ABSTRACT

A plastic guard of general U-shape and channel cross-section for insertion in the mouth to receive a set of teeth including a strap extending from the outer lower anterior portion of the guard and a protector for the lips and the surrounding facial areas slidable on the strap and frictionally retainable thereon in adjusted position to accommodate different lip thicknesses and jaw formations.

9 Claims, 6 Drawing Figures
MOUTHGUARD WITH LIP PROTECTOR

This invention relates to a mouthguard for the protection of the teeth in contact sports having a strap secured thereto for attachment to a face guard or chin strap and a lip protector removably mounted on the strap of the mouthguard.

Most mouthguards in use at present are in the form of a saddle of substantial U-shape and of channel cross-section made of a tough resilient thermoplastic resin. The guard fits over one set of teeth, usually the upper set, and to prevent loss due to a substantial impact, a strap is secured to the anterior lower outer portion of the guard which is looped around the bar of a face guard or chin strap. Some guards or mouthpieces used are standard saddles with smooth interior tooth-receiving channels and others may be custom molded to contain the impressions of the teeth of the wearer. The standard type mouthguard with integral strap is shown in U.S. Pat. No. 3,448,738 whereas the custom fitted type mouthguard with strap is shown in U.S. Pat. No. 3,485,242.

Protective devices equipped with lip guards are known in the art as disclosed in the U.S. Pats. of Oberto No. 2,521,084; Miller No. 2,589,504; Lee No. 2,614,560; Freedland No. 2,702,032; Helmer Nos. 3,082,765 and 3,203,417; and Petersen No. 3,307,539. None of these patents show a mouth insertable member of channel cross-section to receive and shield the entire set of teeth with a strap secured to the anterior outer portion thereof and a separate lip shield or protector mounted on the strap and spaced from the mouth insertable channel portion.

There is presently on the market a guard sold by Shield Mfg. Inc. of Buffalo, N.Y. under the designation “Shield-270 Lip And Mouth Guard” which comprises a custom fitted channel shaped tooth receiving guard with an integral strap extending from the lower anterior outer portion thereof and an integral arcuate lip shield in a fixed position on the strap relative to the guard itself.

It is the primary object of this invention to provide a substantially U-shaped mouthguard of channel cross-section insertable in the mouth to receive and shield an entire set of teeth having a strap secured to the outer anterior portion thereof and an arcuate flexible, impact absorbing lip protecting shield slidably mounted on the strap and frictionally retainable thereon in adjusted position thereon relative to the guard to accommodate different thicknesses of lips and different jaw and mouth formations.

Another object of the invention is to provide a mouthguard with lip protector of the character described in which the lip protecting shield is generally concavo-convex and is provided at its concave face with a boss which is adapted to engage the anterior portion of the guard to limit inward movement of the lip shield at its central portion and to provide greater impact absorption at the central portion thereof.

Another object of the invention is to provide a mouthguard with lip protector of the character described in which the strap is secured to the anterior outer lower portion of the guard by an enlarged portion to reinforce the same, the boss extending from the generally concave face is provided with a bore having two widths approximating the widths of the enlarged portion of the strap and the narrower strap itself to frictionally engage both the enlarged portion and the strap adjacent the guard or the strap itself remote from the guard if required for adjustment with respect to a thicker lip or special jaw formation. With such a construction, the lip protector may also be adjustably slidably mounted on straps which do not contain the enlarged shoulder at its connection to the guard.

These and other objects of the invention will become more apparent as the following description proceeds in conjunction with the accompanying drawings, wherein:

FIG. 1 is a group perspective view of the invention;
FIG. 2 is a fragmentary plan view thereof;
FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2;
FIG. 4 is a sectional view taken on the line 4—4 of FIG. 3;
FIG. 5 is a view similar to FIG. 4 of a modified form of the invention; and
FIG. 6 is a view similar to FIG. 5 of yet another modified form of the invention.

Specific reference is now made to the drawings in which similar reference characters are used for corresponding elements throughout.

The invention generally comprises a guard or saddle 10, a strap 12 secured thereto and a separate lip protector or shield 14 slidably on the strap. The guard is a substantially U- or horseshoe-shaped mouth insertable member of channel cross-section having an outer flange or buckle 16 and a preferably lower inner or lingual flange 18 connected by a web portion 20. Its outer surface preferably tapers upwardly at its distal ends while the posterior ends of the inner and outer flanges taper anteriorly.

The guard or saddle is molded of a suitable tough resilient plastic and of a size to fit over and shield an entire set of teeth, usually the upper teeth. It can be used as non-custom or what is known in the trade as a standard unit, in which case the inner surface thereof is smooth, or can preferably be used as a custom fitted unit having indentations of the particular wearer's teeth impressed therein formed by immersing the saddle in boiling water, removing it while it still retains the essential shape, placing it over a set of teeth to form teeth impressions therein and then allowing it to cool or immersing it in cold water to fix the impressions in the saddle.

An example of a plastic most suitable for the saddle are the high molecular weight binary or pure ethylene-vinyl acetate copolymers which are tough, have a rubber-like flexibility or resilience and have high stress crack resistance even at low temperatures. The average properties which these resins possess are as follows: a melt index of 3.5-15 dg./min., a density of 23° C. of 0.95 g./cc., a tensile strength at 73° F. of 1,550-2,000 lb./sq. in., an elongation at 73° of 800-900 percent, a stiffness at 73° F. of 1,550-1,770 lbs./sq. in., a tensile impact at 73° F. of 228-330, a softening point, Vicat, of 120°-127° F. and an index of refraction of 1.428-1.485, all determined by ASTM methods. They are also odorless, tasteless and non-toxic. Two such resins are commercially available from Du Pont as Alathon 3175 and Alathon 3180.

The strap 12 may be made of the same plastic as the guard or saddle and molded as an integral unit.
therewith to extend from the lower anterior outer portion of the guard. The strap may also be secured by bonding or by suitable adhesive to the guard. It is preferred that the saddle be made of Alathion 3180 which has a melt index of about 15 dg./min. and a softening point of about 120°F. whereas the strap is preferably made of the tougher Alathion 3175 which has a melt index of about 35 dg./min. and a softening point of about 127°F. The saddle is preferably about 3 mm. thick whereas the strap is a substantially flat rectangular member which is preferably about 17 mm. wide and about 2.5 mm. thick.

One end of the strap is tapered to form a neck 22 which terminates in a ball 24. Spaced apertures 26 are provided through the strap which are slightly smaller in diameter than ball 24. By looping the strap over the bar of a face guard or chin strap and then inserting the ball 24 through a selected aperture 26 after preferably wetting the ball until the neck 22 is positioned in the aperture, the guard can be adjustable retained on the face guard or chin strap. As the apertured areas of the strap are the weakest portions thereon and children have shown a tendency to play with the strap while looped in the aperture to the point where the strap has torn through, the strap is molded with an annular reinforcing ridge 30 around each aperture which extends outwardly from one or both of the opposite faces of the strap.

To reinforce the point at which the strap is secured to the guard, that end of the strap is enlarged as at 32 relative to the body of the strap and is of a generally rectangular cross-section. Hence, it is thicker and wider than the strap and is preferably about seven-sixteenths inch long and is about five-eighths inch wide as compared to a width of about one-half inch for the body of the strap; and the enlarged portion 32 is about three-sixteenths inch thick as compared to a thickness of about 0.100 inch for the body of the strap.

The strap may be made of the same or a different plastic from the guard or saddle and as stated earlier may be molded integrally therewith or secured thereto by a cementious or weld bond. The weld joint between the strap and the guard may be such, as disclosed in U.S. Pat. No. 3,485,242, that an impact acting to exert a pull of about 14-24 pounds will permit the strap to break away from the guard to prevent damage to the teeth.

The lip protector or shield 14 may also be made of the same or a different plastic as the guard and is generally a flexible concavo-convex unit whose width approximates the width of the guard itself, whose height is about twice that of the maximum height of the guard, and whose thickness approximates the mean thickness of the guard. When the lip protector is mounted on the strap, its convex face 34 faces away from the guard and its concave face 36 towards the guard. A boss 38 extends centrally from the concave face 36 whose length exceeds that of the shoulder 32 of the strap and whose outer sides are tapered to permit ready removal of the lip protector from the mold in which it is formed. Extending through the boss and opening as at 40 through the convex face 34 is a bore 42 whose contour conforms to that of the strap. The upper and lower faces 44 and 46 of the bore, see FIG. 3, are substantially parallel. However, the side faces of the bore are such that the forward portion 48 of the bore has a width closely approximating the width of the shoulder 32 of the strap and the rear portion 50 of the bore closely approximates the narrower width of the strap body. Thus, a shoulder 52 is formed in each side wall of the bore where the portions 48 and 50 thereof of differing widths join. The forward edge 54 is concavely curved to conform to the curvature of the outer lower anterior portion of the guard, and centrally, the overall length of the boss 38 is about twelve-sixteenths inch as compared to about seven-sixteenths inch for that of the strap shoulder 32 so that the length of forward wider portion 48 of the bore is about seven-sixteenths inch while the length of the rear narrower portion 50 of the bore is about five-sixteenths inch.

In use, the free end of the strap is pushed through the bore 42 of the lip protector 14 and the latter is slid along the length of the strap until the forward edge 54 of the boss 38 thereof abuts the outer lower anterior portion of the guard 10, at which point the side walls of the wider bore portion 48 frictionally grip the side walls of the strap shoulder 32 and the side walls of the narrower bore portion 50 frictionally grip the side walls of the body portion of the strap immediately to the rear of the shoulder 32. In this position the lip protector 14 is spaced from the guard 10 by the length of the boss 38 and when the guard is inserted in the mouth over a set of teeth, the lip protector will shield the lips and the area around the lips, namely the cheeks, the upper chin portion and the area just below the nose. The strap will then be looped around the bar of a face guard or chin strap and an impact on the protector will flex it whereas the central portion thereof containing the boss will further act as an absorbing cushion.

Should the lip or jaw formation be such as to require a different spacing of the lip protector relative thereto, the lip protector can be moved rearwardly on the strap to a different adjusted position. In view of the fact that the bore of the boss contains a smaller width portion 50 approximating the width of the strap, if the lip protector should have to be moved so that the boss 38 does not engage the strap shoulder 32 there will still be available for frictional grip engagement with the sides of the strap, the side walls of the smaller width portion 38. Also, if a construction of strap and guard should exclude the enlarged portion 32, as seen in FIG. 5, the side walls of the smaller width portion 50 of the boss will frictionally engage the sides of the strap anywhere along its length.

While the contour of the strap and its enlarged should and that of the bore of the boss is shown as substantially rectangular in cross-section, other contours can be used such as oval, circular, etc. as long as the maximum transverse dimension of all or a portion of the bore of the boss closely approximates the maximum transverse dimension of the strap when no enlarged shoulder is used on the strap or if such is used, the maximum transverse dimensions of the two portions of the bore closely approximate the maximum transverse dimensions of the strap and its shoulder to permit adjustable slide movement and gripping retention of the lip protector on the strap.

The use of bore portions of differing widths can also be obtained with a tapered or non-stepped bore 56, as seen in FIG. 6, the taper widening from the concave
face 36 of the lip protector toward the free curved surface 54 of the boss. At its widest, adjacent the surface 54, the tapered bore 56 has a width which closely approximates the width of the shoulder 32 and at its narrowest, adjacent the lip protector itself, the bore has a width which closely approximates that of the body portion of the strap.

Because the lip protector of the instant invention provides a close fit to the facial areas surrounding the lip, the lip protector may be provided with apertures 58 on both sides of the boss 38 to serve as breathing vents.

While preferred embodiments of the invention have here been shown and described, it is understood that a skilled artisan may make minor variations without departing from the spirit of the invention.

What is claimed is:

1. A combined mouthguard and lip protector comprising a guard of general U-shaped and channel cross-section adapted to be inserted in the mouth to receive a set of teeth, a strap extending from the outer lower anterior portion of the guard and adapted to be looped over the bar of a face guard or chin strap, a protector member dimensioned to shield the lips and the surrounding facial area and means slidably mounting said lip protector on said strap and frictionally retaining said lip protector in adjusted position thereon relative to said mouthguard.

2. The article of claim 1 wherein said means includes a boss extending from one face of said lip protector and a bore in said boss extending through said lip protector, said bore having a maximum transverse dimension closely approximating the maximum transverse dimension of said strap so that said lip protector can be slid along said strap and be frictionally retained in an adjusted position therealong.

3. The article of claim 2 wherein said lip portion is generally concavo-convex, said boss extends from the concave face of said lip protector and the free end of said boss engages said outer lower anterior portion of said guard at the extreme inward position of said lip protector relative to said guard to space said lip protector from said guard and serve as an impact-absorbing cushion.

4. The article of claim 3 wherein said outer lower anterior portion of said guard and said free end of said boss are correspondingly curved.

5. The article of claim 1 wherein said strap includes an enlarged shoulder portion at its point of attachment to said mouthguard, said means including a boss longer than said strap shoulder extending from one face of said lip protector and a bore in said boss extending through said lip protector, said bore having one transverse dimension which closely approximates the maximum transverse dimension of said strap and another transverse dimension which closely approximates the maximum transverse dimension of said shoulder so that said lip protector can be slid along on said strap and be frictionally retained on said strap and its shoulder or on the strap itself.

6. The article of claim 5 wherein said strap, its shoulder and said bore are substantially rectangular in cross-section and said bore includes two portions of differing widths separated by a shoulder, one of said portions containing the transverse dimension closely approximating the width of said strap and the other containing the transverse dimension closely approximating the width of said strap shoulder.

7. The article of claim 6 wherein the length of said wider width portion of said bore is substantially the same as the length of said strap shoulder.

8. The article of claim 5 wherein said bore is tapered, the taper widening from said lip protector to the free end of said boss, the narrowest portion of said taper closely approximating the maximum transverse dimension of said strap and the widest portion of said taper closely approximating the maximum transverse dimension of said strap shoulder.

9. The article of claim 1 wherein the same is made of a tough resiliently flexible plastic, the mouthguard being made of a plastic capable of fixing and retaining the teeth impressions of the wearer therein.

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