United States Patent

Hernandez

[15] **3,693,260**

[45] **Sept. 26, 1972**

[54] **MULTIPURPOSE ADJUSTABLE OCCLUSAL FORK**

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[22] Filed: **May 22, 1970**

[21] Appl. No.: **39,765**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 712,215, March 11, 1968, abandoned.

[52] **U.S. Cl.** **32/32,** 32/20
[51] **Int. Cl.** **A61c 11/00**
[58] **Field of Search** 32/19, 20, 32

[56] **References Cited**

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[57] **ABSTRACT**

A horizontal bite plate support combined with a dental articulator which has a calibrated vertical post member and which has a connection to support a face bow in a position to establish the location of a patient's transverse mandible hinge axis. The bite plate support has a calibrated elongated handle portion with a slide member on the handle portion slidably receiving and being clampingly engageable with the handle portion and also slidably receiving the vertical post member and being clampingly engageable therewith. The horizontal bite plate support has an inner plate member recessed to interlock with a smooth bite plate, whereby the bite plate can be positively supported in a horizontal position corresponding to the location of a patient's occlusal area relative to his transverse mandible hinge axis.

9 Claims, 7 Drawing Figures

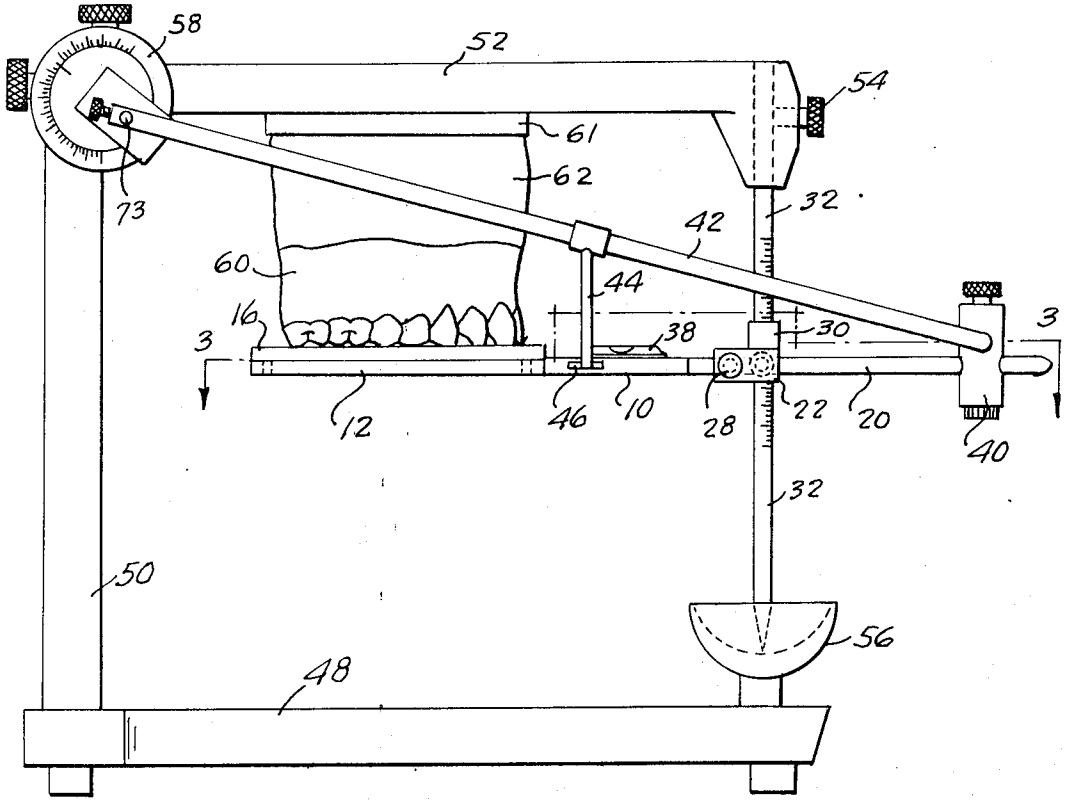

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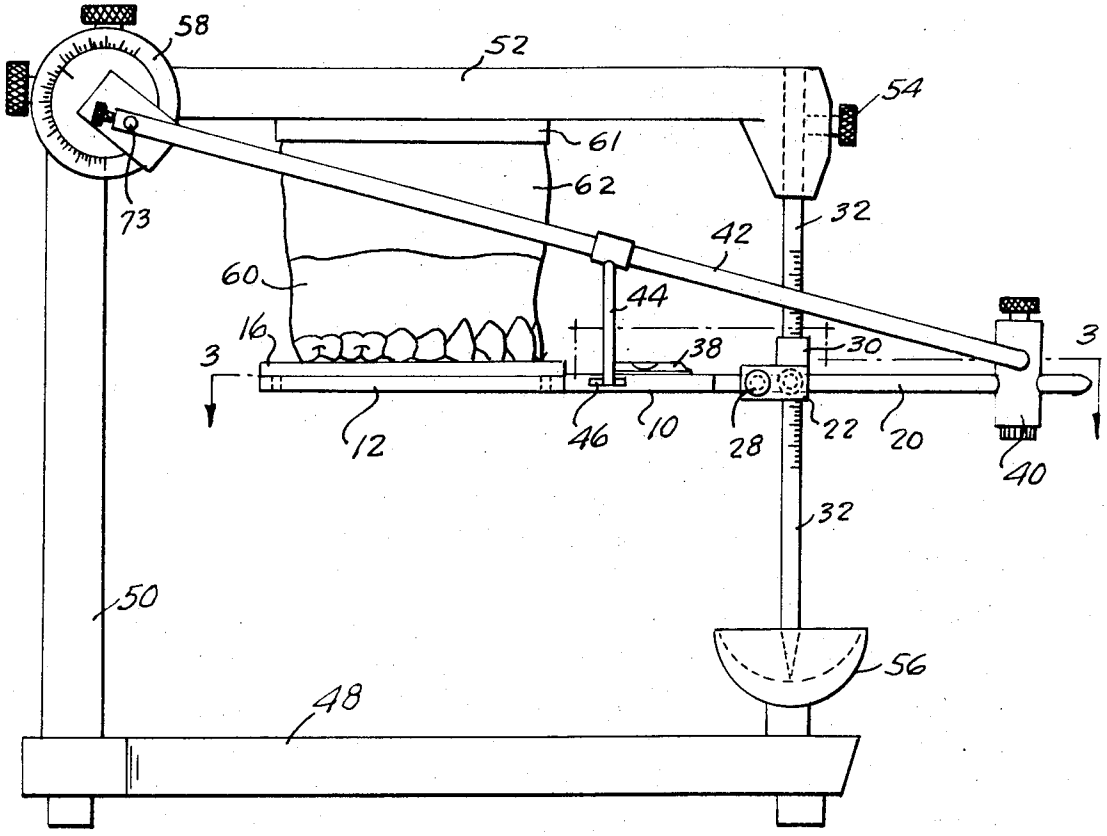
FIG. 1.



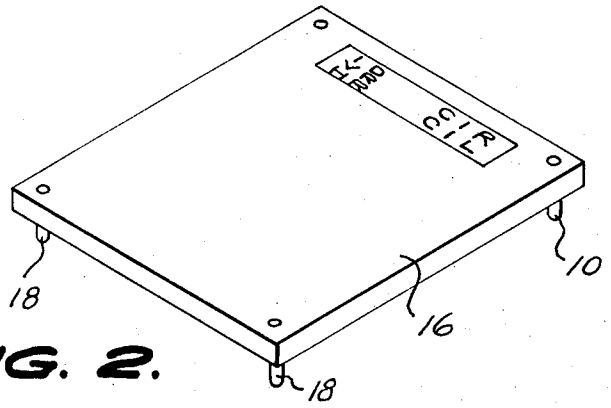


FIG. 2.

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FIG. 3.

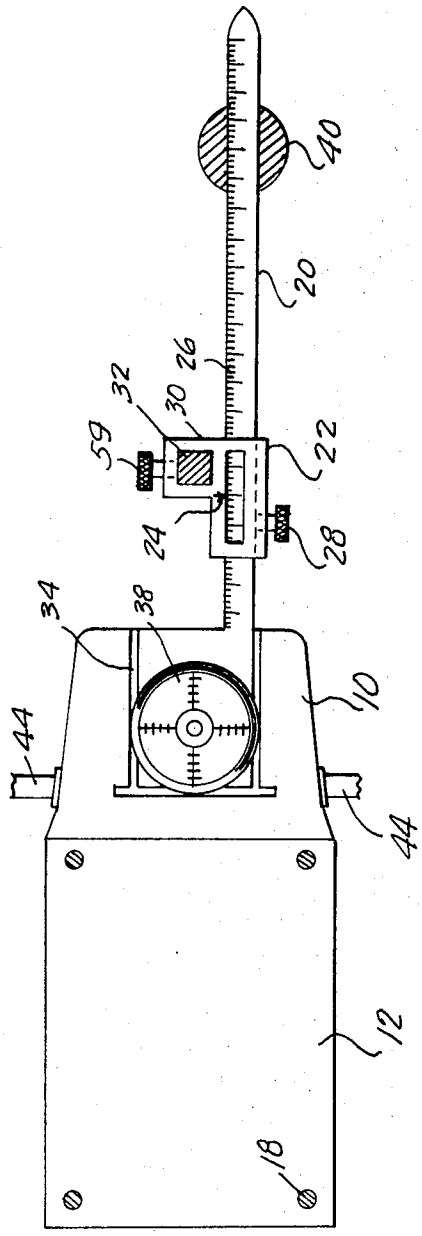

FIG. 4.

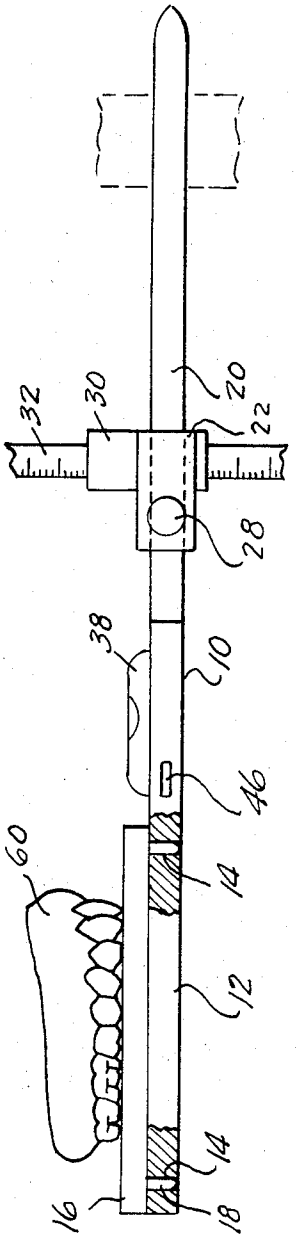

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FIG. 5.

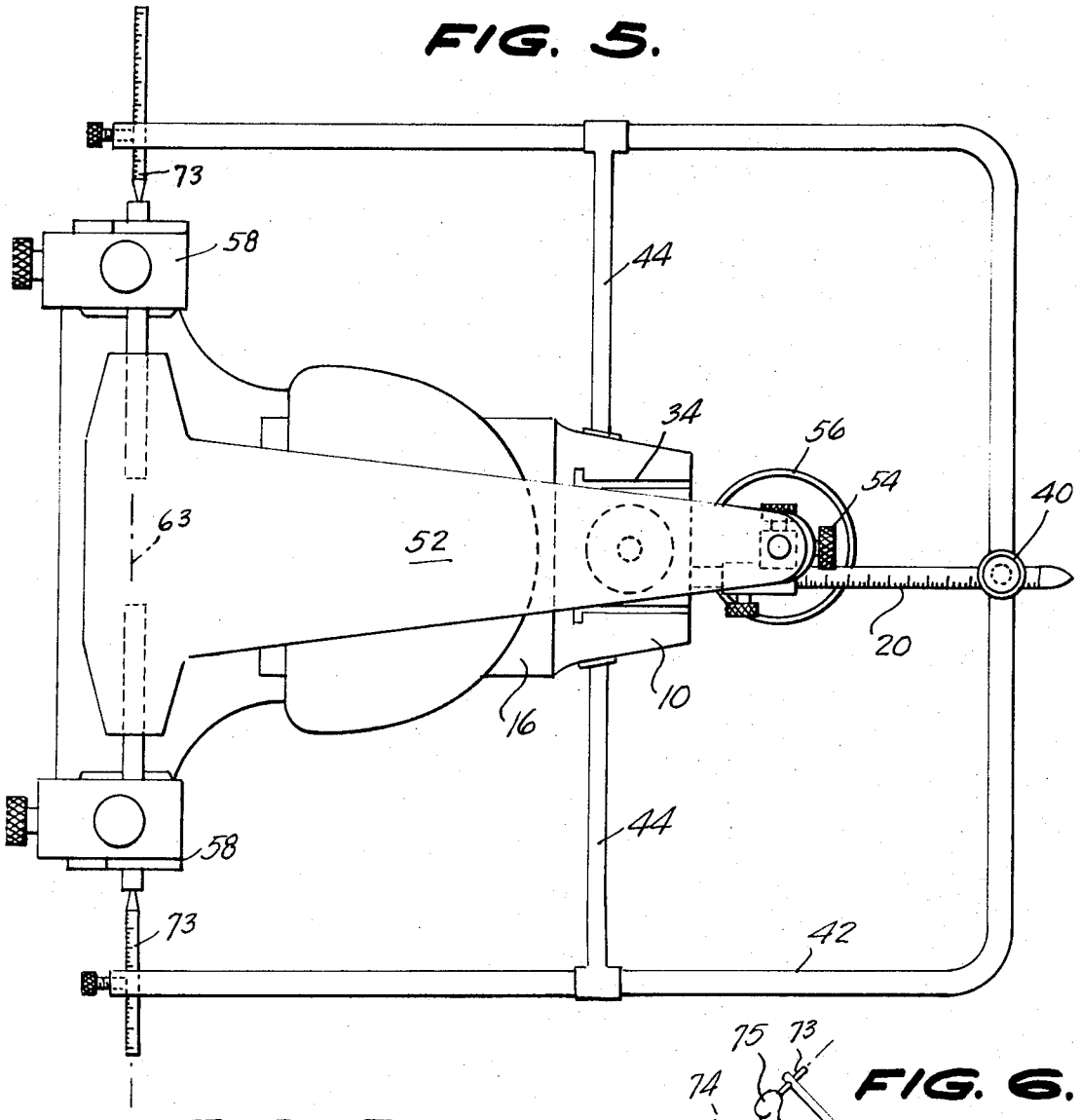


FIG. 7.

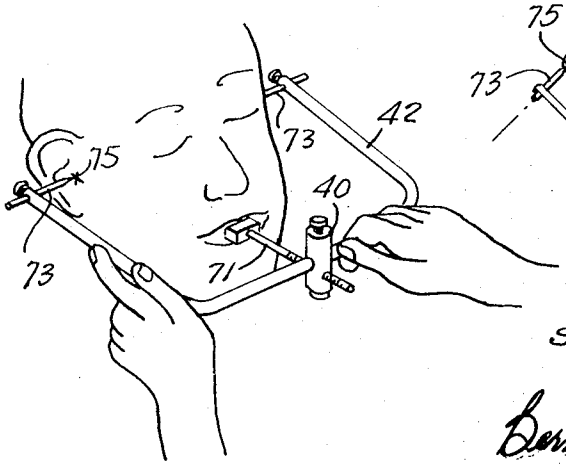
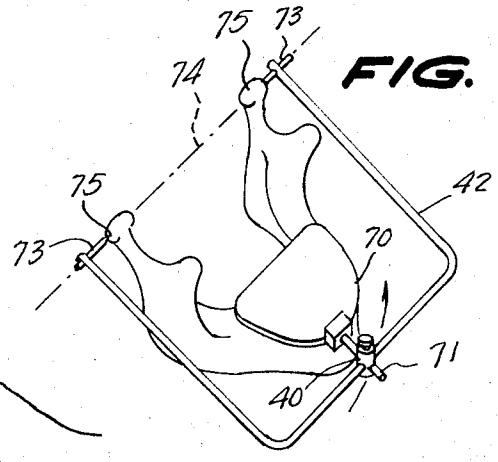


FIG. 6.



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MULTIPURPOSE ADJUSTABLE OCCLUSAL FORK

This is a continuation-in-part of applicant's previously filed application Ser. No. 712,215 titled "Multipurpose Adjustable occlusal fork," filed Mar. 11, 1968 and now abandoned.

This invention relates to devices for making artificial dentures and more particularly to a device employed in conjunction with a dental articulator for supporting a bite plate.

A main object of the invention is to provide a novel and improved adjustable occlusal fork device in which a bite pallet plate selected in size and shape for an individual patient may be set, regardless of its size and shape, in fixed relationship to an occlusal fork to establish a plane based on the cusps of the teeth in which said plane is related to true horizontal. The bite plate being removable, may have inscribed thereon appropriate instrument readings so that the bite plate with the data can be transferred, for example, to a dental laboratory and there placed in an articulator in precisely the relationship that it had when the bite was taken in the patient's mouth. Because the individual bite plate is of low bulk and weight, it is economically advantageous to use a separate bite plate for each patient, thereby providing a permanent record of the bite on the date on which it was taken.

A further object of the invention is to provide an improved occlusal fork device having a graduated handle coacting with a slide for horizontal readings, the slide also having means cooperable with a graduated vertical post member for making vertical readings.

A further object of the invention is to provide a novel and improved occlusal fork attachment for use with a dental articulator of the type provided with a calibrated vertical post member and provided with means to support a face bow in a position corresponding to the position of a patient's transverse mandible hinge axis, the attachment providing improved means for supporting a bite plate in a horizontal position corresponding to the location of a patient's occlusal area relative to his transverse mandible hinge axis, the attachment involving relatively simple parts, being easy to install, and enabling a bite plate to be accurately supported in its desired position.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

FIG. 1 is a side elevational view of an improved occlusal fork attachment according to the present invention operatively mounted in a dental articulator.

FIG. 2 is a perspective view of a typical bite plate adapted to be supported on the attachment employed in FIG. 1.

FIG. 3 is a somewhat enlarged horizontal cross-sectional view taken substantially on line 3—3 of FIG. 1 and showing the improved attachment according to the present invention in top plan view.

FIG. 4 is a front elevational view, partly in vertical cross-section, of the attachment shown in FIG. 3.

FIG. 5 is a top plan view of the combination of elements shown in FIG. 1.

FIGS. 6 and 7 are diagrams for illustrating how the hinge axis of a patient's mandible is located by using a face bow subsequently to be employed with a dental articulator and attachment according to the present invention.

Referring to the drawings, the occlusal fork attachment comprises a frame member **10** having projecting therefrom a bite portion **12** which bite portion has apertures **14** at each of its corners. An individual bite plate **16** has projecting legs **18** sized and spaced to enter the apertures **14** so that regardless of the size of the bite plate **16** it will always occupy a fixed position relative to the bite portion **12** and the frame **10**.

The frame **10** has a horizontal handle **20** projecting therefrom and a slide **22** is movable on the handle to various horizontal positions. The slide **22** has a vernier **24** to coact with graduations **26** on the handle **20**. The graduations on the handle **20** read in millimeters, while the vernier narrows this down to units of one-tenth millimeter. Once the particular setting is arrived at, the slide **22** is locked on the handle **20** by means of a set screw **28**. The handle **20** may be of any desired cross-sectional form.

Forming a part of the slide **22** is a frame **30** which is adapted to receive a vertical post **32** associated with a conventional articulator, as best seen in FIG. **1**. The post **32** is similarly graduated into millimeters and the frame **30** carries a vernier which gives vertical readings in tenths of a millimeter. The frame **30** is locked to the post **32** by means of a set screw **59**.

The frame **10** has its upper surface grooved at **34** to receive a conventional bubble type of calibrated level indicator **38**.

A clamping member **40** is adapted to receive both handle **20** and the bight portion of a face bow **42**. The face bow **42** is also supportable by inclined bar members **44** suitably secured thereto which slidably bear in longitudinal grooves **46** on opposite sides of the frame **10**.

An occlusal plane is established in the patient's mouth by establishing the position of the bite portion **12** for the removable bite plate **16** over the cusp tip of the teeth (natural or artificial) or their substitute, say, an occlusion rim. The face bow **42** is employed to establish the location of the transverse hinge axis of a patient's jaw.

In establishing the location of a patient's transverse hinge axis, a clutch tray assembly **70**, as shown in FIG. **6**, is employed, the assembly having a protruding calibrated handle **71**. The condyle areas are digitally located and temporarily marked on the patient. The face bow **42** is brought gently over the face and the protruding handle portion **71** of the tray assembly **70** is clamped to the bight portion of the face bow, employing a double clamp member **40**, as shown in FIG. **7**. The scaled hinge axis indicators **73,73** are brought into close proximity to the patient's skin, as shown in FIG. **7**. The patient is instructed to open and close within a limited range. The hinge axis indicators **73** will move in arcs when they are not in line with the exact hinge axis **74**. When the handle portion **71** is adjusted in the clamp member **40** so that the axis indicators **73** are observed to rotate at fixed points on the face, these points, shown at **75** on the opposite sides of the face are considered as establishing the location of the kinematical axis. A marking medium is applied to the points of the indicators **73** so that they mark the hinge axis points on the skin. Permanent marks may be obtained by tattooing.

After location of the point **75** on the patient's skin, the assembly **70**, accompanied by the face bow are

removed from the patient. An occlusal plane is established in the patient's mouth by positioning the bite portion **12** with a bite plate **16** over the cusp tip of the maxillary teeth (natural or artificial) or their substitute, say, an occlusion rim. While the occlusal fork is in the patient's mouth, the face bow **42** is clamped to the projecting handle **20** by the clamping member **40** with the calibrated face bow indicators **73** repositioned to the hinge axis points previously marked on the skin of the patient. The distance between the patient's right and left condyles, recorded with the scaled hinge axis indicators **73**, and the relation of the maxillary teeth to the mandibular hinge axis using the adjustable occlusal fork attachment (attached to the face bow) are readings which may be recorded on the bite plate **16**, and which may be transferred to an adjustable articulator to be employed subsequently, illustrated in FIG. **1**.

It will thus be seen that by the above-described procedure, data may be obtained to establish the location of the transverse hinge axis. The distance between the right and left condyle of the patient's mandible is measured through the usual hinge axis indicators. These data with the occlusal plane established with the occlusal fork and the bite plate comprise a face bow record.

The substitute for the natural teeth (artificial teeth, casts, occlusion rim, etc.) with its occlusal plane as established in the patient's mouth, is secured in bite position to the occlusal fork by suitable adhesive.

The face bow record is transferred to a conventional articulator with the same relations obtained from the patient's mouth.

The conventional articulator has a base member **48** and a pair of condylar posts **50**. The horizontal arm **52** extends outwardly from between the condylar posts and clamps at its forward end by means of a screw **54**, the calibrated vertical post **32**, which is centered in an incisal guidance member **56**.

Once a cast has been made of the teeth to be employed with the bite plate **16** and secured in bite position by suitable adhesive, the members **20**, **32**, and **42** are secured to the articulator through the attachment screws **28**, **59**, **54** and the clamping member **40**. The condylar posts **50** are moved in order to bring the condylar hinge indicator **58** in opposition to the face bow indicators **73**. The condylar hinge indicator **58** which is shown in FIG. **5**, has a hinge axis **63** coincident with that of the hinge axis indicators **73** of the face bow **42**. A record is then made of the distance between the condylar posts **50**, the readings of the vertical scale on post **32** and the horizontal scale on the handle **20** and of the condylar and incisal information. This indicia is marked, as shown on FIG. **2**, on the plate **16** which then can be shipped to a dental laboratory and by placing it on an identical frame **10** and by support **12** is brought into exactly the original relationship, at which time the teeth may be secured to the member **52**.

The occlusal fork and face bow **42** facilitate the mounting into the articulator by holding the cast **60** temporarily until a remount ring **61** or similar device attaches the cast permanently to the upper member **52** of the articulator by means of dental stone or plaster **62**.

Each of the plates **16** provides an individual record of an individual patient's mouth and can be checked against future readings to determine whether the mouth and bite have undergone any changes such as to require alteration of the dentures or natural teeth in orthodontic situations.

The establishment of the occlusal plane horizontally in space is important since this provides a positive basic datum for reconstituting the original conditions in an articulator simply from the data recorded on the bite plate. In this connection, the planar condition of the bite plate contributes to making a highly reproducible record of the measurements by which the bite plate and its associated dentures may properly be positioned and reconstituted in another articulator.

No doubt, various changes in details of construction will occur to anyone skilled in the art. For this reason, it is not intended to limit this invention to the precise details disclosed but only as set forth in the subjoined claims.

What is claimed is:

1. In combination with a dental articulator of the type including a face bow and provided with means to support the face bow in a position to establish the location of a patient's transverse mandible hinge axis with the face bow inclined downwardly from said axis and with a depending outwardly located vertical post member, a horizontal bite plate support having a calibrated elongated handle portion, a slide member on said handle portion slidably receiving said handle portion, means to clamp said slide member relative to said handle portion, means on said slide member to slidably receive said vertical post member, means to clamp said slide member relative to said vertical post member, means spaced outwardly a substantial distance from said slide member to clampingly connect said handle portion to said face bow, said horizontal bite plate support having an inner plate member formed with a plurality of bite plate positioning apertures and a removable smooth imperforate bite plate provided with depending legs engageable in said positioning apertures, whereby said bite plate can be positively supported in an adjusted horizontal position corresponding to the location of a patient's occlusal area relative to his transverse mandible hinge axis, and brace means extending downwardly and inwardly from the sides of said face bow and slidably engaging said handle portion.

2. The structural combination of claim **1**, wherein the means to clampingly connect the handle portion to the face bow comprises a body slidably receiving the handle portion diametrically therethrough and slidably receiving the bight portion of the face bow diametrically therethrough at right angles to said handle portion, and clamping means to rigidly lock said body relative to both the handle portion and said face bow bight portion.

3. The structural combination of claim **1**, and wherein said brace means comprises downwardly and inwardly inclined bars secured to the sides of the face bow.

4. The structural combination of claim **3**, and wherein the opposite sides of the handle portion are formed with longitudinal bearing grooves slidably receiving the lower ends of said inclined bars.

5. The structural combination of claim **4**, and a bubble level mounted on said handle portion adjacent said inner plate member.

6. The structural combination of claim 5, and wherein said bite plate is substantially rectangular and said depending legs are located adjacent the respective corners of said bite plate.

7. The structural combination of claim 6, and wherein said handle portion is provided with graduations, and said slide member is provided with a vernier coacting with said graduations.

8. The structural combination of claim 7, and wherein said means to clamp said slide member relative to said handle portion comprises a set screw provided on the slide member and being lockingly engageable with said handle portion.

9. The structural combination of claim 8, and wherein the means to clamp the slide member relative to said vertical post member comprises an additional set screw provided on the slide member and being lockingly engageable with said vertical post member.

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