April 15, 1947. C. E. D'ESSEN 2,418,824

DENTAL ARTICULATOR

Filed July 13, 1945 2 Sheets-Sheet 1

FIG. 1.

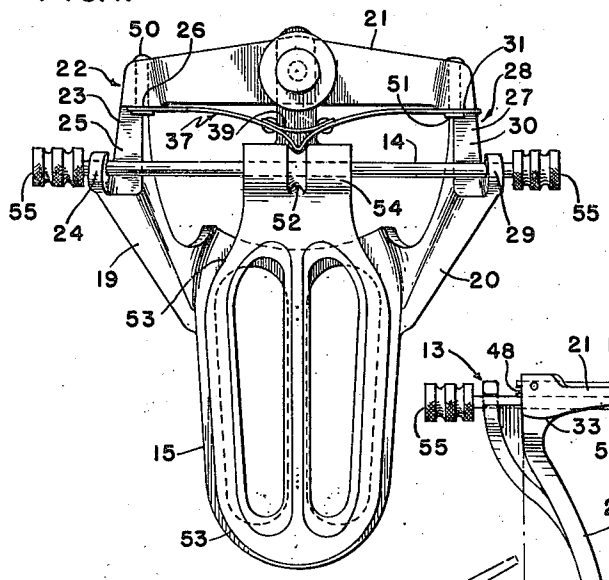
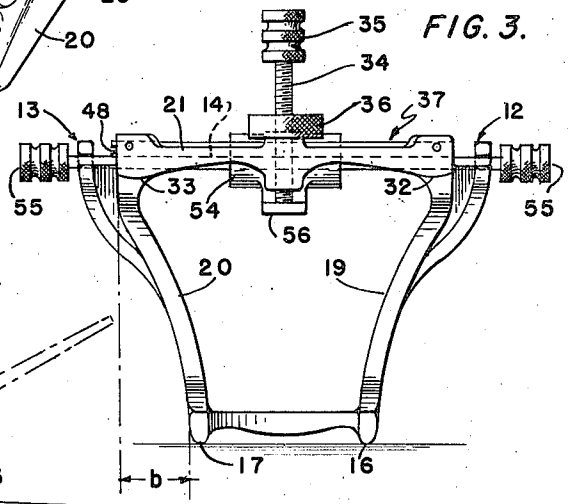


FIG. 3.



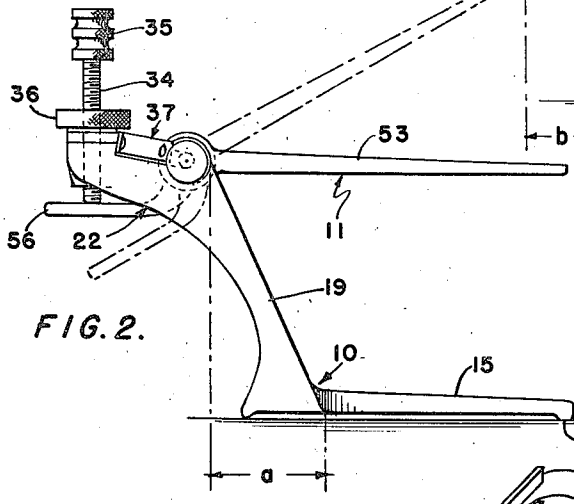


FIG. 2.

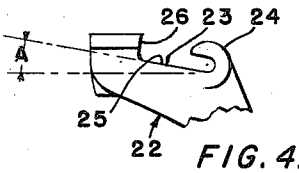


FIG. 4.

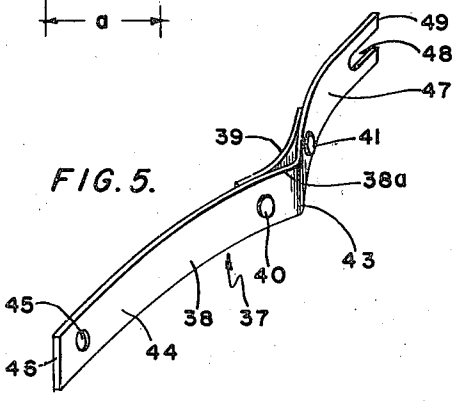


FIG. 5.

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April 15, 1947. C. E. D'ESSEN 2,418,824

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Filed July 13, 1945 2 Sheets-Sheet 2

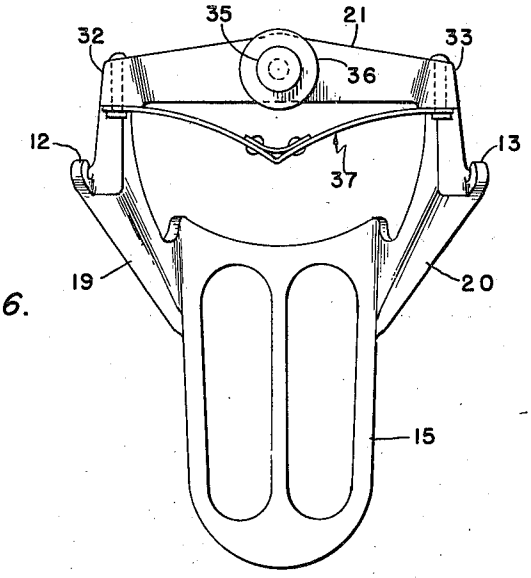


FIG. 6.

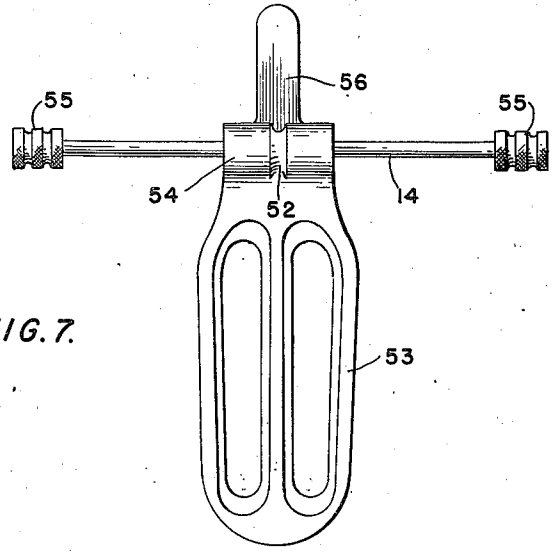


FIG. 7.

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Patented Apr. 15, 1947 2,418,824

UNITED STATES PATENT OFFICE

2,418,824

DENTAL ARTICULATOR

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Application July 13, 1945, Serial No. 604,830

1 Claim. (Cl. 32—32)

1

This invention relates to improvements in dental articulators.

The purpose of such device is to hold in correct relation to one another an upper and a lower cast representing respectively the upper and the lower jaw of the human mouth, which comprises the masticatory mechanism. In dentistry such a device is known as an articulator.

The articulator per se appears as a skeleton structure in which the lower jaw is represented by a skeleton element known as the lower bow adapted to have applied thereto the dental cast of a lower jaw, the upper bow being articulated upon the lower bow as a base for swinging movement about a horizontal axis, and adapted to have applied thereto the dental cast of an upper jaw.

The articulation in such devices must be capable of simulating the motions of the human jaws with respect to each other. That is to say, the articulation must be such as to render the jaws yieldable with respect to each other in the sense that the upper bow is universally displaceable with certain limits with respect to the lower bow, and that the bows will reassume their centralized registering position with respect to one another when the displacing force is removed. Universal displaceability or compound displacement in this connection means that the upper bow in addition to its up and down swinging movement due to articulation, should also be capable of lateral swinging movement, and even of slight total bodily movement in an approximately back and forth direction, all in such a fashion that the bows will normally not become dislocated with respect to each other in an abnormal manner, and will automatically reassume their centralized or normal rgeistering position with respect to each other upon withdrawal of the displacing force. Otherwise expressed, the articulation should allow for transverse as well as longitudinal grinding motions of the jaws upon each other.

Another requirement of such devices is for the upper bow to be easily detachable from its base, that is from the lower bow. There should also be provided adjustable stop means determining that enclosed angle of the bows which corresponds to the position of the dental jaw casts closing upon each other. Another requirement of the articulator construction is that it should offer unobstructed visibility from the rear into the cavity which is formed by the dental casts when closed upon each other.

It is among the objects of this invention to

2

produce an improved articulator which meets the above outlined requirements, and which is of great simplicity involving a minimum of component parts, which is inexpensive to manufacture, which is rugged in construction, and which allows for rapid connecting and disconnecting of the bows.

These objects are attained by the functioning of an element interposed between the lower and the upper bows, so designed and mounted as to serve a multiple purpose and to perform a multiple function. Such an element provides at once the interlocking relationship between the bows along with the resiliently yieldability and universal displaceability of one bow with respect to the other as well as the ability of the bows following a forced displacement to re-align themselves to normal registering position with respect to each other, and further the ability of one bow to be readily disconnected from the other.

According to this invention such multiple purpose and multiple function element is in the form of a structural element of relatively shallow V-shape, that is of a V-shape in which a relatively large angle is enclosed by the shanks of the V. This V-shaped structural member has a solid or non-flexible vertex—or corner portion—and flexible shanks. The extreme end portion of the flexible shanks are spreadably attached to the hinge portion of the lower bow so that the corner portion of the V-shape provides a central prominence substantially in the form of a vertical ridge adapted to engage in a corresponding groove encircling the central portion of the hub or hinge portion of the upper bow. The tension of the spring shank portions of the V-shaped member holds the central prominence thereof engaged in the groove of the upper bow and thereby at once centers the bows with respect to each other, while holding the upper bow resiliently locked in a pair of open hinge portions of the lower bow. The upper bow can be detached by unhinging it from the lower bow against the pressure of the yielding spring shanks of the V-shaped structural member.

Some of the features relate to the disposition of the V-shaped resilient member relative to the associated upper and lower bows of the articulator; other features relate to the V-shaped member per se and as an article of manufacture.

According to one feature one extreme end of a spring shank of the V-shaped member is fixed, while the corresponding end of the other shank is movable although pressure-engaging its base.

Another feature provides for a V-shaped flat

spring member, the vertex or corner portion of which is rendered inflexible by a corner stiffening and bracing element extending within the corner. The invention possesses other objects and features of advantage, some of which with the foregoing will be set forth in the following description. In the following description and in the claim, parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art permit. In the accompanying drawings there has been illustrated the best embodiment of the invention known to me, but such embodiment is to be regarded as typical only of many possible embodiments, and the invention is not to be limited thereto.

The novel features considered characteristic of my invention are set forth with particularity in the appended claim. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings in which

Figs. 1 to 3 show the articulator assembled, Fig. 1 being a plan view, Fig. 2 being a side view, and Fig. 3 being a rear view;

Fig. 4 is a detail side view of the open hinge connection between the upper and lower bows of the articulator;

Fig. 5 is a perspective detail view of the V-shaped structural spring member;

Figs. 6 and 7 show views of the articulator when disassembeld, Fig. 6 being a plan view upon the lower bow with the V-shaped spring member thereon somewhat untensioned and Fig. 7 showing the plan view of the upper bow.

The articulator in Figs. 1 to 3 comprises a so-called lower bow 10 corresponding to the lower human jaw and a so-called upper bow 11 corresponding to the upper human jaw, both bows having disconnectable articulating connection with one another by means of a pair of hinge portions 12 and 13 comprising a shaft 14 of the upper bow lodging in recesses of the lower bow. The lower bow 10 presents a rigid structure, frame, or cast comprising a horizontally extending tongue portion 15 serving as the supporting foot of the articulator and formed with three supporting pads 16, 17, and 18. A pair of posts 19 and 20 rise from the rear end portion of the foot 15, the posts being interconnected at the top by a transverse or bridge portion 21. The posts 19 and 20 are irregularly shaped although disposed symmetrically with respect to each other, one post being disposed at one side of the foot portion 15 and the other post at the side thereof. Thus, for instance, the post 19 extends upwardly with a slight rearward incline as indicated by the distance "a" (see Fig. 2) as well as with a slight lateral outward incline as indicated by the distance "b" (see Fig. 3). The top end portion of the post 19 is formed, as shown more clearly in Fig. 4, with a rearward extending extension 22 formed at the top with a recess 23 presenting an open hinge portion in which the companion hinge part or shaft 14 of the upper bow may lodge. The recess 23 comprises a hook portion 24 to receive the shaft 14, a slightly inclined face 25, the incline being indicated by the angle "A," along which incline the shaft 14 may be displaced, and a vertical face 26. The corresponding portions of a recess 27 on a rearward extension 28 of the post 20 similarly comprises a hook portion 29, an inclined face 30 and a vertical face 31. The extreme rear end portions of the extensions 22 and 28 of the posts 19 and 20 are designated by the numerals 32 and 33 respectively and they are connected by the bridge portion 21, the widened middle portion of which has threaded into it a vertical adjustment screw 34 provided with a knurled head 35 and with a knurled locknut 36.

A V-shaped structural spring member 37 is attached to the vertical faces 26 and 31 in the recesses 23 and 27 respectively, the manner of attachment being clear from Figs. 1 and 2, as well as from the detail perspective Fig. 5 of the V-shaped member per se. The member 37 comprises a flat spring element 38 formed in the shape of a V presenting a vertex or corner portion 38a which of itself is kept rigid by means of a relatively inflexible brace element 39 shown to be riveted to the spring element 38 as at 40 and 41. Hence, there results a V-shaped structure or member 37 having a substantially nondeformable corner portion or prominence presenting a vertical edge 43, a resiliently deformable flat spring portion or shank 44 provided with a hole 45 at the end 46 of the shank and a flat spring portion or shank 47 provided with an indention or cut-out 48 at the end 49 of the shank. The one end portion 46 of the V-shaped member 34 is shown to be fastened to the face 26 of the recess 23 on the lower bow 10 as by a rivet 50, while the other end portion 49 of the member 37 engages the face 31 of recess 27 at the opposite side of the lower bow 10, and is held against vertical displacement although horizontally movable by a pin 51 lodging in the cut-out 48 to allow for resilient deformation or bending of the shanks 44 and 47 of the V-shaped member 37 while maintaining centralized the rigid corner portion 38a which in turn centralizes the upper bow 11 while engaging in a groove 52 thereof. The upper bow comprises a tongue-like horizontal portion 53 formed at the rear with a hinge portion comprising a thickened portion or hub 54 in which is fixed the shaft 14 which is provided at each end with a knurled finger piece 55. From the hub 54 rearwardly extends a finger 56 so disposed as to be engaged by the lower end of the adjusting screw 34, this screw thus serving as an adjustable stop for the downward swinging movement of the upper bow 11, the stop adjustment to be made in accordance with the requirements of the particular casts of the jaws to be carried by the articulator.

The operation of the device and the co-action of the parts are substantially self-explanatory from the discussion of the parts so far rendered, as well as from the drawings. The manipulation of disconnecting the upper bow 11 from the lower bow 10 is extremely simple, requiring nothing but to displace the shaft 14 in a direction transversely to its longitudinal axis upon the sloping faces 25 and 30 far enough to have the shaft released from the hook portions 24 and 29 so as to enable it to be removed upwardly from the recesses 23 and 27.

I claim:

In an articulator the combination of a lower bow comprising a horizontally extending tongue-like foot portion, a pair of posts rising from the rear end of the foot portion and disposed symmetrically with respect to the longitudinal center line of the tongue-like foot portion, a transverse portion interconnecting the top end portions of said posts, each post having in its upper portion an upwardly open recess disposed intermediate

said transverse portion and said foot portion although adjacent to said transverse portion, said recess being defined by a hook portion the open end of which faces said transverse portion, a substantially vertical face facing opposite to said hook portion, an operating face for sliding contact with a portion of the upper bow to be defined below, said operating face extending intermediate said vertical face and said hook portion of the recess, an upper bow comprising a tongue-like portion having fixed to its rear end a transversely extending shaft adapted to lodge in said hook portion and having a circular groove concentric with the shaft and disposed in the middle of said upper bow tongue-like portion, and a V-shaped resiliently deformable locking and centering member having a non-deformable vertex portion at the middle presenting a ridge adapted to lodge in said circular groove of the upper bow, and deformable flat spring shank portions the ends of which are attached to the respective vertical faces of said recesses, so that said V-shaped member is confined and held in tensioned condition between said circular groove and said vertical faces thereby resiliently locking and

centering said upper bow with respect to the lower bow while maintaining articulated relationship between them, one end of said V-shaped members being fixed while the opposite end thereif is horizontally displaceable to allow for deformation of the member, and adjustable stop means for defining the angular relationship between the upper and the lower bow when the same are in jaw closing position.

CHARLES E. D'ESSEN.

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