United States Patent

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[54] **ANATOMY RELATING DEVICE FOR DENTISTS**
10 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **32/17**
[51] **Int. Cl.** **A61c 9/00**
[50] **Field of Search** 32/17, 18, 19, 20, 21

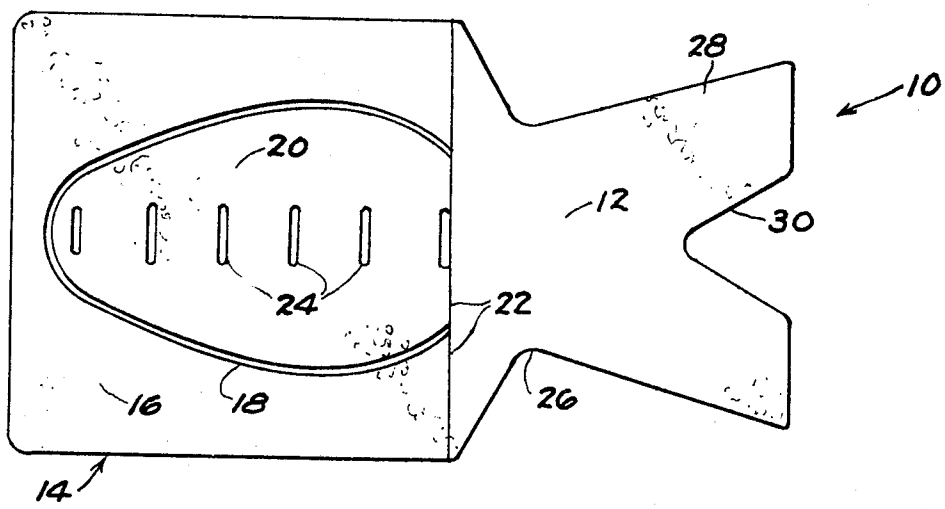
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ABSTRACT: A flat sheet of expanded polystyrene is creased to provide a hinge between an insert to be placed between a patient's maxillary and mandibular teeth and a two-part flap, the outer part being swung upwardly before the patient's face so that his interpupillary line and midsagital plane can be marked thereon. With the sheet flattened, the midsagital plane location is also marked on the inner flap. The insert takes a permanent impression of the patient's cusps when the patient bites thereon. When the insert is transferred to a laboratory model, the flaps are turned upwardly to facilitate transferring the information marked thereon directly to the model.



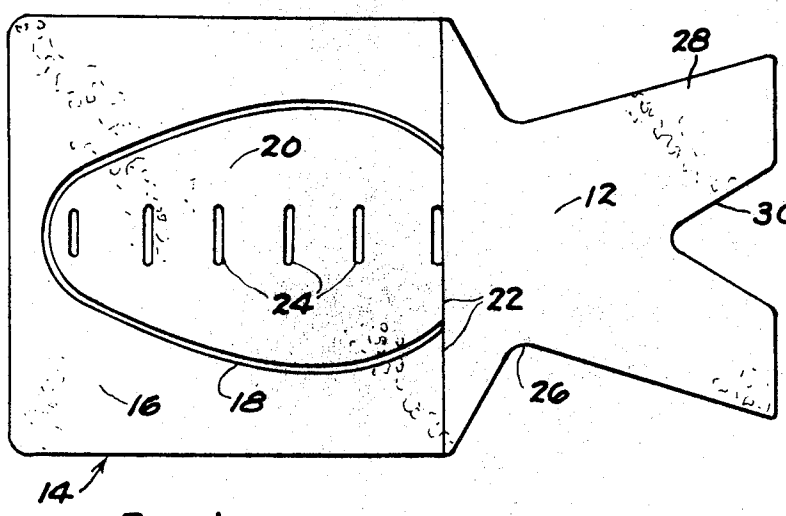


FIG. 1

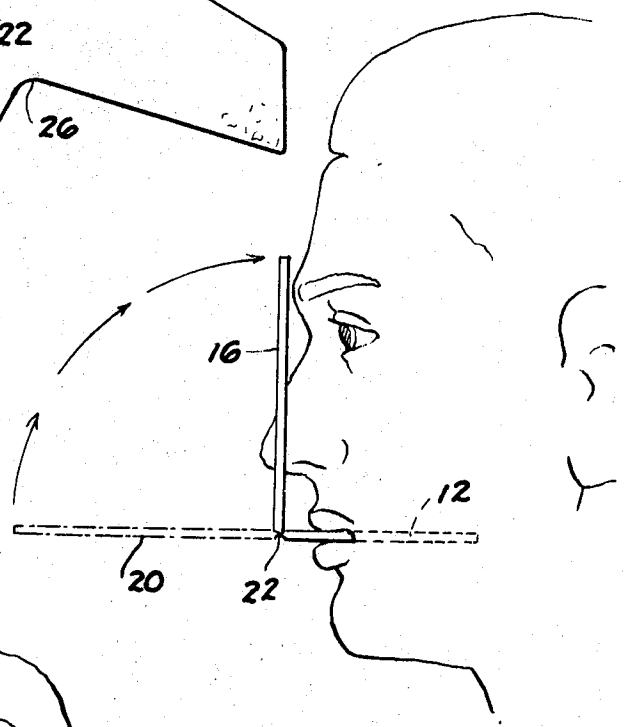


FIG. 2

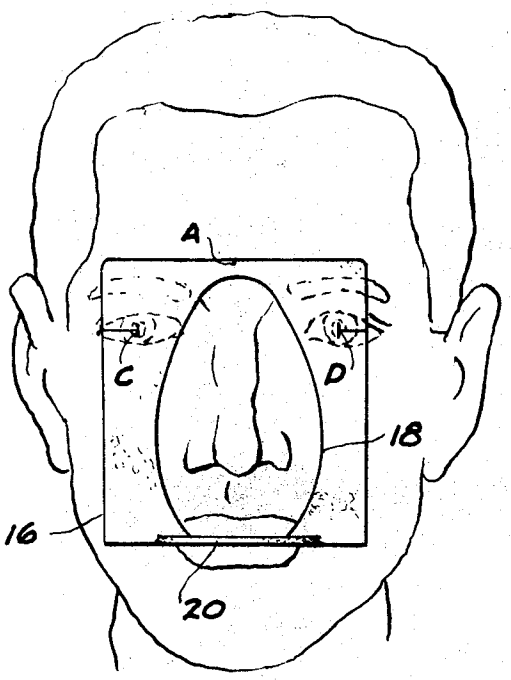


FIG. 3

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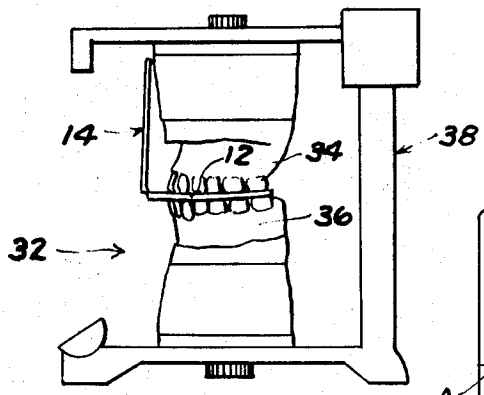
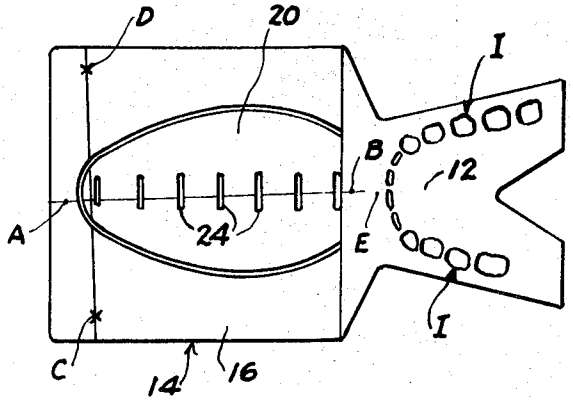


FIG. 5

FIG. 4



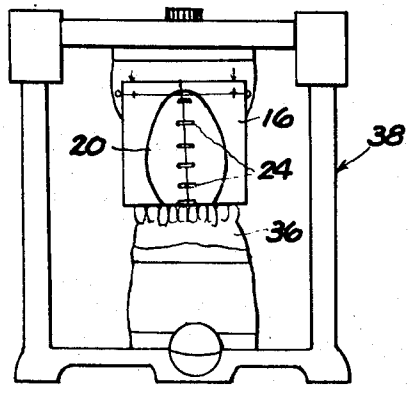


FIG. 6

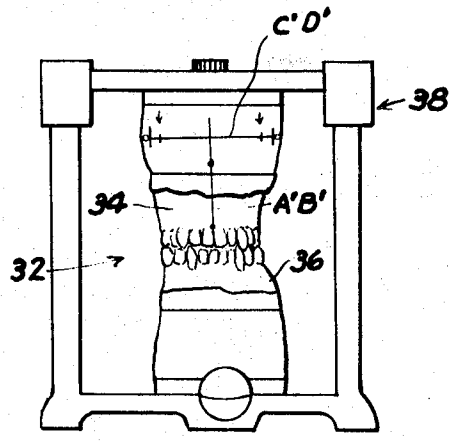


FIG. 7

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ANATOMY RELATING DEVICE FOR DENTISTS

This invention relates to a device which enables a dentist to furnish to a dental laboratory technician information regarding a patient's facial or anatomical features which may be significant in the proper formation of a dental prosthesis.

Conventionally, much of this information is furnished by the dentist to the laboratory technician in the form of maxillary and mandibular arch impressions or models, previous study models, and descriptive matter relating, for example, to the shade, form, and characterization of individual teeth. In some instances, the information also includes a hinge axis and/or face bow transfer and preoperative and postoperative films.

Previously, there has been no satisfactory means for relating the dental features and configurations provided by such information to a patient's extra-oral facial or anatomical features of significance such as lip line, midsagital plane, and interpupillary line. Prior devices designed for this purpose have been unwieldy, complex, inaccurate, or for other reasons not practicable. Consequently, prior to this invention, it has usually been necessary for the laboratory technician to personally examine the patient to obtain such information.

The object of this invention is to provide a very simple, very inexpensive device which will enable a dentist to record quickly and accurately the relationship between a patient's extra-oral facial features and the patient's interarch cusp-tip relationship, and which will enable a dental laboratory technician to transfer such information to models of the patient's dental arches quickly, easily, and accurately.

In general, the invention contemplates the use of an insert which will take a permanent impression of a patient's maxillary and mandibular cusps when he bites down on the insert. The device includes a two-part flap on the insert, an outer part of the flap being turnable upwardly before the patient's face while he bites on the insert so that the location of his interpupillary line and midsagital plane can be marked thereon. When the insert is removed from the patient's mouth, the two parts of the flap are flattened; and the midsagital plane information is marked on the inner flap.

The device is then simply given to the laboratory technician, who places the insert between the models of the patient's maxillary and mandibular arches so that the model teeth register with the indentations in the insert. The flaps are turned up in front of the model and the technician marks the model in accordance with the markings on the flaps. One form of the invention is shown in the accompanying drawings.

FIG. 1 is a top plan view of a device constructed according to the present invention.

FIG. 2 is a side elevational view showing an initial step in use of the device.

FIG. 3 is a front elevational view illustrating use of the device in the initial step.

FIG. 4 is a top plan view illustrating the device with dental impressions and markings thereon after a subsequent step in its use.

FIG. 5 is a partly diagrammatic side elevational view illustrating a subsequent step in use of the device by a dental laboratory technician.

FIG. 6 is a front elevation of the view of FIG. 5.

FIG. 7 is a view similar to FIG. 6 but with the relating device removed and showing the information transferred to the model.

For the sake of convenience, the terms "upper" and "lower" will be used in the following description and in the claims in lieu of "maxiallary" and "mandibular" respectively.

Shown in FIG. 1 is a device 10 according to the present invention. The illustrated device comprises a flat sheet of a material which, in general, is in solid condition and is form retaining but which, when subjected to pressure such as by a relatively sharp tool or a person's teeth, will take a permanent impression or indentation. A suitable material is expanded polystyrene.

The sheet has an insert portion 12 configurated to be inserted into a person's mouth between his upper and lower

teeth and has a flap portion 14. The material forming the flap portion is severed or otherwise separated to form an outer flap 16 with an opening 18 therein and an inner flap 20 disposed within opening 18. Both flaps are integrally connected with insert 12.

The material forming the device is creased along a line 22 which extends across the bases of flaps 16 and 20. Crease 22 forms a hinge which facilitates swinging one or both of the flaps between one position in generally planar extension of insert 12 (as shown in FIG. 1) and another position generally at right angles thereto. Flap 20 is provided along its length with a series of slotlike openings 24 for a purpose to be described.

Insert 12 has a double tapered shape to provide a narrow region 26 which fits within a person's lips and a wider tail portion 28 which fits between a person's upper and lower molars. Tail portion 28 is cut out at 30 to provide room for a person's tongue.

Where sheet 10 is made of expanded polystyrene, the edge portions thereof are preferably heat sealed to protect the edge portions from damage. Typically, sheet 10 is of the order of about one-eighth inch thick.

In use, a dentist places insert 12 into a patient's mouth with tail portion 28 disposed between the patient's upper and lower molars and with his lips closed around narrow portion 26. He instructs the patient to bite down on the insert. The resulting pressure of teeth on insert 12 permanently indents the insert with an impression of the patient's upper and lower cusp tips.

While the patient maintains his bite on insert 12, the dentist swings outer flap 16 upwardly around hinge line 22 before the patient's face (FIG. 2) leaving inner flap 20 in its downward position. Opening 18 in the outer flap provides clearance through which the patient's nose may project so that the outer flap can be positioned closely adjacent the patient's face (FIGS. 2 and 3).

The dentist now marks the top central portion of flap 16 and the extreme forward central portion of insert 12 which projects from the patient's mouth to indicate the location of the patient's midsagital plane. In some cases, the dentist, prior to using device 10, may have drawn a line down the center of the patient's face to indicate the midsagital plane; and if this procedure is followed, he will mark flap 16 and insert 12 at the locations where they intersect this line.

These two marks are illustrated at A (FIGS. 3 and 4) and B (FIG. 4). The marking can be done, for example, with a sharp tool or a pencil, pen, or the like. The dentist also similarly marks the forwardly disposed face of flap 16 to show the location of the patient's pupils, as at C and D.

If desired, the patient's upper lip may be lifted and the top of insert 12 marked at E to show the location of the patient's incisal midline.

The dentist then removes insert 12 from the patient's mouth and swings flap 16 downwardly so that it, insert 12, and flap 20 are in flattened condition. Next, the dentist draws line A–B along the length of flap 16 and inner flap 20. This line shows the location of the patient's midsagital plane and is intersected by openings 24 in the inner flap. The dentist also draws line C–D across outer flap 16 to show the location and angular disposition of the patient's interpupillary line.

Device 10 is then forwarded to a dental laboratory technician who prepares or has prepared a stone or other model 32 of the patient's upper and lower dental arches 34, 36 which are then mounted in an articulator generally indicated at 38. The technician places insert 12 between the upper and lower arches in such a manner that the teeth of the model register or fit within the patient's dental impressions I therein. The technician swings flaps 16 and 20 upwardly around hinge line 22 to a location in front of the stone model as shown in FIGS. 5 and 6.

Utilizing marks C and D on flap 16, the technician is able to mark the model in such a way as to show the location of the patient's pupils and orientation of the patient's interpupillarly line with respect to the patient's dental arches. In FIGS. 6 and 7, the model is illustrated as having been marked with small

arrows and small dots adjacent the upper portion of flap **16** for this purpose. The location and angular disposition of the patient's midsagital plane is marked on the model by inserting a marking instrument through two spaced-apart openings **24** in flap **20** at the points where line A–B intersects these two openings.

Insert **12** is then removed from between arches **34**, **36** and lines A'–B' and C'–D' may then be drawn on the model to show respectively the location and angular disposition of the patient's midsagital plane and interpupillarly line.

Thus, the invention makes it possible to perform quickly, conveniently, and accurately the successive steps of recording the patient's anatomical features, forwarding the recorded information to the laboratory, and applying the information to the stone model. Moreover, device **10** is very inexpensive, the cost being of the order of about three cents each. Thus, a device **10** could be disposed of after being used. However, once the device has been used, it contains a permanent record of the patient's interarch cusp-tip relationship with respect to his extra-oral features; and since typically the device has an overall dimension of about 5½ inches by 3 inches and is only about one-eighth inch thick, it could be conveniently kept on file by a dentist or laboratory.

I claim:

1. An anatomy-relating device which comprises,

means forming an insert adapted to be inserted between a person's upper and lower teeth,

said insert being made of a material which is generally form-retaining but which will take a substantially permanent indentation responsive to biting pressure thereon, whereby to provide a substantially permanent record of a person's interarch cusp-tip relationship,

means forming a flap secured to said insert so that it can be swung between a position in extension of said insert and an upward position before a person's face while the insert is so inserted,

said flap being dimensioned to extend upwardly beyond a person's interpupillary line and to extend laterally at least to a location adjacent a person's pupils,

said insert and flap having surface portions adapted to be marked with indicia of the location of a person's midsagital plane and interpupillary line, said flap having an open central portion through which a person's nose may project with said flap in said upward position.

2. The device defined in claim **1** wherein said insert and flap are integrally formed of said material, said material being creased to form a hinged connection between said flap and insert.

3. The device defined in claim **1** and including in addition a second flap also secured to said insert so that it can be swung between a position in extension of said insert and an upward position,

said second flap being disposed within said open portion when said two flaps are in corresponding ones of said positions,

said second flap having surface portions adapted to be marked with indicia of the location of a person's midsagital plane and having open portions which intersect said surface portions thereof to facilitate transferring the latter-said indicia to a model of a person's dental arches.

4. The device defined in claim **3** wherein said insert and flaps are integrally formed of said material, said material being creased to form a hinged connection between said insert and each of said flaps.

5. The device defined in claim **4** wherein said hinged connections between said two flaps and said insert are substantially in mutual linear extension of each other.

6. The device defined in claim **3** wherein said open portions of said second flap comprise a series of openings arrayed along the length of said second flap.

7. The device defined in claim **5** wherein a portion of said material is severed to form said two flaps.

8. The device defined in claim **2** wherein said material comprises a flat sheet of expanded polystyrene.

9. The device defined in claim **7** wherein said material comprises a flat sheet of expanded polystyrene and the edge portions thereof are heat sealed to strengthen the same.

10. An anatomy-relating device which comprises,

means forming an insert dimensioned and configured to be inserted into a person's mouth and to be disposed between a person's upper and lower teeth,

said insert being formed of a material which is generally form-retaining but which will take a substantially permanent indentation responsive to biting pressure thereon, whereby to provide a substantially permanent record of a person's interarch cusp-tip relationship,

said material having a thickness of the order of about one-eighth inch and being indentable top and bottom responsive to said biting pressure to a depth adequate for fitting therein of the upper and lower cusp tips of a dental arch model,

means forming a flap secured to said insert so that it can be swung between a position in extension of said insert and an upward position before a person's face while the insert is so inserted,

said flap being dimensioned to extend upwardly beyond a person's interpupillary line and to extend laterally at least to a location adjacent a person's pupils,

said insert and flap having surface portions adapted to be marked with indicia of the location of a person's midsagital plane and interpupillary line.