

April 26, 1966

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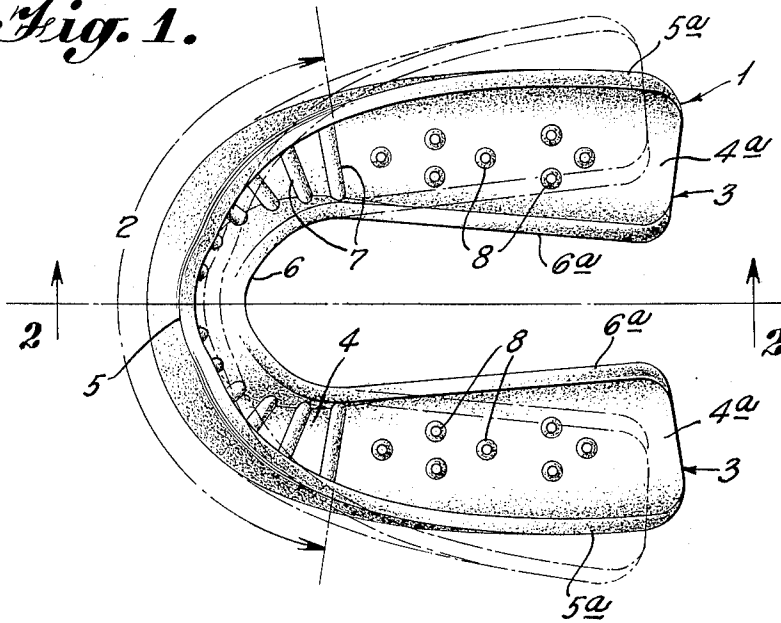
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MOUTH GUARD

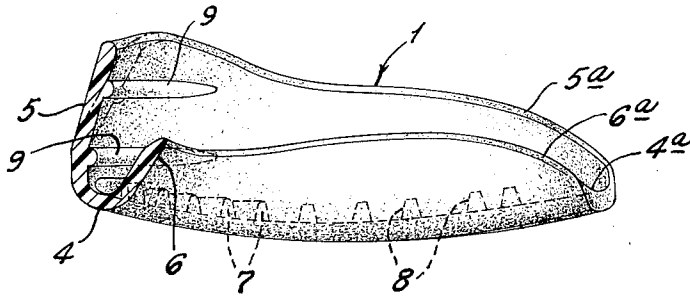
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*Fig. 1.*



*Fig. 2.*



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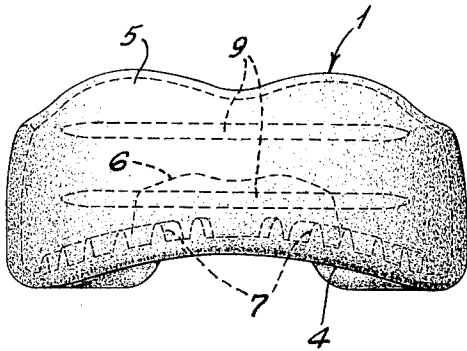
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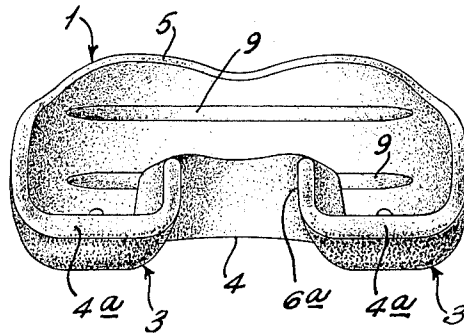
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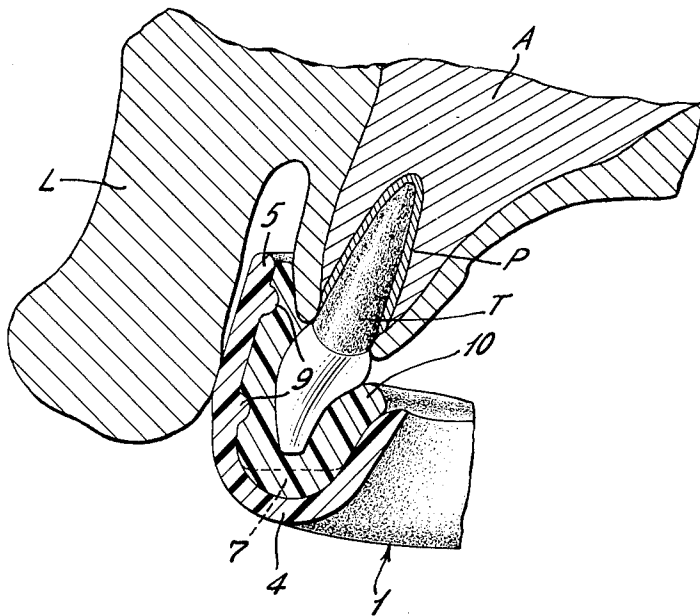
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



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**MOUTH GUARD**

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6 Claims. (Cl. 128-136)

This invention relates to an improved mouth guard of the yieldable type which is used by athletes in sporting events for protecting their teeth, lips and jaws from blows, and more particularly to an improved mouth piece which comprises a trough-shaped base member within which is placed a secondary filler for obtaining an exact impression of the teeth, that is, an outline of their shape and their alignment.

In this embodiment and embodiments previously known, a "custom-made" mouth piece is made by the placing of a rubber base material, fusible at a low temperature, within a standard sized trough-shaped base member which is of the same general configuration as the user's upper teeth. By these means, it can be seen that the necessity of making individual mouth pieces for each user is obviated and that this and other known embodiments provide a simple and easy method for readily making reusable mouth guards in that all that is required is a standard size base member and a moldable filler.

The known embodiments, as well as the present embodiment, include base members which are strengthened in the area which co-acts with the user's front teeth to thereby prevent his piercing the same unknowingly while he is engaged in the activities of the particular athletic event or during the forming of the mouth piece.

Known embodiments, however, are defective in that they do not provide a fit which conforms to the contour of the user's mouth structure and the curvature of his dentition. These defects affect the retention of the mouth piece and will cause the same to interfere with the user's breathing and speech.

It is the primary object of this invention to provide an improved mouth guard that more accurately fits the contours of the mouth and teeth; thus increasing the retention and comfort and reducing the interference with breathing and speech.

It is another object of this invention to provide a mouth guard which has an occlusal plane that conforms substantially to the curvature of the occlusal plane of the dentition.

It is a further object of this invention to provide a mouth guard having an anterior labial flange which slopes upwardly and posteriorly from the anterior incisal edge, following the natural anatomic contour of the labial alveolar bone.

It is another object of this invention to provide an improved mouth guard in which the incisal edge area is made as narrow as possible labiolingually without sacrificing protection; thereby reducing interference with speech and movements of the tongue.

Other objects of this invention will be pointed out in the following detailed description and claims and illustrated in the accompanying drawings, which disclose by way of example, the principle of this invention and the best mode which has been contemplated for applying the principle.

In the drawings:

FIG. 1 is a top plan view of the primary base member forming the present invention as it appears before being filled with a secondary filler material and fitted to the user's mouth, and with the final "fitted" form indicated in dot and dash lines.

FIG. 2 is a vertical sectional view taken along line 2-2 of FIG. 1.

FIG. 3 is a front elevational view of the base member.

FIG. 4 is a rear elevational view of the base member.

FIG. 5 is a vertical cross sectional view in the region of a central incisor showing the integrally molded secondary filler material in the base member of this invention.

With reference to FIGURE 1, there is shown a base member designated generally by the numeral 1 which is preferably formed of a yieldable, moldable material such as rubber or of a special, tasteless, non-toxic vinyl plastic. The base member 1 is usually precast and is generally horse-shoe shaped in configuration when in its "prefitted" or "relaxed" state, and includes a frontal bite portion 2 and a pair of rearwardly extending leg portions 3. In FIGURE 2, which is a vertical sectional view of the base member shown in FIGURE 1, it is seen that in the frontal area the base member includes a narrow base or floor portion 4 which is arcuate in cross section and which has an outer retaining wall or labial flange 5 and an inner retailing wall 6 which together form a trough for maintaining the secondary filling therein. Upon a further inspection of FIGURE 2 it can be seen that the forward or outer wall 5, in the region of the incisors, extends upwardly and rearwardly from the floor 4, also the inner or rear wall 6 slopes upwardly and rearwardly, which construction provides for a mouth piece which more naturally conforms to the anatomic contour of the user's labial alveolar bone, which conformity enhances the retention and comfort of the mouth piece. It should also be noted that the wall 5 is much higher than the wall 6, which construction also aids in enhancing the retention of the mouth piece.

The walls 5 and 6 change in slope as they approach the legs 3 until in the molar region they are substantially vertical as indicated at 5a and 6a. Also the base or floor 4 changes from a narrow, arcuate conformation in the incisal area to a much wider, substantially planar surface in the molar region as indicated at 4a. The outer wall 5 is contoured to avoid the buccal muscle and labial frenum attachments to the mouth; while the inner wall 6 is contoured to avoid the palatal arch and to follow the crest of the gingival tissue.

Due to the formation and material of the base member 1; when the legs 3 are moved farther apart to fit a wider dental arch, the rearward slope of the labial flange 5 increases as shown by dot and dash lines in FIGURES 1 and 2. This rearward movement results in closer adaptation of the labial flange 5 to the anterior alveolar mucosa.

It has been found that by making the mouth guard shell or base member 1 of a size that approximates the average bi-molar width of the smallest one third of a representative sampling of mouth sizes, it is possible to take advantage of this increase in retention when larger arches are fitted.

The present mouth piece includes a plurality of radially transverse ribs 7 disposed in the trough floor 4 in the frontal arcuate portion or incisal zone of the mouth piece, each of which extends from the rear of the forward wall 5 to the front of the rear wall 6. These ribs extend into and terminate in the leg portions 3 forwardly, of a plurality of upstanding frusto-conical bosses 8 formed on the upper surface of the floor 4a in each of the legs 3. The ribs 7 and bosses 8 are effective to prevent the user from piercing with his teeth the floor 4 either during the forming of the mouth guard or while he is participating in some athletic event. Also the thickness of the trough floor gradually increases from the incisal area to the molar area in order to be strongest in the area where the bite pressure is greatest.

To aid in the retention of the mouth guard, the floor 4 is curved to conform to the curvature of the occlusal plane which is a segment of a sphere and known to

the dental profession as "the curve of Spee." This is best illustrated in FIGURES 2 and 3.

Another feature of the present invention is the provision of a pair of vertically spaced horizontal ribs 9 formed on the inside of the forward wall or labial flange 5 and extending around the frontal bite portion 2 of the guard. The ribs 9 reinforce the wall 5; act as additional shock absorbers for the lip and incisors and help retain the secondary filler material in the mouth guard.

Even when the base member 1 has been filled with the secondary filler and molded to the user's mouth and teeth, the plastic resilience of the base member slightly urges the legs 3 toward their original horseshoe shape as seen in solid lines of FIG. 1. This inward urging tendency of the legs 3 aids in the retention of the mouth guard in the user's mouth.

The custom fit of the present mouth guard is made possible by the insertion of a secondary filler material 10 of a rubber base material which is fusible at a low temperature within the base member 1. This filler may take the form of any known mixtures such as those recited in U.S. Patent No. 3,073,300, for obtaining the desired results. These materials, at low temperature, take the form of a fluid which may be made up at will by the user. For instance, a suitable mixture of liquid and powder to form the desired filler may be made just before the impression is to be taken. The filler is placed in the base member and the base member is disposed within the mouth in the cusps of the upper and lower teeth with the base portion disposed between these teeth until the filler has "set"; thus producing a custom fitted, long-wearing, reusable mouth guard.

In FIG. 5, which shows the mouth guard in section; with the secondary filler 10 molded to an incisor, T indicates the incisor, P is the peridental ligament, A is the alveolar bone and L is the lip of the user; all of which are shown diagrammatically.

It can, therefore, be readily seen that a new and improved mouth piece has been provided which more naturally conforms to the anatomical structure of the user's mouth for facilitating the retention of the piece in the user's mouth and which incorporates a reinforced base member which prevents the user from piercing the base member with his frontal teeth.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to the preferred embodiments, it will be understood that various omissions and substitutes and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. A tooth guard and jaw protector comprising a horseshoe shaped base member for fitting between a person's upper and lower teeth which comprises a curved frontal bite portion and a pair of legs each forming a continuation of an end of said frontal bite portion with said legs converging at their free ends, said frontal bite portion characterized by a trough defined by a lingual wall inclined toward said legs, a labial wall the upper portion of which is inclined toward said legs and a connecting arcuate floor, said trough being narrowest in the middle of the frontal bite portion and widening toward either end, a plurality of radially spaced webs attached to the bottom of said trough on the inside surface, at least one peripherally extending rib attached to the inside surface of said labial wall below the top thereof, said legs defining further flat bottom troughs forming continuations of said trough with a plurality of spaced bosses attached on the inside surface of said flat bottom of said legs, said trough and said further troughs cooperating to receive a self-molding filler material, said webs, said rib and said bosses cooperating to provide shock absorption, and for serving to anchor said filler material.

2. A tooth guard and jaw protector as recited in claim 1 wherein the further flat bottom troughs of said leg portions are characterized by an arcuate shape.

3. A tooth guard and jaw protector as recited in claim 1 wherein said trough of said frontal bite portion is characterized by an arcuate shape.

4. A tooth guard and jaw protector as recited in claim 1 wherein the further flat troughs of said leg portions increase in width in the direction of the free ends of said leg portions.

5. A tooth guard and jaw protector as recited in claim 1 wherein a pair of such peripherally extending ribs are attached to the inside surface of said labial wall in a vertically spaced orientation.

6. A tooth guard and jaw protector as recited in claim 1 wherein the convergence of the free ends of said leg portions is such that in normal use the leg portions must be spread apart when inserted in a user's mouth resulting in a bias force being applied to the labial wall increasing its inclination toward said leg portions whereby the protector more securely adapts to the user's dentition.

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