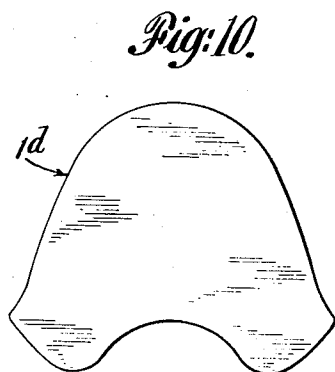
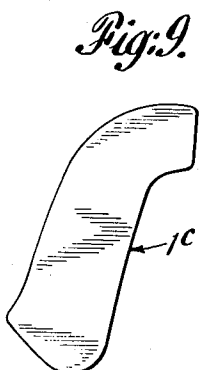
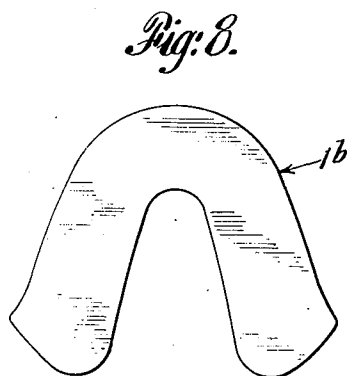
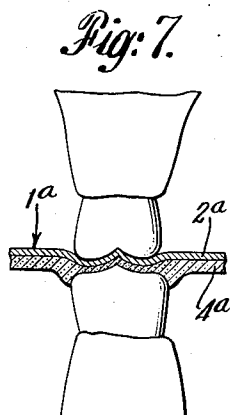
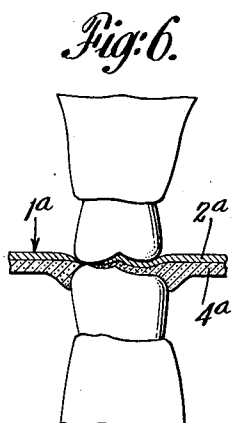
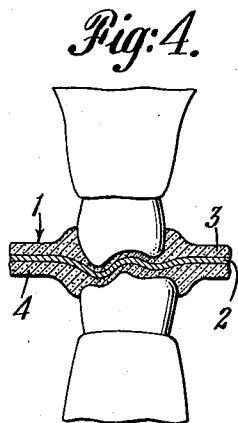
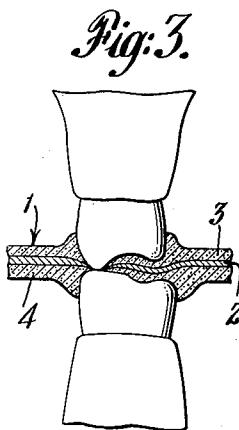
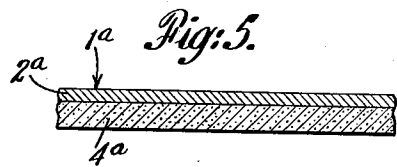
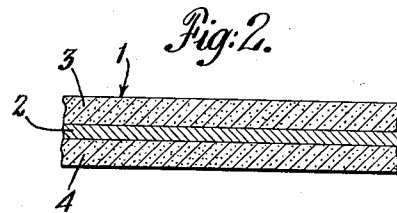
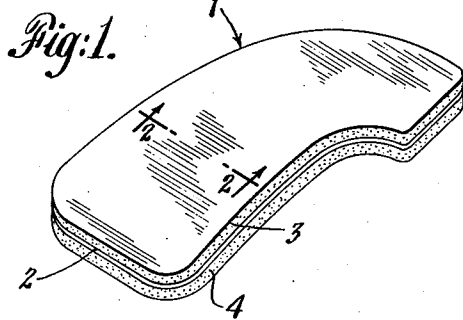


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V. O. LUCIA
HIGH SPOT MARKER
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2,633,637



INVENTOR
VICTOR O. LUCIA.
BY
H. Hume Matheson
ATTORNEY

UNITED STATES PATENT OFFICE

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HIGH SPOT MARKER

Victor O. Lucia, Teaneck, N. J., assignor to The
Dentists' Supply Company of New York, New
York, N. Y., a corporation of New York

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This invention relates generally to dental devices. More particularly, it is concerned with an improved construction for the types of devices used by dentists for marking teeth in the mouth for the purpose of grinding high spots on the teeth to bring them into occlusion.

In certain types of dental work, such as, for example, the fitting of artificial dentures, crowns, bridges and inlays in the mouth, it is necessary to locate and grind off high spots or cuspal interferences which prevent opposing teeth from occluding properly. To locate the high spots it has been the practice to employ a sheet of carbon paper, known as articulating paper. Such sheets of articulating paper are held by the dentist with his fingers or with a tool while the patient closes his mouth, biting on the carbon paper and, if necessary, moving the mandible through the usual protrusive and lateral movements employed in the mastication of food, to leave an imprint on the occlusal surfaces of the opposing teeth of any high spots on the teeth which interfere with the desired occlusal contact.

The articulating paper which has been widely used heretofore has definite disadvantages in that it will smear over all occlusal surfaces and will show prints where there is no contact between the teeth by becoming bunched when the teeth are carried through the masticatory movements.

One of the main objects of this invention is to avoid these disadvantages and to provide an articulating or high spot marker which does not smear over all surfaces of the teeth and which will mark only the true high spots on the opposing teeth.

A further object of this invention is to provide a novel marking device of the class described which is clean to handle, which is convenient to use and which can be easily attached to the upper or lower teeth and maintained in position for effective use while permitting the dentist to grind the opposing teeth without interference or interruption.

A still further object of this invention is to provide a novel dental marking device which is inexpensive to manufacture and which can be used in the correction of artificial dentures either in the mouth or in an articulator, as well as the correction of natural dentitions and partly artificial dentures in the mouth.

Other subjects of my invention will hereinafter become evident from the following description:

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This device will be more fully described with reference to the accompanying drawing, in which:

Figure 1 shows a plan view in perspective of a laminated high-spot marking wafer embodying this invention,

Figure 2 is an enlarged view of a section taken along the line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 shows an enlarged sectional appearance of the marking wafer during the biting thereof,

Figure 4 shows a view somewhat similar to Figure 3.

Figure 5 shows an enlarged sectional view similar to Figure 2, but of a modified form of my wafer.

Figures 6 and 7 are views similar to Figures 3 and 4 but embodying the modified form of my wafer as shown in Figure 5.

Figures 8, 9 and 10 show plan views of modified forms of my marking wafers.

Referring now to the accompanying drawings, wherein like reference characters denote similar elements, it will be observed from Figures 1 and 2 that a wafer 1 generally consists of a laminated sheet, comprising a carrier sheet 2 for a marking substance which is impregnated with or coated on both sides with such a substance and laminated between two sheets of a soft wax 3 and 4. The outer layers 3 and 4 can be of any desired wax or wax-like material, provided that it be non-tacky and sufficiently soft so that the layers 3 and 4 will conform readily to the object imposed on them or pressed into them by light pressure. Such soft wax layers can be compounded, for example, of a mixture of beeswax and paraffin, it may be a microcrystalline wax, paraffin wax, or a similar hydrocarbon wax. It may be a vegetable wax, or it may be one of those waxes compounded with a minor amount of miscible resin or cellulose derivative. The wax or wax compound which I utilize for these outer layers must be sufficiently hard to retain its shape and not soil the fingers when handled gently, soft enough to conform to the shape of a tooth crown when subjected to a gentle biting pressure in the mouth. These wax layers should have a thickness within the range of 0.1 mm. to 2.0 mm. and preferably 0.9 mm. to 1.5 mm.

The substance used as a marking material may be either a water-soluble dye or a pigment, which is non-toxic to humans and of a strong color. I prefer to use black or other dark color to give a maximum contrast with the white or

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yellowish white of natural and artificial teeth. I have found carbon black to be a satisfactory pigment for this purpose. The particular carrier which is chosen for the sheet 1 will depend upon which type of marking material is chosen. A sheet of a thin textile material or a thin absorbent paper sheet is suitable for use with a dye. For use with a pigment type of marking material, the carrier sheet may be, for example, a thin sheet of a textile material, paper or cellophane.

The wafers in finished form may be in the form of rectangular strips having the approximate surface area of the conventional articulating paper. Alternatively, they may assume any of the shapes 1, 1-b, 1-c and 1-d as illustrated in Figures 1, 8, 9 and 10. It is to be clearly understood that the wafers will be of dimensions such that it is suitable for use in a patient's mouth.

Figures 3 and 4 illustrate in a qualitative manner the performance of the marking wafer in accordance with this embodiment of my invention in marking high spots on a patient's molar teeth when bitten between those teeth. These figures illustrate the fashion in which the soft wax layers 3 and 4 conform to the tooth crown and allow any truly high spots on the crown to cut through the wax and come into contact with the marking substance carried by the intermediate sheet 2, while effectively shielding those portions of the occlusal surface which do not come into contact or which come into correct contact, from the marking material. As a result the high spots on the occlusal surface are accurately marked, with no confusing marking or surfaces on which grinding is not indicated. The upper molar tooth shown in Figure 3 has a high spot and it will be noted that this high spot has cut through the upper layer of wax 3 to come in contact with the marking layer 2. In contrast to this, the molar tooth illustrated in Figure 4 which has no high spots have caused the wax 3 and 4 to conform to the shape of the occlusal surfaces but have not penetrated entirely through these wax layers to reach the marking layer 2.

Figure 5 shows an enlarged section view of an embodiment of my marking wafer consisting of a marking layer and a single layer of wax. In this embodiment, the wafer 1-a comprises a carrier sheet 2-a impregnated with or coated on one side with a marking substance and laminated to the sheet 4-a of a wax or wax-like material. When a coated carrier sheet 2-a is utilized the coated side of the sheet is placed next to the sheet 4-a of the wax or wax-like material.

Figures 6 and 7 illustrate, in a somewhat enlarged view, the action of this alternative embodiment of my marking device when bitten by the patient. In Figure 6 it will be noted that the lower molar tooth carries a high spot which penetrates through the wax or wax-like material to come into contact with the marking, 2-a. In the event that this marking sheet carries a marking substance coated on this surface adjacent to wax or wax-like layer 4-a the upper teeth will not be marked; alternatively, if the marking layer 2-a is impregnated with a dye the entire occlusal surfaces of the upper teeth will be marked, but this is immaterial since in using this type of marker the dentist would be concerned with only the lower or the upper teeth as the case might be at any one time. Figure 7 illustrates the performance of this alternative form of my marking wafer when bitten between teeth

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which carry no high spots. It will be noted in this figure that the lower molar tooth has not penetrated entirely through the wax or wax-like sheet 4-a and is not in contact with the marking sheet 2-a and its associated marking substance.

To fabricate a wafer, of the type illustrated in Figures 1, 2, 3 and 4, utilizing a dye, a thin absorbent sheet is impregnated with a solution of the dye in a suitable solvent and the solvent allowed to evaporate to produce a marking layer. Alternately, a sheet is coated on both sides with a pigment suspended in a suitable film-forming vehicle, for example, a molten wax or a solution of wax in a suitable solvent. The marking sheet is then laminated between two sheets of wax or a wax-like material by the application of heat and pressure. The heat and pressure may be applied by pressing the laminate between heated platens of a press or by means of hot rolls.

To fabricate a wafer of the alternative type illustrated by Figures 5, 6 and 7 utilizing a dye, a thin absorbent sheet is impregnated with a solution of dye in a suitable solvent and the solvent allowed to evaporate to produce a marking layer. This marking sheet is then laminated to a sheet of wax or a wax-like material by the application of heat and pressure. Alternatively, a sheet is coated on one side with a pigment suspended in a suitable film forming vehicle, for example, a molten wax or a solution of wax in a suitable solvent. The coated side of this sheet is then placed in contact with a sheet of wax or wax-like material and the two sheets laminated by the application of heat and pressure. When utilizing either of these two types of marking sheets the heat and pressure may be applied by pressing the laminate between heated platens of a press or by passage between hot rolls.

In the fabrication of either of the types of high spot markers utilizing two or three layers, respectively, the temperature of the hot platens or rolls as the case may be should be high enough to cause lamination but not sufficiently high to melt the wax or wax-like material. Similarly, the pressure applied should be sufficient by the temperature employed to cause lamination, but insufficient to create any noticeable flow of the wax or wax-like material.

While I have indicated and described several types of marking wafer construction for carrying my invention into effect, it will be apparent to those skilled in the dental art that my invention is by no means limited to the particular wafers shown and described, but that many modifications may be made without departing from the scope of my invention as set forth in the appended claims.

What I claim and desire to protect by Letters Patent are:

1. A laminated dental marking wafer of a size and shape adapted to fit into the mouth, comprising a relatively thin sheet carrying a dark colored marking substance substantially throughout its entire area and laminated between two relatively thick layers of a soft readily moldable wax, at least one of said wax layers having a thickness within the range from 0.9 mm. to 1.5 mm.

2. A laminated dental marking wafer of a size and shape adapted to fit into the mouth, comprising a relatively thin sheet carrying a dark colored pigment substantially throughout its entire area, laminated between two relatively thick layers of a soft wax, said wax being sufficiently hard to retain its shape when handled at room temperature and sufficiently soft to con-

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form to the shape of a tooth crown when subjected to biting pressure in the mouth.

3. A laminated dental marking wafer of a size and shape adapted to fit into the mouth, comprising a relatively thin sheet carrying carbon black pigment substantially entirely throughout its entire area and laminated between two relatively thick layers of a soft readily moldable wax, capable of being deformed under biting pressure without rupture by properly occluding posterior tooth surfaces and of being pierced under said biting pressure by a posterior tooth high spot.

VICTOR O. LUCIA.

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