June 9, 1964 F. R. DUNNING 3,135,962

CHIN STRAP FOR FOOTBALL HELMET

Filed Nov. 23, 1962

2 Sheets-Sheet 1

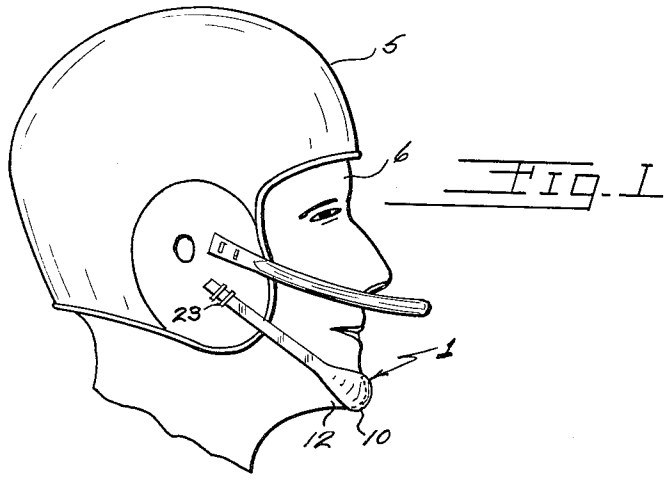


Fig. 1

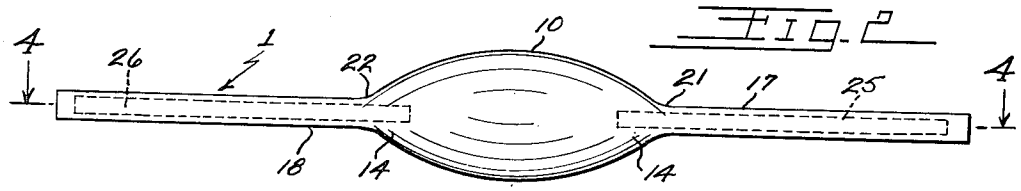


Fig. 2

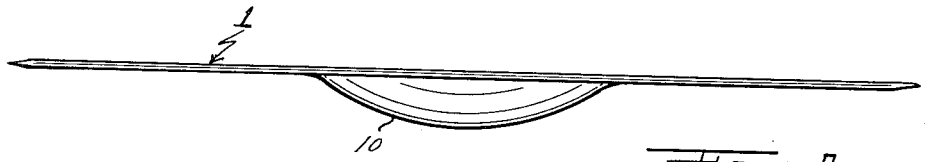


Fig. 3

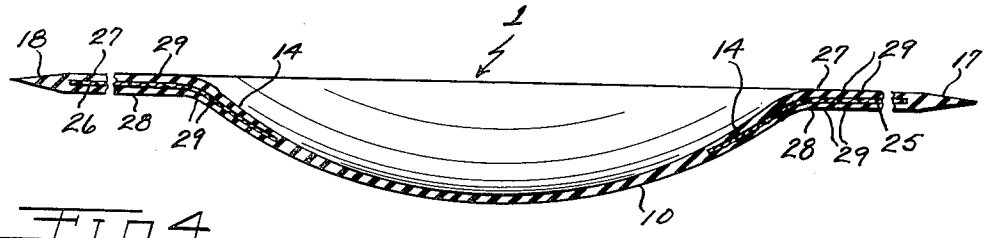


Fig. 4

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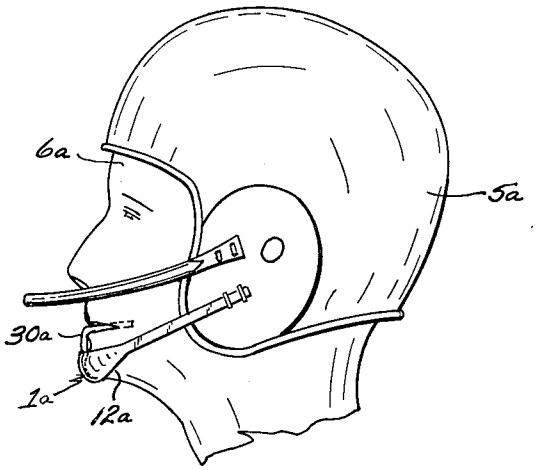
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FIG. 5



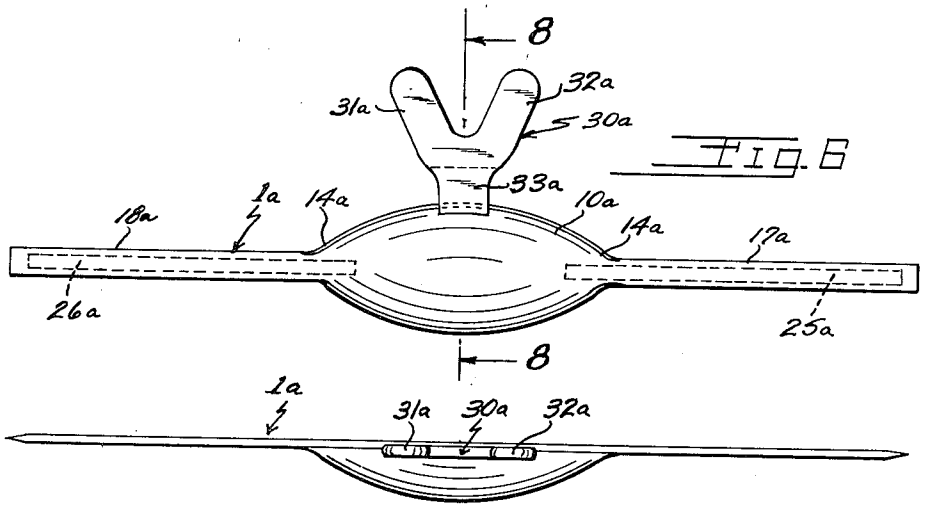


FIG. 6

FIG. 7

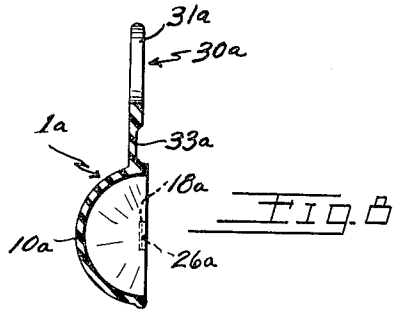


FIG. 8

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CHIN STRAP FOR FOOTBALL HELMET

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7 Claims. (Cl. 2—3)

This invention relates to chin straps for use with football helmets, and more particularly to a chin strap having a cup fitting over the point of the chin of the player.

The above described chin strap holds the helmet securely on the player's head, the strap resisting both the upward and rearward forces. In the past, chin straps have been made of thin plastic-impregnated continuous strips of webbing. Although these straps are long lasting, weather resistant and strong enough to keep the helmet on the head in spite of rearward loosening forces, the use of these straps has sometimes resulted in neck injuries because of the great strength of the impregnated webbing.

It is an object of the present invention to provide an improved chin strap which will hold its associated helmet on the player's head securely, resisting rearward and upward forces but not offering such a high degree of resistance that an injury to the upper neck of the player might occur.

It is an object of the present invention to provide a chin strap that is water resistant, long wearing and strong enough to resist ordinary rearward loosening forces but also fragile enough to break before a point of rearward force is reached that would be likely to cause injury to a player's neck, and, particularly, injury to the upper spinal column.

Other objects will be apparent from the specification that follows, the appended claims, and the drawings in which:

FIG. 1 is a fragmentary side elevational view of a football helmet equipped with the improved chin strap of the present invention, the view including the neck and face of the player wearing said helmet and chin strap;

FIG. 2 is a top plan view of the chin strap shown in FIG. 1 detached from the helmet and lying in a flat position, a pair of reinforcing webbed strips being shown in dotted lines;

FIG. 3 is a side elevational view of the chin strap of FIG. 2;

FIG. 4 is a fragmentary enlarged sectional view taken on the line indicated at 4—4 in FIG. 2;

FIG. 5 is a fragmentary side elevational view of a player wearing a helmet equipped with another embodiment of the chin strap of the present invention, the chin strap of FIG. 5 being similar to that of FIG. 1 except that integrally attached to said strap is a generally Y-shaped mouth piece;

FIG. 6 is a top plan view of the chin strap and attached mouth piece of FIG. 6;

FIG. 7 is a side elevational view of the chin strap of FIG. 6; and

FIG. 8 is a sectional view of the chin strap taken on the line indicated at 8—8 in FIG. 6.

The present invention provides an improved chin strap 1 shown in FIG. 1 attached to a football helmet 5 worn by a player 6. The chin strap 1 is water resistant, weather resistant, washable, tough and strong, although the strength of the strap is held at a predetermined value whereby the strap will break and release the helmet when a large rearward force is encountered that would be likely to injure the player's neck.

One preferred embodiment of the present invention is shown in FIGS. 1–4, in which the strap 1 includes a central chin cup 10 which is formed as a cup to fit over the chin 12 of the player 6, the cup being elliptical in outline.

Integrally attached to opposite peripheral portions 14 of said cup area is a pair of strap portions 17 and 18, each strap being integrally connected to its adjacent peripheral portion and forming junctures 21 and 22 therewith. The strap is adapted for fastening to helmet 5 by suitable fastening means such as adjustable snap member 23.

The strap 1, including the cup 10 and strap portions 17 and 18, is preferably made of a one-piece integral construction, the preferred resilient material being a tough, strong natural rubber composition although synthetic rubber compositions such as those containing a rubbery styrene-butadiene-copolymer or neoprene or a plasticized polyvinyl chloride composition can also be used.

In accordance with the present invention, a pair of reinforcing strips 25 and 26 made of fabric such as braided cotton or woven nylon webbing for strength and toughness, are provided for the chin strap. Each strap portion and its adjacent peripheral cup portion are reinforced by one of the embedded strips, strip 25 reinforcing strap portion 17 and strip 26 reinforcing strap portion 18.

As best seen in FIG. 4, the webbed strip 25 is sandwiched between opposed layers 27 and 28 of the integral resilient material and integral portions 29 of the resilient material are located in the interstices of the webbed strips. Likewise, strip 26 is sandwiched between opposed layers 27 and 28 of the resilient material and integral portions 29 of these layers are located in the interstices. During molding, the softened resilient material, which is preferably natural rubber, apparently flows into the interstices of the webbing to securely anchor and embed the fibers thereof in the resilient material.

As seen in FIG. 1 in the preferred embodiment, about 10 to 20 percent of the total length of each of the strips extends from the strap portion into the central cup to thereby reinforce those sections of the chin strap. In accordance with the present invention, inasmuch as these two strips are not joined together or are not a part of a single continuous piece of webbed fabric, one of the strap portions of the chin strap will break if a large loosening force is encountered so as to free the helmet from the player's head and thus prevent an injury to the neck. In a typical chin strap construction, the length of the elliptical-shaped cup is about 4 inches, the thickness about $\frac{1}{16}$ inch, and its width about 1¾ inches, and each strap has a length about 4 inches, a width of about ½ inch and a thickness of about $\frac{1}{16}$ inch. In such a construction, the length of each of the reinforcing strips is preferably about 5 to 5½ inches, the width about ¼ inch and the thickness about $\frac{1}{64}$ inch.

Preferably, the tear strength, hardness, and tensile strength of the chin strap should be such that the structure can be elongated up to about 375 to 400% before rupturing, the durometer of the resilient material should be about 50 to 60 (Shore A) and the tear strength should be about 1200 to 1500 lbs.

Thus, the chin strap of the present invention has an excellent balance of desirable properties, such as hardness, resiliency, tensile strength, and wear resistance as well as a certain limited amount of strength so that the strap will rupture before any rearward forces reaches a level that will cause injury to a player's neck and, particularly, to his upper spinal column.

Another embodiment of the chin strap of the present invention is shown in FIGS. 5 through 8, inclusive. As therein shown, a chin strap 1*a* is provided for helmet 5*a* that is substantially identical to chin strap 1 of helmet 5 except that a generally Y-shaped mouth piece 30*a* is attached to central cup 10*a*, the mouth piece adapted to be clamped between the upper and lower teeth of a player 6*a* to prevent them from coming together with damaging force.

As in the chin strap 1, chin strap 1*a* comprises an

integral one-piece member of a resilient material that preferably is a molded natural rubber composition. The cup **10***a* is of an elliptical shape adapted to fit over the chin **12***a* of the wearer **6***a* of the helmet **5***a*. The strap **1***a* comprises two elongated strap portions **17***a* and **18***a* and the strap portions are connected to opposite ends of the cup. The strap portion forms junctures **21***a*—**22***a* with their associated peripheral cup ends **14***a*. The strap **1***a* also comprises a pair of reinforcing strips **25***a*—**26***a* of webbed fabric. Each of these strips is sandwiched between two opposing layers of resilient material, the resilient material being integral with integral portions thereof filling the voids of the interstices between the fibers of webbed strips.

Again, as in chin strap **1**, each of the reinforcing strips **25***a* and **26***a* of chin strap **1***a* has a width and thickness considerably less, say, about half the width and one quarter of the thickness of the strap portion in which it is embedded. Also, each of the strips **25***a* and **26***a* extend about 10 to 20% of their length into the central cup **10***a* to provide the structure of limited strength, the strength of the strap and, particularly, the strength of the strap portion at the junctures **21***a* and **22***a* being sufficient to keep the helmet on the player's head but not strong enough ot cause an injury to the back of the player's neck.

The mouth piece **30***a*, as best seen in FIG. 6, has a pair of spaced teeth engaging portions **31***a* and **32***a* as upper legs of the Y-shaped structure and a lower central leg **33***a* that is attached to the cup **10***a*, the mouth piece **30***a* being molded integrally with the cup **10***a* and strap portions **17***a* and **18***a* to form an improved chin strap of one-piece construction.

Braided cotton fibers are preferred for the reinforcing material for the fabric strips. Generally the fibers of the particular fabric used have a diameter of about $\frac{1}{128}$ to $\frac{1}{64}$ inch.

Nylon is generally considered to be an oriented fiber (in which apparently polymer molecules are oriented along the fiber axis) of long-chain linear polymeric amides, such as hexamethylene diamine and adipic acid, which is commonly called type 66 nylon, but also can be considered an oriented fiber of polycaprolactam, which is commonly called type 6 nylon.

Although nylon fiber has been mentioned as a preferred synthetic fiber for the webbed strips, satisfactory results can be obtained with other high strength synthetic fibers such as Dacron, an oriented fiber of a polyester of ethylene glycol and terephthalic acid.

What is claimed is:

1. A chin strap adapted for use with a football helmet, said strap comprising an integral one piece member of a resilient material having a central elliptical-shaped cup adapted to fit over the chin of a wearer of said helmet, said strap also having two elongated strap portions integrally connected to opposite ends of said cup, each strap portion having an upper layer portion and a lower layer portion, said strap also comprising a pair of strips of webbed fabric embedded in the strap portions, each strip disposed between said upper and lower layer portions of the resilient material in one of the strap portions, said resilient material being of one integral piece and integral portions thereof being located within the interstices of the fabric and each of the layers of resilient material being of a thickness greater than the thickness of the fabric, and each strip terminating in said cup near the juncture of said cup and its associated strap portion and each strip being separated from the other strip, said chin strap effective to resist upward and rearward forces but also effective to break before there is danger of an injury to the neck of said wearer.

2. A chin strap as defined in claim 1 in which the strips are made of cotton fibers.

3. A chin strap as defined in claim 1 in which the resilient material is a molded natural rubber composition and said strips are made of braided cotton fibers.

4. A chin strap as defined in claim 1 in which a generally Y-shaped mouth piece is integrally connected to said cup, said mouth piece also being made of said resilient material.

5. A chin strap as defined in claim 4 in which the strips comprise nylon fiber and the resilient material comprises a molded natural rubber composition.

6. A chin strap as defined in claim 1 in which the strips are made of nylon fibers.

7. A chin strap adapted for use with a football helmet, said strap comprising an integral one piece member of a resilient natural rubber material having a central elliptical-shaped cup adapted to fit over the chin of a wearer of said helmet, said strap also having two elongated strap portions of said rubber material integrally connected to opposite ends of said cup and each strap portion having an upper layer portion and a lower layer portion, said strap also comprising a pair of strips of webbed nylon fabric embedded in the strap portions, each strip disposed between said upper and lower layer portions of the resilient material in one of the strap portions and each strip extending about 10 to 20% of its length into the central cup, said resilient material being of one integral piece and integral portions thereof being located within the interstices of the fabric and each of the layers of resilient material being of a thickness greater than the thickness of the fabric, each strip terminating in said cup near the juncture of said cup and its associated strap portion, said strap being adapted to be elongated up to about 375 to 400% without rupturing and a generally Y-shaped mouthpiece of said rubber material integrally connected to the cup by molding therewith.

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