Jan. 30, 1951 M. ZILINSKI 2,539,882

ARTIFICIAL TEETH

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Fig. 1

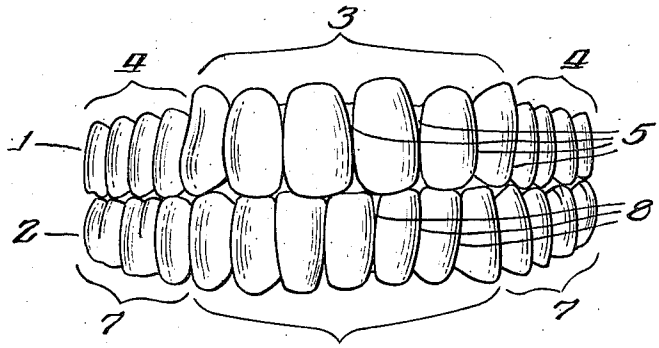


Fig. 2

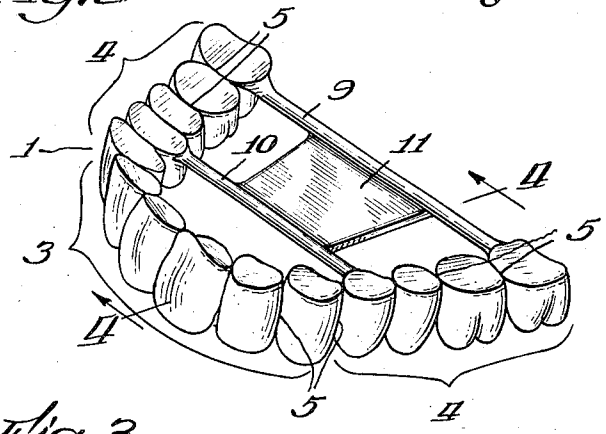


Fig. 4

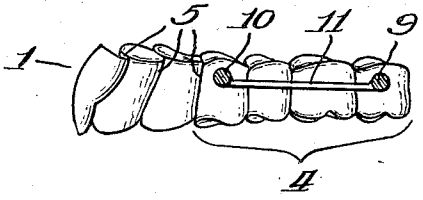


Fig. 3

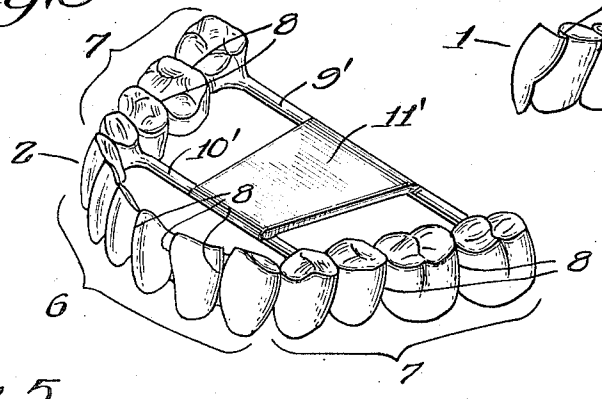
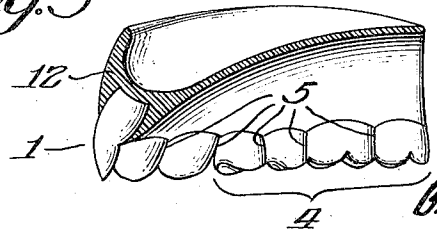


Fig. 5



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ARTIFICIAL TEETH

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3 Claims. (Cl. 32—8)

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This invention relates, in general, to artificial teeth, and has particular relation to an improved preformed anatomical and mechanical arch comprising a full set of fourteen artificial teeth rigidly joined into a unitary structure.

It is well known to those versed in the art that in prosthetic dentistry it has been an exacting part of the work in making a plate or full denture to arrange the teeth in the denture. Heretofore it has usually been necessary for the technician to set the fourteen teeth in each arch individually, requiring considerable expenditure of time, considerable skill, and not always resulting in the best possible end result from the standpoint of appearance and function.

There have been efforts to meet the problem and simplify denture construction, for example, by the use of rigid preformed metallic matrices for establishing level occlusal plane in the patient's mouth; also by the proposed use of a set of teeth strung on a band which is sufficiently pliable, or wherein the teeth are otherwise pliably joined to permit fitting the teeth or obtaining satisfactory articulation of the occlusal surfaces by bending the band or other pliable means connecting the teeth.

According to the first of the above schemes, removal of the matrix and individual setting up of the teeth is required in completing the denture. The second scheme is arranged to allow for and requires bending the means pliably connecting the teeth to change the shape of the set-up to the desired configuration. The latter scheme has also had the disadvantage of being frail and subject, in transporting and handling the flexible tooth set-ups, to distortion from the original typal forms given them.

One of the main objects of the present invention is to provide, as a new article of manufacture, an improved preformed anatomical and mechanical arch comprising a full set of artificial teeth for the adjacent jaw and in which the teeth are rigidly joined into a unitary structure whereby, in transporting and handling, distortion from the original typal form given the arch is avoided; the preformed anatomical and mechanical arched set-up of teeth being adapted in making a full denture to be joined as a rigid integral unit to the denture base which is shaped to fit the patient's mouth.

Another object of the invention is to provide a rigid arched tooth set-up of the character described which, by being made up in different sizes and different contours, will provide for adaptation to different mouth contours and

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mouth sizes without bending the tooth set-ups to fit them to the desired configuration which distorts the original preformed anatomical and mechanical set-up given the teeth in making the arch.

Another object of the invention is to provide, where suitable or desired, in conjunction with the rigid arched tooth set-up, truss or bracing means for maintaining the desired rigidity of the arch and the desired relation of the teeth after the arch is completed; also to prevent warpage during storage, particularly where the rigidly joined teeth are made of synthetic resin material; it being contemplated that such truss or bracing means may be omitted and that, where present, it may be removed from the arch, for example, at the time the denture base is to be molded or joined to the gingival ends of the teeth to form the plate or denture with the set-up teeth and the base formed to fit the patient's mouth.

Another object of the invention is to provide an improved rigid anatomical and mechanical preformed tooth set-up of the character described having various features of novelty and advantages and characterized by its simplicity in construction, the manner in which the anatomical and mechanical set-up is preformed and maintained, and by the improved end results obtained from the standpoint of appearance and function.

Further objects and advantages of the invention will appear from the following detailed description, taken in connection with the accompanying drawing in which:

Figure 1 is a front elevational view of upper and lower tooth arches embodying the present invention showing the same properly articulated;

Figure 2 is a perspective view of the upper tooth arch shown in Figure 1;

Figure 3 is a perspective view of the lower tooth arch shown in Figure 1;

Figure 4 is a fragmentary detail section taken on the line 4—4 of Figure 2; and

Figure 5 is a fragmentary vertical section through the front of the upper tooth arch and showing the same applied to a denture base.

Referring now to the drawing, Figure 1 shows, at 1, an upper preformed anatomical and mechanical tooth arch embodying the present invention, and, at 2, a lower preformed anatomical and mechanical tooth arch embodying the invention properly articulated with respect to the arch 1.

The upper tooth arch 1 comprises a full set of

fourteen upper teeth for the upper jaw. The teeth, which include the six anterior teeth 3 and the molars and bicuspids on each side, as designated generally at 4, are preformed in proper anatomical and mechanical relation and are all rigidly joined together at 5 into a rigid unitary tooth arch.

The lower tooth arch 2 comprises a full set of fourteen lower teeth for the lower jaw. These teeth, which include the six anterior teeth 6 and the molars and bicuspids on each side, as designated generally at 7, are preformed in proper anatomical and mechanical relation and are all rigidly joined together at 8 into a rigid unitary tooth arch.

In making the tooth arch of the present invention, a master pattern is made corresponding with the tooth arch which it is desired to form. The manipulative details of obtaining the desired anatomical and mechanical relation of the tooth portions of the master pattern are well known to those skilled in the art and will not be described, the present invention not being concerned specifically therewith. The master pattern may be formed of artificial stone, metal, or any other suitable or preferred pattern material.

Upon completion of the master patterns, they are used to form molds having cavities in which the preformed anatomical and mechanical arches are formed. Suitable methods for forming molds having such cavities are also well known to those skilled in the art, and they will not be described in detail, the present invention not being concerned specifically therewith.

Where the preformed anatomical and mechanical arch is formed of resinous material, this material is introduced into the mold cavity and molded and cured to the form of the desired preformed anatomical and mechanical arch comprising a full set of artificial teeth for an adjacent jaw and in which all of the teeth of the arch are rigidly joined together into a rigid unitary structure by the tooth material.

The manufacturer, in providing these preformed rigid set-ups of teeth, will provide the preformed anatomical and mechanical arches in a plurality of different shapes and a plurality of different sizes for each shape; also, if desired, covering the several typal forms of teeth and different shades. With these available from the manufacturer, or, for example, from the dental laboratory or distributor, it becomes only necessary for the dentist or the technician to order the arches, for example, by size, mold number, and shade number of the teeth. Where a dental laboratory or distributor is at hand, the dentist may take his model to such laboratory or distributor and immediately select the tooth arch desired.

The making up of the preformed anatomical and mechanical arches of different sizes and different contours provides for adaptation to most mouth contours and sizes, and, with the teeth of the arch rigidly joined into a rigid unitary structure, distortion of the arch from the original typal form given it in its manufacture is avoided in transporting and handling the arch. This is important because it assures maintenance at all times of the proper preformed anatomical and mechanical relation of the teeth. Moreover, in applying the tooth arch to the denture base, there is no bending of the tooth set-up to fit it to the desired configuration which would distort the original preformed anatomical and mechanical set-up given to the teeth in making the arch.

The present invention simplifies tooth arrangement constantly to obtain the most desirable functional relationship of the upper and lower arches to one another because the single arch is rigid and composed of fourteen teeth, and the teeth—especially the posterior teeth—being set in correct anatomical and functional relationship the necessity for skill on the technician's part is minimized. Heretofore it has been necessary for the technician to set the fourteen teeth in each arch individually, requiring considerable skill and considerable expenditure of time and not always resulting in the best possible end result from the standpoint of function.

In the illustrated embodiment of the invention, lateral bracing means is provided between the sides of the arch for maintaining the desired rigidity of the arch and the desired relation of the teeth after the arch is completed. The bracing means for the upper arch, as shown in Figure 2, is in the form of a generally H-shaped truss or brace, having its leg 9 extending laterally between the rearwardmost teeth 4 and its other leg 10 extending laterally between teeth forwardly of the rearwardmost teeth. The ends of the legs 9 and 10 of the bracing structure are formed integral with the teeth at opposite sides of the arch, and the connecting piece 11 between the intermediate portions of the legs 9 and 10 is formed integral with said legs 9 and 10.

The bracing structure may be molded as an integral part of the arch in the formation thereof. The connecting piece 11 of the bracing structure is shown of flat form, and is adapted to carry, for example, the mold number and shade number or other data identifying the size and shape of the arch, and, if desired, the color and form of the teeth, as well as the name of the product and the manufacturer.

The bracing structure for the lower arch 2 is similar to the bracing structure for the upper arch, and the parts thereof are designated in Figure 3 by primed reference characters corresponding with the reference characters used in Figure 2 for designating the parts of the bracing structure for the upper arch.

It is contemplated within the scope of the broader aspects of the present invention to omit the bracing structure, particularly where the arch has the desired strength and rigidity without it. Where the bracing structure is employed, it may be removed from the arch, for example, by cutting the ends of the laterally extending legs of the brace or truss from the adjacent teeth at the time the denture base is to be molded or joined to the gingival ends of the teeth to form the plate or denture with the set up teeth and the base formed to fit the patient's mouth. While in place the brace not only maintains the desired rigidity of the arch and the desired relation of the teeth and prevents breakage, particularly in transporting and handling the arch, but it also prevents warpage during storage, especially where the rigidly joined teeth are made of synthetic resin material.

In using the preformed arch in making a denture, the set-up may be obtained by first adapting a hard base plate—such as shellac or other suitable material—to the model which has been obtained in the usual manner from the impression from the patient's mouth. Next, wax is applied over the ridge area of the adapted base plate against which will be secured the preformed

arch by means of hot wax. The set-up may then be pressed in the patient's mouth for a try-in, to check the esthetic as well as the occlusal relationships, the wax permitting some adjustment. After the desired esthetic and occlusal relationships are secured, the trial plates are referred back to the models, and, after securing them to the models and completing the waxing operation, they are processed in the usual manner—that is, by investing the model with the waxed up and preformed arch applied thereto. The wax is then eliminated, for example, by boiling out in the usual way, and the resin material for the denture base is introduced into the cavity and molded to the preformed arch. In forming the base of denture shown at 12 in Figure 5, the teeth (where they are formed of resin material) may be softened along the gingival ends, but on account of the preformed and rigid relationship of the arch there is no distortion of the arch in the application of the base to it, the investing material preventing any possibility of distortion.

The preformed arches for both the maxilla and mandible are made to dimensions arrived at, for example, by measuring a model taken from an impression of the jaw so that the arch can be selected which will fit directly with the ridge of the opposite model and interdigitate properly with the opposing preformed arch for the opposite jaw. These arches, when attached to bases molded to fit models made from impressions taken by dentists of edentulous patients' upper and lower jaws, enable a dentist or a dental laboratory technician to create comfortable, natural appearing restorations for the purpose of replacing natural teeth that have been lost.

The arches are arranged anatomically and mechanically so that the cusps balance throughout both sets during lateral and protrusive movement. This is obtained by the antero-posterior curve of the occlusal surfaces known as the compensating curve. This makes possible greater stability.

The teeth on the arches are preferably narrow bucco-lingually so as to apply less load to the underlying tissues and, consequently, eliminate excessive resorption. They are also preferably made with full length lingual surfaces, thereby eliminating excessive thickness of completed dentures on palatal and lingual areas, allowing for greater tongue room, natural environment, and no speech interference.

The arches have a tooth arrangement with better esthetics than most dental laboratory technicians can obtain by setting up individual teeth. This because the original set-ups may be made by highly skilled technicians, and the rigidity of the arch maintains the tooth arrangement at all times. The arches may have a tooth arrangement enabling the dental laboratory technician to set up the teeth to an equal height on each side and with both sides parallel to a line through the centers of the pupils of the eyes. They can be set into position faster and better than twenty-eight individual teeth, and they can be set up on either plane line or adjustable articulators.

Moreover, the arches of the present invention provide and preserve a maximum of masticating efficiency because there is no occasion to grind or mutilate cusps on the arches under any circumstances. The arches provide greater security for the teeth after processing, and eliminate the danger of movement of individual teeth during processing. They make it possible to supply anatomical articulation on all dentures constructed with the arches. The articulation may be worked out to perfection in the master patterns by technicians of outstanding ability, and the dentures, with the use of the arches, can be made without requiring that the technicians performing that work have as great ability. It is possible to effect a saving in skilled technicians' labor as compared to the time required for setting up and articulating individual teeth.

In addition, there is a definite time and labor saving to the dentists in that the arches eliminate spot grinding and grinding in to the occlusion of the mouth. The arches may be tried in the patient's mouth for checking esthetics, harmony of tooth form, size of teeth and arrangement, and they need not be supplied in as many shades as are required for individual teeth used on partial dentures.

The preformed arch of the present invention is a rigid unitary arch which maintains the relationship of each tooth to each other tooth, and which also maintain the relationship of all of the teeth to their proper position relative to the ridges.

The embodiment of the invention shown in the drawing is for illustrative purposes only, and it is to be expressly understood that said drawing and the accompanying specification are not to be construed as a definition of the limits or scope of the invention, reference being had to the appended claims for that purpose.

I claim:

1. For application to maxilla and mandible denture bases, a pair of ready-made anatomical and mechanical tooth arches each comprising a full set of artificial teeth for the adjacent jaw, all of the teeth of each tooth arch being permanently and rigidly joined together by the tooth material into a single piece, with the gingival end formations of the teeth confined entirely between the adjacent ends of the lingual and labial surfaces of the teeth and said gingival end formations constituting means for attaching the tooth arches to the denture bases, the teeth of each tooth arch being positioned according to the relation of the ridges of the jaws of the mouth and with the cusps of the teeth of one tooth arch having ready-made anatomical and functional correlation with the cusps of the teeth of the opposing tooth arch, and bracing means extending laterally between the sides of each tooth arch, with the ends of said bracing means integrally joined to the lingual surfaces of the teeth at opposite sides of the respective arches whereby to maintain the ready-made relation of the teeth and to brace the free ends of the sides of the arches.

2. For application to maxilla and mandible denture bases, a pair of ready-made anatomical and mechanical tooth arches each comprising a full set of artificial teeth for the adjacent jaw, all of the teeth of each tooth arch being permanently and rigidly joined together by the tooth material into a single piece with the gingival end formations of the teeth confined entirely between the adjacent ends of the lingual and labial surfaces of the teeth and said gingival end formations constituting means for attaching the tooth arches to the denture bases, the teeth of each tooth arch being positioned according to the relation of the ridges of the jaws of the mouth and with the cusps of the teeth of one tooth arch having ready made anatomical and functional correlation with the cusps of the

teeth of the opposing tooth arch, and bracing means of generally H-shaped form extending laterally between the sides of each tooth arch, with the ends of the legs of said bracing means integrally joined to the lingual surfaces of the teeth at opposite sides of the respective arches, whereby to maintain the ready-made relation of the teeth and to brace the free ends of the sides of the arches.

3. As a new article of manufacture, a ready-made anatomical and mechanical tooth arch comprising a full set of artificial teeth for the adjacent jaw, all of the teeth of said arch being permanently and rigidly joined together by the tooth material into a single piece with the gingival end formation of the teeth confined entirely between the adjacent ends of the lingual and labial surfaces of the teeth and said gingival end formations constituting means for attaching the tooth arch to a denture base, the teeth of said arch having lingual surfaces which follow the anatomy of natural teeth to the gingival ends of the teeth, the teeth of said tooth arch

being positioned according to he ridges of the jaw of the mouth with the cusps of the teeth having ready-made anatomical and functional relation with the cusps of the teeth of the opposing jaw, and bracing means extending laterally between the sides of the tooth arch, with the ends of said bracing means integrally joined to the lingual surfaces of the teeth at opposite sides of the arch whereby to maintain the ready-made relation of the teeth and to brace the free ends of the sides of the arch.

MICHAEL ZILINSKI.

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