Sept. 10, 1963 J. C. BUTLER ETAL 3,103,217

MOUTHPIECE

Filed May 18, 1961

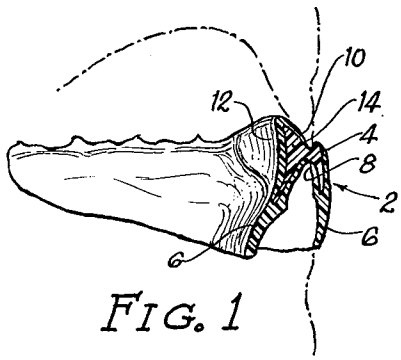


FIG. 1

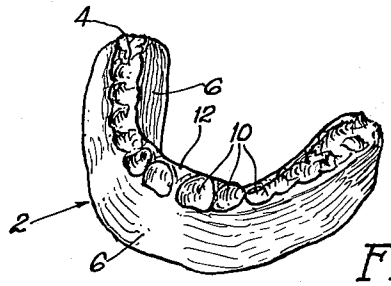


FIG. 2



FIG. 4

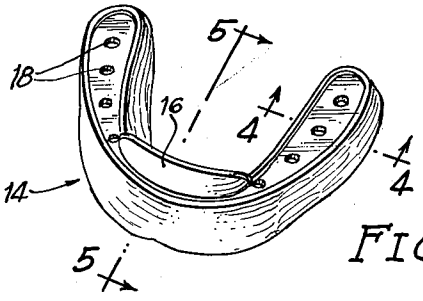


FIG. 3

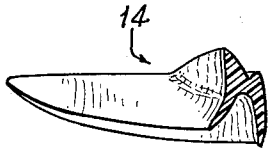


FIG. 5

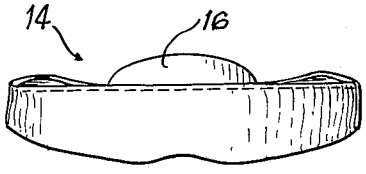


FIG. 6

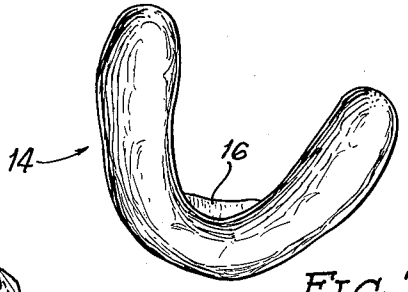


FIG. 7

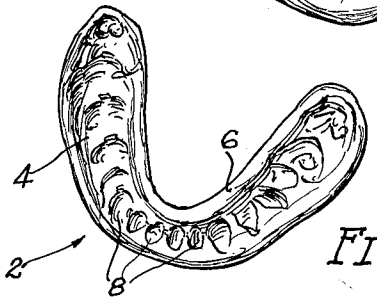


FIG. 8

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MOUTHPIECE

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This invention relates to the production of mouthpieces adapted to prevent injuries to the teeth and mouth of football players, boxers and others engaged in contact sports and similar undertakings.

It is a well known fact that athletes engaged in contact sports are particularly susceptible to damage to the teeth and mouth. The use of protective headgear with face guards has not proved satisfactory insofar as elimination of such injuries is concerned. Such devices, for example, afford no protection for blows coming upward toward the athlete's head, and some protective headgear is not effective for stopping all direct and side blows.

The use of mouthpieces has not totally filled the gap left by present protective headgear. The basic deficiencies of present mouthpieces include the fact that they are bulky and ill fitting, thus greatly impairing normal breathing and speech. Unimpaired breathing is of course a prime consideration for a person engaged in strenuous activity, and normal speech is important in such sports as football where signals must be relayed. Furthermore, the general discomfort will naturally tend to reduce the capacity of an individual for an all-out performance.

In an attempt to ease the discomfort in wearing of mouthpieces, the thickness of the pieces between the upper and lower teeth has been decreased to permit near normal spread of the jaws. This approach has not been practical since the designs of the resulting mouthpieces were susceptible to failure due to biting through by the wearer.

An additional defect of present mouthpieces resides in the fact that they are worn on the upper teeth. This positioning makes it difficult to hold the piece in place and unduly impairs tongue freedom, thus affecting normal speech and breathing. Furthermore, there is no means provided in such mouthpieces for preventing relative sliding movement between the upper and lower jaws. This leads to mandible fracture since the lower jaw is susceptible to side blows even where a protective headgear is worn.

All of the above factors have led to general disfavor among athletes with regard to mouthpieces, there being a general reluctance to use them. It therefore becomes an object of this invention to provide a safe and comfortable mouthpiece for use by football players, boxers and others engaged in contact sports and similar undertakings.

It is a further object of this invention to provide an improved mouthpiece which supplements the protection given by protective headgear presently in use.

It is an additional object of this invention to provide an improved protective mouthpiece which eliminates the bulky and ill fitting characteristics of present mouthpieces which produce general discomfort and greatly impair speech and breathing.

It is a further object of this invention to eliminate defects in present mouthpieces which are fitted on the upper teeth, the improved mouthpieces thus decreasing the susceptibility of the wearer to jaw injuries and the like.

These and other objects of this invention will appear hereinafter and for purposes of illustration, but not of limitation, specific embodiments of this invention are shown in the accompanying drawings, in which—

FIGURE 1 is a side view partly in section of a mouthpiece characterized by the features of this invention;

FIGURE 2 is a perspective view of the improved mouthpiece shown in FIGURE 1;

FIGURE 3 is a perspective view of a core element preferably used in the manufacture of the mouthpieces of this invention;

FIGURE 4 is a sectional view taken about the line 4—4 of FIGURE 3;

FIGURE 5 is a sectional view taken about the line 5—5 of FIGURE 3;

FIGURE 6 is a front end view of the core element of FIGURE 3;

FIGURE 7 is a bottom view of the core element of FIGURE 3; and

FIGURE 8 is a bottom view of the improved mouthpiece shown in FIGURE 2.

The mouthpiece which is characterized by the features of this invention may be generally described as a channel-shaped member having a base portion with the walls depending from the base portion. The channel-shaped member is adapted to fit snugly over the lower teeth of the wearer with the interior side of the base portion of the channel being indented to substantially conform to the contour of the lower teeth. The exterior side of the base portion is indented to substantially conform to the contour of the upper teeth of the wearer. A special embodiment of the mouthpiece of this invention includes an upstanding flange portion formed on the exterior side of the base which is adapted to provide support for the lingual portion of the anterior teeth of the wearer.

The preferred method for manufacturing the protective mouthpieces of this invention includes the use of a core member having the general shape of the finished article and around which the mouthpiece material is built up.

In the drawings, there is shown a mouthpiece **2** comprised of a base portion **4** and depending wall portions **6** forming a generally channel-shaped article. Indentations **8** formed in the base portion interior of the channel will correspond exactly to the contour of the lower teeth of the wearer. Indentations **10** formed in the base portion exterior of the channel will similarly correspond to the contour of the upper teeth of the wearer.

An important element of the improved mouthpiece is the flange **12** extending from the base **4** opposite from the depending walls **6**. This flange is adapted to extend behind the anterior upper teeth, as suggested by FIGURE 1. The flange will extend at least to the gingival in order to provide support for the exposed portion of the upper anterior teeth.

It will be apparent that the positioning of the mouthpiece on the lower jaw in combination with the conforming indentations for the upper and lower teeth will provide several distinct advantages. There is with this arrangement no difficulty in holding the piece in the mouth since it will be held by gravity in addition to the snug fit occasioned by conforming of the piece to the teeth. Furthermore, this position has been found to improve tongue freedom, and therefore speech impairments are greatly alleviated. Due to the tendency of the piece to stay in place, near normal breathing is also possible with this arrangement.

The design afforded has been found to improve the safety of use due to the provision of conforming indentations for both the upper and lower teeth and due to the function of the flange **12**. With regard to the former distinction, the wearer's teeth will be held in place in a manner which will resist relative movements between the upper and lower jaws. Thus, the indentations for both the upper and lower teeth effectively provide a plurality of barriers which will materially reduce the number of mandible fractures. It is apparent that this arrangement

will not impair speech or breathing since the upper teeth may be readily parted from the piece by the wearer.

The flange **12** serves to prevent injury to the upper teeth which could result from direct blows. The flange effectively acts as a backing support cushioning direct blows and avoids fracture and injury of the anterior upper teeth.

FIGURES 3 through 7 illustrate in various views a core **14** which is preferably employed in the manufacture of the mouthpieces **2**. The core is of channel-shape corresponding generally to the outline of the lower teeth of the prospective wearer. The core is provided with an upstanding, centrally located flange **16** in order that the flange **12** may be built up thereon. Orifices **18** are preferably formed in the base of the core to enable uniform distribution of the mouthpiece material during the forming operation.

In order to form a mouthpiece having the characteristics of this invention, a material which will permanently set in a durable but flexible manner is a necessary requirement. Such materials include thermosetting plastic silicone rubbers, mastic type fillers which are heated prior to the formation of the desired impressions, and plasticized methyl methacrylate which remains resilient and flexible, particularly at mouth temperatures. Materials having similar properties and materials presently used in the production of mouthpieces are also contemplated.

The material selected will be fitted in the mouth of the wearer in a formable, impressionable condition and the teeth indentations **8** and **10** and the flange **12** will then be molded into a generally channel-shaped construction. The core **14** is preferably employed in the manufacture of these articles since it simplifies building up of the contour mouthpiece. Where employed, the channel-shaped core generally having the outline of the lower teeth is selected, and the impressionable material having the aforementioned properties is placed within and about the core member. In this manner, the upper and lower impressions are readily taken, and, because of the flange **16**, the flange **12** on the mouthpiece can be accurately positioned. The orifices **18** aid in uniformly spreading the impressionable material on either side of the core element.

In the building up of the impressionable material, it has been found preferable to provide a mouthpiece having a maximum spacing of about 3 mm. between the upper and lower teeth. A thicker mouthpiece will lead to discomfort due to excess unnatural spacing, and a thinner base wall will increase the tendency toward biting through the piece.

The core material should have the same properties with regard to durability and flexibility as the material placed thereabout in the manufacturing sequence. It is therefore contemplated that both materials be of the same composition although, of course, the core will be permanently set prior to use.

Various other methods of manufacture which will produce the novel mouthpiece of this invention are contemplated. The mouthpieces produced are believed to provide maximum protection, while at the same time giving adequate tongue room and stability within the mouth of the wearer. In addition to the improved speech and breathing possibilities, a non-sliding fit with regard to the upper and lower teeth is accomplished due to the firm seat provided for the teeth. The instant design in addition provides cushion support by means of the flange **12** for the lingual side of the upper anterior teeth, and the design permits the use of a relatively thin 3 mm. spacing between the upper and lower teeth, thus increasing the comfort during use.

It will be understood that various changes may be made in the above disclosed protective mouthpiece and in the methods of its manufacture which provide the characteristics of this invention without departing from the spirit of the invention, particularly as defined in the following claim.

We claim:

A mouthpiece for the protection against injury to the teeth and mouth of the wearer comprising a generally channel-shaped, flexible core having a base portion, a centrally located flange portion extending upwardly from the rear side of said base portion and having channel-defining walls depending downwardly from the base portion, said core being imbedded in an outer body of flexible material, said outer body comprising a channel-shaped member having a base portion with channel-defining walls depending downwardly therefrom, said outer body being adapted to fit over the lower teeth of the wearer, the interior side of the base portion of said outer body being indented to substantially conform to the contour of the lower teeth, and the exterior side of the base of said outer body being indented to substantially conform to the contour of the upper teeth, the base portion of said outer body being free of upwardly extending walls except for the centrally located flange portion extending upwardly from the rear side of the outer body, said flange portion of said core being imbedded in this flange portion associated with the outer body, the extent of said flange portion of the outer body being limited whereby it is adapted to fit behind only the upper anterior teeth of the wearer.

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