Jan. 10, 1961 H. W. AUSTIN 2,967,304

HELMET SHELL LINING

Filed July 10, 1956 2 Sheets-Sheet 1

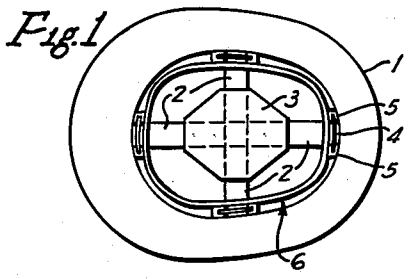


Fig. 1

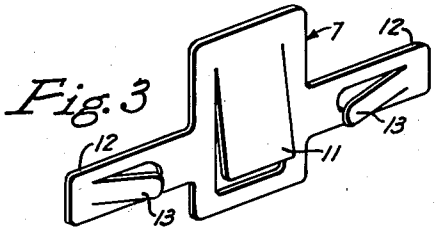


Fig. 3

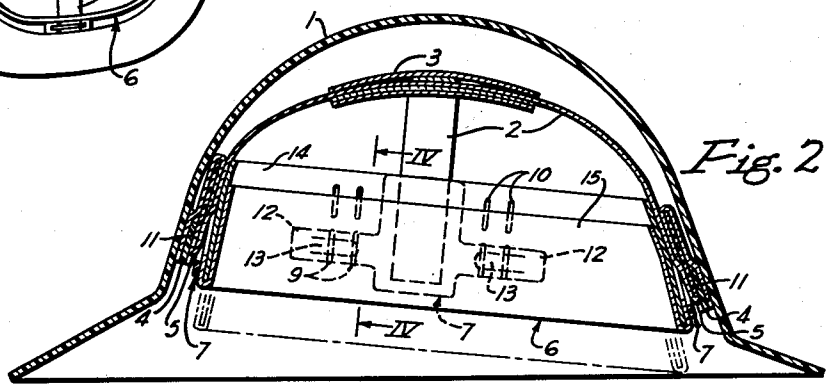


Fig. 2

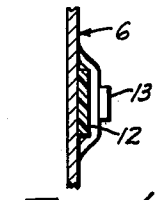


Fig. 4

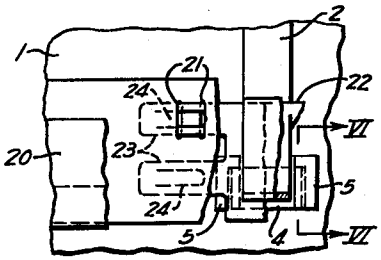


Fig. 5

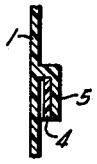


Fig. 6

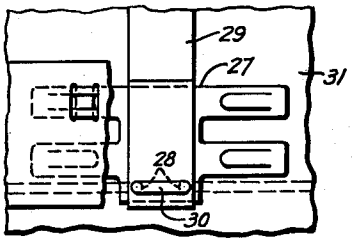


Fig. 7

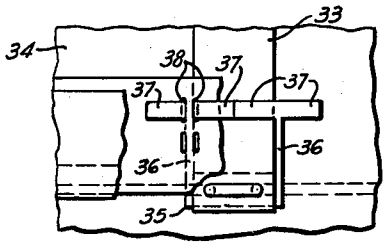


Fig. 8

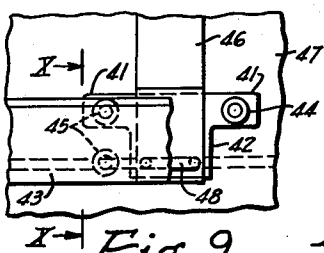


Fig. 9

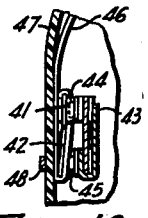


Fig. 10

INVENTOR.

HARRY W. AUSTIN

BY

Brown, Critchlow, Flick & Peckham

HIS ATTORNEYS

Jan. 10, 1961 H. W. AUSTIN 2,967,304

HELMET SHELL LINING

Filed July 10, 1956 2 Sheets-Sheet 2

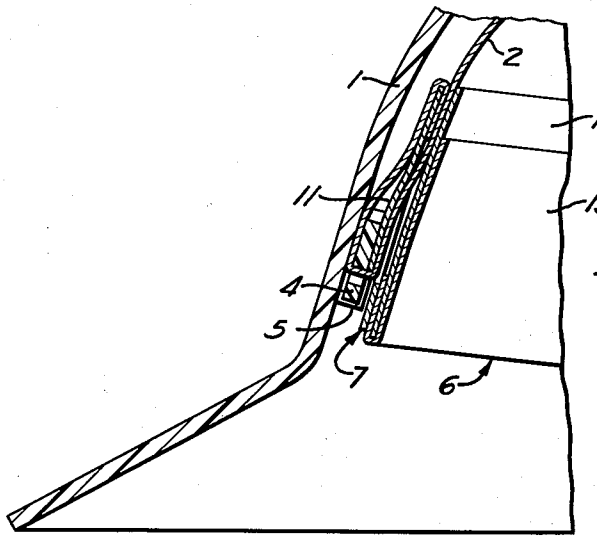


Fig. 11

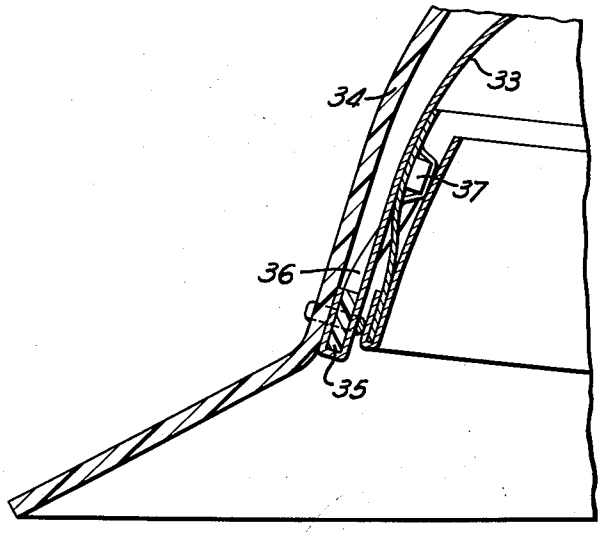


Fig. 12

INVENTOR.
HARRY W. AUSTIN
BY
Brown, Critchlow, Flick & Peckham
HIS ATTORNEYS

United States Patent Office 2,967,304 Patented Jan. 10, 1961

2,967,304

HELMET SHELL LINING

Harry W. Austin, Monroeville, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa., a corporation of Pennsylvania

Filed July 10, 1956, Ser. No. 596,875

9 Claims. (Cl. 2—3)

This invention relates to linings for protective helmet shells, and more particularly to adjustable linings.

The protection that a protective helmet affords is dependent to a large extent upon the clearance between the crown of the rigid shell and the head of the wearer. The greater the clearance, the greater the protection. The clearance is determined by the position of the lining that fits over the head of the wearer and supports the shell. The lining is usually adjustable to fit heads of different crown heights. This is done by a lace which connects the upper ends of the cradle straps. The lace is drawn in for low crowns and is let out for high crowns. Consequently, the clearance between the lining and the top of the shell will vary and in some cases may be too small for safety.

It is among the objects of this invention to provide a helmet in which adjustments can be made for heads of different crown heights, in which the clearance between the upper part of the lining and the top of the shell remains the same regardless of crown height, and in which the cradle straps and headband forming the lining can be replaced easily.

In accordance with this invention the cradle portion of a helmet shell lining is formed from non-adjustable straps, the lower ends of which can be connected to the lower part of a helmet shell for supporting it. Supporting members, preferably in the form of relatively stiff plates like lugs, are carried by the lower ends of the straps. There also is a headband inside the cradle. It is formed for detachable connection to the supporting members at different elevations in the cradle, so that the headband can be lowered for high crown heads and raised for lower crowns. As a result, the headband will be in proper position for either type of head, and there will always be the same clearance between the top of a head and the top of the shell.

The invention is illustrated in the accompanying drawings, in which

Fig. 1 is a bottom view of a helmet equipped with my lining;

Fig. 2 is an enlarged central section through the helmet;

Fig. 3 is a further enlarged perspective view of one of the supporting members;

Fig. 4 is a vertical section of the headband taken on the line IV—IV of Fig. 2;

Fig. 5 is a fragmentary side view of a modification;

Fig. 6 is a vertical section taken on the lines VI—VI of Fig. 5;

Figs. 7, 8 and 9 are views similar to Fig. 5 of three other embodiments of the invention;

Fig. 10 is a vertical section taken on the line X—X of Fig. 9;

Fig. 11 is an enlarged fragmentary section similar to Fig. 2; and

Fig. 12 is a view similar to Fig. 11 but showing the modification in Fig. 8 in central vertical section.

Referring to Figs. 1 to 4 of the drawings, the shell

1 of the helmet may be made in conventional form of any suitable material, such as metal, laminated plastic or glass fibers held together by a resin. The lining inside the shell includes flexible cradle straps 2 extending up into it from circumferentially spaced points around its lower part. The upper parts of the straps may be connected in any suitable manner, a pad 3 through which they extend being shown in the drawings. The lower ends of the straps may be connected to the lower part of the helmet shell in various ways that will support the shell from the cradle fitting over the head. For example, the lower end of each strap may be looped through a flat rigid clip 4, the ends of which can be inserted up into pockets 5 formed on the inside of the shell. Such an arrangement is shown more clearly with the embodiment illustrated in Figs. 5 and 6. Inside the lower part of the cradle there is a headband 6 which may be adjustable in size in a well known manner. This band is connected to the cradle straps through supporting members 7 carried by the latter.

It is a feature of this invention that the headband and the supporting members are formed for detachable connection to each other at different elevations in the cradle. Accordingly, as shown in Fig. 2, the headband is provided beside each supporting member with vertically spaced sets of openings 9 and 10. The openings 9 at one level receive the supporting members to hold the headband at one elevation in the cradle, and the openings 10 at the other level are designed to receive the supporting members when it is desired to change the elevation of the headband in the cradle. Although two levels of openings are shown, it will be understood that more levels could be provided for still further adjustability. As shown in Fig. 3, each supporting member is a relatively stiff plate-like lug that is very strong in an edgewise direction, but which can be flexed transversely to some extent to conform to the shape of the head. It can be made of metal, fiber or plastic, for example. The lug has a central body with a struck-out flap 11 extending downward and outward toward the shell. The strap that is connected to the lug extends out through the opening formed by the flap, then through the rigid clip 4 and back up along the outer surface of the flap and down the inside of the lug a short distance. This loop around the lug can be secured to it in any suitable manner, such as by rivets or stitching. The flaps permit the lugs to move in and out when the size of the headband is changed.

Projecting laterally in opposite directions from the edges of the body of each lug is a pair of tongues 12, and the openings in the headband are slots that receive these tongues. Preferably, the slots are arranged in pairs so that a tongue extends into and then back out of the headband. To eliminate any danger of a tongue pulling out of the headband slots, it may be provided with a struckout tab 13 that extends toward the center of the lug. The tongue is inserted through the slots far enough to permit the tab to spring out, and then the tongue is pulled back a little ways so that the tab will overlap the section of the headband between the pair of slots as shown in Fig. 4. It will be obvious that this locks the tongue in the slots. For best results, the portion of the headband that contains the slots is a relatively stiff fiber band 14, to the lower edge of which a leather sweat band 15 is attached. The sweat band curves around the lower edge of the fiber band and extends up into it.

When the tongues are inserted in the lower level of slots 9, as shown in Fig. 2, the headband will be well up in the cradle for a man who has a low crown. If the helmet is to be worn by a man with a high crown, the headband is lowered by removing the tongues from the lower slots and inserting them in the upper slots

10. The headband then will be in the position indicated by dotted lines in Fig. 2. In either case the headband will surround the wearer's head at the proper place and not ride too high or too low. Also, in both cases the top of the head will be spaced the same distance from the top of the helmet, because the lining has a predetermined fixed clearance from the top of the shell. When desired, the headband can be removed from the cradle easily for cleaning or replacement.

In the modification shown in Fig. 5, the headband **20** is provided with tongue-receiving slots **21** at only one level, but the desired vertical adjustment is obtained by providing each lug **22** with laterally projecting tongues **23** at two different levels. Consequently, when the upper tongues are inserted in the headband slots, where they are locked by tabs **24**, the band will be in its upper position in the cradle. On the other hand, when the lower tongues are inserted in the slots, the headband will be disposed at a lower elevation in the cradle. In both cases the clearance between the top of the cradle and the helmet shell **1** remains the same.

The embodiment of the invention shown in Fig. 7 discloses an alternative way of fastening the lugs and cradle straps to the helmet shell. Although the same kind of lug **27** is illustrated as is shown in Fig. 5, it will be appreciated that the same idea can be applied to the one shown in Fig. 2. In this case, the body of the lug is not provided with a struck-out flap as shown in Fig. 3, but its lower end is provided with a pair of holes **28** that also extend through the loop in the cradle strap **29** around the lug. A lace **30** extends out through these holes and through registering holes in the helmet shell **31**. The lace extends around the outside of the shell and in and out through the lugs to connect them and the lower ends of the cradle straps to the shell.

The supporting lug and cradle strap **33** shown in Fig. 8 also are shown laced to the shell **34**. The lug has a body **35**, from the opposite ends of which legs **36** extend upward. Projecting in opposite directions from the upper end of each leg are tongues **37**, each of which extends through a slot **38** in the encircled headband **39**. Here again the headband can be provided with two levels of slots as shown, or with one level of slots if the supporting member is provided with two or more levels of tongues.

In the form of the invention shown in Figs. 9 and 10, the tongues **41** on the lug **42** are not inserted in the headband **43**, but are provided with parts **44** of snap fasteners which can be engaged with the other parts **45** of the fasteners secured to the headband at different levels. The drawings show the upper level of snap fasteners in use. The lug and cradle strap **46** may be connected to the helmet shell **47** in any suitable manner, such as by a lace **48**.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A helmet shell lining, comprising a cradle formed from straps having substantially vertical lower portions, means for connecting the lower ends of the straps to the lower part of a helmet shell for supporting it, separate supporting members carried by the lower ends of the straps in engagement therewith, and a headband inside the cradle, and vertically spaced separable fastening means for detachably locking the headband and said supporting members together at different distinct elevations with respect to one another, whereby to fit heads having different crown heights.

2. A helmet shell lining, comprising a cradle formed from straps having substantially vertical lower portions,

means for connecting the lower ends of the straps to the lower part of a helmet shell for supporting it, separate supporting members carried by the lower ends of the straps in engagement therewith, and a headband inside the cradle provided with openings beside said members, said supporting members being provided with projections removably inserted in said openings to lock the headband to the cradle at one elevation therein and means for detachably locking the headband and said supporting members together at another elevation with respect to one another.

3. A lining according to claim 2, in which the portions of said supporting members inserted in said openings are laterally projecting tongues.

4. A lining according to claim 2, in which the portions of said supporting members inserted in said openings are tongues projecting in opposite directions, each tongue having a struck-out tab extending toward its inner end for locking the tongue in said headband.

5. A helmet shell lining, comprising a cradle formed from straps having substantially vertical lower portions, means for connecting the lower ends of the straps to the lower part of a helmet shell for supporting it, separate supporting members carried by the lower ends of the straps in engagement therewith and having vertically spaced sets of holding portions, and a headband inside the cradle provided with openings removably receiving one of said sets of holding portions and adapted to receive another set when the first set is removed, whereby the elevation of the headband in the cradle can be changed to fit heads having different crown heights.

6. A helmet shell lining, comprising a cradle formed from straps having substantially vertical lower portions, means for connecting the lower ends of the straps to the lower part of a helmet shell for supporting it, supporting members carried by the lower ends of the straps, and a headband inside the cradle provided with a set of openings removably receiving said members to connect the headband and cradle, the headband also being provided with another set of openings spaced vertically from the first set for receiving said members after they have been removed from the first set, whereby the elevation of the headband in the cradle can be changed to fit heads having different crown heights.

7. A helmet shell lining, comprising a cradle formed from straps having substantially vertical lower portions, means for connecting the lower ends of the straps to the lower part of a helmet shell for supporting it, and a headband inside the cradle, the straps and headband carrying interengaging snap fasteners at different levels to permit the headband to be located at different elevations in the cradle.

8. A helmet shell lining comprising a cradle formed from straps having substantially vertical lower portions, means for connecting the lower ends of the straps to the lower part of a helmet shell for supporting it, separate supporting members carried by the lower ends of the straps in engagement therewith, and a vertically adjustable headband inside the cradle, the headband being provided with openings beside said members, said supporting members being provided with means insertable in said openings at different elevations for detachably connecting said members and headband together at different distinct elevations with respect to one another, whereby to fit heads having different crown heights.

9. A helmet shell lining comprising a cradle formed from straps having substantially vertical lower portions, means for connecting the lower ends of the straps to the lower part of the helmet shell for supporting it, a relatively stiff plate-like lug carried by the lower end of each strap in engagement therewith, each lug having a struck-out flap extending downward with the lower end of the adjoining strap secured thereto, a headband inside the cradle, and vertically spaced separable fastening means detachably connecting the headband and said lugs to-

gether at different distinct elevations with respect to one another.

References Cited in the file of this patent

UNITED STATES PATENTS

1,935,204 Dym ..... Nov. 14, 1933

2,159,681 Wisman ..... May 23, 1939

2,371,712 Scholl et al. ..... Mar. 20, 1945

2,398,561 Ruggiero ..... Apr. 16, 1946

2,763,005 Richter ..... Sept. 18, 1956

2,781,517 Fisher ..... Feb. 19, 1957