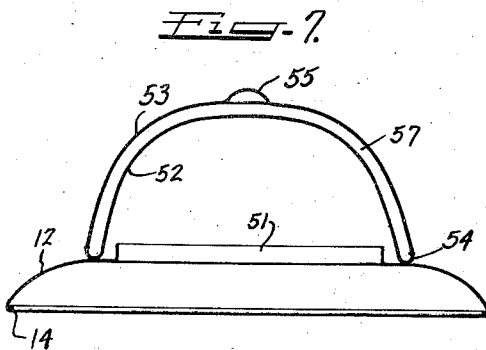
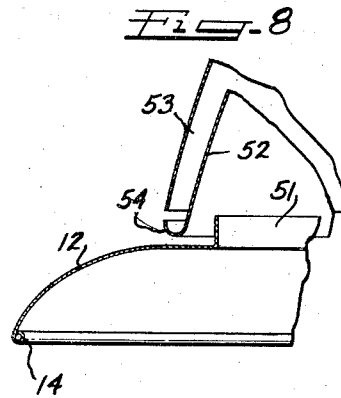
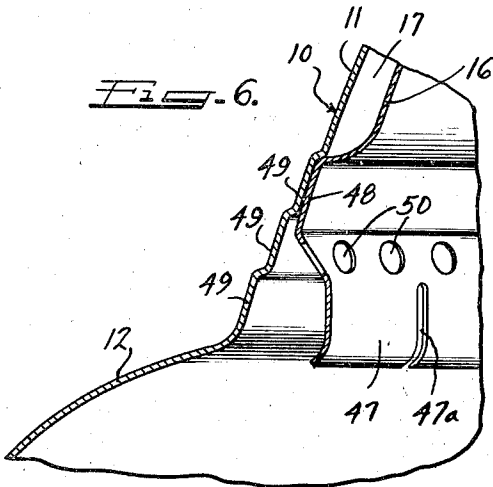
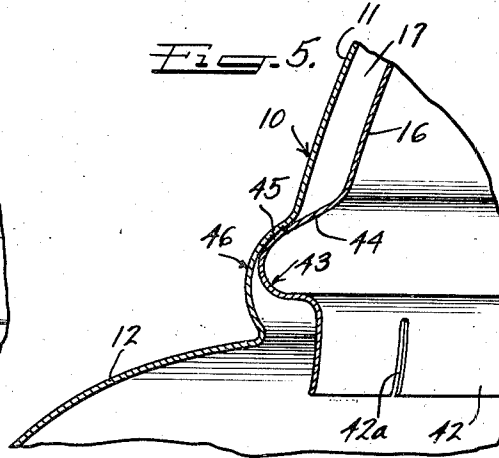
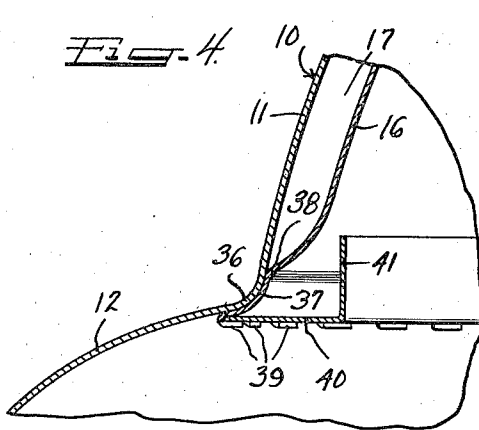
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2,421,633

HELMET CONSTRUCTION

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2 Sheets-Sheet 2



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HELMET CONSTRUCTION

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8 Claims. (Cl. 2—3)

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This invention relates to an improved helmet construction, and is directed more particularly to a helmet construction which is adapted to protect the wearer against injury and at the same time act as an insulator against heat and cold, particularly the former.

An important object of the invention is to provide an improved helmet construction of sheet material, preferably light metal, which may be constructed economically and is well adapted to production methods, the helmet being provided with an evacuated insulated chamber and improved surface coatings particularly adapting it to tropical use.

Another important object of the invention is to provide an improved helmet construction which is made up from a plurality of shell-like members so constructed and arranged that improved insulating qualities are imparted thereto.

Another important object of the invention is the provision of an improved arrangement for interlocking the outer and inner shells and the sweat band or sweat band base together.

Still another object of the invention is to provide a helmet construction of the above character which is so constructed and arranged that it may be manufactured efficiently, quickly and cheaply from sheet metal or other form retaining sheet material.

It is a further object of the invention to provide a helmet construction in which there is provided an insulating vacuum chamber for protecting the head of the wearer against the transmission of either excessive heat or excessive cold, this insulation effect being augmented by novel surface treatment of the correlated shell parts.

It is still another object of the invention to provide a helmet construction in which the respective parts are configured in a novel manner to impart strength thereto, the parts being joined or interlocked by co-engagement of said respective configurations, thereby to further strengthen the joints or interlocks between the parts.

Still another object of the invention is to configure the parts of the helmet, these parts being joined at said configurations by an interfitted relationship therebetween, said configurations being constructed and arranged to afford respective inter-engaging tapered surfaces on the parts to permit the interlocking together of various sized internal parts to accommodate various head sizes with a standard outer part.

In accordance with the general features of the invention there is provided herein a helmet con-

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struction into which is incorporated a plurality of shell like, dome members associated with one another in a novel manner to be securely attached together and to provide therebetween a vacuum chamber, the outer surface of the inner wall thereof having a glossy, reflecting surface and the outer surface of the outer shell having a pure white coating thereon to efficiently reflect the rays of the sun.

Many other objects and advantages of the invention will become apparent from the following specification and accompanying drawings, in which

Figure 1 represents a top plan view of the helmet construction embodying my invention;

Figure 2 represents an enlarged cross-sectional view taken on the line II—II of Figure 1;

Figure 3 represents a still further enlarged fragmentary cross-sectional view of a modified form of my invention;

Figure 4 represents a fragmentary cross-sectional view of another embodiment of the invention;

Figure 5 represents a fragmentary cross-sectional view of another modification of the invention;

Figure 6 represents a fragmentary cross-sectional view of further modified form of the invention;

Figure 7 represents a cross-sectional view of still another modified form of the invention;

Figure 8 represents a fragmentary exploded, cross-sectional view of the form of the invention shown in Figure 7; and

Figure 9 represents a cross-sectional view similar to Figure 8 wherein the inner shell is shown attached to the brim and sweat-band member.

It is to be understood that the embodiments shown herein are for illustrative purposes only and may be changed or modified without departing from the spirit and scope of the claims herein.

As best shown in Figure 2 a helmet embodying the invention includes an outer portion 10 having an upper dome part 11 and a lower brim portion 12. In the form shown in Figure 2 the dome and brim are integral with each other and are formed from any formable sheet material. In practice, it is preferred that the parts of the helmet be formed from thin sheet metal.

To the end that the outer cover or shell of the helmet 10 may be strengthened against crushing action, this part, as shown in Figure 2, consists of the above mentioned portions 11 and 12 which are integral. The junction of the portions 11 and 12 comprises an annular distortion or

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groove 13 which may be pressed or spun therein, while the extremity of the brim 12 is provided with a bead 14. Additionally, the dome portion 11 may be provided with a plurality of annular stepped sections 15 to further strengthen the body thereof.

The uppermost crown section of the dome 11 may be provided with an aperture which is centrally located thereon for purposes to be explained presently.

As shown in Figure 2, an inner shell 16 is provided for the helmet, this shell being of such a size that when assembled with the outer shell 10 it is spaced therefrom to provide an insulation chamber 17. The marginal edge of the shell 16 is spun or pressed at 18 to provide an annular marginal distortion or groove shaped similarly to the distortion 13 of the outer shell whereby assembly of the two shells may be accomplished by merely interfitting the distortions 13 and 18 together.

The shell 16 is provided with a centrally disposed aperture at its dome, the latter being adapted to be aligned with the aperture in the shell 10 when the distortions 13 and 18 are disposed in interfitting relationship. The margin of the dome 16 around the aperture therein is pressed outwardly as at 19, the annular marginal edge of the portion 19 being bent around the edge of the shell 10 which defines the central aperture therein as shown at 20 in Figure 2. To the end that the connection between the portion 19 of the inner shell and the crown portion of the outer shell 10 may be maintained securely in their attached relationship, a rivet-like button member 21 having an external hollow head and a shank portion 22 is inserted in the crown aperture, whereupon the lowermost extremity of the shank portion 22, with the shoulder between the head portion 21 and the shank 22, is compacted around the interlock 20 as indicated at 23.

If it is desired merely to utilize the body of air between the shells in the chamber 17 to obtain the desired insulating qualities for the helmet then the distortions 13 and 18 may be interfitted with each other merely by press fitting them together. However, under certain circumstances it is found desirable to evacuate the chamber 17 to obtain a higher degree of insulation. This may be accomplished by first securing the distortions 13 and 18 together and then welding this junction to provide a tight seal. Thereafter the helmet may be disposed in an evacuated chamber whereupon the interlock 20 may be formed and the rivet like button compacted into the position shown in Figure 2 to finally seal the chamber 17 in this atmosphere of reduced pressure. It will be understood that when the helmet is then removed from the reduced pressure chamber that the chamber 17 will remain evacuated, the final seal thereof being obtained by the interlock at the crown thereof. Suitable sealing substance may be used at the interlocks 20 and 23 to insure the maintenance of the vacuum.

Another highly advantageous feature of the crown interlock above described is that it cooperates with the interlock between the distortions 13 and 18 to securely maintain the shells 10 and 16 immovably in their relative positions, and prevents the inner shell from assuming a cocked position with respect to the outer shell.

In the event that the chamber 17 is subjected to evacuation as above described, the insulating qualities of the helmet have been found to be

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greatly increased by a particular combination of surface coatings for the two shells. This surface treatment comprises the coating of the uppermost surface of each of the shells with a pure white, glossy finish to obtain maximum outward radiation of heat rays and a dark finish on the under side of each of the shells to obtain maximum heat ray absorption outwardly. Thus it will be seen that in addition to the non-conducting characteristics of the evacuated chamber 17 there is provided a surface treatment which effectively prevents the penetration of residual heat rays which might tend to overcome the insulating qualities of the evacuated chamber 17.

The helmet construction is completed by the attachment of a novel, adjustable sweat band arrangement which is adapted to engage the wearer's head.

The sweat band shown at 24 is constructed preferably from a band of rolled sheet metal 24 which may, if desired, be faced with any suitable moisture absorbing covering such as felt or the like. As will be readily understood, while the parts of the helmet, other than the sweat band, may be made to standard size and adapted to any size head, the sweat band itself must be so constructed and arranged that various predetermined sizes thereof may be fitted into the standard shell arrangement.

To this end the sweat bands are rolled, shaped and welded to accommodate various head sizes and shapes and are installed in the helmet by a structure which cooperates with the helmet and at the same time with various sized and shaped bands. As shown in Figure 2 the sweat band 24, having been previously shaped and welded to a given size, is provided around its outer surface with a web or spider 25 which is, in turn, provided with an inner upstanding margin 26, the latter being welded to the outer surface of the band, and an outer upstanding margin 27, the latter being of curvate cross-section to conform to the curvature of the distortion 18 in the shell 16.

The sweat band, thus assembled, may be fitted into the interior of the helmet with the marginal wall 27 in snap-fit engagement with the inner wall of the distortion 18 of the shell 16. As will be clearly seen from the drawings the inner surface of the distortion 18 presents different radial dimensions throughout its depth due to the curvature thereof and the portions 27 of the web or spider 25, being resilient, will thus engage different portions of the surface of the distortion 18 in accordance with the size of the band 24. This accommodation by the distortion 18 of various sizes of sweat bands is of course accomplished by means of a disposition of the different sizes of bands at slightly different horizontal planes through the helmet as shown at Figure 2, however, it has been found that these slight variations are not discernible to the wearer and do not, in any way, detract from the comfort or utility of the completed construction.

In the fragmentary cross-sectional representation of Figure 3 the interlock between the outer shell 10 and the inner shell 16 and between the inner shell 16 and the sweat band 28 is accomplished in a slightly different manner.

In this form of the invention the added strength is imparted to the shell 10 by means of a re-entrant configuration 29 which affords an internally disposed groove 30 and an externally disposed groove 31.

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The peripheral extremity of the shell 16 is formed simply by spinning or pressing the edge thereof so that it flares outwardly to provide a flange 32, the edge of which is interfitted with the internally disposed groove 30 of the shell 10. After this interfitting relationship has been obtained the interlock may be welded to provide an air-tight seal and, if desired, the shell 10 can be left in the form shown or may be compressed to close up the externally disposed groove 31.

The shell 16 as shown in this embodiment is further provided with an inwardly disposed distortion 33 which extends annularly around the shell and may comprise either a continuous internally disposed hump or a plurality of dimples.

The sweat band 28 of this construction is formed as to shape and size by rolling and welding as previously described in connection with the sweat band 24. Additionally the sweat band 28 is provided with breather holes 34 and is rolled at its upper edge to provide an externally disposed hump 35 which cooperates with the distortion 33 in the shell 16.

As explained in connection with the construction of Figure 2 the cooperating distortions 33 and 35 present angularly disposed surfaces toward each other which co-engage to retain the sweat band in the helmet. In the event that varying sizes of sweat bands are to be inserted into a standard helmet construction, assembled in the manner shown in Figure 3, the band may be press-fitted into the helmet to provide cooperation between the distortions 33 and 35, the relative positions of these distortions and the degree of overlap or interlock therebetween, being determined by the horizontal dimensions of the sweat band. If the band is smaller than that shown at 28, it will be inserted less distance into the helmet and the distortion 35 thereof, which possesses a degree of flexibility, will be engaged at a different point on its surface by the distortion 33.

It will be understood that the construction of Figure 3 may be subjected to evacuation as described in connection with Figure 2 and that the surfaces of the shells may be treated in a like manner to obtain maximum insulation from heat rays.

It has been found that certain human skull contours are better adapted to accommodate a sheet metal headband than are others. In the case of the latter it is found that adaptation of the sweat band to the head is benefited considerably by providing slits, such as shown as 28a in Figure 3, whereby a degree of expansibility and contractibility is imparted to the band.

From the foregoing it will be seen that there is provided herein a helmet construction, the strength of which is greatly amplified by annular distortions formed in both the inner and the outer shells, these distortions being so constructed and arranged that they conform to the configuration of each other and may be interfitted with one another to each augment the resistance to crushing pressure of the other.

Furthermore these crush resisting configurations have been utilized to combine with and cooperate with the sweat band structures whereby various sizes of sweat bands may be installed in a standard helmet shell without requiring any variation in the shell construction.

In the construction shown in Figure 4 the dome 11 of the outer shell is formed integrally with the brim 12, the junction between the two parts constituting merely an integral curvate connecting section 36. The shell 16 is spun or pressed so that

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the peripheral margin thereof terminates in a curvate portion 37 adapted to conform to the configuration of the curvate portion 36 of the shell 10. The junction between the dome of the shell 16 and the curvate portion 37 thereof includes an annular peak 38 which affords a strengthening rib for the shell 16, this rib abutting against and reinforcing the shell 10. The edge extremity of the curvate portion 37 of the shell 16 is stamped out to form a plurality of fingers 39 which are adapted to be bent inwardly to underlie the edge of a horizontal flange 40 of the sweat band 41. It will be understood that a seal may be obtained between the curvate portions 36 and 37 by welding or the like.

In the construction shown in Figure 5 the sweat band 42 is disclosed as an integral part of the shell 16 and constitutes the peripheral marginal portion thereof. Intermediate the sweat band 42 and the dome of the shell 16 an outwardly disposed annular bulged portion is provided as shown at 43. This portion 43 is defined on its upper side by an inwardly and upwardly tapering wall 44 which is adapted to slidably cooperate with the inwardly and upwardly tapering wall portion 45 of a bulge 46 formed in the outer shell 10.

As explained in connection with the modifications described above, the cooperating distortions 43 and 46 serve to reinforce the helmet against crushing forces and the tapered surfaces 44 and 45 are adapted to assume different ultimate relative positions to each other, depending upon the size and shape of the internal parts of the helmet.

As in the construction shown in Figure 2 the uppermost rivet-like button assembly may be incorporated in the constructions shown in Figures 3, 4 and 5 in order further to secure the shell parts in their proper relative positions.

In the construction shown in Figure 6 the sweat band 47 is likewise shown integral with the inner shell 16. The sweat band 47 constitutes the peripheral margin of the shell 16 and is rolled so that it extends inwardly to simulate the size and shape of the wearer's head. The portion of the shell 16, between the dome part and the sweat band thereof, is configured to provide an inwardly and upwardly tapering wall 48 which cooperates with one or another of the depth configurations 49 in the shell 10.

As previously explained, in connection with the other modifications of the invention, the cooperating walls 48 and 49 assume relative positions according to the size of the inner members and the variation in their relative positions is not discernible and in no way detracts from the efficiency or comfort of the helmet. If desired, the sweat band 47 of the construction shown in Figure 6 may also be provided with ventilation or breathing apertures 50.

In the construction of Figure 6, as in those constructions formerly described, the walls 48 and 49 may be welded together to provide an air-tight seal whereupon the rivet-like button in the crown of the helmet may be attached in an atmosphere of reduced pressure to provide an evacuated chamber 17. Likewise the surfaces of the shells may be treated in the manner formerly described to augment the insulating qualities of the evacuated chamber.

In the modified construction disclosed in Figures 7, 8 and 9, the sweat band 51 is formed as an integral part of the brim 12 and constitutes the inner peripheral margin thereof. In this

construction the dome of the helmet is made up of inner and outer shell members 52 and 53, respectively, the inner member 52 terminating at its lower edge in an upwardly curved portion 54 and the outer member 53 having a dimple 55 at the crown thereof.

In assembling the parts of this construction the inner shell 52 may be welded to the upper surface of the brim 12 as at 56 whereupon the peripheral edge of the shell 53 may be seam welded to the upstanding edge of the portion 54 of the shell 52, thereafter the sealed chamber 57 thus provided may be evacuated in any suitable manner.

It is to be understood that in the above construction the surfaces of the shell members 52 and 53 may be surface treated in the manner described previously to augment the insulating characteristics of the evacuated chamber 57.

From the foregoing it will be seen that there is provided herein an improved helmet construction which insulates the head of the wearer against the penetration of heat rays by means of an evacuated chamber, the insulating qualities of which are augmented by a novel arrangement of heat radiating and heat absorbing surfaces. There is also provided a helmet construction wherein the brim and dome portions may be uniform for various head sizes and shapes and wherein sweat bands adapted to the many sizes and shapes required may be easily and securely assembled with the uniform, standard helmet construction.

It should be noted that, in all the modifications described hereinabove, the various surfaces of the nested shells going to make up the crown or dome part of the helmet may be coated as described above. I also contemplate that the inner surface of the outer shell may, instead, in accordance with the features of my invention, be provided with a highly lustrous or mirrored surface such as is commonly used in "thermos" bottles so as to enable an action to occur in my helmet similar to the thermal action that takes place in a "thermos" bottle.

It should further be noted that, in all forms of my invention, there is provided a helmet particularly adapted for tropical use made up of nested shells, each of relatively thin material and so interrelated that, when assembled, they provide a helmet including a crown or dome part and a brim and also provide for the accommodation of suitable means to serve the purpose of a head band whereby the helmet may be properly fitted to the head of the wearer.

In addition to the foregoing it will be seen that there is provided herein a helmet construction which is efficiently configured to provide maximum protection against crushing forces, the various helmet parts being configured to also support each other against such crushing forces.

What I claim is:

1. As an article of manufacture, a helmet including a shell portion constructed from form retaining sheet material and having standard size and shape for varying head sizes and shapes, a sweat band structure of a size and shape to conform to the size and configuration of the head of a user, means affording a tapering surface interiorly of said shell and means affording a cooperating tapered surface on said sweat band structure, said surfaces being adapted to engage in overlapping, interlocking relationship to secure said sweat band to said shell, the degree of overlapping varying in accordance with varia-

tions in the shape and size of said sweat band structure.

2. In a helmet constructed from form retaining sheet material, a protective portion including outer and inner shell sections, the outer section including a dome portion and a brim portion extending radially outwardly therefrom, an annular, rigidifying distorted section adapted to provide a tapering surface between said dome and brim portions, said inner shell including a dome portion constructed and arranged to be spaced from said outer shell to define an insulating chamber therewith and having a tapering surface formed to cooperate with the tapering surface of the outer shell and to be disposed in surface abutment therewith to present a tapering surface interiorly of the helmet and a sweat band for said helmet, said sweat band having means affording a tapering surface adapted to overlap and interlock with the interiorly disposed tapering surface of said protective portion to retain sweat bands in varying sizes in operative position within the helmet.

3. In a helmet construction, an outer shell assembly formed from form retaining sheet material, a head engaging band formed of a size and shape to conform to the configuration of the head of a user, said band being adapted to be disposed interiorly of said helmet and having its upper marginal edge shaped to afford an outwardly extending tapering surface, means on said shell affording an inwardly extending tapering surface, said surfaces being adapted to overlap one another in interlocking engagement to retain said band in position and to overlap each other in an amount according to the size and shape of the band.

4. In an insulated helmet construction a dome portion and a brim portion, said dome portion comprising spaced inner and outer wall sections, means for providing a seal joint between said wall sections at the junction of said dome portion with said brim portion to provide a sealed insulation chamber therebetween and means for securing said wall sections together in sealed relationship at the crown of said dome, said last named means including a connecting element extending through said walls at the crown of the dome, said element providing a clinched attachment between said walls.

5. In a helmet construction a dome like shell, finger elements formed at the peripheral edge of said shell, a head engaging band including a vertical portion and an outwardly extending flange formed integrally with the bottom edge of said vertical portion, the outer edge of said flange having a size and shape conforming to that of the dome like shell at the junction thereof with said fingers, said flange being disposed with its outer edge engaging said shell at the upper termini of said fingers and said fingers being distorted inwardly to underlie said flange to maintain the same in fixed relationship to said shell.

6. In a helmet constructed from form retaining sheet material, an outer shell portion including a dome section and a brim section extending substantially radially therefrom, an inner shell portion including a dome section and a head engaging section, said head engaging section comprising the marginal peripheral portion of said inner shell, attachment means on said outer shell portion disposed at the junction of the dome section and the brim section thereof and cooperating attachment means on said inner

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shell section disposed at the junction of the dome section and the head engaging section thereof, said attachment means being constructed and arranged to engage one another to retain said helmet in assembled relationship with said dome sections disposed in spaced relationship to one another and said head engaging section disposed inwardly of the junction between said shell portions.

7. In a head gear construction, a hollow shell-like member including a crown portion and a brim portion, said shell being made of a material having a white heat-reflecting surface, a head engaging band in the lower part of said shell member adjacent the junction of the crown and brim portions and means for attaching said band to said shell member so that the band is spaced through a major portion of its width for a substantial distance from the inner surface of the shell member, said means comprising a second shell spaced throughout a major portion of its area from the inner surface of said member so as to define an insulating chamber between said member and second shell.

8. In a head gear construction, a crown portion having a lower part provided with an over-

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size dimension, a shell-like part in and spaced throughout the major portion of its area from the inner surface of said crown portion and including means for receiving head engaging means of different head dimensions and shapes, and head engaging means including a sweat band construction having a part for retainingly engaging said first mentioned means, said shell-like part defining an insulating chamber between said crown portion and the head of the wearer.

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