

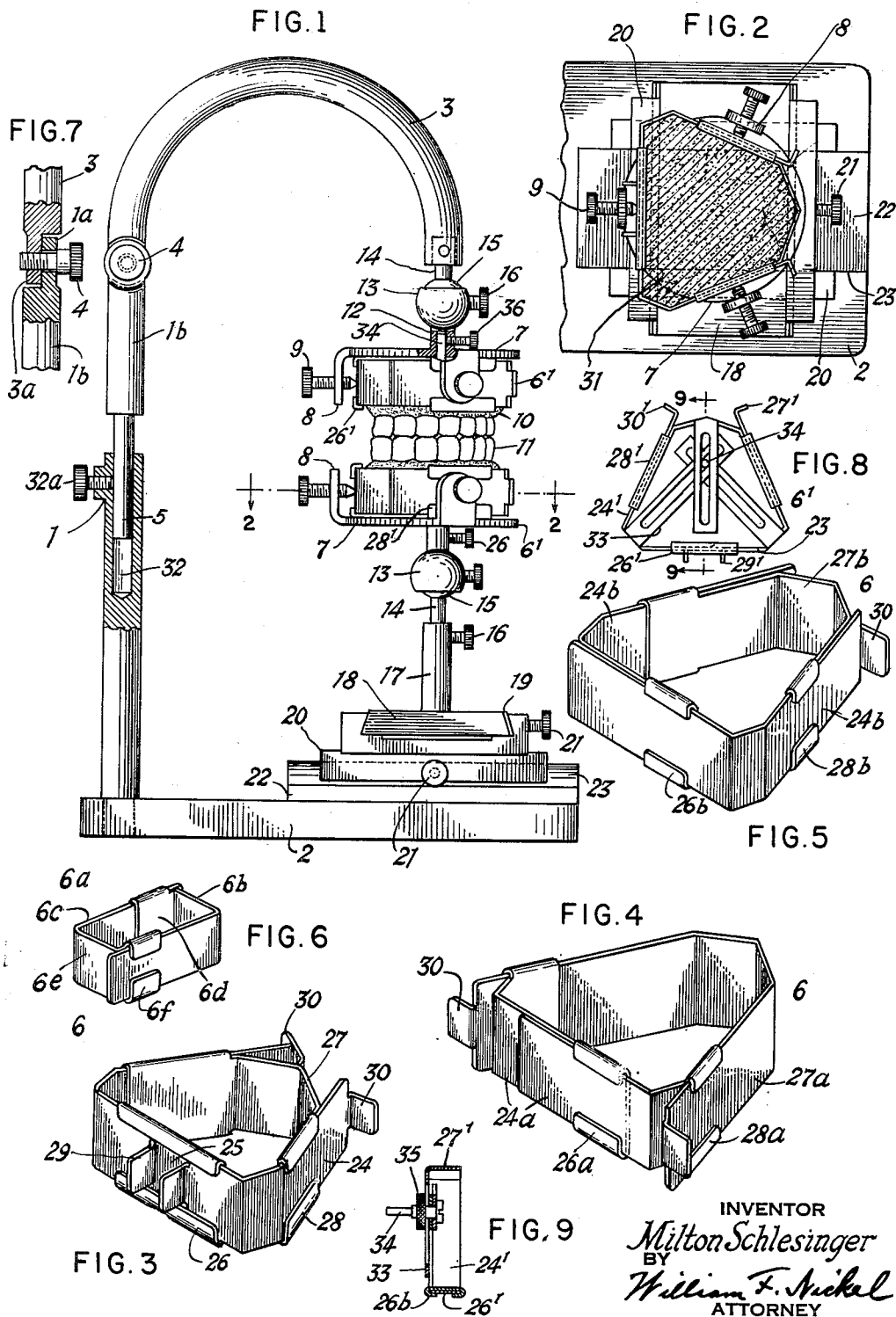
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M. SCHLESINGER

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DENTAL APPARATUS

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DENTAL APPARATUS

Milton Schlesinger, Jamaica, N. Y.

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3 Claims. (Cl. 32—32)

1

This invention is an improvement in dental apparatus, and more particularly an appliance in the form of a stand with means for supporting and adjusting models conforming to the inside of the human mouth.

An object is to provide a stand having members to which the models carrying teeth of porcelain or other suitable material can be readily attached, and which are so mounted that said members can be replaced or shifted in every way required to give the desired results.

The main purpose of my device or appliance, in general, is to give an operator a neat, easy, practical method of securing models to an articulator or other unit, without the aid of any adhesive materials; so as to facilitate the removal of the models, and the replacement thereof on the articulator stand, in their proper positions; and the adjustment of the models to the extent and in the manner required. The models can thus be given form with bases of predetermined size and shape.

Heretofore dental models have been retained in place on various types of articulators by means of plaster of Paris or other adhesive materials, thus producing a more or less permanent bond with the articulator. In cases of necessary adjustment or where steps of construction required removal of these models, the operator has been compelled either to break the models loose from the articulator or else dismount the part of the articulator to which they were attached.

I believe this condition has existed because no apparatus had been heretofore produced to compensate for the various sizes of models obtained from impressions of different sizes corresponding to the dimensions of the individual arches and dentition of the human mouth.

In the accompanying drawings some preferred embodiments of the invention are illustrated, and the details of construction may of course be varied in numerous ways without deviating from the general combinations defined in the appended claims.

On said drawings,

Figure 1 shows a side view of the complete apparatus according to my invention.

Figure 2 is a horizontal section on line 2—2 of Figure 1.

Figures 3, 4, 5 and 6 are perspective views of adjustable retaining frames used in the operation of my invention.

Figure 7 is a sectional view of a detail.

Figure 8 is a top view of a holding member for supporting the model in the stand; and

2

Figure 9 is a section on line 9—9 of Figure 8.

The device includes an adjustable post or standard 1 which is affixed in upright position to the base 2. The top section 3 of this standard curves over and downward and is secured in position to the upright part of the standard by means of perforated ears 1a and 3a, the latter having threads to engage a tightening screw 4. The section 3 can thus be adjusted up and down as needed. The post 1 has an upper section 1b, at the lower end of which is a shank 5 that telescopes into the top of the principal length of the post 1, to permit additional adjustment, as will be described later.

In the operation of the device, molding or shaping frames indicated as a whole by the numeral 6 are utilized to receive the models or impressions of the upper and lower parts of patient's mouth. These frames comprise movable sections, so that the size can be regulated; and after the models are produced they are each transferred to a holding or locking member 6' (Figure 8). The locking or mounting members 6' are attached to plates or supports 7 having down-turned lugs 8 at the rims to mount binding screws 9. Three such lugs with binding screws are provided for each plate at equal distances apart, and when the frames 6' are set within the compass of these lugs and the screws tightened, they are held firmly in position. The frames in question encircle the models made of suitable material, and by means of the post 1 and the manner of mounting the two plates 7 any desired adjustment of the plates 7 relative to each other can be obtained.

The top plate 7 has on its upper face a central stem or shank 12 carrying a cup-shaped bearing element 13, and the downturned section 3 of the standard carries at its outer end a stud 14 with a spherical bearing member 15 at its lower end. The cup-shaped member or socket envelops the spherical bearing member 15 and by means of screw 16 on the member 13 any position of adjustment can be maintained. With this ball-and-socket connection the top element 7 can be tilted in any direction.

The lower plate 7 carries on its under face a similar socket or cup-shaped member 13 that envelops a ball 15 on a stem, standard or shank 14, which is mounted in a socket 17, also having a binding screw 16. The socket 17 rises from a block 18, the sides of which are inclined so that the block has a "dovetailed" shape, to slide in a similarly shaped groove 19 in the top face of a supporting block 20. The position of the block 18

3

is fixed by means of a binding screw 21 in the block 20. On the base is another fixed member 22 having undercut sides indicated at 23, and the block 20 also has a "dovetailed" channel in its lower face which fits the top of the block 22, so that the block 20 can be moved thereon. The member 22 is really part of the base and could of course be made in one piece therewith. The channel in the under face of the block 20 and the block 22 are at right angles to the channel 19 in the upper face, and the block 20 can also be fixed in position on the block 22 by a binding screw 21. Hence the lower plate 7 can not only be tilted in any direction but it can be shifted in two directions at right angles to each other, so that it can be adjusted correctly with respect to the upper plate 7.

The molding frames indicated at Figures 3, 4, 5 and 6 are all similar to one another in construction. They are preferably made of strips of suitable material; the form shown in Figure 3 comprising two sections 24, one end of each being bent into alinement with the adjacent end of the other to bring said ends in opposing positions; said ends being spanned by a connector 25 with overturned edges 26 slidably engaging the ends of the strips 24 along their lateral edges. The remaining portions of the strips 24 are bent towards each other and are bridged by a bent section 27, the edges at the ends of which are bent over to form retaining flanges or guideways 28; engaging the edges of the sections 24 along the sides. The aligned extremities of the sections 24 have lugs 29 and the opposite ends of the strips 24 extend beyond the section 27 and have bent out lugs 30. The size of this frame can be adjusted by pulling the part 27 outward and by moving apart the two members 24 to enlarge the frame. The size is decreased by pressing together the lugs 29 and the lugs 30 and moving the part 27 inward. Owing to the convergence of the parts of the strips 24 having the lugs 30 at the ends and the inclination of the sides of the section 27, the pressing together of these ends tends to force the part 27 towards the part 25 and thus facilitates giving this frame a smaller compass. The part 27 has the approximate shape of a U with the arms at the sides diverging, carrying the long bent over edges or flanges 28 and making an angle with the base or part connecting said arms; and said base consisting of short straight lengths with a bend in the middle. Thus pressing the sections 24 towards each other tends, by a sort of cam effect, to move the section 27 towards the connector 25. The part 27 can of course have other shapes if desired.

In Figure 4 the frame comprises two overlapping portions or sections 24a, one of which has bent edges or flanges 26a at its sides to engage the edges of the other; and a piece 27a which is approximately U-shaped as before and is secured to the opposite bent up ends of the parts 24a. Said ends have turned over edges making flanges 28a to engage the edges of the two arms of the member or section 27a. The extremities of the member 27a have lugs 30. The size of this unit is increased or decreased by sliding the members 24a with respect to one another and moving the member 27a in the flanges 28a.

The frame shown in Figure 5 has a bent suitably V-shaped member 27b, with short flanges 28b, similar in shape to the part 27 shown in Figure 3, cooperating with two side members 24b. The latter are bent so that they overlap at one end, beyond the flanged extremities of the section

4

27b, one of these overlapping ends having bent over projections at the sides making flanges 26b to engage the other end. The part 27b is inside the parts 24b, and its flanges 28b secure the parts 24b. The three parts can also be moved for adjusting the size of the frame with the same effect as in Figure 3, and the remaining ends of the parts 24b have projecting lugs 30.

The main part of the post 1 has a socket 32 in its upper end to receive the shank 5 of the section 1b. The shank 5 is adjustably secured in the socket 32 by a binding screw 32a.

My invention also comprises the supporting or locking frame or member 6' corresponding in construction to the members 6. The frame 6' has three diagonal arms 33 affixed to one edge of its three parts. One arm is joined to the middle of the U-shaped part 27'. Another arm 33 is secured to each part 24' at the two corners adjacent the inner ends of the part or strip 27'. These arms are all longitudinally slotted. The slotted arms intersect and cross at one point to allow a bolt 34 to pass through. This bolt can be locked by means of a finger nut 35 to lock all parts of the frame in position. The size of the frame 6' can therefore be adjustable. The parts 24' have the retaining flanges 26'.

The frame 6' of Figure 8 resembles most closely the frame 6 of Figure 3. However, the form shown in Figures 4 and 5 can likewise be adapted to have arms 33 added, as will be obvious.

This member 6' is intended for mounting or locking the models on the stand illustrated in Figure 1. The bolt 34 is attached to a socket in the shank 12, passing through a hole in the plate 7. An additional binding screw 36 in the side of the shank 12 makes the locking member 6' fast. An upper and a lower member 6' are of course employed. Any type of molding member can of course be utilized with my apparatus.

The operator starts first with the impression of the patient's mouth. This impression is boxed in one of the adjustable molding members shown in Figures 3, 4, 5 and 6. A model is then formed by pouring the desired material into this member, covering the impression and filling the member. When the model material is hardened, the member is removed. The model of course has a base of a pre-determined form and size, according to the shape of the inside of the molding member. The models are then transferred to the frames 6'.

The upper and lower frames 6' attached to the articulator or stand of Figure 1 are adjustable and the interior outline of each frame 6' corresponds identically with the inside of the molding frames 6 containing the impressions or models. The frames 6' are fixed to the plates 7, as above described.

As the base of each poured model will have the same outline form of the inside of its molding frame 6, so likewise will this base be identical in form with the inside of the mounting or locking frame 26' attached to the articulator, and receiving the model.

Upon placing the models into frames 6' and tightening the latter about the models therein, a secure means for readily and perfectly attaching the models and frames to the stand 1 is obtained.

Should the model have to be removed, the frame 6' is loosened, and the model is extracted. Replacement is easy and simple, as all parts are similar in shape—replacing and retightening are all that is required.

5

Figure 6 shows another and simpler type of frame 6a consisting of two angle pieces 6b, each with a long side 6c and a short side 6d connected by an end 6e. This frame is assembled by laying the long sides over the short sides, the short sides having bent over projections 6f at the edges to act as guides for the long sides so that the frame can be shortened or lengthened. A mounting frame with arms 33 as illustrated in Figure 8 can be produced to resemble this outline also.

The shank 5 and socket 32 also permit swing adjustment of the part 3 and upper plate 7, in addition to up and down adjustment about the axis of the screw 4.

The molding members 6 can also have locking means, such as the slotted arms 33 affixed to the parts thereof in the same way as the frame 6', for securing the models or impressions therein.

Having described my invention, what I believe to be new is:

1. Apparatus of the kind described comprising a base, an adjustable standard thereon, a supporting element, means comprising a ball joint for adjustably connecting said element to the standard, a supporting element adjacent the base, means for mounting said last-named element to shift same with respect to said base into alignment with the first-named element, and means comprising a ball joint for adjustably connecting said last-named element with said mounting means, said mounting means comprising a member supported by said base to be shifted in one direction, and a second member disposed on the first to be shifted in another direction.

2. Apparatus of the kind described comprising a base, an adjustable standard thereon, a supporting element, means comprising a ball joint for adjustably connecting said element to the

6

standard, a supporting element adjacent the base, means for mounting said last-named element to shift same with respect to said base into alignment with the first-named element, and means comprising a ball joint for adjustably connecting said last-named element with said mounting means, said mounting means comprising a member supported by said base to be shifted in one direction, and a second member disposed on the first to be shifted in another direction, said second member having guideways in its upper and lower faces.

3. Apparatus of the kind described comprising a supporting plate, a stem, a ball-and-socket joint for adjustably maintaining said plate in position on the stem, retaining means carried by the plate, the apparatus also having a mounting member for said stem, an upright socket for said stem on said member, means for adjustably securing said stem in said socket, said member being disposed to move in one direction, and a second member on which said first member is supported and having a channel slidably receiving said mounting member and means having a channel extending across transversely of the first named channel, on which said second member is disposed to slide in another direction.

MILTON SCHLESINGER.

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