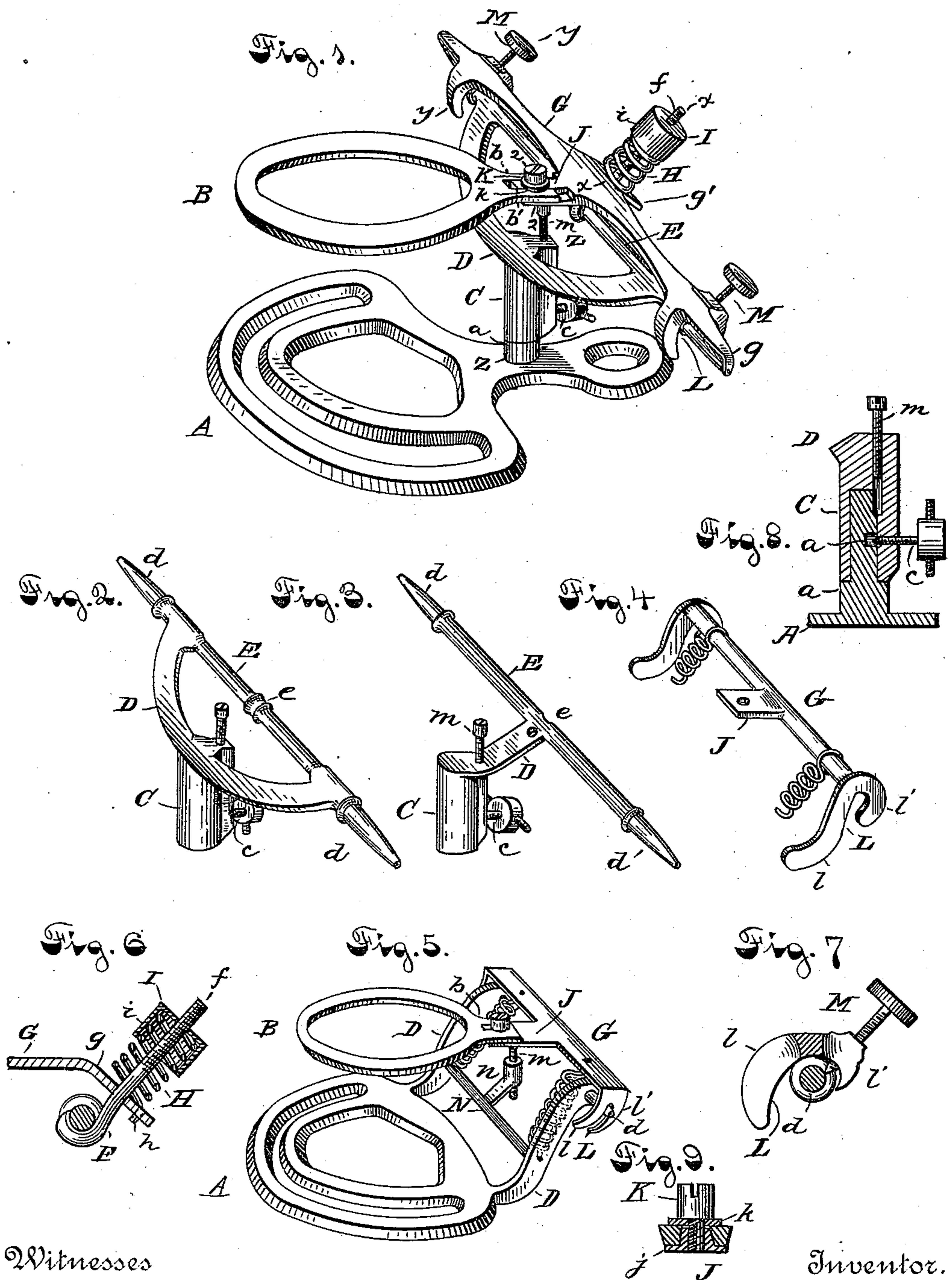


(No Model.)

R. S. HAYES.
DENTAL ARTICULATOR.

No. 396,566.

Patented Jan. 22, 1889.



Witnesses

H. W. Neely.
C. F. Drew.

Inventor.

Richmond S. Hayes

By his Attorney

M. D. Peck

UNITED STATES PATENT OFFICE.

RICHMOND S. HAYES, OF EAST BLOOMFIELD, NEW YORK.

DENTAL ARTICULATOR.

SPECIFICATION forming part of Letters Patent No. 396,566, dated January 22, 1889.

Application filed September 10, 1888. Serial No. 285,018. (No model.)

To all whom it may concern:

Be it known that I, RICHMOND S. HAYES, a citizen of the United States, residing at East Bloomfield, in the county of Ontario and State of New York, have invented certain new and useful Improvements in Dental Articulators; 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, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to that class of devices known as "dental articulators," and has for its object to provide an instrument upon which a dental operator may fix the casts or models of plates of artificial teeth in a position corresponding to that of the natural jaws, and, having placed them in such position, to be able to perform all of the movements by the artificial jaws, one upon the other, that can be performed by the natural jaws, to enable the dental operator in the absence of his patient to perform all of his work and to avoid the necessity of the usual tiresome and painful sitting of the patient for hours in having the teeth of the artificial plates fitted to all of the different positions of the jaws; and it consists in the construction hereinafter described, and more particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective view of an articulator embodying my improved invention. Fig. 2 is a perspective detail view of a portion of the same. Fig. 3 is a detail view of a slightly-modified form of attachment of the arm having the condyles thereon. Fig. 4 is a detail view of an arm, showing a slightly-modified form of condyloid cavities integral therewith and spring attachments for holding the arm and upper plate-holder to the lower holder. Fig. 5 is a perspective view of a modified form of the attachments of the lower and upper plate-holders. Fig. 6 is a sectional detail view of the spring-holder on the line xx of Fig. 1. Fig. 7 is a sectional view of the condyle and condyloid cavity on the line yy of Fig. 1. Fig. 8 is a vertical section of the post and tube uniting the impression or plate holders

on the line zz of Fig. 1, and Fig. 9 is a cross-sectional view of the tongues and set-screw on the line 2 2 of Fig. 1.

Like letters of reference refer to corresponding parts in each figure of the drawings.

In the construction of my articulator a holding-frame, A, representing the lower jaw, is formed, having adjustably mounted thereon an upper holding-frame, B, representing the upper jaw. These frames are so adjusted as to be held substantially parallel one over the other. The lower holding-frame is provided on its rear or handle portion with a vertical recessed post, a , having a hole, a' , in its rear side for the point of a set-screw. Upon the post a there is a vertical sleeve, C, that rests down upon its shoulder, which is provided in its re-enforced rear side with a set-screw, c , that takes into the hole of the post. On the front side of the upper end of the sleeve C there is a curved arm, D, integral with the sleeve, that extends laterally upward and backward from each side of the sleeve, having its extreme rear ends united by a straight bar, E, integral therewith, which extends beyond the ends of the curved arm D on each side to form condyles d , that serve the same purpose in operation of my device as those in the human jaw. The center of the bar E opposite to the sleeve C is re-enforced, forming a groove, e , around the bar, within which a spring-hook, F, is placed for the purpose of connecting the upper with the lower holding-frames.

The upper holding-frame, B, is constructed with a rearwardly-extending tongue, b , having a slot, b' , therein beveled downward and outward to its end.

Over the straight bar E, having the condyles thereon, is another straight bar, G, corresponding in length with the distance from one condyle to the other in the average human jaw, which has projecting ends g , having holes therein for the insertion of the ends of any suitable measuring-calipers for aiding in properly adjusting the casts on the holders after the measurement of the head has been taken from one condyle to the other and from the condyles to the symphysis of the jaw. At the central point of the bar G there is a lug, g' , extending backward and downward, hav-

ing a hole through its center for the admission of a long screw-threaded shank, *f*, which extends up through the lug a sufficient distance to admit of a coil-spring, H, or other
 5 spring, as rubber, being placed thereon. The shank *f* of the hook is provided at its upper end with a nut, I, having a socket, *i*, extending downward from its edges, of the same interior diameter as that of the coil-spring, so
 10 that when the nut is turned down upon the shank the upper end of the spring will be enveloped within the socket and carried with it, while the lower end, *h*, of the spring is securely fastened within the lug *g'* to prevent
 15 its turning upon the shank during the operation of adjusting the bars one upon the other. Upon the opposite side of the bar G from the lug *g'* there is a forwardly-projecting tongue, J, having its edges recessed downward and
 20 outward to near its lower side, where a lateral flange, *j*, is formed, upon which the beveled tongue *b* of the upper holding-frame, B, is adapted to fit and to be adjusted back and forth, as desired.
 25 The flanged tongue J is provided with a set-screw, K, having a collar, *k*, resting thereon underneath the head of the screw. The tongue *b* is slightly thicker than the tongue J above the flange *j*, and projects above the same, so
 30 that when the collar *k* is tightened down upon it by means of the screw the tongue *b* is bound between the flange and the collar and is securely held in any desired position.
 Near the ends of the bar G there are ear-
 35 shaped cavities L, formed integral with and at right angles to the length of the bar, as nearly as possible representing the shape of the condyloid cavities in the human upper jaw. These cavities are formed by a forwardly and downwardly extending projection, *l*, from the front side of the bar G, together
 40 with a rearwardly and downwardly extending projection, *l'*, from back side of the bar. The condyloid cavities thus formed are adapted to receive the condyloid processes *d* on the
 45 ends of the bar E, the end of the front projection forming the cavity extending below the bar E, while the lower end of the rear projection is on about a central plane with the
 50 bar when in a normal position. The rear projection, *l'*, of the cavity is of sufficient thickness to receive a set-screw, M, which passes through it at an angle of about forty-five degrees and rests against the side of the condyloid process, which is for the purpose of
 55 adjusting and holding the process forward or backward in the cavity at any desired point, thereby moving the upper holding-frame back and forth over the lower one to make them
 60 conform in position to the casts thereon taken of the mouth, or to the plates made therefrom which are being fitted to the jaws. With the upper holding-frame, B, thus yieldingly pivoted to the bar E by the spring-hook F through
 65 the bar G, whose cavities rest down upon the condyles of bar E, the front part of the upper holder is free to be turned for the articu-

lation of the teeth, or up or to one side upon the post *a*, as desired, for the insertion or removal of the plates or casts. 70

As it is necessary to bring the holding-plates nearer together in some instances than in others to make them conform to the thickness of the casts or plates to be finished, a vertical supporting and adjusting screw, *m*, 75 is inserted within the top of the re-enforced portion of the sleeve C, which is adapted to be moved up and down at will, upon the head of which the tongue J of the bar G is made to rest. 80

The bar E may be supported by the arm D, extending directly backward and upward from the top of the sleeve C, as shown in Fig. 3. In this form the spring-hook F is passed around the bar E and through an opening in 85 the arm.

If desired, the arms D may extend backward and upward from the lower holding-frame, A, conforming substantially to the rear portion of the human jaw, as shown in Fig. 90 5, in which case the condyles *d* are formed integral therewith and extend outward at right angles to the arms at their rear portions. In this construction the bar G is preferably formed with a downwardly and forwardly extending lip at right angles thereto at each end, having forwardly-curved slots or cavities L therein, representing the condyloid cavities which work upon the condyles, and have 95 coiled springs H secured to the bar and to the inside of the arms below for yieldingly holding the parts together. As the post and sleeve of the lower holder are not necessary in this form, a cross-bar, N, is placed between the arms D, having an inclined arm, *n*, extending backward and upward from its center, carrying a nut for the supporting and adjusting screw *m*. The tongue *b* of the upper holder may rest upon the tongue J of the bar and be adjusted back and forth in a simple 110 slot, *b'*, under the head of the screw K.

A slightly-modified form of the condyloid cavities (shown in Fig. 4) cast integral with the bar G may be substituted for those shown in Fig. 5, in which case the forward projection, *l*, is curved forward and upward a sufficient distance to prevent the condyle from accidentally riding over its end when too great pressure is made upon the upper holder when the casts or plates are removed from the articulator. 120

From the construction of my device it will be observed that in operation all the possible movements of the natural jaws can be performed by the holding-plates of the articulator. 125

The upper holding-plate, B, is adjusted back and forth over the lower plate, A, by means of the set-screw K in the tongue J, while it is supported upon the adjusting-screw *m* from 130 beneath the tongue. The two holding-frames are placed at any desired parallel distance apart, or the upper one tilted or rocked over the lower from side to side, to enable the

teeth upon one side of the dental plate to articulate without bringing the others in contact by means of the adjusting set-screws M, working in the condyloid cavities, throwing
 5 the condyles forward on the inclined projection in the cavities they are screwed in, thereby raising or lowering the bar G and tilting it upon the adjusting-screw *m* either forward or to one side. This same movement
 10 of the holders is accomplished by the modified form shown in Fig. 5 by holding the device in the hands, as the yielding springs admit of the plates being tilted one upon the other without being fixed in position by a
 15 set-screw.

When it is desired to place within or remove the casts or plates from the holder, the upper holder is raised or thrown back upon its pivotal connections with the bar E, and
 20 may then be turned on the post *a* and sleeve C at right angles to the lower holder, so as to move one of the holders out of the way of the other without disconnecting any of its parts.

I am aware that dental articulators have
 25 heretofore been made with one holding-frame adjustable upon the other; but such I do not claim, broadly; but

What I do claim as new, and desire to secure by Letters Patent of the United States, is—

30 1. The combination, with a dental articulator having holding-frames one above the other, the upper frame having a bar at its rear end of a length to correspond with the average distance from one condyle to the
 35 other, provided with projections on its front and rear sides at right angles thereto, the front projection being longer than the rear one, and the two forming ear-shaped cavities, of arms connected with the lower holding-
 40 frame having outwardly-extending processes working in said cavities, the bar of the upper holder being yieldingly secured to the lower holder and adapted to be tilted or rocked from side to side upon said processes, as set forth.

45 2. The combination, with holders adjustable one upon the other, having straight bars extending laterally across their rear ends, of a spring adjustment uniting said bars at their center, the upper bar having near its ends
 50 front and rear projections, forming ear-shaped cavities, and the ends of the lower bar form-

ing condyles working in said cavities, adapting the upper holder to be tilted or rocked from side to side, as set forth.

3. The combination, with holders one of
 55 which is adjustably held over and at a parallel distance above the other, with straight bars extending laterally across their rear ends, of a spring-hook secured to the center of the lower bar, having its shank extending through
 60 the upper bar, with a spring thereon, and a socket-nut yieldingly holding said spring down upon the upper bar, as set forth.

4. The combination, with holders one above the other, of a post in the lower holder, a re-
 65 enforced sleeve on said post having curved arms extending outward and backward, the ends of the arms united by a lateral bar having condyles on its ends, and an adjusting-screw
 70 in the re-enforced portion of the sleeve, the upper holder having a bar with cavities near its ends adapted to work over said condyles and yieldingly secured to the lower bar at its center, as set forth.

5. The combination, with adjustable hold-
 75 ers one over the other, having lateral bars at their rear ends yieldingly secured together at their center, of front and rear projections near the ends of the upper bar forming an ear-shaped cavity, the rear projections hav-
 80 ing adjusting-screws extending into the cavities, and condyles on the lower bar working in said cavities, as set forth.

6. The combination, with holders one above the other, yieldingly secured together by bars
 85 at their rear ends, of a tongue extending forward from the upper bar, having its edges recessed downward and outward from the top to a lateral flange beneath, the tongue having a set-screw therein and collar on the screw,
 90 and a beveled slotted tongue on the upper holder resting on said flange and extending above its tongue under the collar, adapted to be adjusted back and forth and to be held in place by the said screw, as set forth.

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

RICHMOND S. HAYES.

Witnesses:

FRANK MUNSON,
 J. H. ADAMS.