

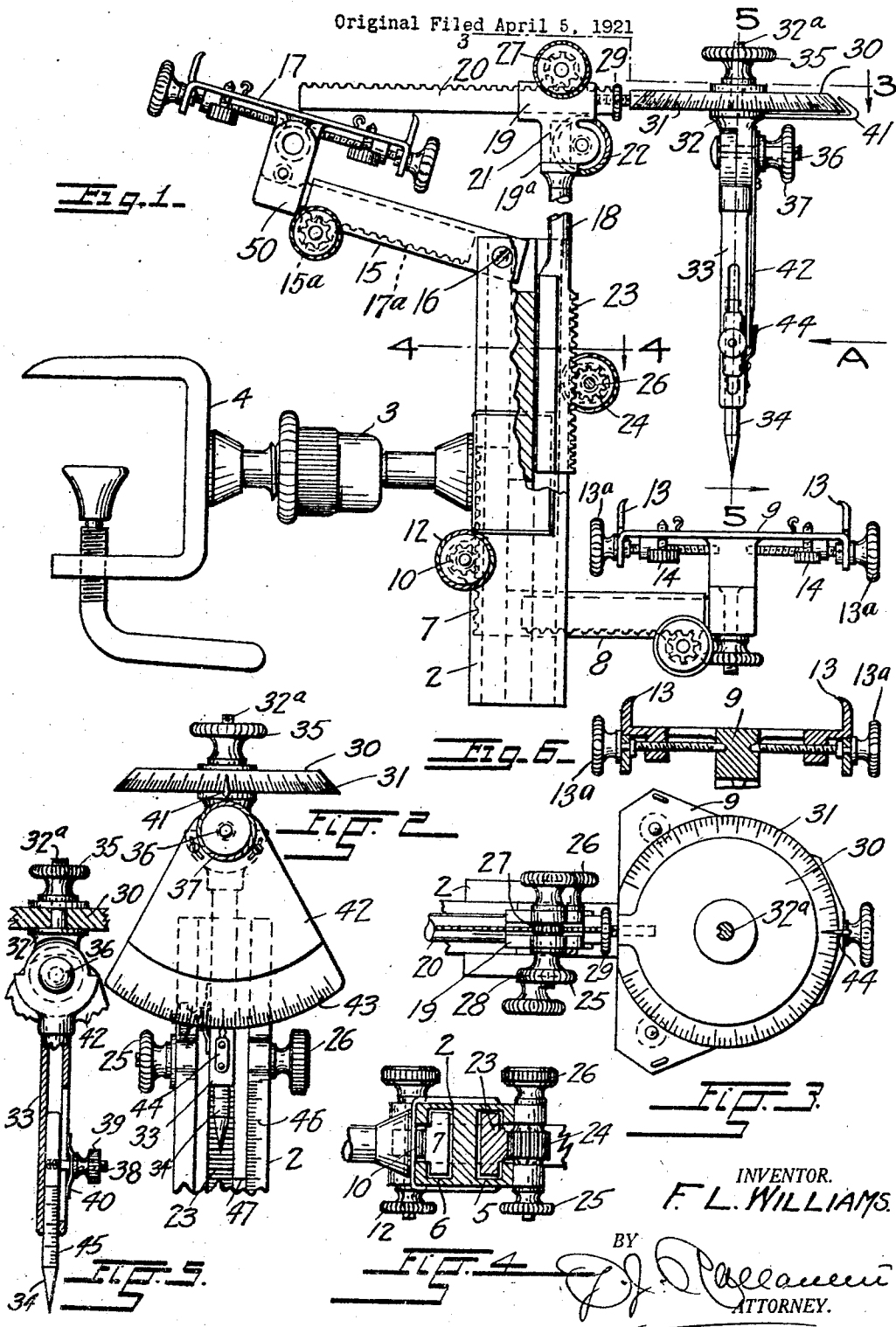
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DENTAL INSTRUMENT

Original Filed April 5, 1921



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DENTAL INSTRUMENT.

Application filed April 5, 1921, Serial No. 458,675. Renewed April 21, 1923.

To all whom it may concern:

Be it known that I, FRANK L. WILLIAMS, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Dental Instruments, of which the following is a specification.

This invention relates to dental instruments and its primary object is to provide a mechanism of simple and highly efficient construction which in the practice of prosthesis, indicates the sizes, positions and angles of artificial teeth on a dental model of the formation of a jaw according to geometric calculations.

With this object in view, my invention resides in the arrangement of parts and details of construction hereinafter to be described with reference to the accompanying drawings in the various views of which like parts are similarly designated and in which—

Figure 1 is a sectional side elevation of the instrument in its operative position;

Figure 2, a fragmentary front elevation of the same looking in the direction of the arrow A, Figure 1;

Figure 3, a horizontal section taken on the line 3—3, Figure 1;

Figure 4, a section on the line 4—4, Figure 1;

Figure 5, a section along the line 5—5, Figure 1, and, Figure 6, a fractional sectional elevation of the model holding means shown in Figure 1.

The instrument of the present invention has been shown in the drawings in association with an articulator of the type disclosed in my application for patent, Serial No. 458674, filed April 5, 1921, but I desire it understood that while the two instruments are particularly adapted for cooperation to accurately locate artificial teeth in dental models of the upper and lower jaws in prosthetic dentistry, the instrument which forms the subject of this application may be used successfully in connection with other means adapted for its adjustable support relative to a holder for the model, in the practise of either prosthesis or orthodontia.

In the construction shown in the drawings, the reference character 2 designates the standard of an articulator of the character above referred to which through the medium of a ball and socket joint 3, is con-

nected to a clamp 4 by means of which it is attached to the edge of a table, work-bench or other suitable support.

The standard has two longitudinal slideways 5 and 6 which connect with slots in opposite sides of the same. The slideway 6 is partially occupied by the rack-bar 7 of a bracket 8 upon which a model clamp 9 is adjustably supported. A pinion 10 on a headed shaft which is mounted in bearings on the standard cooperates with the rack to adjust the position of the bracket in a vertical direction and a nut 12 on the threaded end of the shaft serves to secure the bracket in its adjusted positions.

The bracket and the adjustably mounted clamp constitute conjointly the lower model-holding member of the articulator, and the clamp which in its preferred form consists of a slotted plate, a pair of opposed slidably mounted clamping jaws 13, and screws 13^a which act upon the jaws to move them in the slots, has a plurality of set screws 14 which serve to adjust a dental model fastened between the jaws, in the occlusal plane determined in the operation of the present invention as will hereinafter be described.

The articulator has an upper model-holding member 50 which after the teeth in a dental model of the lower jaw supported on the lower member, have been properly positioned by the use of the present invention, may be placed in superposed relation thereto to correspondingly locate the teeth on the model of the upper jaw.

The upper model holding member comprises a bracket 15 which is pivoted as at 16 at the upper end of the standard and a clamp 17 similar to that of the lower member, which is adjustably carried on the bracket. The clamp is to this end pivotally connected at an end of a rack bar 17^a which is slidable in a groove of the bracket 15 and which meshes with a pinion 15^a on a spindle which is rotatably mounted at an end of the bracket. The spindle has a knurled head to facilitate its manual rotation.

In order to connect the locating instrument to the articulator in operative relation to the lower model-holding member, the upper member is removed from the space above the same by moving it about its pivot to the position shown in Figure 1 of the drawings.

The locating instrument which forms the subject of this application, consists of a

post 18 which is fitted in the slide-way 5 of the standard and which at its upper end carries a transverse longitudinally slotted sleeve 19 for the support of a rack bar 20.

5 The sleeve is rotatably mounted upon a pin 21 at the upper end of the post by means of a collar 19^a which is divided in the plane of the longitudinal slot of the sleeve to clampingly engage the pin for the purpose
10 of fastening the sleeve in its adjusted position. The collar has to this end at opposite sides of its divisional slot, ears provided with axially aligned apertures one of which is threaded to cooperate with a clamping screw
15 22 passing through the other.

A rack 23 on the post extending in the slot of its slideway, meshes with a pinion 24 on a headed bolt 26 which is rotatably supported in bearings on the standard and a
20 knurled nut 25 on the threaded end of the bolt, is provided to clamp the pinion against rotation and thereby lock the post in its adjusted positions.

The sleeve 19 which is rotatably supported
25 at the upper end of the post as hereinbefore described, has at opposite sides of its longitudinal slot, lugs which are apertured for the support of the shaft of a pinion 27 which meshes with the before-mentioned rack-
30 bar 20.

A milled head on the shaft provides for its manual rotation and a nut 28 screwed upon the threaded end of the same serves to lock the bar in the positions to which it has
35 been moved by rotation of the pinion.

Rigidly fastened at the end of the rack bar 20 through the medium of a screw-threaded stud and a set nut 29 is a horizontally positioned circular plate 30 the
40 peripheral edge of which is beveled for the application of a graduated scale 31.

The plate provides a support for the indicating element of my invention which in the operation thereof functions to determine the
45 width, angle and position of artificial teeth on the wax trial plate of a dental model fastened in a relatively stationary position on the clamp of the lower holding member.

The indicator comprises a head 32
50 mounted to rotate in the axis of the circular plate, a tubular holder 33 which is pivotally connected to the head to move about an axis at right angles to its axis of rotation, and a pointer 34 which is slidably fitted in the
55 holder.

The head of the indicator has a shoulder in contact with the lower surface of the supporting plate, and a pin 32^a which extends loosely through a central opening of
60 the same and a nut 35 is screwed upon the threaded extremity of the pin to clampingly engage the upper surface of the plate.

The pivotal connection between the head and the holder is established through the
65 medium of a headed pivot pin 36 passing

through aligned apertures of the cooperating members of a hinge joint formed integrally with the parts, and a nut 37 which is screwed upon the threaded end of the pivot pin and which by engagement with one of the mem- 70
bers of the joint locks the holder in its adjusted positions.

The pointer 34 which, as stated before, is slidably fitted in the tubular holder has a threaded aperture to receive the end of a 75
stud 38 which extends through a slot in the holder and carries a nut 39 bearing upon a spring washer 40 to secure the pointer against longitudinal displacement.

The head 32 of the indicator carries an 80
index 41 the end of which is bent across the peripheral edge of the supporting plate to cooperate with the circular scale thereof. A segmental plate 42 rigidly fastened to the hinge member of the head and extending 85
alongside the holder in a plane parallel to its longitudinal axis, has at its peripheral edge a graduated scale 43 which in the operation of the instrument functions to indicate the angular position of the indicator 90
relative to the vertical passing through its axis of rotation on the supporting plate 30, by cooperation with an index 44 fastened to the holder.

The slidably mounted pointer 34 bears a 95
graduated scale 45 which registers with the end of the holder to indicate the length of the indicator from the extreme end of the pointer to the axis of rotation of the holder on the head which connects it to the support- 100
ing plate.

A scale 46 applied to the standard along the slot of the slideway 5 cooperates with an indicating mark 47 on the sliding post to designate the elevation of the axis of rota- 105
tion of the indicator relative to the model holding plate of the lower supporting member of the articulator. The different scales on the relatively movable parts of the instrument are graduated according to geometric 110
calculations and the operator in order to determine the location, angle and width of artificial teeth on a dental model by the operation of the instrument requires the use of one or more charts which by reference to 115
the scales give the position of the indicator and the other parts of the instrument with which it is associated for each tooth in the occlusal arch.

After the upper holding member of the 120
articulator has been moved to its inoperative position as shown in Figure 1, and the post of the locating instrument is inserted in the slideway of the standard in cooperative relation to the pinion, the indicator is 125
adjusted to a position in vertical alinement with a predetermined center point on the plate of the lower holding member by adjustment of the sleeve 19 and the rack bar which is slidably supported therein. 130

A dental model of the formation of the lower jaw including a wax trial-plate is now fastened between the clamping jaws on the plate of the lower holding member and is leveled by the use of the set screws 14 to place its upper surface in the occlusal plane.

This plane is determined by swinging the indicator about its vertical axis on the supporting plate after it has been placed at an angle to said axis and the model is adjusted in the plane by turning the set-screws until three separate points of its upper surface, preferably at the extremities and the middle of its occlusal arch are engaged by the end of the pointer.

The model is also moved by adjustment of the holding member of the articulator to arrange its medial line, i. e., the line passing through the apex of its occlusal arch at equal distances from the ends thereof, in the plane of the movement of the pointer swinging about its transverse axis on the head of the indicator after the latter has been turned on the supporting plate to a position in which its index registers with a point of the graduated circular scale at right angles to the direction of the linear movement of the rack-bar 20.

After the dental model on the lower supporting member of the articulator and the operating parts of the superposed locating instrument are thus relatively adjusted, the width, angle and relative positions of the artificial teeth on the model are readily determined through the medium of the different scales by reference to the geometric charts which designate the graduations on the scales with which the respective indexes must register to place the teeth in the proper position in the occlusal plane with relation to each other and the medial line of the occlusal arch.

To attain this result the elevation and length of the indicator are first of all adjusted to correspond with the proportions of the arch of the dental model, by moving the post longitudinally in its slideway and sliding the pointer in its holder to the position given on the charts and determined by their respective scales.

After the indicator has thus been adjusted in accordance with the size of the arch, each tooth is located therein at the proper angle and in the correct position with relation to the medial line of the arch and to the centers of the next adjoining teeth by adjusting the indicator according to the charts through the medium of the cooperating horizontal and vertical scales, it being understood that the charts indicate the graduations on the scale to which the indicator is adjusted for each tooth in the arch.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. In an instrument of the character described, the combination with a support, of means for holding a dental model, an instrument superposed above a model held by said means, said instrument including a straight member adapted to indicate the location of teeth on said model and means for determining the position of said member according to predetermined measurements, and means whereby said straight member may be angularly adjusted with respect to the upper surface of the model.

2. In an instrument of the character described, the combination with means for holding a dental model, of a support, and an angularly adjustable indicator mounted to move thereon about an axis to any point of the occlusal arch of a model on said holding means, the support bearing scales to determine the position of the indicator for different teeth in said arch.

3. In an instrument of the character described, the combination with a support and means thereon for holding a dental model, of a vertically adjustable member on the support, there being a scale on the support to determine the positions of the member relative to a model on said holding means, and an angularly adjustable indicator mounted on the member to move about an axis to any point of the occlusal arch of the model, the member bearing scales to determine the position of the indicator for different teeth in said arch.

4. In an instrument of the character described, the combination with a support and means thereon for holding a dental model, of a vertically adjustable member on the support, there being a scale on the support to determine the positions of the member relative to a model on said holding means, and an extensible angularly adjustable indicator mounted on the member to move about a vertical axis to any point of the occlusal arch of the model, said indicator bearing a scale determining its length and said member bearing scales determining the position of the indicator for different teeth in said arch.

5. In an instrument of the character described, the combination with means for holding a dental model, of a support, and a longitudinally extensible and angularly adjustable indicator mounted thereon to move about an axis to any point in the occlusal arch of a model on said holding means, said indicator bearing a graduated scale determining its length and said support bearing scales determining the position of the indicator for different teeth in said arch.

6. In an instrument of the character described, the combination with a model-holder, of a support, an angularly adjustable indicator mounted thereon to move about an axis to any point of the occlusal

arch of a dental model on said holder, said support bearing scales determining the position of the indicator for different teeth in said arch, and means on the holder to adjust a model to a plane determined by the movement of the indicator.

7. In an instrument of the character described, the combination with a standard and a model-holding member thereon, of a support vertically movable on the standard, and an angularly adjustable indicator mounted on the support to move about an axis to any point in the occlusal arch of a dental model on said member, said support bearing scales determining the position of the indicator for different teeth in said arch.

8. In an instrument of the character described, the combination of a standard, a support vertically movable thereon, and an angularly adjustable indicator mounted on the support to move about a vertical axis, said support bearing scales designating predetermined positions of the indicator.

9. In an instrument of the character described, the combination of a standard having a slideway, a support having a rack-bar in said slideway, a rotary pinion on the standard cooperating with the rack-bar, and an angularly adjustable indicator mounted on the support to move about a vertical axis, said support bearing scales to designate predetermined positions of the indicator.

10. An instrument of the character described, comprising a support bearing a circular scale, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, and a pointer movable about a transverse axis on the head and having an index cooperating with the last-mentioned scale.

11. An instrument of the character described, comprising a support bearing a circular scale, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, and a longitudinally extensible pointer movable about a transverse axis on the head and having an index co-operating with the last-mentioned scale.

12. An instrument of the character described comprising a support bearing a circular scale, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, a holder movable about a transverse axis on the head and having an index cooperating with the last-mentioned scale, and a graduated pointer longitudinally adjustable on the holder.

13. In an instrument of the character described, a support, a vertically adjustable member thereon bearing a horizontal circular scale, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, and a pointer movable about a transverse axis on the head and having an index cooperating with the last-mentioned scale.

14. In an instrument of the character described, a support, a horizontally adjustable member thereon bearing a horizontal circular scale, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, and a pointer movable about a transverse axis on the head and having an index cooperating with the last-mentioned scale.

15. In an instrument of the character described, a support, a pivotally mounted member thereon bearing a horizontal circular scale, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, and a pointer movable about a transverse axis on the head and having an index cooperating with the last-mentioned scale.

16. In an instrument of the character described, a support, a pivotally and horizontally adjustable member thereon bearing a horizontal circular scale, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, and a pointer movable about a transverse axis on the head and having an index cooperating with the last-mentioned scale.

17. In an instrument of the character described, a standard, a post vertically adjustable thereon, a pivoted and horizontally adjustable member on the post bearing a horizontal circular scale, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, and a pointer movable about a transverse axis on the head and having an index cooperating with the last-mentioned scale.

18. In an instrument of the character described, a standard, a post vertically adjustable thereon, a slidable member on the post bearing a horizontal circular scale, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, and a pointer movable about

a transverse axis on the head and having an index cooperating with the last-mentioned scale.

19. In an instrument of the character described, an upright post, a transverse sleeve pivoted thereon, means for clamping the sleeve to said post, a bar slidable on the sleeve and bearing a circular scale, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, and a pointer movable about a transverse axis on the head and having an index cooperating with the last-mentioned scale.

20. In an instrument of the character described, an upright post, a transverse sleeve thereon, a rack bar slidable on the sleeve and bearing a circular scale, a rotary pinion on the sleeve meshing with the rack bar, an indicator composed of a head mounted to rotate about a vertical axis in the center of the scale, the head having an index cooperating with said scale and bearing a vertical scale, and a pointer movable about a transverse axis on the head and having an index cooperating with the last-mentioned scale.

21. In an instrument of the character described, the combination with a dental model support, of an indicating device for locating and measuring teeth on a model on the support and including a pointer mounted for circular movement about a fixed axis and pivotally adjustable in a plane of said axis, there being scales on said indicator to designate the positions of the pointer according to predetermined measurements, and means for supporting said indicator above said dental model support.

22. In an instrument of the character described, the combination with a dental model support, of an indicating device for locating and measuring teeth on a model on the support and including an extensible pointer mounted for circular movement about a fixed axis and pivotally adjustable in a plane of said axis, there being scales on said indicator to designate the positions of the pointer according to predetermined measurements, and means for supporting said indicator above said dental model support.

23. In an instrument of the character described, the combination with a dental model

support, of an indicating device for locating and measuring teeth on a model on the support and including an extensible pointer mounted for circular movement about a fixed axis and pivotally adjustable in a plane of said axis, there being scales on said indicator to designate the positions and the length of the pointer according to predetermined measurements, and means for supporting said indicator above said dental model support.

24. In an instrument of the character described, the combination with a dental model support, of an indicating device for locating and measuring teeth on a model on the support, including a fixed scale, a pivoted scale at right angles to the other, an index co-operating with the fixed scale to designate the relative position of the pivoted scale, and a pivoted pointer having an index designating its position relative to the pivoted scale, and means for supporting said indicator above said dental model support.

25. In an instrument of the character described, the combination with a dental model support, of an indicating device for locating and measuring teeth on a model on the support, including a fixed scale, a pivoted scale at right angles to the other, an index co-operating with the fixed scale to designate the relative position of the pivoted scale, and a pivoted longitudinally extensible pointer having an index designating its position relative to the pivoted scale, and means for supporting said indicator above said dental model support.

26. In an instrument of the character described, the combination with a dental model support, of an indicating device for locating and measuring teeth on a model on the support, including a fixed scale, a pivoted scale at right angles to the other, an index co-operating with the fixed scale to designate the relative position of the pivoted scale, and a pivoted longitudinally extensible pointer having an index designating its position relative to the pivoted scale, and bearing a scale to designate the position of its extremity relative to its pivotal axis, and means for supporting said indicator above said dental model support.

In testimony whereof I have affixed my signature.

FRANK L. WILLIAMS.