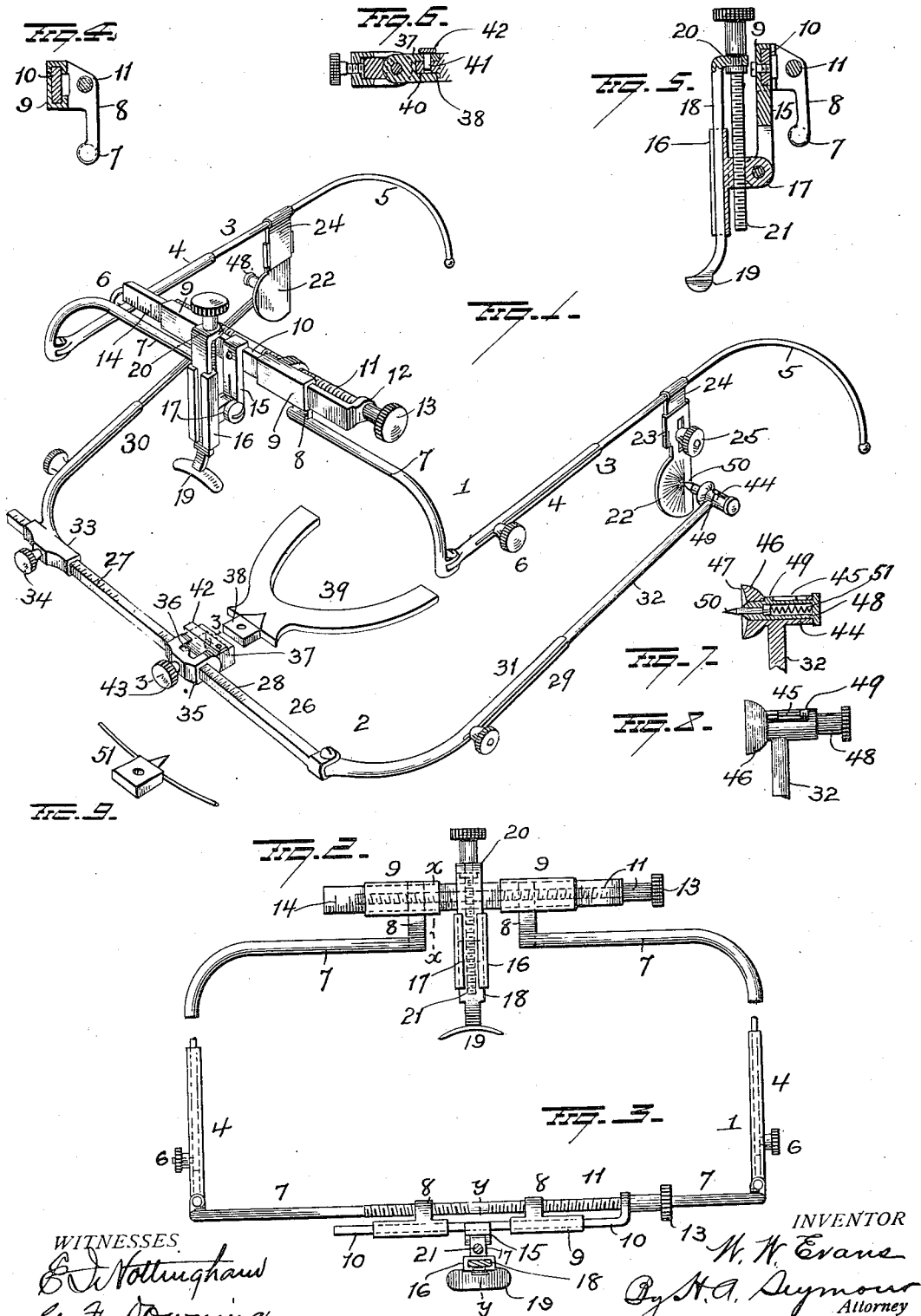


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DENTAL INSTRUMENT.
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DENTAL INSTRUMENT.

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To all whom it may concern:

Be it known that I, WILLIAM W. EVANS, of Hamilton, in the county of Loudoun and State of Virginia, have invented certain new and useful Improvements in Dental Instruments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in dental instruments and more particularly to measuring and registering devices for enabling proper adjustments of an articulator for use in each particular case,—the object of the invention being to provide means whereby the distance between the human condyles can be accurately measured and the movements of the lower jaw definitely determined and recorded, and the data thus acquired utilized in effecting accurate adjustments of a dental articulator.

With this and other objects in view, the invention consists in certain novel features of construction and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings; Figure 1 is a perspective view of a dental instrument embodying my improvements; Fig. 2 is a rear view of a portion of the instrument; Fig. 3 is a plan view of the structure shown in Fig. 2; Fig. 4 is a sectional view on the line $w-w$ of Fig. 2; Fig. 5 is a sectional view on the line $y-y$ of Fig. 3; Fig. 6 is a sectional view on the line $z-z$ of Fig. 1; Figs. 7 and 8 are detail views, and Fig. 9 is a view of a modification.

1 represents an adjustable frame which supports protectors on which the condyle paths are indicated, said frame being also adapted to be adjusted to the width of a patient's face, and to effect other adjustments as hereinafter explained, and 2 represents a bow operative to determine the distance from one condyle to the other; to also represent the distance from the condyles to the lip line, and to coöperate with a trial plate and the protractors on the frame 1 to record on said protractors, the paths marked by the condyles of a patient when the jaws are moved as in the act of mastication.

In constructing the frame 1, I provide two adjustable temples 3—3 each comprising, a tubular slotted member 4 and a wire 5, the latter being bent to engage over the ears of a patient as in ordinary spectacles. The members of the extensible temples may be secured at any desired adjustment by means of set screws 6. At their forward ends, the members 4 of the temples are hinged to the depending end portions of rods 7; the latter being disposed (when the instrument is in use) approximately at right angles to the temples, and provided at their inner ends with upwardly projecting arms 8. Slides 9 are provided at the upper ends of the arms 8 and are movably mounted on a bar 10. The arms 8 are provided with holes having their walls threaded with right and left hand threads respectively, for the accommodation of a right and left hand threaded rod 11,—the latter being swiveled in an ear 12 at one end of the bar 10 and said threaded rod is provided with a head 13 to facilitate the manipulation of the rod in moving the slides 9 simultaneously in reverse directions for moving the temples relatively to each other and thus adjusting them to accommodate the width of the head of a particular patient. The bar 10 may be provided with a scale 14 whereby the width of the face may be accurately measured.

An arm 15 depends from the central portion of the bar 10 and to the lower end of this arm, a guide 16 is hinged through the medium of a lug 17 projecting from said guide. A bar 18 is movable longitudinally through the guide 16 and provided at its lower end with a curved plate or member 19 to rest upon the nose of the patient. The upper end of the bar 18 is provided with a lug 20, in which an adjusting screw 21 is swiveled, said screw being disposed parallel with the bar 18 and passed through a threaded hole in the lug 17. It is apparent that by means of the screw 21, the bar 18 and plate 19 (constituting a nose rest) can be adjusted up or down and that said nose rest can be moved forwardly or backwardly by reason of its hinged connection with the arm 15. By means of these adjustments, the frame 1 may be mounted upon the head of the patient in such manner as to cause the

temples 3 to become approximately horizontal when the head of the patient is in an upright position.

The temples 3 support depending protractors 22, each of which is provided at its upper end with a slotted plate or extension 23 attached to and depending from an arm 24 mounted on the member 5 of one of the temples 3. The protractors may be adjusted vertically on the arms 24 and secured at any desired adjustment by means of set screws 25, and, if desired, said protractors may be adjusted in a direction parallel to the temples by sliding the arms 24 on the latter. Thus it will be seen that when the frame 1 has been placed on the face of the patient, the protractors may be so adjusted that their central points from which the graduations radiate can be accurately located directly over the condyles.

In constructing the bow 2, I provide a bar 26 (preferably angular in cross section), provided with two scales 27 and 28, and with respective ends of this bar, extensible arms 29—30 are connected,—each of said arms comprising a tubular slotted member 31 and a rod 32 telescoping thereinto. The arm 29 is hinged or pivotally connected to one end of the bar 26, while the tubular member 31 of the arm 30 is provided with a sleeve 33 movable on the bar 26 and adapted to register with the graduations of the scale 27 near one end of said bar,—said sleeve, and consequently the arm 30, being secured at any desired adjustment by means of a set screw 34.

A slide 35 is mounted on the bar 26 and provided with a tooth 36 at its center to register with the graduations 28 on said bar. The openings in the arms of the slide are made sufficiently large to permit the slide to move loosely on the bar 26 and between said arms of the slide, a block 37 is pivotally supported. The pivoted end of this block adjacent to the bar 26 is slightly curved and the bar 26 is made slightly concave to accommodate the curved edge of the block (as shown in Fig. 6) and permit said block to be swung vertically on its pivotal support and thus become adjusted to the position of a shank 38 of a trial plate support 39, which latter will be placed in the mouth of the patient, as will be readily understood. The block 37 is provided with a socket 40 for the reception of the shank 38 and said block and shank are perforated for the reception of a pin 41 on a spring 42, for the purpose of removably locking the trial plate support to the block 37 and consequently to the slide 35 to which said block is pivoted. When the slide shall have been properly adjusted on the bar 26 and connected with the trial plate support, it will be secured against movement by means of a set screw 43 which passes through the wall of the slide and engages the bar 26, thus locking

the slide to the bar and at the same time clamping the block 37 to said bar and holding said block in proper relation to the bar and the trial plate support.

The member 32 of each arm 29—30 of the bow, is provided at its free end with a tube 44 disposed at right angles to said member 32. Each tube 44 is provided in its wall with an L-shaped slot 45 and at their inner ends, said tubes are made with heads 46 (each having a slightly concave face 47) to be applied on the face of the patient coincident with the condyles, when the frame 1 and protractors are not in place. A spindle 48 is mounted in each tube 44 and adapted to project through the tube 44, said spindle being provided with a pin 49 to enter the L-shaped groove 45 in said tube. The spindle 48 carries a marker 50 which is normally pressed forwardly so as to project beyond said spindle, by means of a spring 51 located within the tubular portion of the latter. When the heads 46 are to be applied to the face of the patient to determine the distance from the condyles to the lip line, the spindle 48 carrying the marker 50, will be withdrawn as shown in Fig. 8, and locked in such position by the cooperation of the pin 49 and L-shaped slot 45. When, however, the bow is used in cooperation with the protractors, (as will be presently more fully explained) the markers 50 will be disposed as shown in Figs. 1 and 7.

If desired, the use of the trial plate support 39 may be dispensed with and an indicator 51 secured to the block 37.

For the purpose of permitting a record to be made on the protractors by movement of the pins 50 thereon, said protractors will be coated with a readily removable transparent material,—such, for example, as a mixture of paraffin dissolved in benzine.

To operate the instrument, the frame 1 will first be adjusted to the face of the patient as before explained, so that the temples 3 will be approximately level when the head is in an upright position. The operator will then adjust the protractor plates so that the centers of the graduations thereon will be disposed directly over the condyles, and lock said protractor plates in such position. The frame 1 with the protractor plates adjusted to proper positions, may then be removed temporarily from the patient. The bow 2 will then be applied to the patient (with the markers 50 withdrawn) so that the heads 46 will rest about one-fourth of an inch in front of the lobes of the ears. The operator will move the slide 35 on the bar 26 so as to properly adjust the block 37 to the shank of the trial plate support in the mouth of the patient, and he will also adjust the arms 29—30 to proper lengths. The arm 30 may now be moved outwardly about half an inch (by moving the sleeve 33) and

the spring-pressed pins 50 will also be projected as shown in Figs. 1 and 7.

The frame 1 with the protractor plates may now be reapplied to the face of the patient, and the bow will also be placed in position and connected with the trial plate support in the mouth of the patient, care being exercised to cause the points of the pins 50 to engage the protractor plates exactly opposite the points on said plates from which the graduations radiate. The patient will now be requested to open and close the mouth as in the act of mastication. The result will be, if the points of the pins are just in contact with the protractor plates, that lines will be made by said pins on said protractor plates representing the condyle path.

The sleeve 33 on the bar 26 will register the distance from one condyle to the other and the slide 35 will register the center of the mouth and said slide will, in conjunction with the arms 29—30, determine the correct distance from the plane of the condyles to the lip line. These various features of adjustment may be readily transferred to an articulator, and the hinge devices of the latter may be accurately adjusted from the record made on the protractor plates, so that the manipulations of the protractor will be made to accurately simulate the movements of the jaws of the patient, as in the act of mastication.

Having fully described my invention what I claim as new and desire to secure by Letters-Patent, is:—

1. In a dental instrument, the combination of protractors and means for supporting the same adjacent to the condyles in the face of a patient, and means operable by the patient to record the condyle paths on said protractors.

2. In a dental instrument, the combination of a face frame, protractor plates adjustably supported by said frame so as to be disposed adjacent to the jaw condyles of a patient, a bow adaptable for attachment to a trial plate support, and markers carried by the arms of said bow to record the condyle paths on said protractors.

3. In a dental instrument, the combination of a face frame, means for adjusting said frame lengthwise, means for adjusting the frame transversely, plates suspended from said frame, a bow provided with markers to make records on said plates, and means for connecting said bow to a trial plate support.

4. In a dental instrument, the combination of a face frame, adjustable plates depending from said frame and adapted to receive a record, means for adjusting said frame lengthwise, means for adjusting the frame transversely means for adjusting the frame vertically, a bow provided with

markers to make records on said plates, and adjustable means for connecting said bow with a trial plate support.

5. A dental instrument comprising an adjustable frame, recording plates suspended therefrom, a bow comprising a bar, an arm hinged to one end thereof and a bar adjustable on the other end portion of said bar, means for connecting a trial plate support with said bar, and markers carried by the arms of said yoke to make records on said record plates.

6. A dental instrument comprising a bow provided with adjusting devices for measuring the distance from the plane of the condyles to the lip-line of a patient, adjustable devices adaptable to the face of a patient for measuring the distance between the condyles, protractors carried by said adjustable devices, means for adjusting said protractors to the condyles of a patient, and means carried by said bow for recording the condyle paths on said protractors.

7. In a dental instrument, the combination of a face frame comprising temples, a transverse bar, means adjustably connecting said temples with the transverse bar, protractors suspended from said temples, a bow, means for connecting said bow with a trial plate support, and markers carried by the arms of the bow recording condyle paths on said protractors.

8. In a dental instrument, the combination of a face frame comprising longitudinally adjustable temples, a transverse bar, devices adjustable on said bar and connected with said temples, a nose rest connected with said transverse bar, means for adjusting said nose rest to raise or lower the frame, protractors carried by the temples, a bow, means for connecting the bow with a trial plate support, and markers carried by the arms of said bow for recording condyle paths on said protractors.

9. In a dental instrument, the combination of a face frame comprising temples, a transverse bar, slides on said bar connections between said slides and the temples, means for adjusting said slides simultaneously in opposite directions, a guide hinged to said transverse bar, a nose support carried by said guide, means for adjusting said nose support relatively to said guide, protractors suspended from the temples of said frame, and means for recording condyle paths on said protractors.

10. In a dental instrument, the combination with record plates and means for supporting the same adjacent to the jaw condyles of a patient, of a bow comprising a graduated bar, an arm hinged to one end of said bar, a slide adjustable on said bar near its other end and adapted to register with graduations on said bar, an arm projecting from said slide, markers carried by said

arms for recording condyle paths on said
record plates, an intermediate slide adjust-
able on said bar and adapted to register with
graduations thereon, and means for connect-
5 ing a trial plate support with said inter-
mediate slide.

In testimony whereof, I have signed this

specification in the presence of two subscrib-
ing witnesses.

WILLIAM W. EVANS.

Witnesses:

EDITH M. EVANS,

Mrs. J. P. SHANNON.