

Sept. 14, 1965

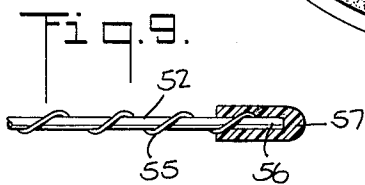
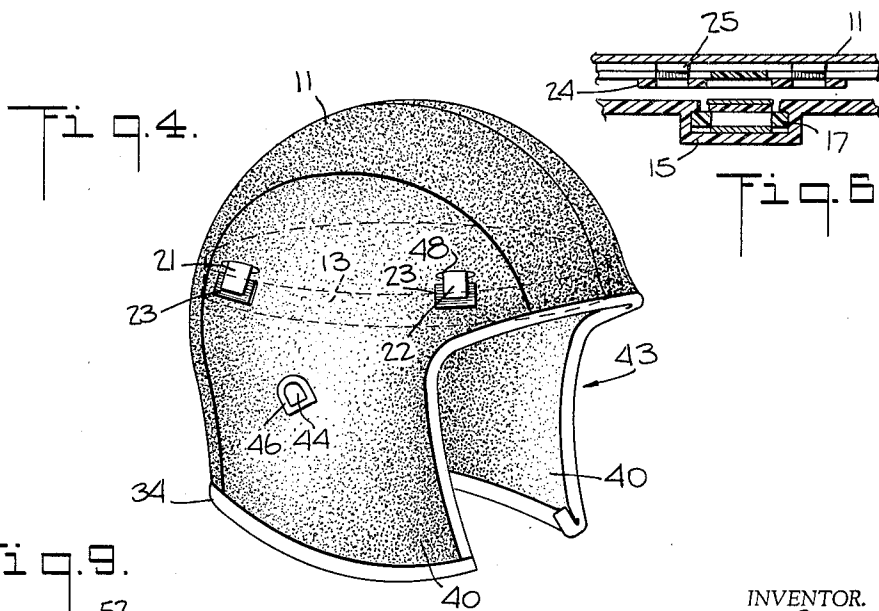
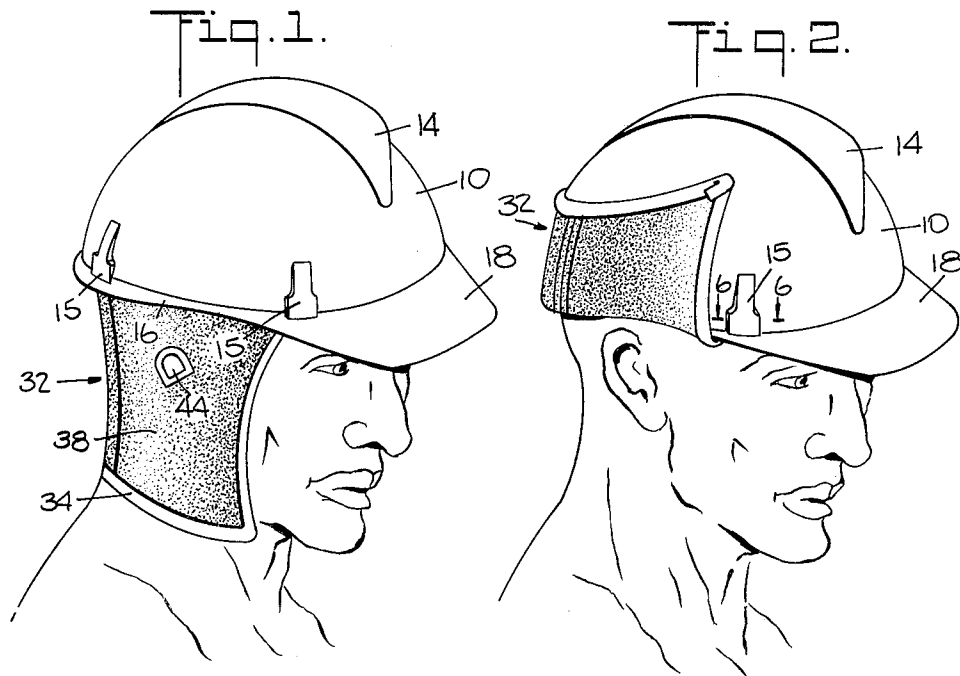
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3,205,508

SAFETY HELMET LINER AND ASSEMBLY

Filed Dec. 2, 1963

3 Sheets-Sheet 1



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SAFETY HELMET LINER AND ASSEMBLY

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3 Sheets-Sheet 2

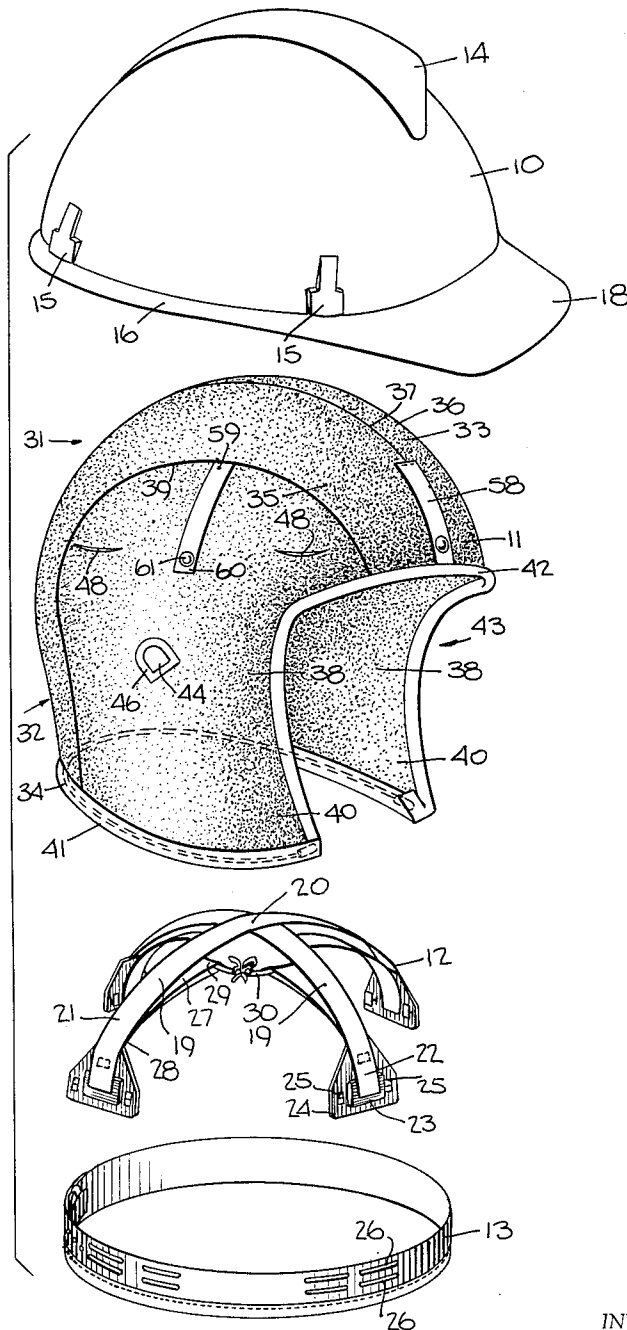


Fig. 3.

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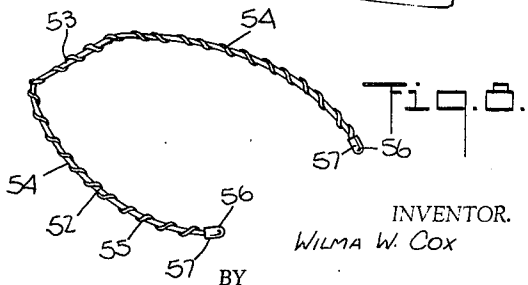
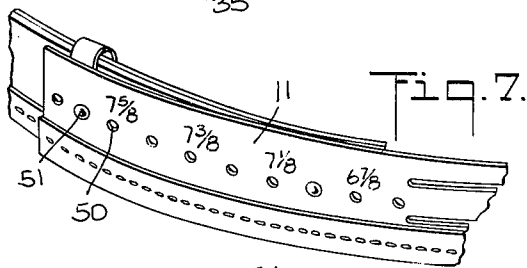
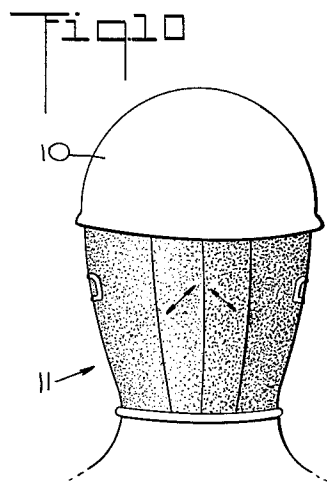
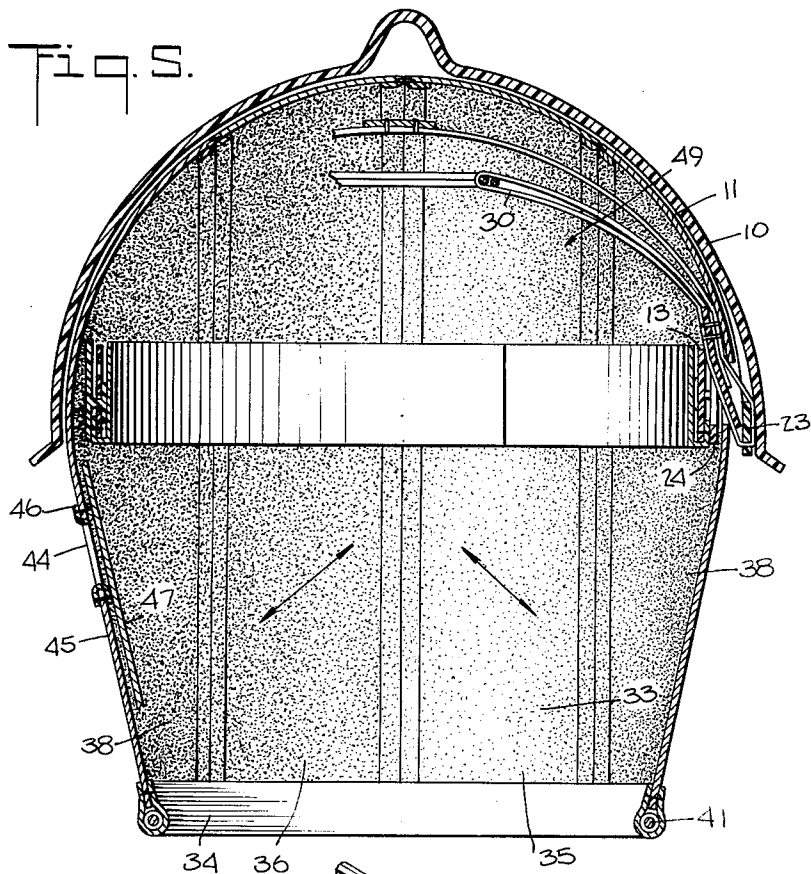
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SAFETY HELMET LINER AND ASSEMBLY

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3 Sheets-Sheet 3



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SAFETY HELMET LINER AND ASSEMBLY

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10 Claims. (Cl. 2—3)

This invention relates to safety helmets and more particularly to a winter liner therefor.

Safety helmets find increasingly wide use in construction trades and many other types of industrial operations. The helmet is constructed with a hard shell, usually plastic or the like, which generally is constructed to fit all head sizes or at least a range of head sizes. Within the shell is mounted a head suspension assembly which includes an adjustable sweatband which is secured to the inner surface of the shell at a plurality of spaced positions by a variety of means. The head suspension assembly also includes a plurality of crown straps which are attached at their lower ends to either the shell adjacent the sweatband or to the sweatband itself and extend upwardly to join at their upper ends to provide a cradle which maintains the head at a spaced position from the inside top portion of the shell in order to protect the head from falling objects and the like during use. The head suspension assembly may include adjustable cradle straps in addition to the fixed straps in order to provide additional adjustability for different head sizes. Various adjustable means are disclosed and claimed in Patent 3,046,559 issued July 31, 1962.

In order to provide additional protection for the neck and ears from cold temperatures various types of insulated liners have been used in the prior art principally involving chin straps for closing the liner against the side of the head. Such prior liners have been for a single or at least a very small range of head sizes, thereby necessitating the maintenance of a large inventory of various sizes by any company using the safety helmets. Further, usually no means has been provided for releasing the chin straps and anchoring the flaps or free ends of the liner to the helmet when desired due to increase in temperature or the like, and as a result the user has been inclined to let the flaps of the liner hang loosely, thereby creating the inherent danger of catching the loose flaps in machinery, etc. In some instances, users have removed the liner from the helmet altogether because of the problems involved in anchoring the flaps in some manner away from the ears as above mentioned.

Another danger of the prior liners has been that with them buckled or otherwise secured downwardly and over the ears, sound has thereby been muffled and many accidents have resulted from the inability of the user to hear approaching vehicles or shouted warnings and the like.

The present invention provides a winter liner which eliminates or greatly improves upon the prior liners by providing a single liner which fits a wide range of head sizes, e.g. 6 to 9; it is adapted for assembly within any safety helmet made or used throughout the world today; it provides means, without buckles or straps, for anchoring the ear flaps against the neck during use and alternately for holding the flap ends up against the safety helmet itself when desired; and further provides sound vents in the flaps themselves which provide increased sound transmission through the flaps while yet retaining a certain degree of protection from the elements.

Briefly the safety helmet liner according to the present invention comprises a crown portion and a depending flap portion formed therewith having an elongated stretch fabric portion extending centrally across the crown portion in a fore and aft direction and down through said flap portion to the base thereof. Side panels of the liner are joined to respective opposite sides of said elongated section and each have a pair of horizontal slits therein

at spaced positions adapted to receive the head harness straps of the helmet. Insulating fabric lining members are affixed to the insides of the side panels and each side panel has a sound vent or opening therein covered by a portion of its corresponding liner member and is located at the ear covering portion of the liner. Spring means is included in the base of said liner for releasably holding said flap portion in alternate positions against the neck and upwardly against said helmet, said spring means including a plurality of spring steel wires twisted around one another and having a relatively straight intermediate portion and arcuate end portions adapted to lie closely against the neck of the wearer.

Other embodiments of the invention as well as other objects and features thereof will become apparent in the following description and claims, and in the drawings in which—

FIG. 1 is an isometric view of one embodiment of the invention;

FIG. 2 is a similar isometric view;

FIG. 3 is an exploded assembly view of the same embodiment;

FIG. 4 is an isometric view of another form of liner;

FIG. 5 is an enlarged sectional elevation of the helmet assembly shown in FIGS. 1—3;

FIG. 6 is a section taken along lines 6—6 of FIG. 2;

FIG. 7 is an enlarged fragmentary isometric of the sweatband;

FIG. 8 is an isometric of the spring means;

FIG. 9 is an enlarged fragmentary partial section of the spring means; and

FIG. 10 is an end view of the assembly.

Referring now to the drawings and in particular FIGS. 3 and 5 one arrangement according to the principles of the present invention is shown including the safety helmet 10 consisting of a hard plastic shell or the like, the liner 11, head suspension assembly 12 and sweatband 13. The helmet 10 has a strengthening ridge 14 extending from front to rear along its crown and has a plurality of bosses 15 at spaced positions around rim 16 defining inner mounting grooves 17 (see also FIG. 6). A suitable forwardly extending brim 18 is provided at the front of the helmet.

The head suspension assembly 12, in the particular embodiment shown in FIG. 3, is comprised of a pair of straps 19 sewn or otherwise connected together at cross over point 20 to provide four spaced depending straps 21 having at their lower ends 22 rectangular anchoring slugs 23 adapted for insertion in mounting grooves 17 in helmet 10 and in addition mounting frames 24 with anchor pins 25 thereon for engagement with preselected mounting slots 26 in sweatband 13. In addition the head suspension assembly 12 includes shorter looped straps 27 affixed at their lower ends 28 to the fixed straps 21 and interconnected at their upper ends 29 by adjustable lace 30.

The liner 11 is comprised of a crown portion 31 and a depending flap portion 32 having an elongated stretch fabric section or gusset 33 extending centrally across the crown portion 31 in a fore and aft direction and down through flap portion 32 to the base 34 thereof (see also FIG. 4). In the embodiment shown the gusset 33 is constituted by a pair of symmetrical panels 35, 36 stitched together along a common seam 37. The gusset 33 is made of stretch fabric such as Helanca and the like and may be napped on the inside for greater warmth and comfort. Side panels 38 are sewn or otherwise joined to the side edges 39 of gusset 33 and provide downwardly extending flap portions 40 terminating in base portion 34 which extends around both side panels 38 and gusset 33 and carries spring means 41 therein. Reinforced edging 42 may be provided around the face portion 43 or liner 11.

Sound vents 44 are provided in each side panel 38 which are dimensioned and located in the side panels to

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lie adjacent the ear of the wearer. The side vents 44 are cut through the outer fabric 45 and have reinforced edging 46 of plastic, leather, or any other suitable material as desired. The side panels 38 may be provided with an inner lining 47 of jersey or the like to enhance to warmth and insulating properties. The material of the outer side panels 45 (see also FIG. 5) may be of vinyl plastic, gray twill, etc. In order to retain the insulating properties and protect the ears the sound vents 44 are cut through the outer layer 45 of the side panel but not the inner liner 47 so that the inner liner completely covers the sound vents 44 while such construction of the side panels 38 enhances the sound transmission properties thereof.

In the helmet assembly as shown in FIG. 5 in anchoring slugs 23 of the head suspension are disposed upwardly into the downwardly facing slots 17 in the helmet 10 and are retained therein by a press fit. Such slugs are of plastic or any other suitable material. The straps 21 and 27 associated with slugs 23 extend upwardly and inwardly through the respective slits 48 through side panels 38 and into the interior 49 of the helmet. The corresponding mounting frames 24 are disposed inwardly of the liner 11 and their downwardly disposed anchor pins 25 engage respective slots 26 in sweatband 13 to mount the latter within the helmet 10 as shown. Sweatband 13 is adjustable by means of peripherally spaced holes 50 and pin 51 for a range of head sizes (see FIGS. 7 and 10).

Spring means 41 is constructed of any suitable material such as spring steel wire having in the embodiment shown a main wire 52 having a straight intermediate portion 53 and arcuate end portions 54. A second wire 55 is twisted around the first wire 52 throughout its length and is joined at the ends 56 thereto by plastic tip members 57 (see also FIG. 9).

In use the helmet and associated parts are assembled as above described and the sweatband 13 is adjusted for the desired head size and the looped straps 27 are adjusted by means of lace 30 for the crown dimension of the user's head so that the helmet 10 fits the wearer as shown in FIGS. 1 and 2. The liner, as shown in FIG. 1, may be used with the side panels 38 placed down over the ears of the wearer and they will be maintained in that position around the neck of the wearer by the spring means 41 within base portion 34. When desired the user may swing the flap portion 32 upwardly and over the helmet to the position shown in FIG. 2 where it will be retained by the same spring means 41 close against the helmet and exposing the neck and ears of the wearer when desired.

Due to the stretch fabric construction of gusset 33 the helmet liner is self-adjusting for a preselected range of head sizes. The liner 11 is also provided with a plurality of vertical tabs 58 being attached to the liner 11 at their upper ends 59 by sewing or other well known means and are removably secured at their lower ends 60 by strap means 61 or other conventional fastener. With the latter straps 58 the liner can be used in safety helmets where it might be desired to have the liner 11 completely within the helmet construction to lie against the head of the wearer. The straps 58 permit location of the sweatband outside of the liner 11 and the liner is held in the helmet by means of the straps 58 being fastened around the sweatband.

It can thus be seen that the above construction provides all of the objects aforementioned with the many advantages over prior art structures. While certain embodiments of the invention have been described and shown herein it is to be understood that certain changes and additions may be made by those skilled in the art without departing from the scope and spirit of the invention.

I claim:

1. A liner for a safety helmet of the type having an outer hard shell and an inner head suspension assembly

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including an adjustable sweatband and a plurality of crown straps interconnected therewith adapted to support the inner surface of said shell at a spaced position from the wearer's head, said liner being adapted to fit any head size and to cover the sides of the head down to the neck below the ears comprising a crown portion and a depending flap portion formed therewith, an elongated stretch fabric section extending centrally across said crown portion in a fore and aft direction and down through said flap portion to the base thereof, side panels in said liner joined to respective opposite sides of said section, means on said liner adapted for interconnecting said liner with the head suspension assembly, respective insulating fabric lining members affixed to said side panels, each side panel having an opening therein covered by a portion of its lining member and located at the ear covering portion of said liner, and spring means at the base of said liner for releasably holding said flap portion in alternate positions around the neck and over a portion of said helmet, said spring means including a plurality of spring steel wires twisted around one another.

2. A liner for a safety helmet of the type having an outer hard shell and an inner head suspension assembly including an adjustable sweatband and a plurality of crown straps interconnected therewith adapted to support the inner surface of said shell at a spaced position from the wearer's head, said liner being adapted to fit any head size and to cover the sides of the head down to the neck below the ears comprising a crown portion and a depending flap portion formed therewith, an elongated stretch fabric section extending centrally across said crown portion in a fore and aft direction and down through said flap portion to the base thereof, side panels in said liner joined to respective opposite sides of said section, means on said liner adapted for interconnecting said liner with the head suspension assembly, respective insulating fabric lining members affixed to said side panels, each side panel having an opening therein covered by a portion of its lining member and located at the ear covering portion of said liner, and spring means at the base of said liner for releasably holding said flap portion in alternate positions around the neck and over a portion of said helmet, said spring means including a plurality of spring steel wires twisted around one another with plastic tip members joining the ends.

3. A liner for a safety helmet of the type having an outer hard shell and an inner head suspension assembly including an adjustable sweatband and a plurality of crown straps interconnected therewith adapted to support the inner surface of said shell at a spaced position from the wearer's head, said liner being adapted to fit any head size and to cover the sides of the head down to the neck below the ears comprising a crown portion and a depending flap portion formed therewith, an elongated stretch fabric section extending centrally across said crown portion in a fore and aft direction and down through said flap portion to the base thereof, side panels in said liner joined to respective opposite sides of said section, means on said liner adapted for interconnecting said liner with the head suspension assembly, respective insulating fabric lining members affixed to said side panels, each side panel having an opening therein covered by a portion of its lining member and located at the ear covering portion of said liner, and spring means at the base of said liner for releasably holding said flap portion in alternate positions around the neck and over a portion of said helmet, said spring means including a plurality of spring steel wires twisted around one another with plastic tip members joining the ends having a relatively straight intermediate portion and arcuate end portions adapted to lie closely against the neck of the wearer.

4. A liner for a safety helmet of the type having an outer hard shell and an inner head suspension assembly including an adjustable sweatband and a plurality of crown straps interconnected therewith adapted to support

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the inner surface of said shell at a spaced position from the wearer's head, said liner being adapted to fit any head size and to cover the sides of the head down to the neck below the ears comprising a crown portion and a depending flap portion formed therewith, an elongated stretch fabric section extending centrally across said crown portion in a fore and aft direction and down through said flap portion to the base thereof, side panels in said liner joined to respective opposite sides of said section, a plurality of tabs at spaced positions on said liner, said tabs being adapted to span respective portions of the safety helmet sweatband as assembled in said helmet, respective insulating fabric lining members affixed to said side panels, each side panel having an opening therein covered by a portion of its lining member and located at the ear covering portion of said liner, and spring means at the base of said liner for releasably holding said flap portion in alternate positions around the neck and over a portion of said helmet, said spring means including a plurality of spring steel wires twisted around one another with plastic tip members joining the ends and having a relatively straight intermediate portion and arcuate end portions adapted to lie closely against the neck of the wearer.

5. A liner for a safety helmet of the type having an outer hard shell and an inner head suspension assembly including an adjustable sweatband and a plurality of crown straps interconnected therewith adapted to support the inner surface of said shell at a spaced position from the wearer's head, said liner being adapted to fit any head size and to cover the sides of the head down to the neck below the ears comprising a crown portion and a depending flap portion formed therewith, an elongated stretch fabric section extending centrally across said crown portion in a fore and aft direction and down through said flap portion to the base thereof, side panels in said liner joined to respective opposite sides of said section, a plurality of tabs at spaced positions on said liner being releasably attached thereto on at least one end of said tabs, said tabs being adapted to span respective portions of the safety helmet sweatband as assembled in said helmet, respective insulating fabric lining members affixed to said side panels, each side panel having an opening therein covered by a portion of its lining member and located at the ear covering portion of said liner, and spring means at the base of said liner for releasably holding said flap portion in alternate positions around the neck and over a portion of said helmet, said spring means including a plurality of spring steel wires twisted around one another with plastic tip members joining the ends and having a relatively straight intermediate portion and arcuate end portions adapted to lie closely against the neck of the wearer.

6. A liner for a safety helmet of the type having an outer hard shell and an inner head suspension assembly including an adjustable sweatband and a plurality of crown straps interconnected therewith adapted to support the inner surface of said shell at a spaced position from the wearer's head, said liner being adapted to fit any head size and to cover the sides of the head down to the neck below the ears comprising a crown portion and a depending flap portion formed therewith, an elongated stretch fabric section extending centrally across said crown portion in a fore and aft direction and down through said flap portion to the base thereof, side panels in said liner joined to respective opposite sides of said section, a plurality of vertical tabs at spaced positions on said liner being releasably attached thereto on at least one end of said tabs, said tabs being adapted to span respective portions of the safety helmet sweatband as assembled in said helmet, respective insulating fabric lining members affixed to said side panels, each side panel having an opening therein covered by a portion of its lining member and located at the ear covering portion of said liner, and spring means at the base of said liner for releasably holding said flap portion in alternate positions around the

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neck and over a portion of said helmet, said spring means including a plurality of spring steel wires twisted around one another with plastic tip members joining the ends and having a relatively straight intermediate portion and arcuate end portions adapted to lie closely against the neck of the wearer.

7. A liner for a safety helmet of the type having an outer hard shell and an inner head suspension assembly including an adjustable sweatband and a plurality of crown straps interconnected therewith adapted to support the inner surface of said shell at a spaced position from the wearer's head, said liner being adapted to fit any head size and to cover the sides of the head down to the neck below the ears comprising a crown portion and a depending flap portion formed therewith, an elongated stretch fabric section extending centrally across said crown portion in a fore and aft direction and down through said flap portion to the base thereof, side panels in said liner joined to respective opposite sides of said section and having a pair of horizontal slits therein at spaced positions adapted to receive the head harness straps of said helmet, respective insulating fabric lining members affixed to said side panels, each side panel having an opening therein covered by a portion of its lining member and located at the ear covering portion of said liner, and spring means at the base of said liner for releasably holding said flap portion in alternate positions around the neck and over a portion of said helmet, said spring means including a plurality of spring steel wires twisted around one another with plastic tip members joining the ends and having a relatively straight intermediate portion and arcuate end portions adapted to lie closely against the neck of the wearer.

8. In combination a safety helmet having an inner head suspension assembly including an adjustable sweatband and a plurality of crown straps interconnected therewith adapted to support the inner surface of said shell at a spaced position from the wearer's head, a fabric liner adapted to fit any head size comprised of a crown portion disposed substantially within said helmet and a depending flap portion formed therewith extending beneath said helmet, said liner having an elongated stretch fabric section extending across said crown portion in a fore and aft direction, side panels in said liner joined to respective opposite sides of said section and each having a pair of slits therein at spaced positions receiving a respective one of said crown straps therethrough with said sweatband being disposed inside of said liner, insulating lining members on each of said side panels, said side panels each having an ear opening therein covered by its lining member, and spring means at the base of said liner for releasably holding said flap portion in alternate positions around the neck and over a portion of said helmet.

9. In combination a safety helmet having an inner head suspension assembly including an adjustable sweatband and a plurality of crown straps interconnected therewith adapted to support the inner surface of said shell at a spaced position from the wearer's head, a fabric liner adapted to fit any head size comprised of a crown portion disposed substantially within said helmet and a depending flap portion formed therewith extending beneath said helmet, said liner having an elongated stretch fabric section extending centrally across said crown portion in a fore and aft direction, side panels in said liner joined to respective opposite sides of said section, a plurality of tabs on said liner spanning respective portions of said sweatband and detachably connected thereto, insulating lining members on each of said side panels, said side panels each having an ear opening therein covered by its lining member, and spring means at the base of said liner for releasably holding said flap portion in alternate positions around the neck and over a portion of said helmet, said spring means including a plurality of spring steel wires twisted around one another.

10. In combination a safety helmet having an inner

head suspension assembly including an adjustable sweatband and a plurality of crown straps interconnected therewith adapted to support the inner surface of said shell at a spaced position from the wearer's head, a fabric liner adapted to fit any head size comprised of a crown portion disposed substantially within said helmet and a depending flap portion formed therewith extending beneath said helmet, said liner having an elongated stretch fabric section extending centrally across said crown portion in a fore and aft direction and down through said flap portion to the base thereof, side panels in said liner joined to respective opposite sides of said section, a plurality of tabs on said liner, said liner spanning respective portions of said sweatband and detachably connected thereto, insulating lining members on each of said side panels, said side panels each having an ear opening therein covered by its lining member, and spring means at the base of said liner for releasably holding said flap portion in alternate positions around the neck and over a portion of said helmet, said spring means including a plurality of spring steel wires twisted around one another with plastic tip members joining the ends and having a relatively straight intermediate portion and arcuate end portions adapted to lie closely against the neck of the wearer.

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