Dec. 11, 1951 H. KANE 2,577,769

DENTURE

Filed Dec. 31, 1947

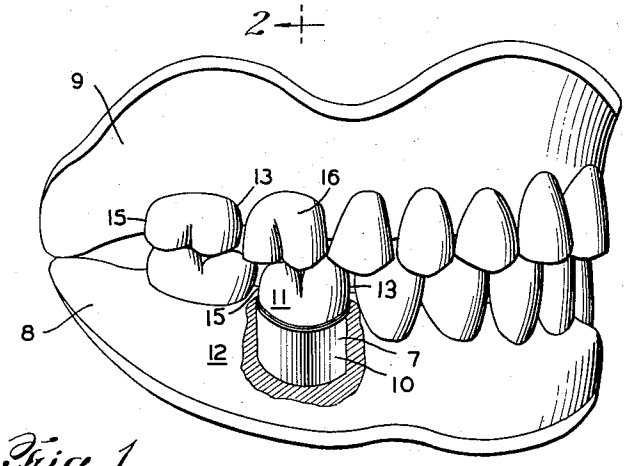


Fig. 1

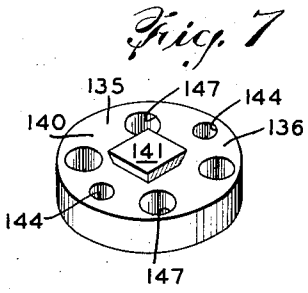


Fig. 7

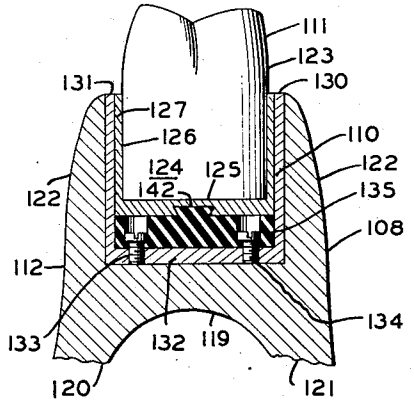


Fig. 6

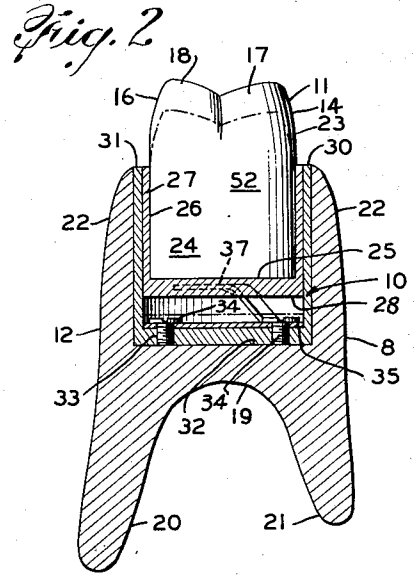


Fig. 2

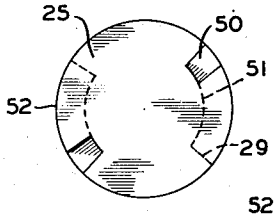


Fig. 4

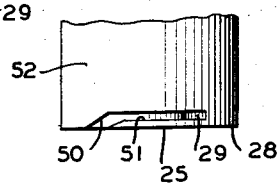


Fig. 5

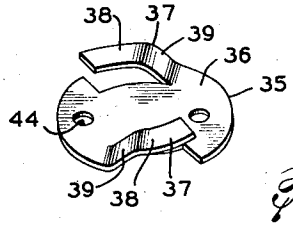


Fig. 3

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Patented Dec. 11, 1951 2,577,769

UNITED STATES PATENT OFFICE

2,577,769

DENTURE

Harry Kane, Brooklyn, N. Y.

Application December 31, 1947, Serial No. 795,044

4 Claims. (Cl. 32—2)

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This invention relates generally to dentures, and more particularly to an improved construction thereof in which the artificial teeth may have axial movement with respect to the denture base element.

It is a well known medical fact that live or natural teeth, have independent movement with respect to the sockets in the jaw bone within which they are located and secured. This movement of the teeth tends to absorb shock as the upper and lower teeth meet in biting or chewing jaw movement, and also to distribute the pressure exerted by the muscles as they move the lower jaw toward the upper jaw.

In dentures heretofore known and used, the artificial teeth are rigidly mounted in the denture base element, said base element being of irregular shape to conform to the gum-covered upper and lower jaw bones. In such dentures, the hollow portions thereof are generally U-shaped in cross section to conform to the ridge formed after the extraction of the natural teeth. Biting and chewing pressures may reach relatively high orders, in tests made such pressures having been indicated in the range of 25 to 50 pounds per square inch and up to 75 or 100 pounds per square inch. Since the artificial teeth in known denture base elements have been unable to shift in position to distribute the strain, it frequently occurs that the pressure is concentrated at localized areas along the ridge. This results in the destruction of tissue and destruction of the process thereat. Because of this condition, the dentures or plates become ill-fitting after short periods of use necessitating relining in order to make them fit properly again.

It is therefore, among the objects of the present invention to provide an improved denture construction in which the artificial teeth are each mounted for movement independent of the denture element and of the remaining teeth. This construction permits the teeth to shift in varying amounts so that biting and chewing stresses are partially absorbed and are distributed over a greater areas of the ridge. This results in less tissue and process damage and longer periods between adjustments of the denture element to produce proper fit.

Another object herein lies in the provision of structure of the class described wherein the artificial teeth are axially movable with respect to the denture base.

Another object herein lies in the provision of denture construction in which the teeth have a movement thereof lubricated by the saliva of the mouth.

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Another object herein lies in the provision of denture construction having independently movable teeth in which the movement of the teeth is cushioned or resiliently controlled.

Another object herein lies in the provision of artificial tooth mounting structure in conjunction with a denture base which is compact and efficient so that the present construction may be incorporated in dentures for use by persons having a high ridge with relatively low inter-jaw clearance when the lower jaw is in the upper or biting position thereof.

A feature of the invention lies in the fact that there is greater denture stability and increased masticating comfort.

Because of the balancing of forces produced by the independent action of the individual artificial teeth, less tipping or rocking of the denture is encountered.

Another advantageous feature of the present invention lies in the fact that should a tooth or teeth become worn or damaged, it is a relatively simple and inexpensive matter to remove the faulty tooth or teeth and to replace the same. The interchangeability of the teeth is assured by having certain standard shapes and sizes of the interfitting parts, particularly the inner and outer members of the mounting means.

These objects and other incidental ends and advantages will more fully appear in the progress of this disclosure and be pointed out in the appended claims.

In the drawings in which similar reference characters designate corresponding parts throughout the several views:

Fig. 1 is a side elevational view, partly broken away to show internal construction, of upper and lower dentures embodying the invention.

Fig. 2 is an enlarged vertical sectional view of a first embodiment of the invention, as seen from the plane 2—2 on Fig. 1.

Fig. 3 is a view in perspective of the resilient element in the first embodiment of the invention.

Fig. 4 is a bottom view of the tooth retaining element of the first embodiment of the invention.

Fig. 5 is a fragmentary elevational view of the tooth retaining element of the first embodiment of the invention.

Fig. 6 is a vertical sectional view corresponding to Fig. 2 of the individual tooth mounting structure in a second embodiment of the invention.

Fig. 7 is a view in perspective of the resilient element of the second embodiment of the invention.

There are shown in Fig. 1 an upper denture 9 and a lower denture 8. While it is possible to

install the present improved structure in connection with the mounting in said dentures of the anterior teeth, I consider it most desirable to use the present structure in connection with the posterior teeth. This is so because the anterior teeth are used principally for biting and not for grinding, and they do not normally meet at the occlusal edges thereof. With the exception of size and arrangement, the present structure may be utilized with any of the posterior teeth. The present construction therefore may be used with all of the posterior teeth of a lower denture, an upper denture, or both, depending upon the number, position and arrangement of the natural teeth in the mouth of the particular user.

Since the construction of the supporting structure for each of the posterior teeth is substantially identical, except for changes in size and arrangement, a detailed description of one, generally indicated by reference character 10, will suffice for all.

This structure includes broadly a tooth element 11 and mounting means 7 therefor. The mounting means 7 serves to movably position and secure the tooth element 11 upon the dental base 12. The tooth element 11, at least as to the exposed surfaces thereof may be of the usual configuration including a mesial surface 13, a lingual surface 14, a distal surface 15, a buccal surface 16 and an occlusial surface 17. The cusps 18 are preferably formed to simulate the natural tooth and to provide the proper occlusion. A tooth 11 is preferably composed of a suitable material such as porcelain or plastic composition and includes an outer portion 23 and an inner portion or base portion 24. The base portion 24 is preferably of cylindrical shape having an outer generally vertical surface 52 and a bottom surface 25.

The mounting means 7 includes an inner member 26, an outer member 30 and a resilient or cushioning element 35.

The inner member has a vertical wall 27, and a thickened bottom wall 28. As may be seen on Figs. 4 and 5, the bottom wall is provided with a plurality of rectangular openings 50 leading to angularly arranged cam portions and thence to horizontally disposed curvilinear channels 51. While for purposes of clarity, only two orifices and channels are shown, there may be any convenient number, consistent with strength, and relative ease of manufacture. They should however be of sufficiently large circular sector to provide a positive locking action as will more fully appear. These channels terminate in flat surfaces 29.

The retaining or inner member 26 is preferably composed of metal which is not easily corroded by food or saliva. The outer surfaces thereof, particularly the outer surface 52, are preferably smooth, while the inner surfaces are preferably etched or roughened to provide a good bond for the base portion 24 of the tooth 11. Where the material of which the tooth 11 is composed possesses sufficient resistance to wear and is otherwise strong enough, the tooth 11 and the member 26 may be formed integrally. While the cross sectional periphery of the retaining element 26 is circular, this is affected by the shape and size of the outer member 30. Other shapes may be used, such as oval, elliptical, polygonal, or irregular. The outer sleeve or lining member 30 is positioned peripherally around the retaining member. It includes a circular wall portion 31, substantially vertically disposed, and a relatively thicker horizontally disposed bottom wall 32 provided with a plurality of threaded holes 33 adapted to receive the screws 34.

Horizontally disposed between the bottom walls 28 and 32 is the resilient cushioning element 35, including a main body element 36 and resilient tab members 37 which are bent upwardly from the main body element. The size and configuration of these tabs substantially correspond with the orifices 50 and channels 51. Each includes a relatively horizontal portion 38 and a shorter angularly disposed portion 39. Screw holes 44 are provided in the body element.

The lining member 30 is secured to the base element 12 in the upper or gingival portion 22 by any suitable means, such as having a roughened or etched outer surface which is retained by casting the base element in contact therewith.

By means of the present structure, the tooth, together with the retaining member may be readily removed by rotating the tooth and retaining member through a small angle, should it become advisable to replace either the tooth or the resilient member. It is essential however, that the fit between the vertical walls 27 and 31, be to very close tolerances as any appreciable movement other than along the axis of the tooth would cause excessive wear, resulting in loose fit and poor occlusion.

The base 12, except as otherwise noted, is generally of the conventional acrylic or hard rubber type, including a ridge engaging surface 19, a buccal periphia 20, a lingual periphia 21, and a gingia 22. In the case of the upper plate, the lingual periphia is, of course, replaced by the palate (not shown).

While I have shown the cushioning element as being secured to the outer member 30 by a plurality of screws 34, since most of the external stress is downward against the cushioning element, all save one of the screws may have dowel pins substituted therefor.

Turning now to the second embodiment of the invention, illustrated in Figs. 6 and 7, certain of the parts corresponding to the first embodiment are given the same reference characters with the addition of a prefix "1."

The second embodiment differs from the first embodiment principally in the resilient element which is composed of rubber or similar elastic material. As may be seen on Fig. 7, it includes a body element 136 having therein a plurality of holes 144 which serve to pass screws 134 securing the resilient element to the lower wall 132. Orifices 147 serve to allow for compression. When the tooth is in its unstressed position, the resilient element assumes the shape as seen on Fig. 7. When the resilient element is compressed however, the rubber must occupy a smaller volume. This smaller volume is made possible by some of the rubber expanding into said orifices. When the pressure is released, the resilient element resumes its original shape.

On the upper surface 140 of the resilient element is a locking member 141, which is made preferably integral with the resilient element. As may be seen on Fig. 6, it is of a trapezoidal vertical cross section. A corresponding recess 142 is provided in the lower wall 128, positioned to engage the locking member 141 when the various members have been assembled. Like the first embodiment, the teeth may be readily removed for adjustment or replacement when required. In the case of the second embodiment, removal of the tooth does not require rotation, being instead pulled straight up.

In operation, the tooth is normally at the uppermost portion of its line of action with respect to the base, at which point the resilient means is unstressed. As the tooth comes in contact with resistance, in the form of food or opposing teeth, the shock of contact is transmitted to the resilient element, which cushions the impact, and thereby provides a more natural action to the masticating process.

This device is applicable to either the upper or lower plate, as required. In general, if both an upper and a lower denture is used, it will be found more satisfactory to mount the teeth of the lower plate resiliently.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. A denture comprising: a denture base; a tooth; and means to detachably engage said tooth with said base, said means including a channel in said tooth and a rotatably engageable finger in said channel.

2. A denture comprising: a denture base having a recess therein; a lining for said recess; a tooth retaining element; a tooth disposed in said element; and a finger rotatably engageable with said tooth retaining element by a rotational movement with respect to said tooth retaining element, whereby the tooth and tooth retaining element may be detachably engaged with the denture base in said recess.

3. In a denture having a denture base, and a tooth, the improvement comprising: means to detachably engage said tooth with said base; said means including a channel in said tooth, and a rotatably engageable finger in said channel.

4. In a denture comprising a denture base having a recess therein, and a tooth, the improvement comprising: a lining for said recess; a tooth retaining element; said tooth being disposed in said element; and a finger rotatably engageable with said tooth retaining element by a rotational movement with respect to said tooth retaining element, whereby the tooth and tooth retaining element may be detachably engaged with the denture base in said recess.

HARRY KANE.

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