

July 8, 1941.

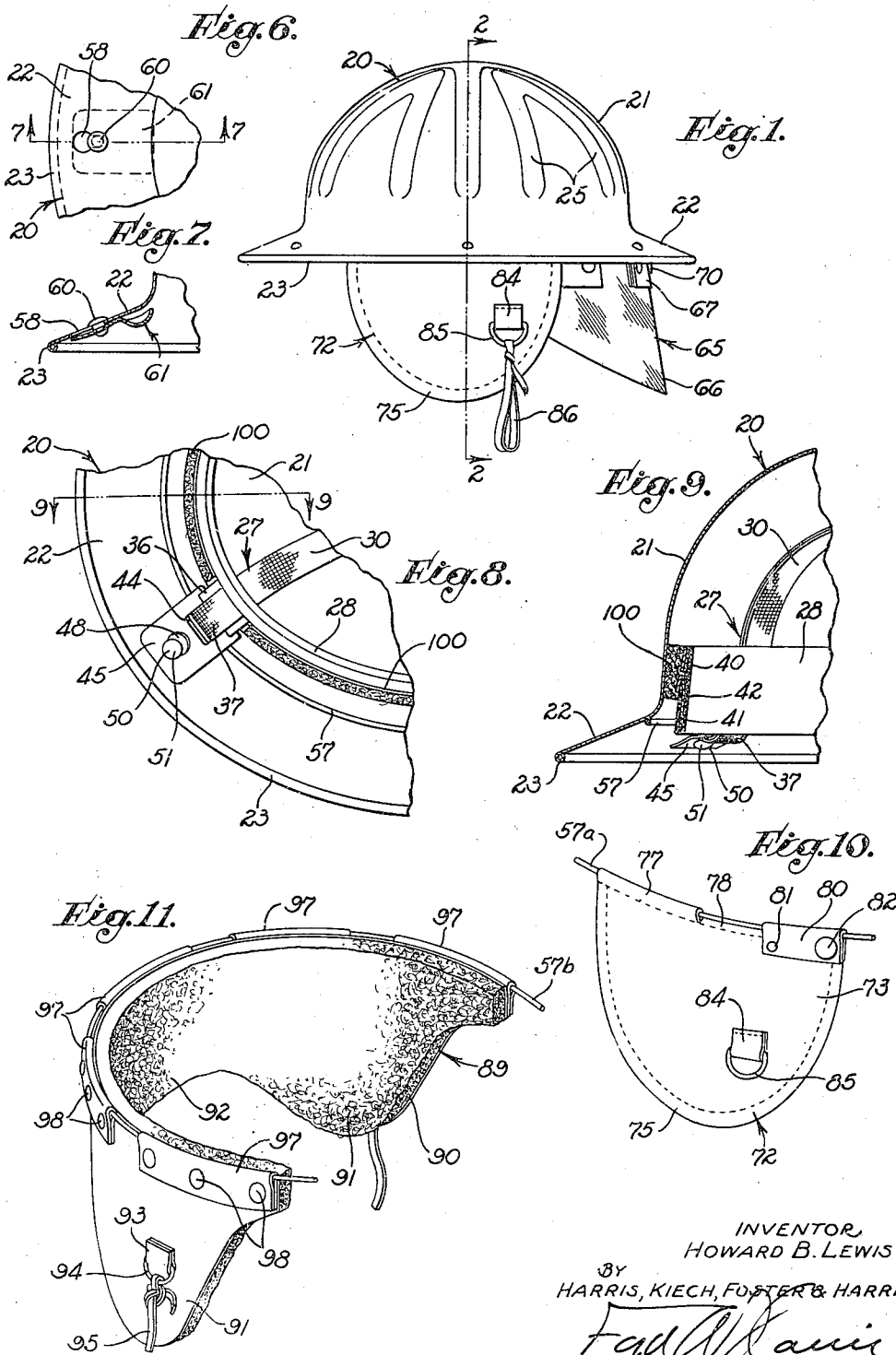
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2,248,366

SAFETY HAT

Filed Oct. 2, 1939

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3.

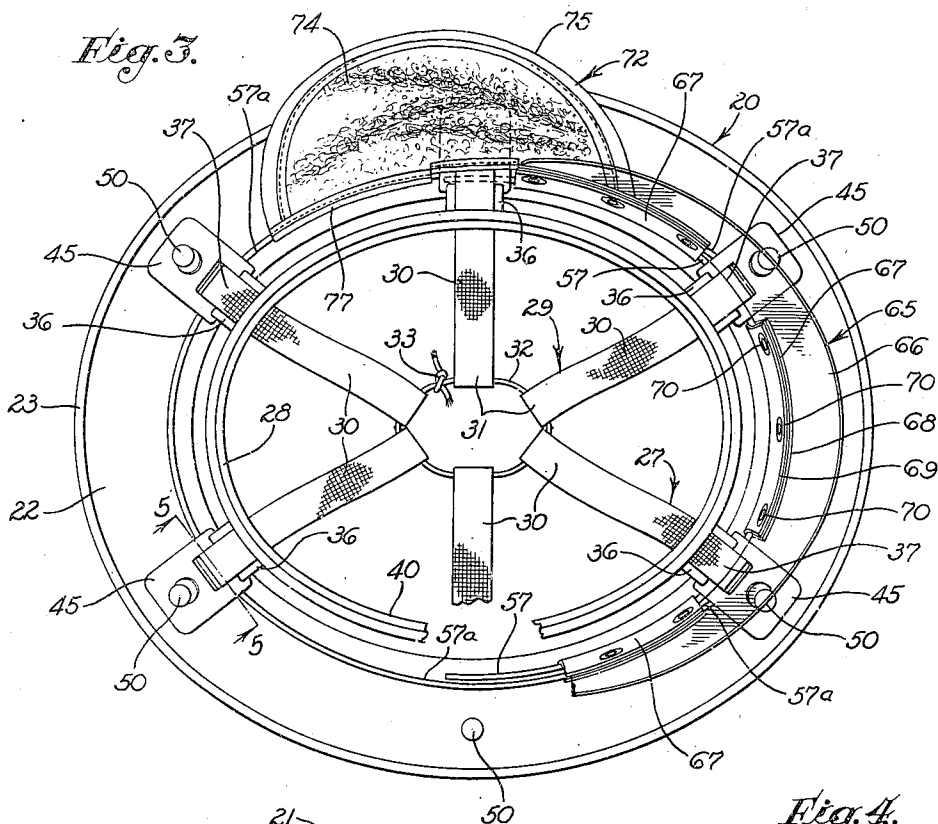


Fig. 2.

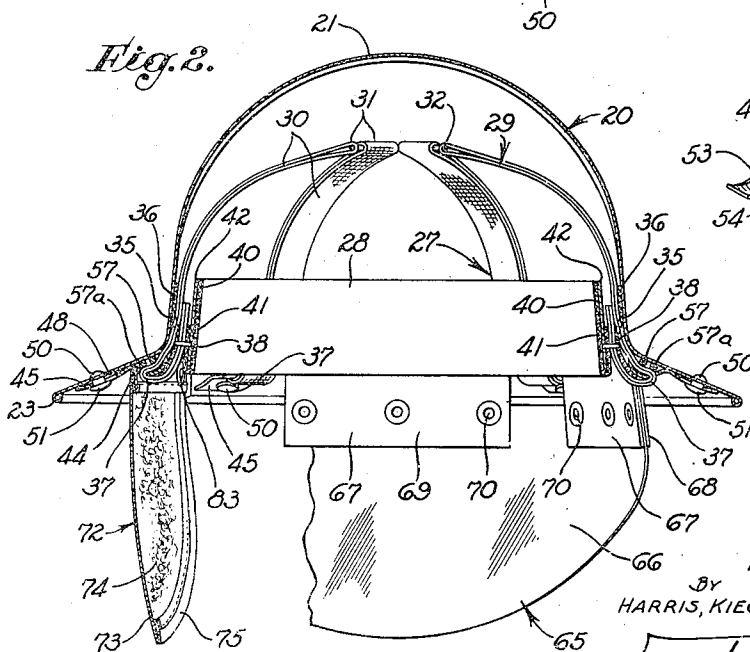


Fig. 4.

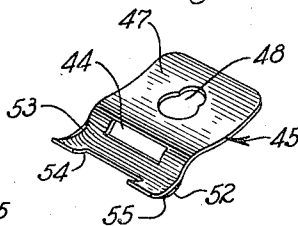
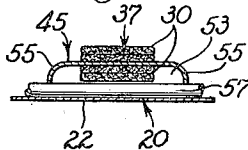


Fig. 5.



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2,248,366

SAFETY HAT

Howard B. Lewis, Venice, Calif.

Application October 2, 1939, Serial No. 297,465

13 Claims. (Cl. 2—3)

My invention relates to safety devices, with special reference to safety hats or helmets, and is directed particularly to improvements over the disclosure of my copending application entitled Safety hat, Serial No. 45,039, filed October 15, 1935, which has matured into Patent Number 2,177,145, dated October 24, 1939.

In fields of industry where there is considerable danger of head injuries from falling bodies and from other causes, it is desirable to provide workers with head protectors or safety hats that are of impact-resistant material and are constructed to cushion blows. Such devices are commonly supplied to men in oil well work, building construction, tunneling, and mining.

As exemplified in my copending application, a safety hat of the type under consideration includes a hat-like shell of suitable tough material, usually sheet metal, and a head-band assembly, which assembly may comprise both a head-band proper and an associated cradle to fit over the wearer's head. The preferred forms of my improved hat also include one or more accessories such as a visor, a pair of ear-muffs, and a neck-band.

The general object of my invention is to provide such a safety hat combination in which all the absorbent materials employed may be readily attached to or detached from the metal shell and to provide a safety hat that is exceptionally flexible to meet the requirements for various operating conditions in the sense that various accessories may be readily added and removed at the desire of the wearer.

One group of the more specific objects of my invention relates to the manner of attaching the head-band assembly to the shell. I am aware that it has heretofore been proposed in the art to make head-bands removable from safety hats so that they may be replaced after prolonged periods of wear. For example, head-bands have been attached to hat shells by lacing and other inconvenient and time-consuming expedients. It is my object, however, to provide means for connecting the head-band assembly to the shell that is readily operable for attachment or detachment in a few seconds so that it becomes a simple matter to separate all of the absorbent materials from the metal shell. In providing such convenient and quickly operable attachment means I achieve two further objects of my invention. The first of these further objects is to make it possible to renovate a used hat for a new wearer by stripping the hat shell of all absorbent material, sterilizing the shell, as by dipping it in

an antiseptic solution, and then equipping the shell with a new head-band assembly and other absorbent elements. The second of these further objects is to make the attachment and detachment of the head-band assembly so convenient that it is feasible for one set of hat shells to serve more than one shift of workmen on a job, each workman carrying his own head-band assembly to the job to be added to a shell at the job and stripped from the shell at the end of the working shift. In the preferred form of my invention, the attaching means comprises a plurality of clips connected to the head-band assembly and adapted for releasable attachment to the hat shell.

A second group of the more specific objects of my invention relates to safety hat accessories and the means for releasably attaching the accessories to the hat. One of these objects is to provide an arrangement in which the aforementioned fastening means for the head-band assembly has the further function of cooperating to releasably attach the accessories to the hat. The various accessories mentioned above are fabricated from sheet material and my invention is characterized by the concept of slidably mounting such elements on wire-like members that are curved to conform with the wearer's head. Such wire-like members may be attached to the hat shell in any suitable manner, but in the preferred form of my invention, as indicated above, are releasably engaged by the clips that secure the head-band assembly. One of the specific objects is to provide such a combination in which the attachment clips cooperate to limit sliding movement of the accessories longitudinally of the wire-like members.

With reference to the accessories themselves, one of my objects is to provide simple and efficient but inexpensive designs. In one of my accessories it is my object to provide ear-muffs attached to the hat in a manner to permit the ear-muffs to be turned up to concealed positions between the head-band and the crown of the shell when they are not required by the wearer. In another accessory my purpose is to combine in one member a pair of ear-muffs and an interconnecting neck-band for protection in severe weather.

In another accessory, a visor assembly, it is my object to provide a simple but efficient means for releasably attaching the visor to the hat and to provide a construction in which the visor element proper is an inexpensive replaceable element comprising simply a sheet of suitable con-

figuration with suitable apertures to receive attachment means.

A further group of specific objects of my invention relate to the clips per se that are employed to releasably attach the head band assembly and accessories to the hat shell. Among these objects are the following: to provide a clip that affords a positive interconnection and is stressed in tension by forces across the interconnection; to provide a clip that in its effective disposition is of minimum thickness and presents no dangerous projections or sharp corners; to provide a clip that is flexibly deformed to exert substantial pressure against the hat shell when in effective position, thereby offering substantial frictional resistance to movement out of its normal effective disposition; to provide a clip adapted for pin-and-keyhole engagement with the hat shell in which the engagement is positive in the direction of interconnecting stresses and in which movement out of engagement in the opposite direction is opposed by said frictional relationship of the clip to the hat shell; and, finally, to provide a clip that serves with equal efficacy the purpose of attaching the head-band assembly to the shell and the purpose of securing the wire-like members on which the hat accessories are mounted.

The above and other objects and advantages will be apparent from the detailed description to follow, taken with the accompanying drawings.

In the drawings:

Fig. 1 is a side elevation of the preferred form of my safety hat as equipped with a visor and a pair of ear-muffs;

Fig. 2 is a transverse section through the hat on an enlarged scale taken as indicated by the line 2—2 of Fig. 1, a portion of the visor being broken away for clarity;

Fig. 3 is a bottom plan view of the hat on the same scale as Fig. 2, one ear-muff being omitted and a portion of the visor being broken away and a clip omitted for better showing of the construction;

Fig. 4 is a perspective view on a still larger scale of one of the attachment clips;

Fig. 5 is a transverse cross-section on the same scale of the clip taken as indicated by the line 5—5 of Fig. 3;

Fig. 6 shows in plan a fragment of a hat brim to indicate an alternative method of attaching a clip to the hat;

Fig. 7 is a cross-section taken as indicated by the line 7—7 of Fig. 6;

Fig. 8 is a fragmentary view from the bottom showing a head-band assembly constructed for winter use;

Fig. 9 is a transverse section taken as indicated by the line 9—9 of Fig. 8;

Fig. 10 is a perspective view of an ear-muff or ear-flap, one of the accessories used with the hat; and

Fig. 11 is a similar view of an accessory that combines the functions of a pair of ear-muffs and a neck-band for severe winter conditions.

With reference to the drawings, which are to be taken as illustrative only, the numeral 20 generally designates a hat-like shell shaped to provide a crown 21 and a brim 22 unitary therewith. The shell 20 may be made of any suitable impact-resistant material and fabricated in any acceptable manner, but in the preferred practice of my invention I form the shell from a single blank of Duralumin by a stamping process and

turn the edge of the metal to form a finishing bead 23. Preferably the metal of the shell is highly light-reflective on its exterior surfaces and, if necessary, may be polished or otherwise treated to this end. The crown 21 of the hat may be embossed to provide reinforcing ribs 25.

The head-band assembly generally designated 27 comprises a head-band member 28 and a cradle generally designated 29 that is adjustable to conform to the wearer's head. The cradle 29 may be a continuous sheet of flexible fabric forming a skull cap, but in the preferred form of my invention is a spider formed by substantially radially disposed straps 30. Each of the straps 30 may consist of a single ribbon of material folded back on itself to form a loop 31 at the inner end of the strap, the inner loops 31 of the various straps being interconnected by an adjustable securing member 32 in the form of a simple cord, the ends of which are tied together by a knot 33 to form a central ring for the cradle. Each of the straps 30 passes downward through a slot 35 in an engaging member 36 of leather or other flexible sheet material, and below the slot the strap is turned back on itself to pass around the lower edge of the engaging member 36 and to form a loop 37 by means of which the head-band assembly may be locally attached to the shell 20 in some releasable manner. Finally, the lower end of each tape that is turned back to form the attachment loop 37 is connected by suitable means such as a rivet 38 both to the engaging member 36 and to the head-band member 28. In the preferred form of my invention the head-band member 28 comprises a ring of leather or other suitable flexible material that is turned back on itself to form an inner fold 40 and an outer fold 41, and a relatively tough reinforcing member 42 is inserted between the two folds for engagement with the inner ends of the various rivets 38. Each rivet 38 extends outwardly through the reinforcing band 42, the outer fold 41 of the head-band, the end of the strap 30, and finally terminates at its outer end in the engaging member 36.

Each of the loops 37 formed at the lower ends of the strap 30 may in the preferred form of my present invention slidably extend through a slot 44 in a clip 45 that is removably mounted on the under surface of the hat brim 22. It is apparent that each of the straps 30 performs the several functions of: receiving the adjustable securing member 32 to permit the cradle to be adjusted to a particular wearer's head; serving as parts of the cradle 29; connecting the cradle with the shell 20; connecting the head-band assembly 27 with the shell 20; and providing for equalization of forces between the connection of the cradle with the shell and the connection of the head-band member 28 with the shell, this equalization being accomplished through the sliding connection of the strap 30 with the various engaging members 36. Thus, the upper part of each of the straps 30 constitutes an element of the cradle 29 and the lower part of each strap is an equalizing means between the cradle and the head-band member 28.

Each of the clips 45, best shown in Figs. 4 and 5, may be fabricated from suitable sheet metal, preferably flexible metal such as spring steel or high strength aluminum alloy. The clip has a leaf portion 47 toward its outer end to lie adjacent the under surface of the hat brim 22 and is provided in this leaf portion with a keyhole aperture 48, the narrower portion of the keyhole

aperture being disposed toward the outer end of the clip and the broader portion of the keyhole aperture being disposed toward the inner end of the clip. The keyhole aperture 48 of the clip 45 is dimensioned to cooperate with a complementary stud, or headed pin 50, mounted on the under surface of the hat brim 22, there being a plurality of such studs on the brim distributed to positions corresponding with the required locations of the various clips.

It will be noted that when the clips 45 are mounted on the brim 22 in their normal positions of engagement, as best shown in Figs. 2 and 3, the clips are placed in tension by loads imposed by the straps 30 and such tension is opposed in a positive manner by virtue of the fact that the tension draws the narrower end of each keyhole aperture 48 against the corresponding stud 50. Preferably the leaf portion 47 of each clip 45 is bowed or arched away from the adjacent surface of the hat brim 22 to such an extent that appreciable pressure of the clip against the hat brim is necessary to force the clip into engagement with the stud 50, so that after the clip is in place it tends to maintain its normal alignment against accidental forces. A second reason for giving the leaf portion of the clip such a bent configuration is that such configuration permits considerable tolerance in the spacing of the head 51 of a stud from the under surface of the hat brim 22.

The inner end of each clip 45 is formed with an arcuate offset 52 providing a transverse groove 53, the face of the groove being upward when the clip is in its normal position. The slot 44 for receiving the loop 37 of one of the cradle straps is cut transversely of the clip at the outer side of the transverse groove 53 and a notch 54 for the strap 30 is cut in the inner end of the clip in alignment with the slot 44. Preferably the side edges of each clip at the ends of the transverse groove 53 are bent inward to form inclined side flanges 55, as best shown in Fig. 5. In the construction described one side of each loop 37 formed by a strap 30 extends across the groove 53 of a clip 45, as best shown in Fig. 2, the strap 30 passing through the slot 44 and the notch 54 of the clip. If one or more of the previously mentioned accessories is attached to the hat, at least some of the clips 45 will have the further function of clamping one or more wires or wire-like members 57 to the hat shell, in which case the one or more wire members 57 will lie against the hat shell within the transverse groove 53 of the clip. In the construction described the groove 53 of the clip provides ample clearance for the portion of the strap 30 that crosses the groove, yet direct contact on the part of the clips with the one or more wire-like members is provided by the side flanges 55 of the clip at the ends of the transverse groove.

In the preferred form of my invention as above described, the keyhole aperture is in the clip and the stud for connecting the clip to the hat shell is fixedly mounted on the brim of the shell. In the modified clip arrangement suggested by Figs. 6 and 7, however, a keyhole aperture 58 is formed in the brim 22 with the narrower portion of the aperture inward, and a stud or headed pin 60 for engagement with the aperture is fixedly mounted on a clip 61. The clip 61 is in all other respects similar to the previously described clip 45 and in the same manner is bowed or arched to place the stud 60 under tension when the clip is in its normal position.

One of the accessories for the hat shown in

the drawings is a visor 65, and one of the features of my invention is the manner in which such a visor is constructed and is releasably attached to the hat. The visor 65 is an assembly that includes a visor sheet 66 and a plurality of connecting members 67 by means of which the visor sheet is releasably connected to one of the wire members 57. This particular wire member 57, as best shown in Fig. 3, is engaged by four of the clips 45 and there is one connecting member 67 on each of the three portions of the wire member between adjacent clips. It is apparent that in this construction the four clips cooperate to limit sliding movement of the connecting members 67 along the wire member 57 and thereby limit corresponding movement of the visor sheet 66. Each of the connecting members 67 may consist simply of a piece of leather or other suitable material that is folded over to embrace the wire member 57 and to provide an outer fold 68 to lie against the outer surface of the visor sheet, and a coextensive inner fold 69 to lie against the inner face of the visor sheet. Each of the connecting members 67 is provided with one or more snap-fasteners 70, there being one element of each snap-fastener on the outer fold 68 of the connecting member and the other coacting element of each snap-fastener being on the inner fold 69, the two elements of each snap-fastener being engaged through a corresponding aperture (not shown) in the visor sheet 66. It is apparent that such a construction is relatively inexpensive. The visor sheet is a replaceable member consisting of simply a blank of suitable transparent or semi-transparent material, the blank with the required apertures being readily manufactured in one punch-press operation.

Another accessory that may be provided for the hat is a pair of ear-muffs or ear-flaps 72. These two ear-flaps may be mounted on a common wire member 57a which, as indicated in Fig. 3, may be engaged by all of the clips 45, the two ends of the wire member terminating in the two front clips. Each of the ear-flaps 72 may be made with an outer layer 73 of strong cloth and an inner liner 74 of flannel or other suitable material, the flap having a marginal hem 75. A feature of my invention is that each of the ear-flaps may be attached to the wire member 57a in the unique manner best shown in Fig. 10. One portion of the ear-flap adjacent the wire 57a is formed with an open hem 77 to slidably embrace the wire member 57a. The remainder of the ear-flap that is adjacent the wire member 57a is provided with a closed hem 78 out of engagement with the wire. This latter portion of the ear-flap, however, may be releasably connected to the wire 57a by virtue of a connecting member 80 that is similar in construction to the previously described connecting members 67 of the visor assembly. The connecting member 80 may comprise simply a small piece of leather or other sheet material folded over the wire 57a and maintained in such folded disposition by a suitable rivet 82. A snap-fastener element 82 (Fig. 10) on the connecting member 80 is adapted for releasable engagement with a complementary snap-fastener element 83 (Fig. 2) on the ear-flap, and when these two snap-fastener elements are in mutual engagement, the connecting member 80 is spaced from the open hem 77 by a sufficient distance to permit the assembled ear-flap to straddle one of the clips 45, as best shown in Fig. 3, so that

the clip limits movement of the ear-flap longitudinally of the wire member 57a.

One feature of this construction for the ear-flap is that the ear-flap may have either of two positions, an effective position shown in Figs. 2 and 3, or an alternate position, not shown, in which the ear-flap extends upward out of the way between the head-band assembly 27 and the inner surface of the hat crown 21. To shift an ear-flap from its effective disposition to its upper position, it is merely necessary to disengage the snap-fastener elements 82 and 83 to make it possible to turn the flap upward inside the crown without interference by the clip or the associated strap of the cradle. Preferably each of the ear-flaps 72 is provided with an external loop 84 and a metal ring 85 whereby the ear-flaps may be tied together under the wearer's chin by a flexible member 86 shown in Fig. 1.

Another accessory that may be employed with the hat is the protective device generally designated 89 in Fig. 11, an accessory to be used when the weather is extremely cold. The protective device 89 consists essentially of a piece of sheepskin 90 or other suitable material cut to form two ear-flap portions 91 and integral therewith an interconnecting band portion 92 to cover the back of the wearer's neck. Each of the ear-flap portions 91 may be provided with a leather loop 93 and a metal ring 94 so that a tie member 95 may be employed to interconnect the ear-flap portions under the wearer's chin to hold the sheepskin snugly in place. The sheepskin may be releasably connected to a wire member 57b in the general manner heretofore described. Thus, Fig. 11 shows a plurality of connecting members 97 on the wire member 57b to serve as spacers between the clips 45 when the protective device is assembled to a hat. In the particular construction shown, each of the connecting members 97 consists simply of a rectangular piece of leather folded over the wire 57b, snap-fastener elements 98 serving as rivets to permanently interconnect the leather fold. Complementary snap-fastener elements (not shown) are attached to the sheepskin 90 for releasable engagement with the corresponding snap-fastener elements 98.

In the hat construction indicated by Figs. 2 and 3, the head-band member 28 is spaced from the surrounding shell 20 to favor ventilation and air circulation between the shell and the hat-band assembly. The provision for such air circulation together with the expedient of making the exterior surface of the shell highly light-reflective serves to keep the wearer's head relatively cool in hot weather. If the weather is extremely cold, however, and especially if the weather is cold enough to make the sheepskin 90 desirable, the head-band member 28 may be provided with segments 100 of sheepskin or other suitable material to cut off air circulation between the wearer's head and the hat crown 21, as indicated in Figs. 8 and 9. The sheepskin segments 100 are attached to the head-band member 28 by spaced rivets 101 that penetrate the outer fold 41 of the head-band as well as the intermediate reinforcing band 42. Each of the segments 100 is long enough circumferentially of the hat to extend from one engaging member 36 adjacent a clip 45 to the next engaging member 36 adjacent the next clip.

It is apparent that the construction for a safety hat herein described has two outstanding features. The first feature is that the metal hat

shell can be stripped of all of its fittings or supplied with fittings in a matter of seconds. The second feature is that the hat is extremely flexible in the sense that by virtue of quickly attachable and detachable accessories the hat may be adapted for any weather conditions from extreme cold to extreme heat.

The specific forms of my invention described in detail herein will suggest to those skilled in the art various changes, modifications, and substitutions that do not depart from my underlying inventive concept, and I reserve the right to all such changes, modifications, and substitutions that properly come within the scope of my appended claims.

I claim as my invention:

1. In a head protector, the combination of: a hat shell; a head-band assembly; a plurality of headed pins mounted on said shell at spaced points; and a corresponding plurality of clips attached to said head-band assembly and having keyhole apertures for releasable engagement with said clips, said keyhole apertures being disposed with their smaller ends in the directions to which said pins tend to move relative to the apertures when the weight of said shell is transmitted to said head-band assembly on a wearer's head.

2. In a head protector, the combination of: a hat shell having crown and brim portions; pins mounted at spaced points on said brim portion of the hat shell spaced from said crown portion; a head-band assembly; and clips of flexible material attached to said head-band assembly at spaced points for releasable engagement with said pins, said clips having keyhole apertures to engage the pins and being bowed to press against said brim portion of the shell when so engaged, said keyhole apertures having their smaller ends outward whereby the weight of said shell tends to move said pins toward said smaller ends when the head protector is in use.

3. In a head protector, the combination of: a hat shell; a head-band assembly within said shell; a plurality of clips attached to said head-band assembly at spaced points and adapted to lie against said shell, each of said clips having a flexible portion bent away from the shell; and means releasably interconnecting each of the clips to the shell and compressing said flexible portion toward the shell for frictional resistance against movement of the clip relative to the shell.

4. In a head protector the combination as set forth in claim 3 in which said interconnecting means comprises a headed pin extending through a keyhole aperture, said aperture being disposed with its smaller end in the direction toward which the weight of said shell tends to move said pin relative to the aperture when the head protector is in service.

5. In a head protector, the combination of: a hat shell; a head-band assembly within the shell; a wire-like member of arcuate configuration; an accessory mounted on said wire-like member; and a plurality of clips in pin-and-keyhole engagement with said shell for releasably connecting to the shell said head-band assembly and said wire-like member.

6. In a head protector, the combination as set forth in claim 5 in which said accessory straddles one of said clips and engages said wire-like member on each side of the clip whereby the clip prevents movement of the accessory longitudinally of said wire-like member.

7. In a head protector, the combination of:

a hat shell; a head-band assembly within the shell; a wire-like member; a plurality of means interconnecting said head-band assembly and shell at spaced points; and an ear-flap having marginal portions connected to said wire-like member on opposite sides of one of said interconnecting means, one of said marginal portions of the ear-flap being detachable from the wire-like member whereby the ear-flap may be turned up between said shell and head-band assembly when the ear-flap is not in use.

8. In a head protector, the combination of: a hat shell; a head-band assembly within the shell; a wire-like member of arcuate configuration; means releasably connecting said head-band assembly and wire-like member to said shell at spaced points; a visor of flexible sheet material having spaced holes; a connecting member attached to said wire-like member and having one wing lying against the outside face of said visor and a second wing lying against the inside face of said visor; and snap-fastening means interconnecting said wings of the connecting means through said holes of the visor, thereby connecting the visor with said shell.

9. In a head protector, the combination of: a hat shell; a head-band assembly within said shell; a wire-like member of arcuate configuration; an accessory member attached to said wire-like member; and a plurality of clips releasably connecting said head-band assembly to said shell, said clips having upwardly presented transverse grooves adapted to engage said wire-like member to clamp said wire-like member against said shell.

10. In a head protector the combination as set forth in claim 9 in which said head-band assembly is connected to said clips by loops extending through slots in the clips, the loops passing across said grooves of the clips, and in which the side edges of the clips at the ends of the

grooves are turned in for contact with said wire-like member.

11. In a head protector, the combination of: a shell member; a fastening member; a head-band assembly secured to said fastening member; and headed studs on one of said members, the other of said members having corresponding keyhole slots for releasable engagement with said headed studs whereby said head-band assembly may be attached to said shell member in a quickly detachable manner, said keyhole slots being disposed in the directions in which said studs tend to move relative to the slots when the weight of said shell is transmitted to said head-band assembly through said fastening member.

12. In a head protector of the character described, the combination of: a hat shell; a plurality of fastening clips; a head-band attached to said clips; and a cradle attached to said clips, said clips being releasably connected to said shell whereby said head-band and said cradle may be simultaneously released from said shell by disengagement of said clips, said clips being movable into engagement with said shell in the directions of service stresses transmitted through the clips to the shell whereby the weight of the shell and impacts against the shell when the shell is on a user's head tend to maintain engagement of the clips with the shell.

13. In a head protector of the character described, the combination of: a hat shell; a plurality of fastening clips; a head-band attached to said clips at spaced points; a cradle attached to said clips at spaced points; and a plurality of studs corresponding to the clips for releasably connecting said clips to said shell whereby said head-band and said cradle may be simultaneously released from said shell by disengagement of said clips.

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