R. W. BURCH.

DENTAL ARTICULATOR.

APPLICATION FILED FEB. 10, 1911.

1,080,809.

Patented Dec. 9, 1913.

2 SHEETS—SHEET 1.

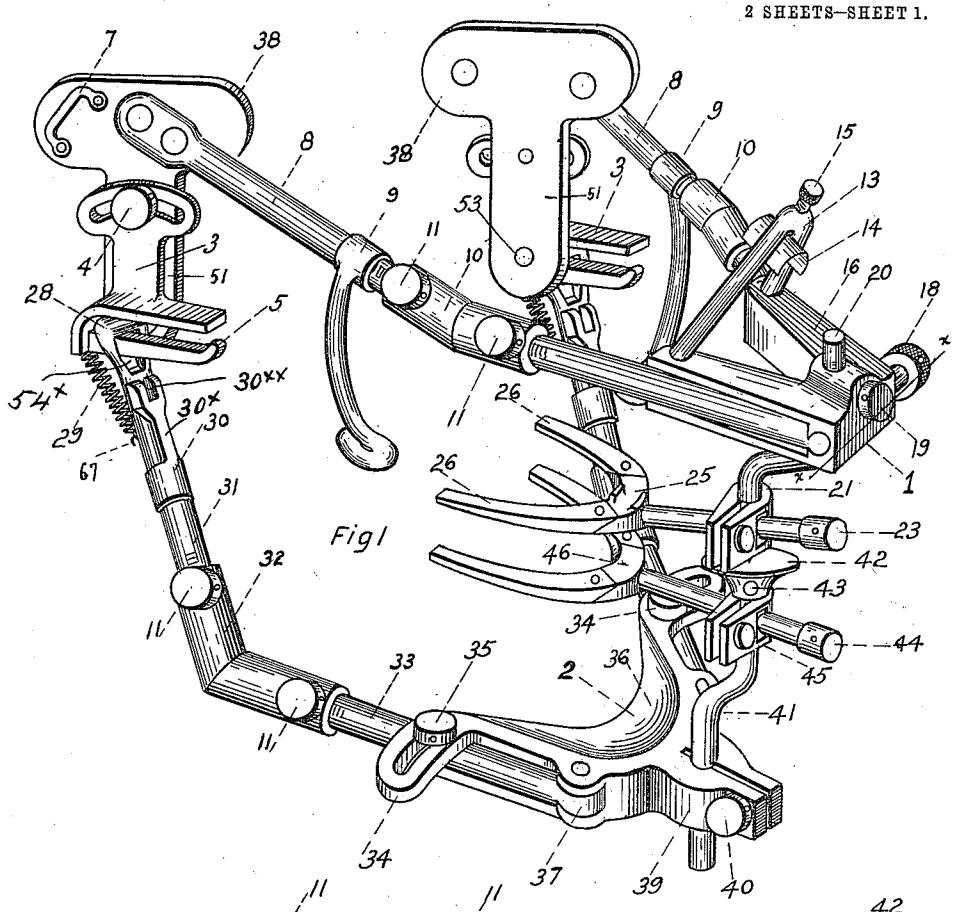


Fig 1

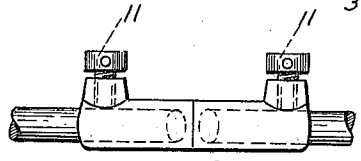


Fig. 2.

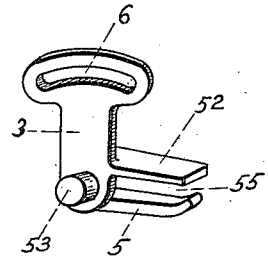


Fig. 5.

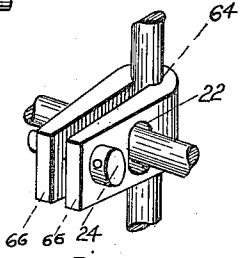


Fig. 4.

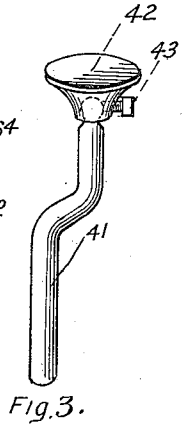


Fig. 3.

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2 SHEETS—SHEET 2.

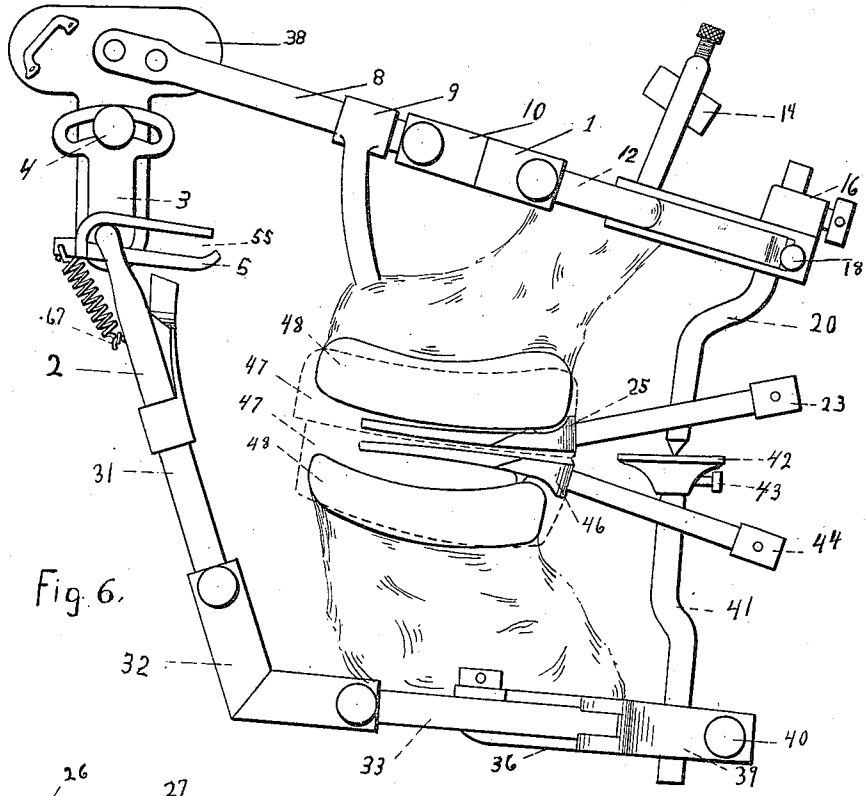


Fig. 6.

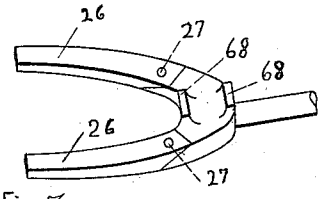


Fig. 7.

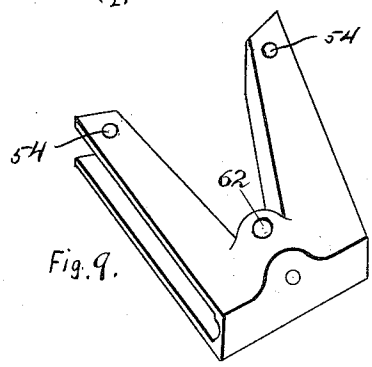


Fig. 9.

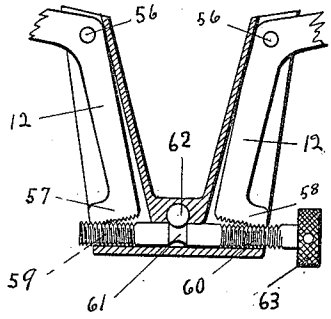


Fig. 8.

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DENTAL ARTICULATOR.

1,080,809. Specification of Letters Patent. Patented Dec. 9, 1913.

Application filed February 10, 1911. Serial No. 607,887.

To all whom it may concern:

Be it known that I, RAY W. BURCH, a citizen of the United States, residing at Hart, in the county of Oceana and State of Michigan, have invented a new and useful Dental Articulator, of which the following is a specification.

My invention relates to dental articulators. It supplies a device the purpose of which is to enable the dentist to secure correctly and scientifically the exact relations between the alveolar ridges of the upper jaw and the glenoid cavities or condylar paths, and between the alveolar ridges of the lower jaw and the condyles. It is also designed to determine the inclination of the condylar paths or bite-paths of the condyles, and to hold the trial-wax-plates in position on the alveolar ridges of the patient while the most suitable line of occlusion is being determined. It also serves as a bite-taker by holding the plaster models of the upper and lower jaws in their established relations.

In constructing the instrument provision is made for adapting it to the jaws of any patient, and for the removal of the instrument with the trial-wax-plates intact. Thus when the plaster models of the alveolar ridges are placed into the trial-wax-plates and secured to the instrument they are in the same relations to the condylar parts of the instruments as the alveolar ridges of the patient are to his condylar parts, and the above mentioned relations are exactly duplicated in the instrument as they are in the living patient. Therefore it enables the dentist using such an instrument to set up the artificial dentures with precision, insuring perfect articulation of the teeth not only while they are at rest but also while they are in use. In the accomplishment of these ends I construct the preferred embodiment of my invention as shown in the accompanying drawings, and hereinafter described.

In said drawings the several views are as follows:

Figure 1 is a perspective view of the preferred embodiment of my invention. Fig. 2 is a cross section of the sleeve joints used. Fig. 3 is a perspective of the extension post and plate. Fig. 4 is a perspective of the device used to clamp arms and rods used together. Fig. 5 is a perspective of gliding surfaces viewed from within the frames. Fig. 6 is a side view in which the plaster casts are secured to the frames and showing the trial-wax-plates and their holders. Fig. 7 is a perspective of a trial-wax-plate holder. Fig. 8 is a sectional view of the clamping device. Fig. 9 shows the casting used to support said clamping device.

In constructing the preferred embodiment of my invention I provide an upper frame, 1, which consists of two temple pads, 38, from each of which project the arms, 8 and extensions 12 connected by sleeve joints 10 and meeting in a clamping device 16 near the center of said frame. The pads 38 are designed to rest firmly upon the head and to support gliding surfaces 3 from projections 51 by means of rivets 53. The members bearing the gliding-surfaces may be said to be connecting members between the two frames. Elongated surfaces 52 of the sections 3 are the gliding-surfaces proper. They are designed to guide the movements of the pivotal-endings of the lower frame as the condylar paths of the patient guide their condyles. Said gliding-surfaces move on the rivets 53 as axes or pivots, and are fastened by set screws 4. The projections 5 from the gliding-surfaces 3 project through and partially fill the openings in the necks of said pivotal-extremities, and they coöperate with said gliding-surfaces to form open slots 55 in which move said pivotal-extremities of the lower frame. The open ends of said slots form a means whereby the two sections may be separated. Projections 7 from the temple pads are for the attachment of straps which pass over the head and aid in holding the instrument in position when necessary. The braces 9 are adjustable by means of the sleeves on arms 8 and may be swung into position for plastering the casts of the jaw to the upper frame as shown in Fig. 6. The sleeve joints having an elbow join the arms 8 and extensions 12 together at an angle. The graduated ends of said arms and extensions are closely fitted into the sleeve joints thus allowing a longitudinal adjustment of said arms and extensions. Set screws are threaded into said sleeve joints and secure the adjustable parts. The device 16 furnishes a hinge for said extensions 12 and attachments to said extensions by means of which the said temple pads may be brought against the head, also an opening into which fits extension rod 20 and a set screw 19 which secures said rod.

The rod 13 forms a loop over the nose of

the patient and supports a lug screw 15 which is attached by a swivel to nose pad 14. The end of said rod pass through openings 54 in the device 16 shown in Fig. 9, and by passing through openings 56 in said extensions 12 they form the axes upon which said extensions hinge. The surfaces of the ends 57 and 58 of extensions 12 are threaded with right and left screw threads respectively. The said surfaces being determined as arcs of a circle with openings 56 as centers. Shafts 18 is fitted with right and left screw threads to coincide with those of extensions 12. A groove 61 is cut around the periphery near the center of the shaft acting with the presence of rod 20 in the opening 62 to limit the longitudinal movement of said shaft. Thus by revolving the shaft 18 by its extremity 63 in one direction the threaded extremities of extensions 12 are moved apart and through the hinge joints at 56 and the arms 8 the pads 38 are brought against the head, and by revolving said shaft in the opposite direction the pads are released. The extension rod 20 is bent inward as it leaves the opening 62 and is made fast to arm 23 by clamping device 21. The bend in rod 20 enables it to be revolved until it lies at the correct clamping distance from arm 23. In Fig. 6 the opening at 64 receives rod 20 and the slot 22 closely fits arm 23. When the jaws 66 are brought together by the clamping screw 24 the rods 20 and arms 23 are clamped together without being distorted from their relative positions. The inner end of arm 23 is screwed into trial-plate holder 25. The said trial-plate holder is fitted with arms 26 which are movably joined to the central piece by rivets 27. The ridges 68 fit over the alveolar processes to render the plate more stable in the mouth.

The lower frame 2 embraces the arms 31 which extend into the sleeve joints 32 from which project the extensions 33 meeting in a chin piece 36. Each of arms 31 have ends called pivotal-extremities designed to move upon the elongated surfaces of section 3. Openings 54^{x} in the neck of said pivotal-extremities acting with projections 5 allow said pivotal-extremities a lateral movement on said surfaces. On the arms 31 is the sleeve 30 which carries the spring 30^{x} on whose upper end is the bifurcation 30^{xx} which latter is adapted to be sprung into the opening 54^{x} and so prevent further lateral movement of the said pivotal extremities on said projection 5, in cases requiring the same. Projections 67 from arms 31 serve as hooks into which are detachably fastened ends of springs to said gliding-surfaces. The graduated ends of arms 31 and extensions 33 are joined together by sleeve joints 32 as similar parts of the upper frame. The chin piece 36 receives the extensions 33 at hinge 37 and is provided with slotted projections 34 in which move set screws 35 which secure said extensions when properly adjusted. The chin piece fits snugly about the chin and when the device is being used more directly as an articulator, it supports the lower plaster models 48. Projection 39 from said chin piece is bored and slotted to form clamping bearings. The extension post is made fast to the chin piece by operating set screw 40. Post 41 is made fast to plate 42 by a swivel joint and set screw 43. The said plate coöperates with rod 20 limiting the bite as established. Said plate also affords a surface upon which extension rod 20 may move while articulating the teeth. Arm 44 is made fast to 41 by clamp 45 and supports plate-holder 46. These parts are like similar parts of the upper frame.

Thus having described the apparatus its operation is as follows: The trial-wax-plates are prepared in the usual manner excepting the trial plate holders 25 and 46 are embedded in the plastic material instead of stays sometimes used. The trial-wax-plates are now placed in the mouth and the line of occlusion partially determined. The upper frame is adjusted upon the head in such a position that the gliding-surfaces 52 lie over the condyle paths of the patient and the nose pad 14 rests upon the nose. The shaft 18 is revolved until the temple pads rest firmly against the head. The chin piece 36 being held in position the post 41 is adjusted to allow the plate 52 to mark the center of the lip lines. Arm 44 is screwed into the trial plate holder and is clamped by device 45 to post 41. The upper trial plate holder is likewise secured to the upper frame the point of rod 20 coming in contact with plate 42. The pivotal-extremities of the lower frame are now adjusted until they lie over the condyles of the patient and thus they rest upon the gliding-surfaces of the upper frame. Now when the patient's mouth is widely opened the gliding-paths will lie over the condyle paths of the patient throughout and are secured in this position by set screw 4. The lower jaw is moved about until the line of occlusion is fully determined. The springs 24 are attached to the hooks 67. The device is removed from the patient by releasing the temple pads and the clamping screw 40. The plaster casts are placed in the trial-wax-plates and plastered to the frames. The upper trial-wax-plate may be removed. The articulator is now ready for the placing of the teeth upon the upper cast, and by likewise removing the lower trial-wax-plate the teeth may be placed for the lower jaw. While articulating the teeth the upper section is pressed backward, and the springs serve to restore the sections to their normal relations when the pressure is

released. The stoppers 30 may be used when the patient has no lateral movement of the jaws.

As described the instrument is best suited for cases in which all the teeth have been extracted, but by slight changes in manipulation and by the use of different shaped plate holders, it may be used where some of the teeth remain in the mouth. It may be also used in crown and bridge work. The upper trial plate holder may be used without the lower in the operation known as taking the bite.

I claim:—

1. A dental articulator comprised of two U shaped frames designed to superimpose the jaws, pivoted together at their extremities and each having means whereby trial-wax-plates may be secured to said frames, and means whereby plaster models of the jaws may be attached thereto, substantially as set forth.

2. A dental articulator and face bow comprising an upper and lower section, the upper section comprising temple pads with means of clamping said pads upon the head, extension rod for securing trial-wax-plates to said upper section, adjustable braces for securing plaster models to said section, the lower section comprising a U shaped frame, an extension post from said frame for the securing of trial-wax-plates, gliding surfaces pivoted to said upper frame upon which move the pivotal extremities of said lower frame.

3. The upper U shaped frame having temple pads at its extremities, joints interposed between said pads and a clamping device, nose pads attached to said clamping device, extension for supporting trial-plates, gliding surfaces pivoted to said upper frame, a lower U shaped frame having upturned extremities engaging with said gliding surfaces, a chin piece and trial-plate holders, as and for the purpose set forth.

4. A dental articulator comprising essentially two U shaped frames, the lower frame having upwardly extending arms with pivotal extremities, gliding surfaces pivoted to the upper section engaging with said pivotal extremities to complete the joints between the two sections, extension rod passing downward from said upper frame in contact with extension post from said lower frame, said extension rod and post each supplying a means whereby trial-wax-plates may be secured to said frames, and a means whereby plaster models may be attached to each frame, all substantially as set forth.

5. A dental articulator comprised of two pivoted sections, one of which forming substantially a horizontal bow to fit about the face, having temple pads at each extremity, joints interposed between said pads and a hinge or closing device, extension rod passing downward to which may be secured trial-wax-plate holders, a nose pad adjustably mounted at the center of said bow, the other section of which having upwardly extending arms with pivotal extremities, joints interposed between said extremities and a chin piece, extension post passing upward from said chin piece, plate mounted upon said post, an intermediate member pivoted to one of said sections and having gliding surfaces which completes the joints, springs secured to one section and detachably secured to the other section, as and for the purposes set forth.

6. A dental articulator, face bow, and bite-taker in combination comprised essentially of an upper and lower section, the upper section essentially comprised of a U shaped frame having temple pads at each extremity, means of clamping said pads about the head, rod extending downward from said upper section in contact with the lower section and serving as a means whereby trial-wax-plate holders may be secured, the lower section comprised essentially of a U shaped bow bent upwardly at each extremity forming pivotal axles in contact with the upper section, joints interposed between said pivotal axles and a chin piece, extension post attached to the lower section bearing a plate in contact with the upper section, said post also serving as a means whereby trial-wax-plates may be secured to said lower section, intermediate members interposed between the two sections, pivoted to the upper and bearing elongated surfaces in contact with said pivotal extremities, means whereby plaster models of the alveolar ridges may be secured to said sections, as and for the purposes set forth.

7. A dental articulator of the character set forth comprised essentially of two U shaped frames, intermediate members pivoted to one of said frames and bearing gliding surfaces engaging with said other frame, and means whereby trial-wax-plates and also plaster models of the jaws may be attached thereto.

8. In a dental articulator, a pair of frames adapted to superimpose the jaws, means pivotally connecting them at their extremities and means on said frames whereby trial-wax-plates may be secured to said frames.

9. In a dental articulator, a pair of frames adapted to superimpose the jaws, means pivotally connecting them at their extremities, means on said frames whereby trial-wax-plates may be secured to said frames, and gliding surfaces pivotally mounted on said frames.

10. In a dental articulator, a pair of frames adapted to superimpose the jaws, means pivotally connecting them at their extremities, means on said frames whereby trial-wax-plates may be secured to said

frames, and pads and gliding surfaces carried by said frames.

11. In a dental articulator, a pair of frames adapted to superimpose the jaws, means pivotally connecting them at their extremities, means on said frames whereby trial-wax-plates may be secured to said frames, and a chin-piece carried by one of said frames.

12. In a dental articulator, a pair of frames adapted to superimpose the jaws, means pivotally connecting them at their extremities, means on said frames whereby trial-wax-plates may be secured to said frames, a chin-piece carried by one of said frames, and pads carried by the other frame.

13. In a dental articulator, a pair of frames adapted to superimpose the jaws, means pivotally connecting them at their extremities, means on said frames whereby trial-wax-plates may be secured to said frames, and means whereby plaster models may be attached to each frame and pads carried by one of said frames.

14. In a dental articulator, a pair of frames adapted to superimpose the jaws, means pivotally connecting them at their extremities, means on said frames whereby trial-wax-plates may be secured to said frames, and pads and a chin-piece carried by said frames and pivotally mounted gliding surfaces carried by said frames.

In testimony whereof I affix my signature in the presence of two witnesses.

RAY W. BURCH.

Witnesses:

WILFRED H. BARRIES,

ANTHONY P. BARRETT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."