Nov. 19, 1963 G. J. CROWDES, JR 3,110,900

RIGID HELMET WITH SHOCK-ABSORBING ADJUSTABLE SUSPENSION FOR THE HEAD

Filed Jan. 29, 1962 2 Sheets-Sheet 1

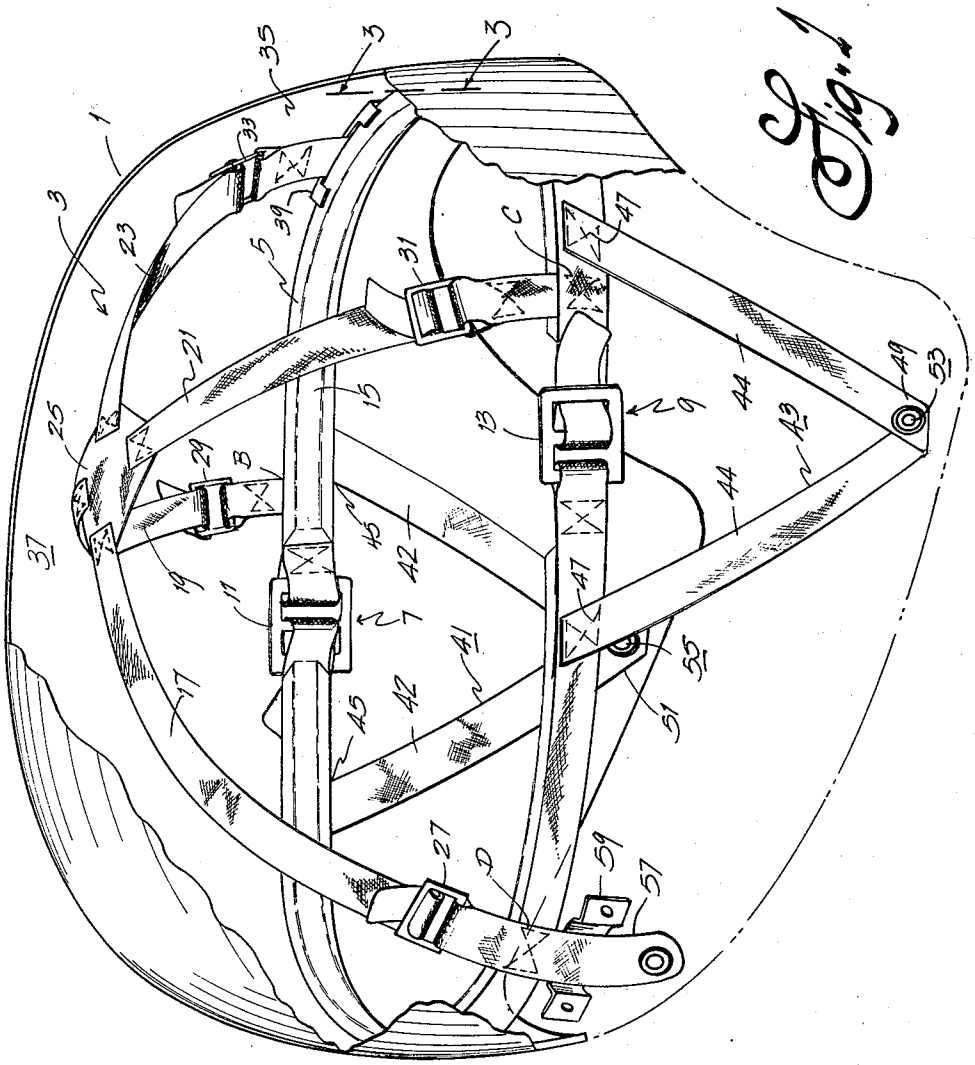


Fig. 1

INVENTOR.
GEORGE J. CROWDES, JR.
BY John P. Cacoa
Arthur L. Rollins
ATTORNEYS

Nov. 19, 1963 G. J. CROWDES, JR 3,110,900

RIGID HELMET WITH SHOCK-ABSORBING ADJUSTABLE SUSPENSION FOR THE HEAD

Filed Jan. 29, 1962 2 Sheets-Sheet 2

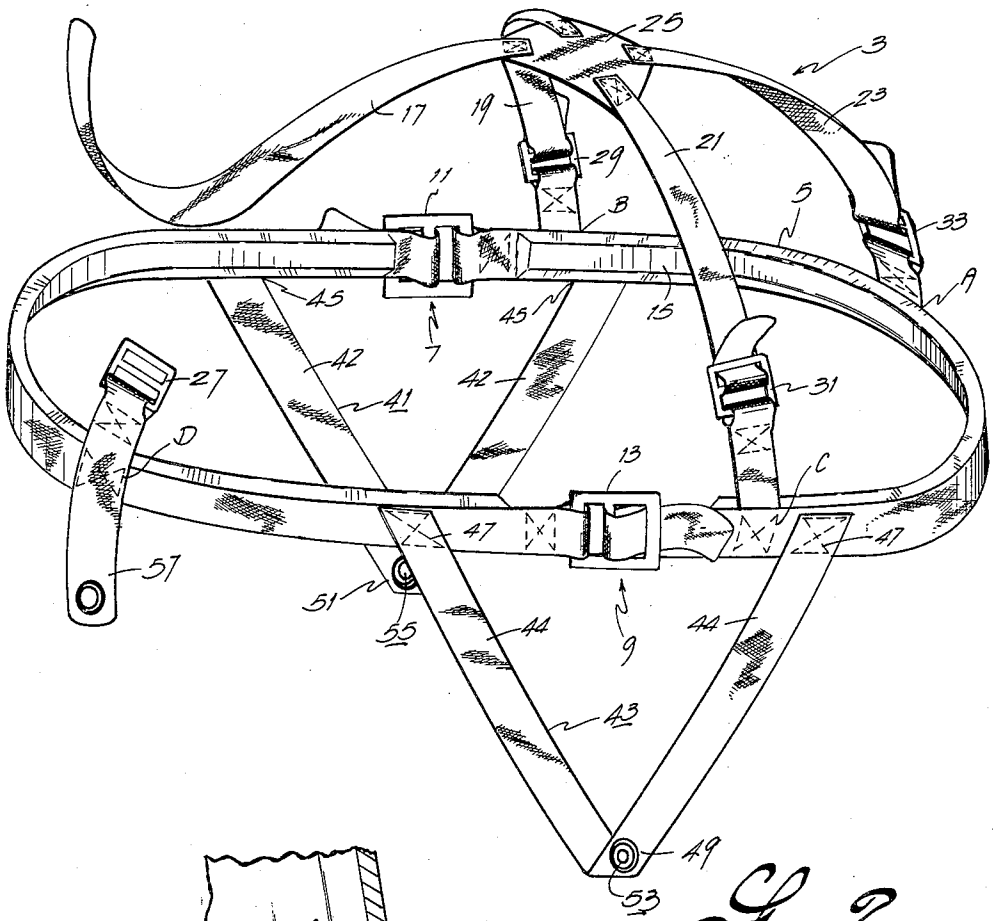


Fig. 2

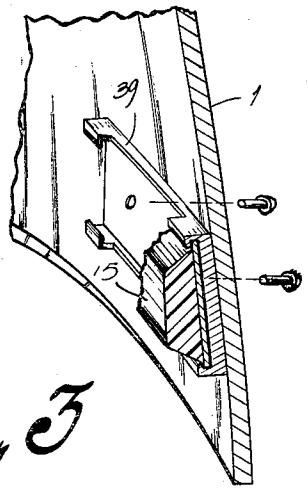


Fig. 3

INVENTOR.
GEORGE J. CROWDES, JR
BY John P. Calgan
Arthur L. Collins
ATTORNEYS

United States Patent Office 3,110,900 Patented Nov. 19, 1963

3,110,900

RIGID HELMET WITH SHOCK-ABSORBING ADJUSTABLE SUSPENSION FOR THE HEAD

George J. Crowdes, Jr., Chesterland, Ohio, assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed Jan. 29, 1962, Ser. No. 169,691
4 Claims. (Cl. 2—3)

This invention relates to a type of crash helmet to be worn by a flyer, and is more particularly directed to an improved suspension for such helmets.

Heretofore, there has been a problem with providing a satisfactory suspension lining, incorporating sizing techniques, for crash helmets. In order to reduce manufacturing costs, it is desirable to produce the outer shell of a crash helmet in one standard size and to provide this shell with adjustable head-engaging means to thereby adapt the head-gear to fit heads of various shapes and sizes. However, the use of adjustable head-engaging means has occasioned difficulty due to the fact that it either did not provide a satisfactory fit after adjustment or resulted in an off-center mounting of the hard shell upon the head. More difficulties with the known adjustable head-engaging means were that they are relatively complicated thereby making them difficult and time-consuming to adjust. The present invention is directed to an improved shock absorbing, adjustable suspension lining designed to alleviate these difficulties encountered with adjustable suspension heretofore known under the prior art.

One of the objects of the present invention is to provide an improved crash helmet having a suspension which is a separate and self-sustaining assembly easily connected to or detached from the helmet shell.

Another object of the invention is to provide an improved suspension for crash helmets, which can be fitted or adjusted to any size of head, which allows for vertical adjustment of the shell on top of the head thereby allowing for the positioning of all individuals in the same location with respect to the front of the shell with the forehead and eyes.

A further object of the invention is to provide an improved suspension for crash helmets, which suspension can be quickly removed from a helmet or shell, fitted or adjusted to a particular size and thereupon installed back in the helmet without disturbing said fit or adjustment.

A still further object of the invention is to provide an improved crash helmet and a supporting means therefor, the latter being constructed in such a manner that when adjusted it holds that helmet away from the head of the wearer in all locations except a front check point whereby a localized blow on the helmet shell is transmitted to a relatively large area of the head and is thus cushioned to such an extent that even relatively severe blows do not cause injury to the wearer's head.

Yet another object of the present invention is to provide an improved suspension for crash helmets, which suspension is simple and rugged in construction, safe and dependable in use, and is relatively inexpensive to manufacture.

Various other objects and advantages will be apparent from the following description of one embodiment of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawings:

FIG. 1 is a longitudinal sectional view of the helmet.

FIG. 2 is a perspective view of the helmet suspension being arranged into the shape which it takes in a helmet.

FIG. 3 is an enlarged fragmentary sectional view taken on line III—III of FIGURE 1 showing one type of front headband supporting means.

While the principles of this invention are broadly applicable to the manufacture of any type of head-gear, such as miner's helmets, caps, safety helmets and the like, they are particularly applicable to the manufacture of crash helmets worn with pressure suits, and accordingly the invention has been so illustrated and will be so described.

Referring to FIGURE 1, the numeral **1** indicates generally a rigid shell of a protective crash helmet. The shell may be stamped or molded in a single or standard size from any suitable material such as metal, synthetic resin, hard rubber, or asphaltic composition with or without fabric reenforcement.

The helmet is supported on the head of a wearer by a rigging or suspension **3**. This suspension **3** comprises a headband **5** made of a strip of strong, flexible but substantially unstretchable material having free end portions **7** and **9**. These free end portions terminate in adjustable means **11** and **13** which may be buckles or the like. The buckles permit the peripheral adjustment of the head-band. The head-band is stitched on its inside with a pad **15** of sponge rubber or the like.

A plurality, in the present instance four, of head-straps **17**, **19**, **21** and **23**, are stitched to the head-band equidistant around its periphery as shown at points A, B, C and D. These head-straps are secured at their upper ends to the crown **25**. Adjusting buckles or the like **27**, **29**, **31** and **33** are attached to each of the head-straps to permit the crown height to be adjusted so as to allow the head to be shifted vertically in the suspension to position the eyes of a wearer in the center of the shell opening **35** and leave a space **37** between the crown **25** and the top of the shell.

The suspension **3** is inserted into the shell **1** by passing the head-band **5** through the flange **39** which is permanently affixed to the front of the shell as illustrated in FIGURE 3.

This is the only direct contact between the head-band and the shell. Two V-shaped tapes **41** and **43** having their legs **42** and **44** secured to the head-band by stitching **45** and **47** as illustrated in FIG. 1, provide support for the suspension on the sides of the head. These tapes are romovably fastened to the shell at points **49** and **51** as illustrated with snap fasteners **53** and **55**.

The rear head-strap **57** is passed under a positioning strap **59** which is riveted to the rear of the shell. This head-strap is also stitched to the head-band at D.

An important advantage of my improved helmet resides in the fact that such helmet is in direct contact with the suspension at only one point. This enables the suspension to float about the head thereby providing a "cushion" effect. As can be easily appreciated with reference to FIGURE 1, the rigidity of the head-band **5** in conjunction with the rear torque strap **57** maintains the head of the individual on-center in the helmet and the peripheral adjustment of the head-band, when adjusted, holds the head away from the shell in all locations except the front check point **39**. These features enable a tangential blow of extremely high energy content occurring on the surface of the hard shell (which is relatively incompressible) to be effectively absorbed and re-distributed over a large area of the head thereby bringing the unit force down to a tolerable value.

It will be understood that various changes in the details, materials and arrangements of parts which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

What is claimed is:

1. In a flyer's crash helmet, the combination of a hard outer shell and an inner shock-absorbing adjustable suspension lining wherein said lining comprises a head-band having free end portions; a crown; a plurality of head-

straps depending downwardly from the crown and being secured to the head-band so that the head-band is supported around the periphery of the helmet; a plurality of buckles connected to said head-straps for permitting the adjustment of the vertical alignment of the lining in the helmet so that a predetermined distance is maintained between the crown and the shell; adjusting buckles connected to the free end portions of the head-band for adjusting its peripheral sizes; and means attached to the front of the shell for receiving the head-band so that the lining only makes direct contact with the shell at this point thereby providing a resilient cushioning effect for blows striking the helmet.

2. A helmet according to claim 1 further including a soft padding connected to the inside of the head-band.

3. A helmet according to claim 2 further including snap fasteners removably securing the head-band to the shell; V-shaped tapes securing the snap fasteners to the head-band, said tapes being secured by the upper legs of the V to the head-band and carrying the snap fasteners at the bottom of the V.

4. A helmet according to claim 1 further including an attachment means at the rear of the shell for adjusting the lining inside of the helmet so that the head of an individual wearer is maintained on-center in the helmet.

References Cited in the file of this patent

UNITED STATES PATENTS

2,066,493	Sporre	Jan. 5, 1937
2,371,712	Scholl et al.	Mar. 20, 1945
2,758,306	Grancsay et al.	Aug. 14, 1956
2,763,005	Richter	Sept. 18, 1956
2,802,212	Finken	Aug. 13, 1957
2,846,683	Dye et al.	Aug. 12, 1958