

Sept. 25, 1962

J. A. AILEO

3,055,012

HELMET WITH HOOD LINER

Filed May 8, 1959

3 Sheets-Sheet 1

Fig. 1.

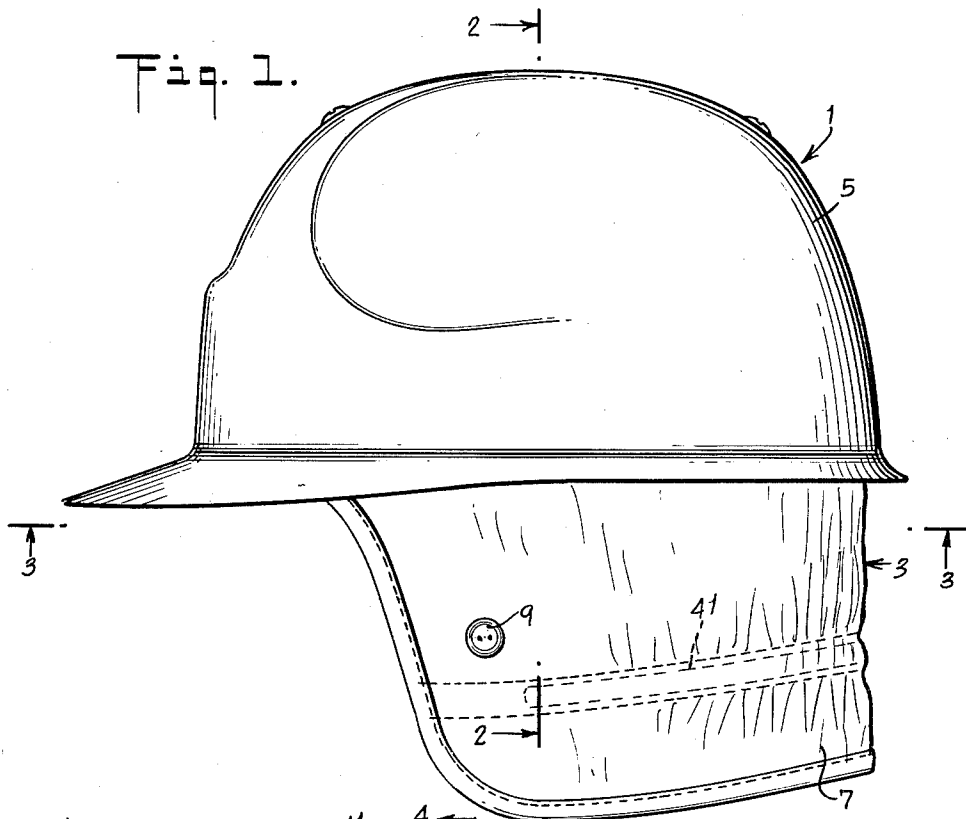
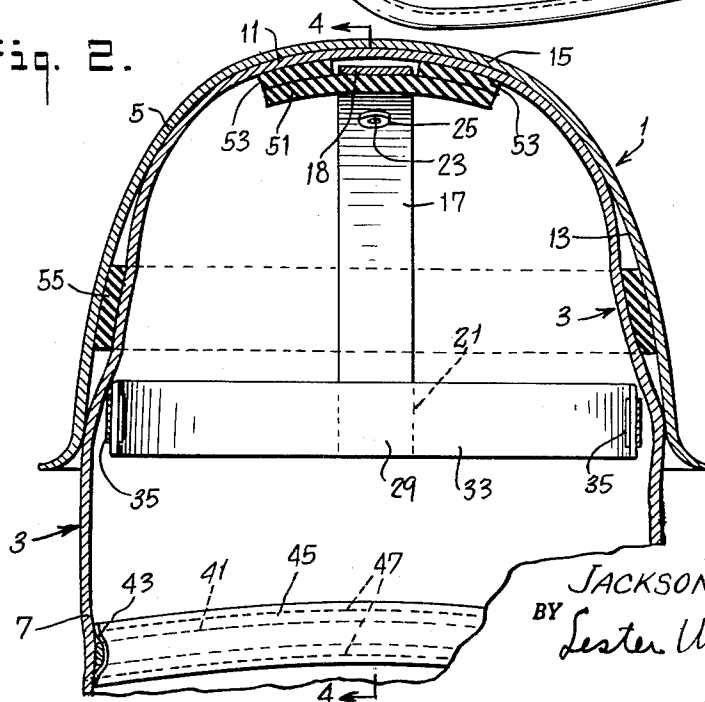


Fig. 2.



INVENTOR.
JACKSON A. AILEO
BY *Lester W. Clark*
ATTORNEY

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3 Sheets-Sheet 2

Fig. 3.

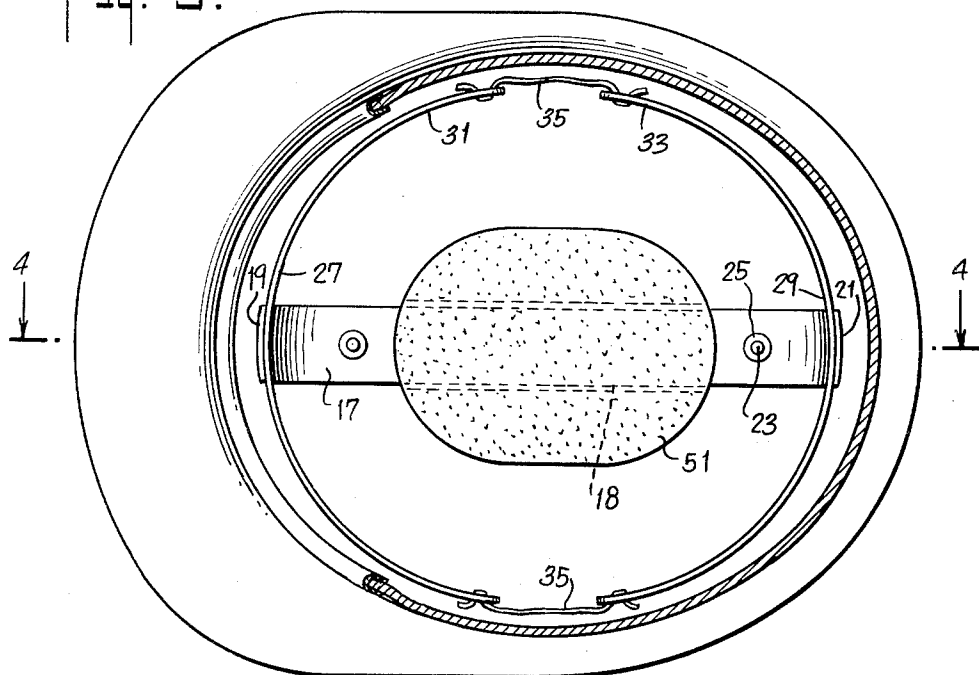


Fig. 5.

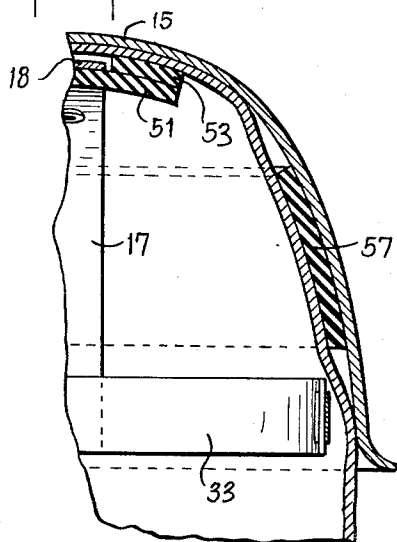
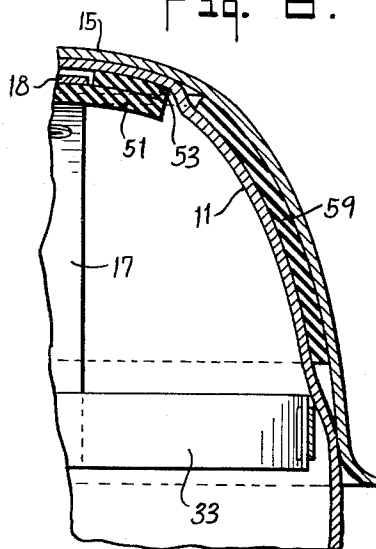


Fig. 6.



INVENTOR.
JACKSON A. AILEO
BY *Lester W. Clark*
ATTORNEY

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J. A. AILEO

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3 Sheets-Sheet 3

Fig. 4.

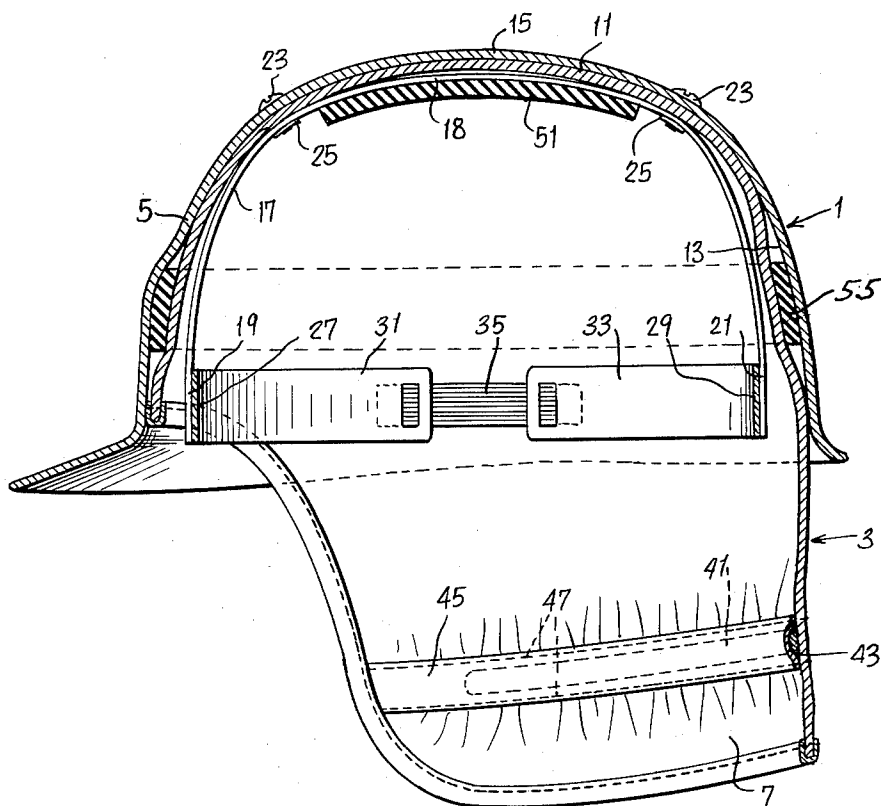


Fig. 7.

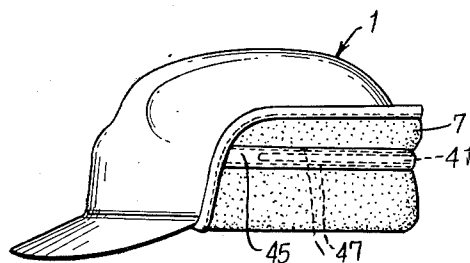
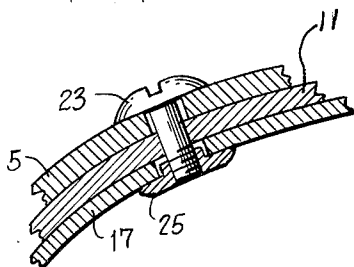


Fig. 8.

INVENTOR.
JACKSON A. AILEO
BY Lester W. Clark
ATTORNEY

1

3,055,012

HELMET WITH HOOD LINER

Jackson A. Aileo, Carbondale, Pa., assignor to Leonard P. Frieder, Great Neck, N.Y.

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7 Claims. (Cl. 2—3)

This invention relates to a head protecting device and more especially to a rigid helmet provided with an inner head covering hood. The invention particularly relates to a construction providing for supporting a hood within a rigid shell of a helmet and to the construction of the hood itself.

Helmets of various types, whether in the form of rigid shells or of more or less flexible form, have been provided heretofore for different purposes with various auxiliary protective means against heat and cold, shock and vibration, these means as linings and fabrics of different kinds ordinarily being carried by and within the structure of the helmet. Where such head coverings and helmets are to be worn by the wearer under widely varying conditions of temperature, as for example, between summer and winter, or in places of different longitude or altitude, a helmet provided with a lining or insulating fabric, while serving to give the desired protection at low temperature or to limit the effect of noise and vibration, becomes uncomfortable at higher temperatures, for example under summer or torrid zone conditions, or when the wearer is no longer subjected to the effects of noise and vibration. Such variations in the conditions of use might be met by providing a plurality of helmets respectively having different amounts or kinds of insulation or no insulation at all for different seasons, longitudes, altitudes or other different conditions. The provision of such a plurality of helmets to meet these varied conditions, however, involves a large capital expenditure as well as the need for storing the different helmets when not in use.

It is an object of the invention to provide a head covering in which a protective lining or fabric may readily be inserted in and removed from the helmet.

It is another object of the invention to provide a rigid helmet with a removable lining or fabric which may be held in place by the means which supports the helmet on the head.

It is an additional object of the invention to provide a helmet with a head covering hood which may be removably supported within a rigid shell and disposed therein so that the composite helmet easily may be placed upon the head without interference by the hood.

It is a further object of the invention to provide a hood which may be supported within the shell of a helmet and having head covering and neck covering portions, to cover and protect the head, and the neck covering portion being foldable from the neck covering position upon the head covering portion and being provided with means for holding the neck covering portion in another position.

It is a feature of the invention that the lining or insulating fabric is supported within the rigid shell of the helmet so as to extend over the inner surface of the shell and to be disposed over a substantial part or all of this surface, between the shell and the head of the wearer. The invention has particular application in a helmet of the type in which the rigid shell is provided with means for engaging the head of the wearer for supporting the helmet on the head. This means in general constitutes a head band, preferably of resiliently flexible construction so as to be adjustable to the head of the wearer, this head band means, in accordance with the invention, serving also to dispose the portions of the hood adjacent thereto outwardly from the head of the wearer so that the head readily may be inserted in the helmet in the same

2

manner as when the helmet is placed on the head without the hood.

The head band supporting means may be conventional and may comprise a resilient elongated member which extends from an edge or brim portion of the shell, ordinarily over the crown portion of the shell, to an oppositely disposed edge or brim portion of the shell. This elongated member adjacent the respective ends thereof may carry head band elements respectively engaging the forehead and the back of the head, the ends of these elements being disposed adjacent each other at the respective sides of the shell. In the usual construction the elongated member extends in curved contour from the forward brim portion of the shell upwardly and rearwardly over the crown portion to the rear brim portion of the shell. This elongated member in this curved form is spaced inwardly from the shell of the helmet at its respective ends and is resiliently biased to this position. It, however, may be formed and disposed so as to flex outwardly at its ends as the helmet is placed on the head so as to bring slight pressure on the forehead and on the back of the head of the wearer. Conventionally elastic means may be provided connecting the adjacent ends of the two elements of the head band means above referred to so as to provide for slight separation thereof at each side against the bias of the elastic means, this elastic means being adjustable further to adjust the pressure which is brought upon the forehead and rear part of the head of the wearer.

The elongated member referred to may be secured in place by suitable fasteners which may pass through the shell and through the elongated member for holding this member in position at the inside of the shell. In accordance with the invention, by removing the head band supporting means upon removal of the fasteners, the hood may be inserted in place with its head covering portion disposed at the inner surface of the shell. When the hood thus is disposed within the shell the head band supporting means may be replaced and fastened in position with the elongated member of the head band means holding the head covering portion of the hood, particularly the crown thereof, against the inner surface of the shell. The hood may be provided with apertures through which the fasteners may pass securing the elongated member to the shell. When the head band means is in place the portions of the hood which are adjacent the brim are held outwardly toward the shell with respect to the space therewithin by the elements of the head band means which have been referred to, these edge or brim portions of the hood being disposed between these elements and the brim of the shell. The helmet in which the hood now is disposed may be placed upon the head in the usual manner without the edge portions of the hood falling into the inner space and interfering with placing the helmet on the head.

For protecting the neck of the wearer the hood may be provided with a portion depending below the edge or brim of the shell of the helmet so as to extend about the neck. Such depending portion, in accordance with another feature of the invention, is provided with a resiliently deformable element which extends generally horizontally about the neck at the rear part thereof and holds the depending portion in place adjacent the neck of the wearer. This element may be U-shaped with the legs of the U extending forwardly and resiliently movable apart to spread the ends of the legs. These legs under their bias hold the sides of the neck portion against the neck.

In head coverings or hood which heretofore have been provided with a neck covering portion, this portion has been foldable upwardly and outwardly upon the rear part of the head covering or hood. The depending neck

covering portion of the hood of the present invention also is thus foldable upon the rear part of the shell outwardly thereof, when the hood is carried within the shell, or outwardly upon the rear part of the hood itself when the hood is removed from the shell. In either case the U-shaped resilient element is effective to hold the folded neck covering portion of the hood in place in its folded position upon the rear portion of the shell or upon the head covering portion of the hood itself, as the case may be.

These and other features of the invention will be understood more clearly from the description to follow taken in connection with the drawings in which:

FIG. 1 shows in elevation a helmet with a hood supported therein with its neck covering portion depending therefrom;

FIG. 2 is a vertical section on line II—II of FIG. 1; FIG. 3 is a horizontal section on line III—III of FIG. 1;

FIG. 4 is a vertical section on line IV—IV of FIG. 3; FIG. 5 is a partial section similar to FIG. 2 showing a modification of a detail of the construction;

FIG. 6 is a partial section similar to FIG. 2 showing another modification of a detail of the construction;

FIG. 7 is a section showing a fastening means;

FIG. 8 is an elevation showing the neck covering portion of the hood folded upon the shell.

FIG. 1 shows the helmet 1 in elevation with the neck covering portion of the hood 3 depending below the brim or edge portion of the shell 5 of the helmet. In the embodiment disclosed this neck covering portion 7 is of continuous extent from a forward part of the helmet around the back of the neck to the opposite side, so that a strap, frog or other conventional device may be passed across the throat and provided, for example, with button holes for engaging a button 9 on either side of the neck covering portion.

As will be seen in FIGS. 2 and 4 the hood 3 in the embodiment disclosed has a continuous head covering portion 11 extending from the peripheral part of the hood which is adjacent the brim of the shell upwardly and along the inner surface 13 of the shell and over the crown portion 15 thereof. As shown in FIG. 4 this portion of the hood is held in place by an elongated member 17 of a head band means. The member 17 is of arcuate shape in FIG. 4 and extends from an end 19 disposed adjacent the forward part of the shell upwardly and along the crown portion and downwardly to the rear end 21 adjacent the rear edge portion of the shell. The elongated member 17 is secured to the crown portion 15 of the shell by slotted head screws 23 passing through holes in the shell and in the hood 11 and in the member 17 into threaded engagement with nuts 25 at the inner surface of the elongated element 17. Thus, the arcuate portion 18 of the elongated element bears over a substantial extent of the crown portion of the hood and holds it into engagement with the inner surface 13 of the shell.

The elongated member 17 is of such form that when it is secured in place its end portions 19 and 21 are disposed in the spaced relation to the shell shown and which generally has been described above. This element 17, however, is of such resilience that its ends 19, 21 resiliently may be moved toward the shell 5 to allow the head of the wearer to be engaged with slight pressure by the inner surfaces 27, 29 respectively of arcuate head band parts or elements 31, 33 which respectively are secured by thermoplastic welding, adhesive or other suitable means to the ends 19 and 21 of the elongated element 17. The ends of the head band parts 31, 33 adjacent each other at the sides of the helmet are connected by elastic bands 35 which are adjustable resiliently to draw the parts 31, 33 toward each other so as to provide for fitting the head band means to a smaller head size while retaining the elastic condition to commodate to the head and to hold the head band means conforming thereto.

The head band means, and more particularly the parts 31, 33, are disposed in inwardly spaced relation to the shell 5 so that the portions of the hood which are disposed adjacent the edge portion or brim of the shell are disposed between the parts 31, 33 and the shell. Thus the parts 31, 33 serve to hold the edge portions of the hood from collapsing into the space within the shell. The placing of the helmet on the head, therefore, is facilitated and the hood becomes disposed without further adjustment thereof in proper relation to the head to provide for protection or insulation and so that the depending neck covering portion 7 also is held in position to extend about the neck when the helmet is in proper position on the head. The throat strap may be immediately buttoned across.

As shown in FIGS. 1, 2 and 4 the depending neck covering portion 7 of the hood 3 carries a resilient U-shaped element 41 which extends from a part of the depending portion 7 at one side of the neck around the back of the neck to the corresponding part of the depending portion at the opposite side of the neck. This U-shaped element 41 is disposed within an elongated space 43 formed between the wall of the depending portion 7 of the hood and a strip or tape 45 which is sewed by stitches 47 or otherwise fastened along the strip to the depending portion 7. The width of the strip and the spacing of the stitches 47 are such that the U-shaped element 41 is somewhat free for movement within the space 43, so that the hood and the strip may move about the element 41 circumferentially upon the contour of the transverse section of the element 41 throughout the length thereof in the folding of the depending portion 7 as about to be described. The element 41 may have some displacement lengthwise thereof with respect to the depending portion 7 and the strip 45 to adjust the depending portion comfortably with respect to the neck. The U-shaped element 41, however, by virtue of its resilience, in general will hold the depending portion 7 with slight pressure in engagement with the neck of the wearer and, for example, if the strap is not fastened across the throat, the depending portion will not be blown away from the neck.

In the manner of conventional caps or hoods, the neck portion 7 may be folded upwardly about the brim of the shell with the portion 7 lapping upon the outer surface of the shell 5, as shown in FIG. 8. In such folding the outer surface of the depending portion 7 comes into engagement with the outer surface of the shell and the inner surface of the portion 7 becomes exposed outwardly of the helmet. It will be understood in this inversion of the positions of the two surfaces of the portion 7 that the strip 45 will become disposed outwardly with respect to the portion 7 and the shell 5. It also will be clear that the forward ends of the space 43 and each point of the strip 45 and of the space 43 therealong will move upwardly to a position above the brim and lapping upon the outer surface of the shell. In this inversion of the parts the space 43 itself becomes inverted in the sense that, whereas in FIGS. 1, 2 and 4 the strip 45 at its exposed face is concave, this surface of the strip becomes convex when the portion 7 of the hood is folded upon the helmet. It will be understood also that such inversion requires that the U-shaped element 41 which is confined within the space 43 must move upwardly with the portion 7 and the strip 45 while retaining its U shape. The element 41 does not become inverted and this is accomplished because the element is not confined within the space 43 against relative movement of the portion 7 and the tape 45 together with respect to the element 41 circumferentially upon the contour of the transverse section of the element 41 throughout the length thereof. Thus the element 41 is retained with its resilient legs directed forwardly and is effective to hold the portion 7 of the hood in the lapping relation upon the shell 5 in a manner similar to its function in holding the portion 7 against the neck of the

5

wearer when the portion 7 extends downwardly as shown in FIGS. 1, 2 and 4.

The U-shaped element 41, because of its resilience, provides for movement of its leg portions away from and toward each other so as to pass over the brim of the shell and such movement is facilitated by virtue of the flexibility of the fabric of the portion 7 of the hood. Moreover, the fabric of the portion 7 of the hood and the flexible element 41 cooperate to hold each other in the proper relation to the shell 5 above the brim thereof so that the folded and lapped portion 7 is retained in place against displacement by the wind or other accidental occurrence. It will be understood that the resilient element 41 and the flexible hood easily may be moved to and from the lapping position as in FIG. 8 and this may be accomplished by one hand of the wearer whenever desired.

As shown more particularly in FIGS. 2 and 4, the helmet of the invention may be provided with a cushion 51 disposed adjacent the crown portion 15 of the shell and carried by the portion 18 of the elongated element 17 which extends along the crown portion of the shell. The cushion 51 may be fastened to the portion 18 by any suitable means, for example, by an adhesive. A substantial area may be given to the cushion 51 by providing a considerable lengthwise extent along the portion 18, as shown in FIG. 4, and this cushion may have a substantial width, as shown in FIG. 2, extending transversely of the portion 18 of the elongated element 17. In order to provide bearing for the laterally extending parts of the cushion 51, as shown in FIG. 2, additional laminations 53 may be provided at either side of the portion 18 and carried by the cushion 51 and bearing upon the inner surface of the hood 11, the space between the two laminations 53 providing for the portion 18 held in bearing relation to the hood and secured to the shell by the screws 23 as described above.

In FIGS. 2, 5 and 6 are shown additional padding or cushion means 55, 57, 59 disposed upon portions of the shell 5 downwardly spaced from the crown and at the inner surface of the shell and between this inner surface and the body 11 of the hood. These cushions 55, 57, 59 are of different vertical widths and extend generally about the shell with their lower edges adjacent but somewhat spaced above the head band means, so that, when it is desired to insert or remove the hood 11 from the shell in the manner described, the lower edge of the cushions 55, 57, 59 will not interfere with such insertion or removal. The vertical width of the cushions 55, 57, 59 is varied in order that greater or less protection against shock or noise may be secured for different conditions of service. The upper edge of the cushion 59, however, is somewhat spaced from the cushion 51 and the lamination 53 so that the hood 11 readily may be inserted and removed as described.

It will be understood that the form of the hood may be varied to suit different conditions of service. Instead of the depending portion 7 extending fully about the neck at the back thereof, the hood merely may be provided at each side with a throat strap connected to an ear covering portion depending from the head covering portion 11 of the hood and provided with suitable fasteners of conventional type for securing the two throat straps across the throat. If desired, the material of the hood may be of greater or less elastic or stretchable character in order to conform securely to the neck of the wearer. Hoods of different weights and insulating capacity may be provided for mounting in the same shell.

The hood of the invention also may be provided with ear pieces of the sound attenuating type adjustable to accommodate their position to the ear of the wearer, as disclosed in my copending application Serial No. 792,625, filed February 11, 1959, now Patent No. 3,005,203, granted October 24, 1961. The hood also may be constructed

6

adjustably to support ear phones or the like in position over the wearer's ears, if desired in cooperation with sound attenuating ear pieces, as suggested in the application Serial No. 792,625.

All such variations in the form and construction both of the hood and of the combination of the hood supported in a rigid helmet may be made while providing the feature of the hood supported and secured in the shell, in the manner which has been described, by the structure which provides the means for engaging the head as a head band means to hold the shell on the head; also the feature of the depending neck protecting portion of the hood with the U-shaped retaining element as described. All such variations are intended to come within the scope of the appended claims.

I claim:

1. In a protective helmet the combination with a rigid outer shell having an opening at the lower side thereof for receiving the head of a wearer, of a fabric hood disposed within said shell and open at the lower side thereof for receiving and covering the head of the wearer, the fabric of said hood extending generally over and adjacent the inner surface of said shell, an elongated member of stiffly resilient material disposed inwardly of said hood with respect to said shell and extending over said inner surface of said shell from a first point adjacent the edge of said opening of said shell to another point adjacent said edge of said opening of said shell spaced from and disposed generally oppositely with respect to said first point across said opening, said elongated member at a location thereon between and spaced a substantial distance from said points being secured to said shell so as to provide for resilient movement of the portions thereof respectively adjacent said points relative to said shell, said elongated member engaging said fabric hood at said location to hold said hood in position between itself and said shell, and means supported by said elongated member respectively adjacent said points and extending generally along said edge of said opening of said shell in inwardly spaced relation to said shell for engaging the edge portions of said hood along said opening thereof to dispose said edge portions adjacent the edge portions of said shell.

2. In a protective helmet the combination as defined in claim 1 in which said means extending generally along the edge of the shell opening in inwardly spaced relation to said shell provides head band means for engagement with the head of the wearer for holding said helmet in position on the head.

3. In a protective helmet the combination with a rigid outer shell having an opening at the lower side thereof for receiving the head of a wearer and having a crown portion spaced from the edge of said opening, of a fabric hood disposed within the shell and open at the lower side thereof for receiving and covering the head of the wearer, the fabric of said hood extending generally over and adjacent the inner surface of said shell, an elongated member of stiffly resilient material disposed inwardly of said hood with respect to said shell and extending between its ends over said inner surface of said shell from a point adjacent the forward edge of said opening of said shell and over said crown portion thereof to a point adjacent the rear edge of said shell opening, said elongated member being secured to said crown portion of said shell at a location spaced substantially from the edge of said opening of said shell so as to provide for resilient movement of the ends of said elongated member relative to said shell, said elongated member engaging said fabric hood disposed between said elongated member and said shell adjacent said crown portion to hold said hood in position with respect to said shell, and means supported by said elongated member respectively adjacent its ends and extending generally along the edge of said shell opening in inwardly spaced relation to said shell for engaging the edge portions of

7

said hood along said opening to dispose said edge portions thereof adjacent the edge portions of said shell.

4. In a protective helmet the combination as defined in claim 3 in which said means extending along the edge of said shell opening in inwardly spaced relation to said shell comprises forward and rear parts respectively supported by said elongated member adjacent the ends thereof so that said parts are movable relative to each other generally in the forward and rearward direction upon resilient flexure of the end portions of said elongated member to provide for engagement with the head of the wearer.

5. In a protective helmet the combination as defined in claim 3 which comprises resilient force absorbing padding means supported upon said elongated member at said crown portion of said shell and disposed between said elongated member and the head of the wearer.

6. In a protective helmet the combination as defined in claim 1 which comprises resilient force absorbing padding means supported by said shell and disposed between the fabric of said hood and said shell upon a portion of said shell spaced from the edge of said opening thereof.

8

7. In a protective helmet the combination as defined in claim 1 which comprises resilient force absorbing padding means supported by said shell and disposed between the fabric of said hood and said shell upon a portion of said shell adjacent said edge portions of said hood.

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