This invention relates to improvements in protective mouthpiece for athletes.

It is the principal purpose of the invention to produce protective mouthpieces that cover the teeth of the individual with a yielding covering that enables the wearer to talk, drink, and open the mouth, and which when worn, avoid uneven pressures or individual teeth parts of the jaws.

It is well known that the arrangement of teeth in the mouth is different with every individual. The need of athletes for some cushioning means for the teeth has long been recognized. Boxers generally use a mouthpiece of rubber which they place between their teeth. More widespread use of such protection by athletes in other sports, such as football, basketball, etc., has not been common because of the handicaps imposed upon the athletes by the ordinary mouthpiece. It does not afford speech, opening the mouth wide for breathing or drinking. Mouthpieces according to the present invention overcome these handicaps and provide better protection.

More particularly it is the purpose of the present invention to produce individually fitted, yielding coverings for the teeth and adjacent flesh surfaces whereby to protect against fractured teeth and jaws and against lacerations of the lips and cheeks.

The nature and advantages of the invention will appear more fully from the following description and the accompanying drawings. It should be understood however, that the drawings and description are illustrative only and are not intended to limit the invention except sofar as it is limited by the claims.

In the drawings:

Figure 1 is a somewhat diagrammatic view illustrating the initial step in preparing mouthpieces according to the present invention;

Figures 2 and 3 are fragmentary views showing the original impressions or negatives that are made;

Figure 4 is a fragmentary sectional view illustrating the step of forming a replica of the tooth and jaw section to be protected;

Figures 5 and 6 are fragmentary section views illustrating the next step in the formation of the mouthpiece;

Figure 7 is a fragmentary sectional view showing how the built up unit of Figures 5 and 6 is utilized to form a mold for the ultimate production of the mouthpiece;

Figure 8 shows the mold completed ready for pouring; and

Figure 9 shows the completed mouthpieces as they are received within the wearer's mouth.

Referring now in detail to the drawings, the improved mouthpieces of the present invention are made to fit the individual jaws and teeth configuration of the person who is to wear them.

Separate upper and lower mouthpieces are provided and each mouthpiece is constructed in such a way as to fit and protect the teeth covered thereby and to cooperate with the other mouthpiece so that the wearer of the mouthpieces may move the jaws to open and close the mouth, to speak and drink and to breathe freely. The combination of the two mouthpieces yieldingly encloses the teeth and the adjacent flesh sections of the jaws. As shown in Figure 9, the mouthpieces extend into the buccal fold portion. The fleshy parts of the gums inside and outwardly of the teeth. The gum covering portions are tapered. This construction gives a good suction to hold the individual mouthpieces in place when the wearer opens and closes the mouth.

As indicated in Figures 1, 2 and 3, initial impressions are taken of the maxilla or upper tooth section and the mandible or lower tooth section. These impressions are taken by any well recognized dental procedure, using any impression material 10 in a suitable container 11. The negatives shown in Figures 2 and 3 at 12 and 13, constitute a pair of impressions. These impressions are next utilized to make models such as 14 and 15 of dental stone or plaster. These models constitute replicas of the exposed portions of the teeth and the adjacent flesh sections from which the teeth protrude.

After having obtained the models 14 and 15, these models are coated with a readily removable material such as wax as illustrated in Figures 5 and 6. The model 14 has the wax built up in such a fashion as to provide limited extent of the wax over the hard palate section of the maxilla. Both of the sections have the wax covering all of the teeth including the tuberosities. The thickness of wax over the teeth is tapered so that the edges fitting over the fleshy portions adjacent the teeth are relatively thin.

When the waxing has been completed the models with the wax thereon are used to form molds 16 of the dental plaster or stone. These molds are then separated and all the wax is removed from the molds and the models. The molds are then provided with the openings 17 in the top or closed section. The molds with the positive models of the jaws are then heated to remove moisture, and preferably while they are still warm, they are covered with a coating or separator 18 which is given a short period of time to dry. Gauze strips 18a, the width of the biting surface of the posterior teeth and of the three surfaces of the anterior teeth, are placed on the models. The separator is tacky enough to hold the gauze in place. When the separator is dry the two sets of molds and models are assembled together as illustrated in Figures
2,682,870

8 and 9 and the material of which the mouthpiece is made, is poured into the molds, filling the space within the molds around the models. Any suitable plastic molding composition, which is thermosetting and which, when cured, will retain its yielding flexible nature, may be used. A product which may be used for this purpose is a vinyl resin of suitable hardness when cured. A flavoring is incorporated in the resin. The assembled mold with the thermosetting plastic is then placed in an oven at a temperature sufficient for setting and curing. The particular material identified above may be cured in an oven at a temperature of 300 degrees F. in about forty-five minutes. The molds are then removed from the oven and allowed to cool about ten minutes after which the molds and models may be separated and the mouthpieces removed therefrom. The excess material at the filler opening and at the edges of the mold are then trimmed to complete the two matching mouthpieces for the individual. The gauze prevents biting through the protective covering when it is compressed between the upper and lower teeth of the wearer.

It is noted that with this method of making the mouthpieces, each jaw of the wearer is protected by an individually molded, yielding covering which protects each tooth regardless of its position and also provides a yielding barrier between the teeth and the adjacent surfaces of the cheeks and lips. If any of the teeth are missing the material of the mouthpiece fills the space where the missing teeth should be. Since each section or mouthpiece is free of the other and fits the jaw snugly, the wearer may open the jaws and close them and speak with the mouthpieces in place. They do not interfere with breathing or drinking. The lowering of that portion of the covering on the inside of the upper mouthpiece, to free the hard palate immediately back of the upper teeth, is important in facilitating speech. In articulation, the tongue makes contact with the hard palate in the formation of word sounds. By forming the mouthpiece so as to avoid any obstruction at this particular point, the ability to speak is not curbed.

The advantages of the improved mouthpiece construction are most evident when it is used by boxers, hockey players, and others who may receive hard blows on the face. An extra hard blow on the lower jaw is transmitted via the jaw to the articulating joint and its socket by the ear. It is this force that causes concussion or unconsciousness. When these mouthpieces are worn, the shock of such a blow is absorbed substantially by the yielding substance of the mouthpieces.

The flavoring used in the mouthpieces stimulates the salivary glands. This serves to eliminate excessive dryness in the mouth by increasing the saliva flow.

The construction of the mouthpieces is such that the blood supply to the nostrils is protected. The front of the upper mouthpiece extends under the upper lip. The experience of boxers, hockey players and football players in actual competition when wearing these mouthpieces, has shown a remarkable decrease in nose bleeding when compared with the results obtained with conventional mouth protections. Boxers equipped with the present mouthpieces, have taken many face blows with no nosebleed resulting, while their opponents, not so equipped, had repeated nose bleeding with no more face blows.

The mouthpieces are closely fitted to the teeth and adjacent portions because of the way in which they are made. They are not dislodged by a blow struck when the mouth is open. The wearer avoids laceration of the gums, cheeks and lips because the blows cannot force the tissue against hard tooth surfaces. The mouthpieces keep the individual from biting himself. They prevent many fractures of jaws and teeth by acting as shock absorbers and by distributing the force of a blow over a large area rather than allowing it to concentrate at a single point.

It is believed that the nature and advantages of the invention will be apparent from the foregoing description.

Having thus described our invention, we claim:

1. The method of producing a protective mouthpiece for an individual which comprises making impressions of the teeth and adjacent portions, forming from the hardened plastic covering of the maxilla and mandible of the individual, moul.,dng models in the impressions, covering the models with a wax covering of substantial thickness around the tooth portions, reducing the covering in thickness along the outer portions of the models and flattening the meeting surfaces of the wax coverings so that one rests evenly on the other, forming moulds over the wax covered models, then removing the wax and casting in its place a flexible resilient composition.

2. Protective means for the teeth and jaws of athletes comprising flexible resilient coverings to be fitted to the upper and lower teeth and adjacent flesh surfaces of the jaws, said coverings adapted to completely enclose the teeth and being reduced in thickness over the flesh surfaces, the coverings having matched meeting faces, the upper covering having the inner upper edge recessed to expose the hard palate adjacent to the upper teeth.

3. Protective means for the teeth and jaws of athletes comprising two flexible resilient coverings formed with interior sockets and surfaces matching the exposed surfaces of the teeth and gums of the upper and lower jaws of the wearer, said coverings being adapted to completely enclose the teeth and having the outer portions thereof extending beyond the teeth receiving sockets tapered in thickness to the edges, whereby to provide yielding shields between the fleshly surfaces of the jaws and the cheeks of the wearer.

4. Protective means for the teeth and jaws of athletes comprising two flexible resilient coverings formed with interior sockets and surfaces matching the exposed surfaces of the teeth and gums of the upper and lower jaws of the wearer, said coverings being adapted to completely enclose the teeth and having the outer portions thereof extending beyond the teeth receiving sockets tapered in thickness to the edges, whereby to provide yielding shields between the fleshly surfaces of the jaws and the cheeks of the wearer.

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