Aug. 2, 1927. 1,637,934

W. M. GAMBILL

ARTICULATOR

Filed July 24, 1926 3 Sheets-Sheet 1

Fig. 1.

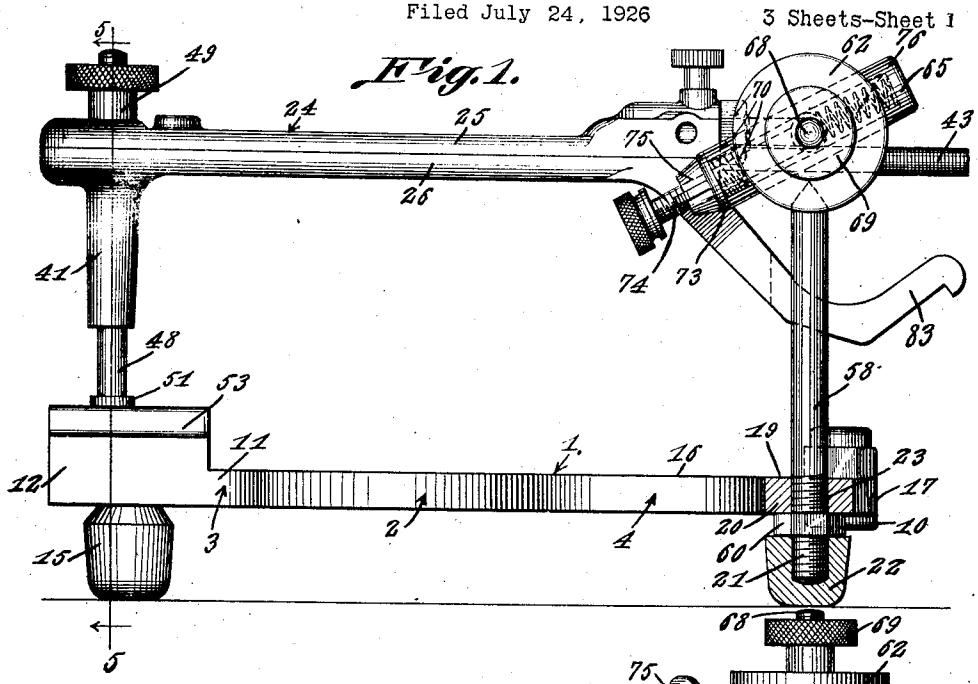
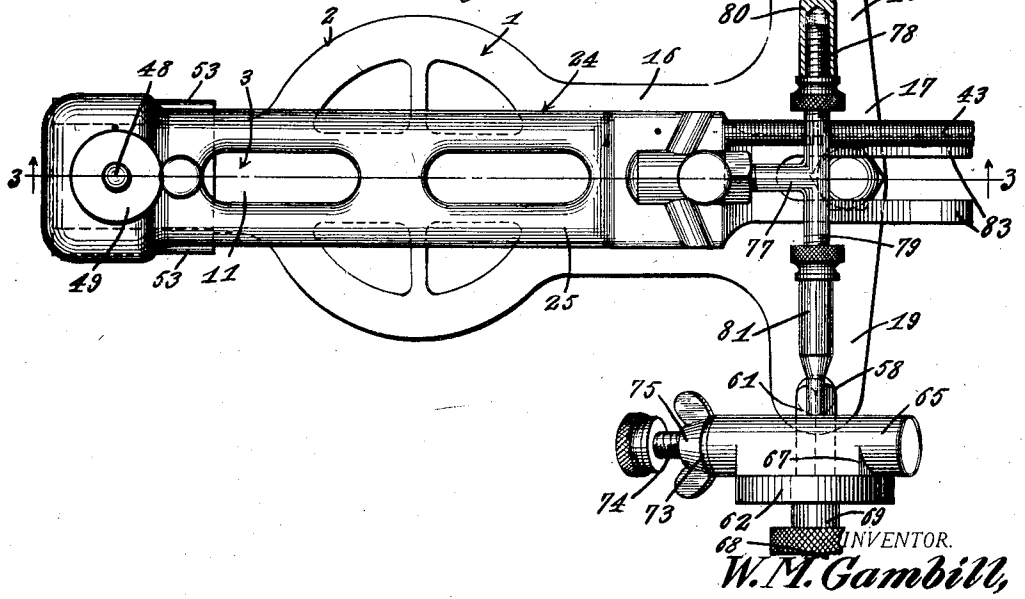


Fig. 2.



INVENTOR.

W. M. Gambill,

BY

Geo. P. Kimmel. ATTORNEY.

Aug. 2, 1927. 1,637,934

W. M. GAMBILL

ARTICULATOR

Filed July 24, 1926 3 Sheets-Sheet 2

Fig. 3.

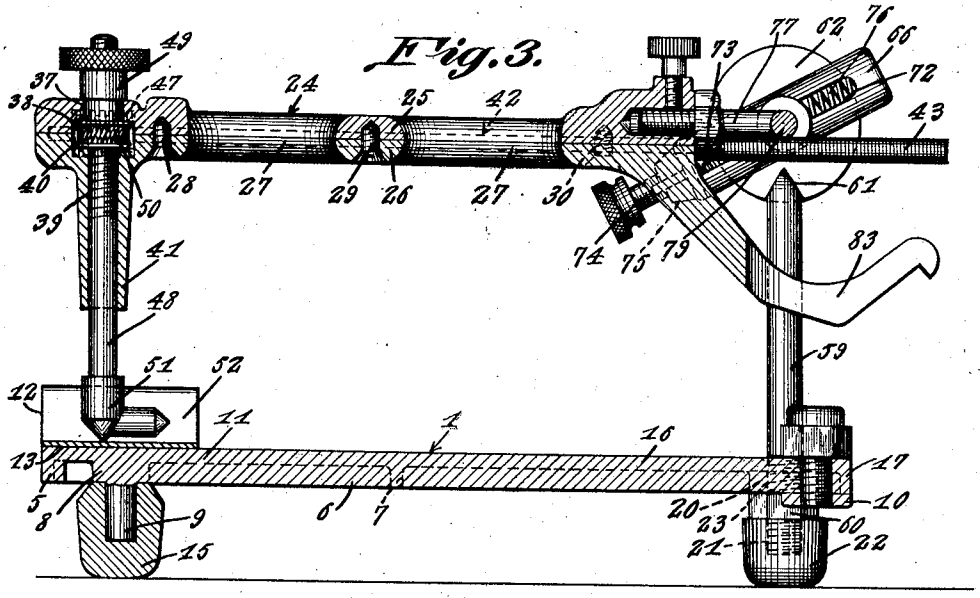
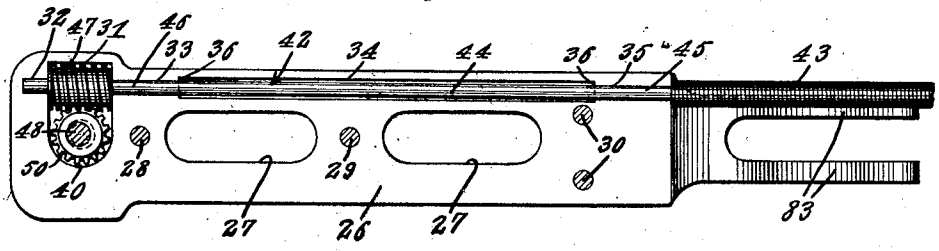


Fig. 4.



INVENTOR.

W. M. Gambill,

BY

Geo. P. Kimmel ATTORNEY.

Aug. 2, 1927. 1,637,934

W. M. GAMBILL

ARTICULATOR

Filed July 24, 1926 3 Sheets-Sheet 3

Fig. 5.

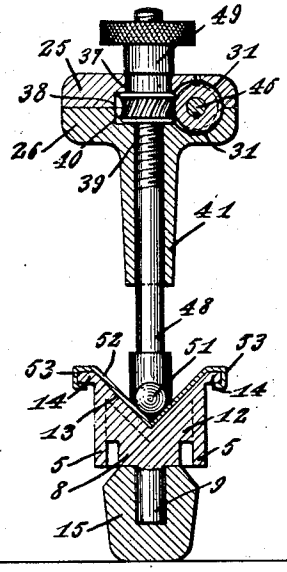


Fig. 6.

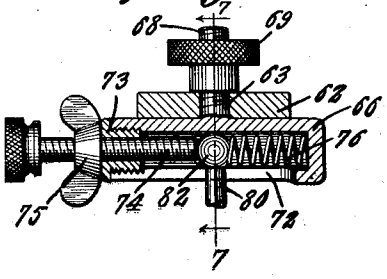


Fig. 7.

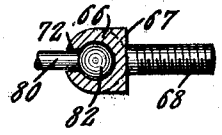


Fig. 9.

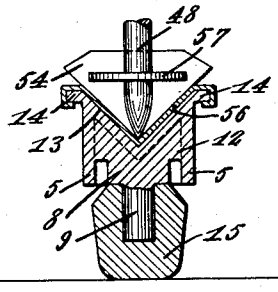


Fig. 8.

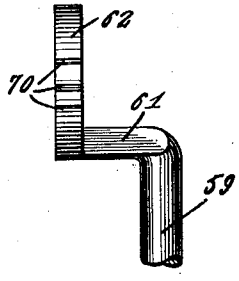
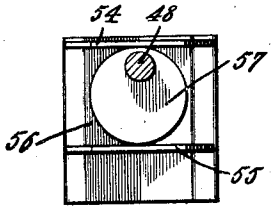


Fig. 10.



INVENTOR.

W.M. Gambill,

BY

Geo. P. Kimmel. ATTORNEY.

Patented Aug. 2, 1927. 1,637,934

UNITED STATES PATENT OFFICE.

WILLIAM M. GAMBILL, OF MERKEL, TEXAS.

ARTICULATOR.

Application filed July 24, 1926. Serial No. 124,704.

This invention relates to a dental articulator, and has for its object to provide, in a manner as hereinafter set forth, an articulator of the class referred to, with adjustable means for efficiently grinding in the teeth to obtain a thoroughly satisfactory occlusion for producing and perfecting the individual three point contact, the rotation point, the inward slant, the downward slant, and the incisal slant on the occlusal surface of the teeth.

A further object of the invention is to provide, in a manner as hereinafter set forth an articulator having means to provide, combined oscillatory and vertical movements during the grinding action and further with means for positioning a retruded and a protruded bite therein.

A further object of the invention is to provide, in a manner as hereinafter set forth, an articulator having means for adjusting the retruded and protruded bites.

A further object of the invention is to provide, in a manner as hereinafter set forth, a dental articulator for producing retruded and protruded movements and further with means for adjusting the retruded and protruded bites.

Further objects of the invention are to provide, in a manner as hereinafter set forth, a dental articulator, which is simple in its construction and arrangement, strong, durable, adjustable, thoroughly efficient and convenient in use, readily coupled with a driving means therefor, and comparatively inexpensive to manufacture.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described and illustrated in the accompanying drawings wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

Figure 1 is a side elevation of a dental articulator in accordance with this invention.

Figure 2 is a top plan view thereof.

Figure 3 is a section on line 3—3 Figure 2.

Figure 4 is a fragmentary view in sectional plan.

Figure 5 is a section on line 5—5, Figure 1.

Figure 6 is a fragmentary view in sectional plan.

Figure 7 is a section on line 7—7, Figure 6.

Figure 8 is a fragmenatry view in vertical elevation.

Figure 9 is a fragmentary view in vertical section of a modification.

Figure 10 is a fragmentary view, in sectional plan of the form shown in Figure 9.

Referring to the drawings in detail, 1 generally denotes a stationary base member formed of an intermediate portion 2 of skeleton form and which is of circular contour, an outer end portion 3 and an inner end portion 4. The base member 1 is formed with a depending flange 5 which is co-extensive therewith and also provided with depending reinforcing ribs 6, 7. The rib 6 is disposed lengthwise of the base member 1 and intersected by the rib 7 which extends from one side of the flange 5 to the other side thereof. The base member 1 has formed on its lower face, at the forward end thereof a circular enlargement 2 having a depending pin 9 extended therefrom and on its lower face, at its rear end a depending circular enlargement 10 arranged in alignment with respect to the enlargement 8. The rib 6 extends from the enlargement 8 to the enlargement 10. The enlargement 8 is spaced rearwardly with respect to the forward end of the flange 5, see Figure 3.

The diameter of the intermediate portion 2 is greater than the width of either of the end portions of the base member 1. The end portion 3 is of rectangular form and comprises an inner part 11 and an outer part 12, see Figures 1, 2, 3, 5 and 9. The outer part 12 is of materially greater height than the inner part 11, see Figure 1. The outer part 12 has its upper face formed with a lengthwise extending V-shaped groove 13 and at each side of its top has each side formed with a laterally extending lengthwise disposed flange 14. The flanges 14 are oppositely disposed with respect to each other and the function thereof will be presently referred to.

The enlargement 8 depends centrally with

respect to the outer part of the end portion 3 and mounted on the pin 9 which depends from the enlargement 8 is a supporting cap 15 formed of resilient material, preferably rubber.

The end portion 4 comprises an inner part 16 and an outer part 17, see Figure 2. The part 17 is of materially greater length, but of less width than and extends at right angles with respect to the part 16, but the latter merges into the part 17 centrally thereof whereby a pair of oppositely disposed extensions 18 and 19 are provided and which are arranged at right angles with respect to the part 16. The lower face, at the outer end of each of said extensions has an enlargement of circular form, as indicated at 20, see Figure 3 and each of said enlargements has extending therethrough the lower peripherally threaded portion 21 of a post, to be hereinafter referred to, and upon which is mounted a resilient supporting cap 22 formed of rubber. The caps 15 and 22 provide supporting means for the base member 1.

The rear part 11 of the end portion 3 merges into the intermediate portion 2 centrally thereof and the part 16 of the end portion 4 merges into the intermediate portion 2 centrally thereof. The caps 15 and 22 not only provide supporting means for the base member 1, but prevent the marring of the support upon which the articulator is mounted, and further acts as a cushioning means for the articulator. The extension 18, as well as the extension 19, at its enlarged outer end is formed with a vertically disposed opening 23 having a threaded wall, see Figure 1, and engaging with said threaded wall is the lower peripherally threaded portion 21 of a post. Carried by each post and interposed between a cap 22 and an enlargement 20 is a lock nut 60.

Arranged in superposed relation with respect to the base member 1 is the upper articulator member referred to generally by the reference character 24. The member 24 is of rectangular contour and formed of an upper section 25 and a lower section 26. The said sections are of skeleton form or formed with lengthwise extending spaced oval shaped openings 27 which align with each other. The sections 25 and 26 are connected together by the hold fast devices 28, 29 and 30, disposed throughout the length of said sections. The inner faces of the sections 25 and 26, at one side thereof are formed with oppositely disposed aligned semi-circular grooves 31, see Figure 5. The inner faces of said sections are furthermore provided with oppositely disposed aligning semi-circular grooves, each formed of parts 31, 32, 33, 34 and 35. The parts 34 are of greater width than parts 33 and 35 and form shoulders 36. The parts 31 are of materially greater width than the other parts of said grooves. A vertical opening is formed in the forward end of the section 25 and the section 26 and each opening has a small part and a large part, indicated respectively at 37, 38 on section 25 and at 39, 40 on section 26. The parts 38 and 40 register with each other. The parts 31 of the grooves open into the parts 38 and 40 of the openings. The section 26 is formed with an integral depending sleeve 41 which provides a continuation of the part 39 of the opening in section 26.

Mounted in the registering grooves is a driving shaft for an oscillatory mechanism for the upper articulator, and which includes a rigid section 42 comprising an intermediate portion 44 and end portions 45, 46. The shaft further includes a flexible section 43 extended from the end portion 45 for connection with a prime mover, not shown. The intermediate portion 44 of the shaft is mounted in an oil well provided by the parts 34 of the grooves. The end portion 46 of the shaft carries a worm pinion 47 positioned within the parts 31 of the grooves.

The oscillatory mechanism for the upper articulator member comprises a vertically disposed shaft 48 which extends up through the sleeve 41 and projects above the forward end portions of the sections 25 and 26 of the articulator member 24. A jamb nut 49 is secured to the upper end of the shaft 48 and bears against the upper face of the worm wheel 50. The shaft 48 carries a worm wheel 50 which is driven from the worm pinion 47. The lower end of the shaft 48 carries a fixed L-shaped shifting element 51 for the articulator or element 24. The shifting element 51 operates in a controlling member therefor, which in Figure 5 is indicated at 52 and consists of a V-shaped trough seating in the groove 13 throughout and formed with extensions 53 which overlap the flanges 14. The member 52 is open at each end.

In Figures 9 and 10 the controlling member or element for the shifting element 51 is constructed in the same manner as the member 52, with this exception, that spaced vertical abutments 54, 55 are carried by the controlling member, which in Figures 9 and 10 is indicated at 56. In Figures 9 and 10 the shifting element is illustrated in the form of a disk 57 which is eccentrically mounted upon the shaft 48 and which is clearly shown in Figure 9. As the shaft 48 revolves, due to the operation of the driving means therefor, the shifting element 51 or the shifting element 57 engaging with the walls of the member 52 or 56 will provide for an oscillatory movement for the upper articulator 24, as well as providing for a vertical movement of such member 24 during the oscillations thereof.

Secured in each opening 23 is a vertically

disposed post and one of which is indicated at 58 and the other at 59. Lock nuts 60 are carried at the lower end of each of the posts. Each of the posts at its upper end is formed with an outwardly extending right angularly disposed arm 61 terminating in a vertically disposed disk 62 provided with an axial opening 63, see Figure 6.

Positioned against the inner face of each disk 62 is an angularly adjustable tubular casing. One of the casings is indicated at 65 and the other at 66. Each casing has that side opposing the inner face of a disk formed with a squared offset 67 of the same length as the diameter of the disk and which has its ends flush with the edge of the disk.

Projecting outwardly from each offset portion 67, as well as being formed integral therewith centrally thereof is a peripherally threaded tubular bar 68 which extends through an opening 63, see Figure 6, and carries a clamping nut 69 which abuts against the outer face of a disk 62 for clamping a tubular casing against the inner face of the latter in adjusted position. Each disk 62 has its edge provided with spaced notches 70, see Figure 8, which associate with the side edges of an offset 67 to provide for adjusting the casings 65, 66 to align with each other.

The inner side of the casing 65 or 66 is formed with a lengthwise extending slot 72. Each casing is closed at its outer end and open at its inner end and threadedly engaging within the inner end of each casing as well as projecting therefrom is a flanged interiorly threaded bushing 73 having an adjusting screw 74 extending therethrough and engaging therewith. See Fig. 6. A lock nut 75 is carried by the screw 74. Within each casing is arranged a coiled tensioning spring 76. The screws 74 are employed for increasing and decreasing the tension of the springs 76 and also for retruded and protruded bite relations. The upper articulator member 24 is oscillated against the action of the springs 76.

Fixedly secured to the rear end of the section 26 of the articulator member 24 is a T-shaped coupling 77, see Figure 3. Adjustably connected to the coupling 76 is a pair of oppositely extending threaded arms 78, 79, to which pivot members 80, 81 respectively are adjustably secured and each of said pivot members has a globular outer end 82, see Figure 6. The pivot members 80, 81 are oppositely disposed with respect to each other and they extend through the slots 72 into the casings 65, 66. The globular heads 82 bear against the forward ends of the springs 76. The adjusting screws 74 bear against the globular ends or heads 82 of the pivot members 80, 81. The pivot members 80, 81 in connection with the members 67, 68, permits of the articulator member 74 to swing on a pivot at right angles to the shaft 48. The casings and springs and the connections between the casings and the articulator member 24 provides means to produce retruded and protruded movements. The adjustability of the casings and their connections with the articulator member 24 provide for adjusting retruded and protruded bites. The slots formed in the casings will permit of the pivot members 80 and 81 alternately swinging forward with respect to the springs in said casings and swinging rearwardly, alternately, against the action of such springs.

The section 26 of the articulator member 24 has its rear provided with a pair of depending arms or fingers 83 to shift the upper articulator on the pivot members 80, 81 when occasion requires.

The shaft 48 can be driven at any desired speed, but preferably the ratio of the element 50 with respect to the element 47 is thirty to one. The connections between the articulator member 24 and posts 58 and 59 enables the free movement of said member and the latter is always under tension, due to the springs in the casings 65, 66. Further the connections between the articulator member 24 and the posts provide for the retruded and protruded positions of the articulator member during the operation thereof and the shifting element 51 or 57, in both instances they may be termed a cam element, provide for the rise and fall of the articulator during the oscillatory movement thereof, and therefore it is thought that the many advantages of an articulator, in accordance with this invention can be readily understood, and although the preferred embodiment of the invention is as illustrated and described, yet it is to be understood that changes in the details of construction can be had which will fall within the scope of the invention as claimed.

What I claim is:—

1. A dental articulator comprising a base, a spring-controlled upper articulator member arranged in superposed relation with respect to the base, a pair of spaced tensioning mechanisms supported by the base and each including a housed coiled spring, transverse pivot means for and carried by said member, said pivot means slidably mounted in said mechanisms and bearing against said springs, driven means carried by said member and operatively engaging with the base for imparting simultaneously an oscillatory and a vertical movement to said member, and means mounted in said member for operating said driven means.

2. A dental articulator comprising a base, a spring-controlled upper articulator member arranged in superposed relation with respect to the base, a pair of spaced tensioning mechanisms supported by the base and each including a housed coiled spring, trans-

verse pivot means for and carried by said member, said pivot means slidably mounted in said mechanisms and bearing against said springs, driven means carried by said member and operatively engaging with the base for imparting simultaneously an oscillatory and vertical movement to said member, means mounted in said member for operating said driven means, and each of said mechanisms including an adjusting screw bearing against said pivot means for increasing or decreasing the tension of said springs.

3. A dental articulator comprising a base provided at its forward end with a V-shaped trough, a spring controlled upper articulator member arranged in superposed relation with respect to the base, a pair of spaced tensioning mechanisms supported above the base at the rear thereof, each of said mechanisms including a housed coiled spring, transverse pivot means for and carried by said member, said pivot means slidably mounted in said mechanisms and bearing against said springs, driven means carried by said member and including an L-shaped element engaging said trough for imparting simultaneously an oscillatory and vertical movement to said member, and means mounted in said member for operating said driven means.

4. A dental articulator comprising a base provided at its forward end with a V-shaped trough, a spring controlled upper articulator member arranged in superposed relation with respect to the base, a pair of spaced tensioning mechanisms supported above the base at the rear thereof, each of said mechanisms including a housed coiled spring, transverse pivot means for and carried by said member, said pivot means slidably mounted in said mechanisms and bearing against said springs, driven means carried by said member and including an L-shaped element engaging said trough for imparting simultaneously an oscillatory and vertical movement to said member, means mounted in said member for operating said driven means, and each of said mechanisms including an adjusting element bearing against the pivot means for increasing or decreasing the tension of said springs.

5. A dental articulator comprising a base, a spring-controlled upper articulator member arranged in superposed relation with respect to the base, a pair of independently adjustable spaced tensioning mechanisms supported by the base at the rear thereof and each including a housed coiled spring, a V-shaped trough carried by the base at the forward end thereof, transverse pivot means for and carried by said member, said means slidably mounted in said mechanisms and bearing against said springs, driven means carried by said member and operating in said trough for imparting simultaneously an oscillatory and a vertical movement to said member, and means mounted in said member for operating said driven means.

6. A dental articulator comprising a base, a spring-controlled upper articulator member arranged in superposed relation with respect to the base, a pair of bodily adjustable spaced tensioning mechanisms supported above said base, transverse pivot means for and carried by said member, said pivot means slidably mounted in said mechanisms, adjusting means for said mechanisms to increase and decrease the tension thereof, and means carried by said member and operatively engaging with the base for imparting simultaneously an oscillatory and a vertical movement to said member.

7. A dental articulator comprising a base, a spring-controlled upper articulator member arranged in superposed relation with respect to the base, a pair of bodily adjustable spaced tensioning mechanisms supported above the base at the rear thereof and each including a housed coiled spring, a V-shaped trough carried by the base at the forward end thereof, transverse pivot means for and carried by said member, said means slidably mounted in said mechanism and bearing against said springs, driven means carried by said member and operating in said trough for imparting simultaneously an oscillatory and a vertical movement to said member, means mounted in said member for operating said driven means, said mechanisms having the inner sides thereof slotted for the passage of said pivot means.

8. A dental articulator comprising a base, a spring-controlled upper articulate member arranged in superposed relation with respect to the base, a pair of independently bodily adjustable spaced tensioning mechanisms supported above the base, transverse pivot means for and carried by said member, said pivot means slidably mounted in said mechanism each of said mechanisms including an adjustable element bearing against the transverse pivot means to increase and decrease the tension of said mechanisms, and means carried by said member and operatively engaging with the base for imparting simultaneously an oscillatory and a vertical movement to said member.

9. A dental articulator comprising a base, a spring-controlled upper articulator member arranged in superposed relation with respect to the base, a pair of bodily adjustable spaced tensioning mechanisms supported by and above the base, each of said mechanisms including a housed coiled spring, transverse pivot means for and carried by said member, said means extending into said mecha-

nisms and bearing against said springs, each of said mechanisms having the inner sides slotted for the passage of said means, a trough carried by said base, and driven means carried by said member and including an L-shaped element for operating in said trough for imparting simultaneously an oscillatory and vertical movement to said member.

10. A dental articulator comprising a base, a spring-controlled upper articulator member arranged in superposed relation with respect to the base, a pair of spaced, bodily adjustable, tensioning mechanisms supported by and above the base, each of said mechanisms including a housed coiled spring, transverse pivot means for and carried by said member, said means extending into said mechanisms, said mechanisms having the inner sides slotted for the passage of said means, a trough carried by said base, driven means carried by said member and including an L-shaped element for operating in said trough for imparting simultaneously an oscillatory and vertical movement to said member, and means bearing against said pivot means for adjusting the tension of said spring.

11. A dental articulator comprising a base, a spring-controlled upper articulator member arranged in superposed relation with respect to the base, a pair of independently bodily adjustable spaced tensioning mechanisms supported above the base, transverse pivot means for and carried by said member, said pivot means slidably mounted in said mechanism, each of said mechanisms including an adjustable element bearing against the transverse pivot means to increase and decrease the tension of said mechanisms and means carried by said member and operatively engaging with the base for imparting simultaneously an oscillatory and a vertical movement to said member, a support for each of said mechanisms, each of said mechanisms including a threaded member extending through its respective support, and means carried by said members and coacting with said supports for clamping said mechanisms in adjusted position.

12. A dental articulator comprising a base, a spring-controlled upper articulator member arranged in superposed relation with respect to the base, a pair of independently bodily adjustable spaced tensioning mechanisms supported above the base, transverse pivot means for and carried by said member, said pivot means slidably mounted in said mechanism, each of said mechanisms including an adjustable element bearing against the transverse pivot means to increase and decrease the tension of said mechanisms, and means carried by said member and operatively engaging with the base for imparting simultaneously an oscillatory and a vertical movement to said member, a support for each of said mechanisms, and said supports and mechanisms having coacting means to provide a setting gauge for each of said mechanisms.

13. A dental articulator comprising a base, a spring-controlled upper articulator member arranged in superposed relation with respect to the base, a pair of bodily adjustable spaced tensioning mechanisms supported by and above the base, each of said mechanisms including a housed coiled spring, transverse pivot means for and carried by said member, said means extending into said mechanism and bearing against said springs, each of said mechanisms having the inner sides slotted for the passage of said means, a trough carried by said base, and driven means carried by said member and including an L-shaped element for operating in said trough for imparting simultaneously an oscillatory and vertical movement to said member, a support for each of said mechanisms, and said supports and mechanisms having coacting means to provide an independent setting gauge for each mechanism.

In testimony whereof, I affix my signature hereto.

WILLIAM M. GAMBILL.