

[54] BRUXISM MONITORING DEVICE

[76] Inventor: Albert Gerard Forgione, 5 Rollstone Rd., Marblehead, Mass. 01945

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[58] Field of Search..... 32/19, 20, 21

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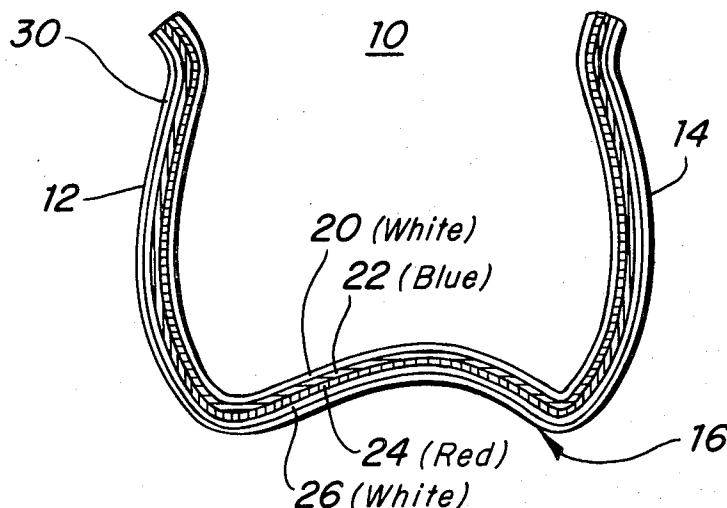
Primary Examiner—Robert Peshock

Attorney, Agent, or Firm—Joseph S. Iandiorio

[57] ABSTRACT

A bruxism monitoring device comprising a flexible, inelastic mouthpiece for snugly engaging one of every pair of occluding teeth whereat bruxism is to be monitored, the mouthpiece having generally vertical side walls providing one or more recesses to receive one or more teeth and a thin biting plate interconnecting the side walls for disposition between upper and lower occluding teeth, the plate including a plurality of layers, each layer having a color distinguishable from the colors of adjacent layers.

6 Claims, 4 Drawing Figures



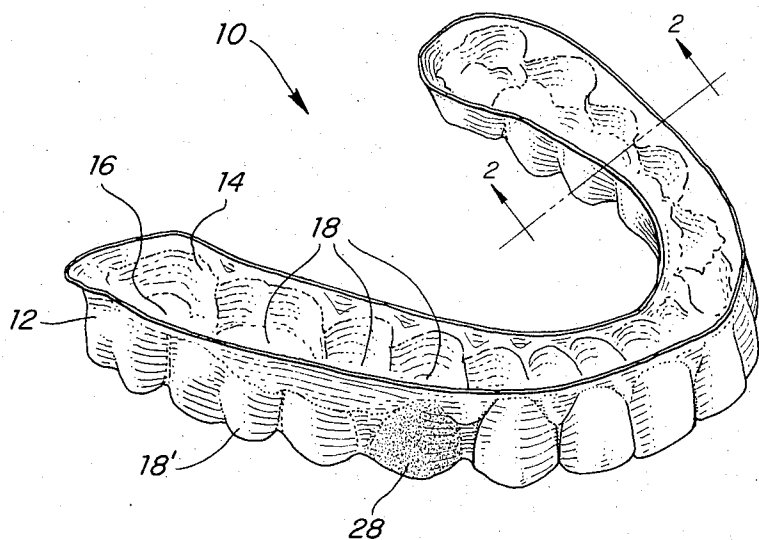


FIG. 1.

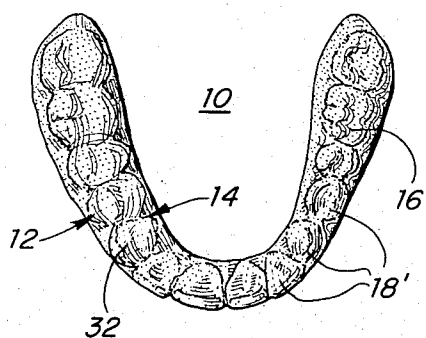


FIG. 3.

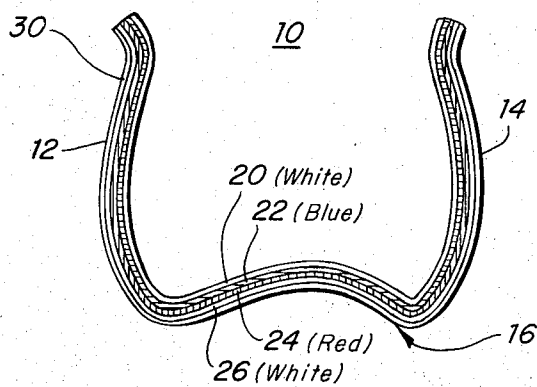


FIG. 2.

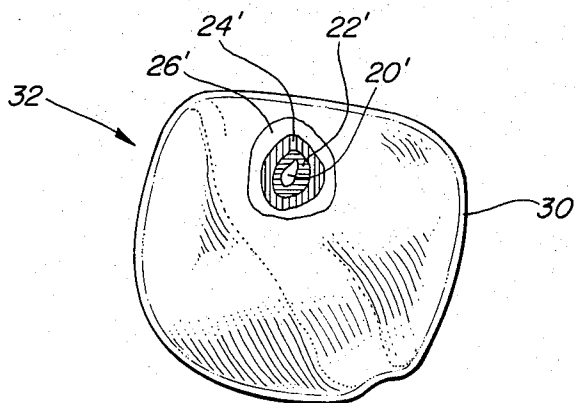


FIG. 4.

## BRUXISM MONITORING DEVICE

## FIELD OF INVENTION

This invention relates to a multilayer bruxism monitoring device and more particularly to such a device in which each layer is distinct from adjacent layers.

## BACKGROUND OF INVENTION

Bruxism, the abnormal, excessive, non-functioning grinding of teeth is of interest to both psychologists and dentists. To psychologists the occasion of, and extent of bruxism may be important as an indication of emotional stress, and may be used as a tool for understanding behaviour whereas dentists are primarily interested in the results of tooth grinding. Measurement of the area and of the intensity of tooth grinding of a person i.e. the area of the teeth actually undergoing grinding and the force applied in the grinding are important in evaluating the psychological problems and in predicting the probable damage to the teeth and associated areas. Conventional devices for measuring tooth grinding are generally expensive and involve complex electronic equipment. Trained technicians are used to employ the device and monitoring periods are kept short because of inconvenience to the patient. These factors tend to limit widespread use of these monitoring devices. The use of such devices is also inconvenient because the periods of highest tooth grinding activity usually occur at night when the patient is sleeping.

## SUMMARY OF INVENTION

It is therefore an object of this invention to provide a simple, inexpensive, easy to use bruxism monitoring device which can be applied by the patient himself and can be engaged for long periods during sleep with minimum interference with the patient's normal life style.

It is a further object of this invention to provide such a bruxism monitoring device which measures both the area affected by, and the intensity of the bruxism.

The invention features a bruxism monitoring device including a flexible, inelastic mouthpiece for snugly engaging one of every pair of occluding teeth whereat bruxism is to be monitored. The mouthpiece has generally vertical side walls providing one or more recesses to receive one or more teeth. A thin biting plate is interconnected between the side walls for disposition between upper and lower occluding teeth. The plate includes a plurality of layers; each layer has a color distinct from the colors of adjacent layers. In preferred embodiments the topmost layer to be exposed to the uncovered occluding teeth may have printed upon it a pattern of lines or dots to facilitate measurement of areas abraded or worn away. This printed pattern may be covered with a thin, clear layer of plastic.

## DISCLOSURE OF PREFERRED EMBODIMENT

Other objects, features and advantages will occur from the following description of a preferred embodiment and the accompanying drawings, in which:

FIG. 1 is an axonometric view of a bruxism monitoring device according to this invention;

FIG. 2 is an enlarged cross-sectional view taken along lines 2—2 of FIG. 1;

FIG. 3 is a bottom plan view looking upward at the mouthpiece shown in FIG. 1; and

FIG. 4 is an enlarged detailed view of one tooth recess of the mouthpiece shown in FIG. 3 with a portion worn away by bruxism.

The bruxism monitoring device of this invention may be embodied in a mouthpiece which snugly engages either the upper or the lower one of a pair of occluding teeth at which bruxism is to be monitored. The mouthpiece may be constructed to accommodate one or more such pairs of upper and lower occluding teeth and typically is used to monitor bruxism between all of the upper teeth and lower teeth. The mouthpiece is preferably constructed by any well known technique whereby a mold of the particular patient's teeth may be constructed. However, such exactness is not required so long as the mouthpiece snugly engages either the upper or lower teeth including the group of teeth between which bruxism is to be monitored. The mouthpiece is formed of a flexible but inelastic member. The member is flexible in order to accommodate discrepancies between the shape of the mouthpiece and the patient's mouth and to permit the mouthpiece to more comfortably and snugly engage the patient's teeth. The mouthpiece is inelastic in that biting or other pressure to which the mouthpiece may be subjected in the patient's mouth does not cause the mouthpiece to be substantially deformed or otherwise lose its shape. The mouthpiece includes generally vertical sidewalls which provide one or more recesses to receive one or more teeth, with which it is to snugly engage, and a thin biting plate which interconnects the side walls for disposition between upper and lower occluding teeth. The sidewalls may extend along the teeth and over the gums or just short of the gums or just barely over the crown of the teeth; a function of the sidewalls is to help locate and snugly engage the mouthpiece with the teeth. The plate includes a plurality of layers having mutually distinguishable colors; each layer has a color which is distinct from the colors of adjacent layers. Preferably each of the layers is a different color for easier evaluation. The thickness and characteristics of the layers may vary. For example, the layers may vary in thickness or in hardness as a factor of distance from the engaged teeth.

In one specific construction the biting plate is formed of four layers of polyvinylchloride each having a thickness of 0.005 inches. The layer closest to the engaging teeth is white; the next layer is blue; the next red; and the outermost layer, the first to be worn away by bruxism by the occluding teeth, is also white. The outermost white layer may be printed with an edible ink dot screen of 50 percent coverage and covered with a clear plastic coating 0.001 inches thick. The final layer of clear plastic may also be polyvinylchloride. The total thickness of the layers is 0.021 inches.

The invention may be accomplished using a mouthpiece 10, FIG. 1, including vertical walls 12 and 14 interconnected by a biting section 16. Mouthpiece 10 may be constructed with recesses 18 which conform to the teeth of the patient that is to use the mouthpiece 10 so that mouthpiece 10 snugly engages one or more of either the upper or the lower teeth of the user. The outside of recesses 18 form replicas 18' of the teeth they engage. In FIG. 1, mouthpiece 10 is an upper mouthpiece designed to engage all of the upper teeth of the user. Biting section 16, FIG. 2, includes four layers: layer 20, closest to the engaging teeth, is white; the next layer 22 is blue; the next layer 24 is red; and the fourth

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and outermost layer 26 is also white. White layer 26 is covered with a 50 percent halftone pattern 28 visible in FIG. 1 and the entire mouthpiece 10 is covered with a thin coating 30 of clear plastic. Walls 12 and 14, in the embodiment shown in FIG. 2, are formed continuously with the same layered construction as biting section 16, for ease of fabrication.

When a particular tooth replica 18', FIG. 3, such as replica 32, is worn away the underlying layers are exposed, FIG. 4. First the clear coating 30 is worn away exposing a portion 26' of white layer 26. Next white layer 26 is worn away exposing a portion 24' of red layer 24. Next red layer 24 will be worn away exposing a portion 22' of blue layer 22, following which blue layer 22 will be worn away exposing a portion 20' of white layer 20. The area of portions 26', 24', 22' and 20' indicates the area of bruxism occurring at tooth 32, the colors of the layers exposed indicates the depth of penetration and thus the intensity of the bruxism.

In operation one or more mouthpieces 10 are formed to fit a particular patient. The patient may then take these mouthpieces with him and put them in his mouth at predetermined times for predetermined periods so that the bruxism can be monitored throughout extended periods of times during the night or day, during weekdays or weekends without the aid of a technician and the inconvenience of electronic sensors and similar apparatus.

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Other embodiments will occur to those skilled in the art and are within the following claims:

What is claimed is:

1. A bruxism monitoring device comprising a flexible, inelastic mouthpiece for snugly engaging one of every pair of occluding teeth whereat bruxism is to be monitored, said mouthpiece having generally vertical side walls providing one or more recesses to receive one or more teeth and a thin biting plate interconnecting said side walls for disposition between upper and lower occluding teeth, said plate including a plurality of layers having mutually distinguishable colors, each layer having a color distinguishable from the colors of adjacent layers.

2. The device of claim 1 in which said mouthpiece engages teeth in the upper set of teeth.

3. The device of claim 2 in which said mouthpiece engages all of the teeth in the upper set of teeth.

4. The device of claim 1 in which said layers decrease in hardness with increase in distance from the teeth engaged by said mouthpiece.

5. The device of claim 1 in which said layers decrease in thickness with increase in distance from the teeth engaged by said mouthpiece.

6. The device of claim 1 in which the layer farthest from the teeth engaged by said mouthpiece has a pattern on its surface to facilitate area measurement.

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