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J. L. BISCHOF ET AL

3,085,334

DENTURE ATTACHMENT

Filed March 16, 1960

FIG. 1

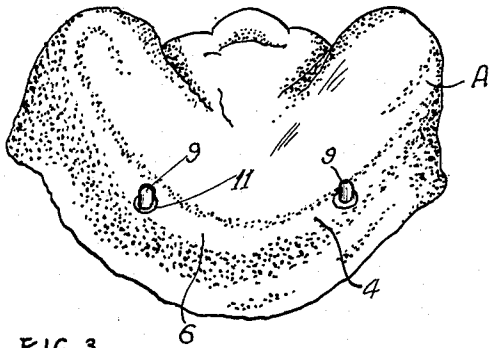


FIG. 2

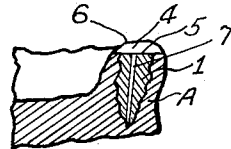


FIG. 3

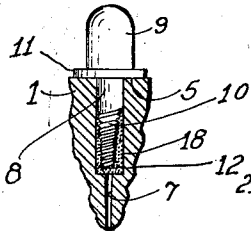


FIG. 6

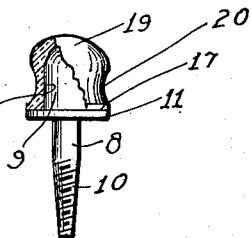


FIG. 4

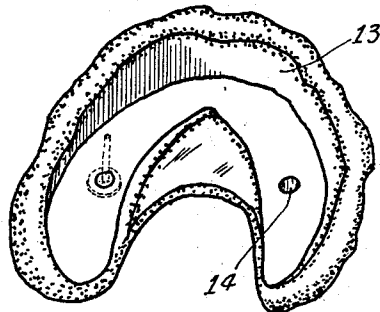


FIG. 5

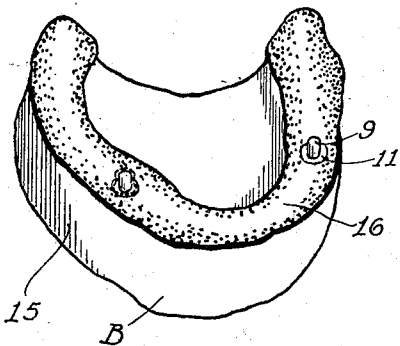
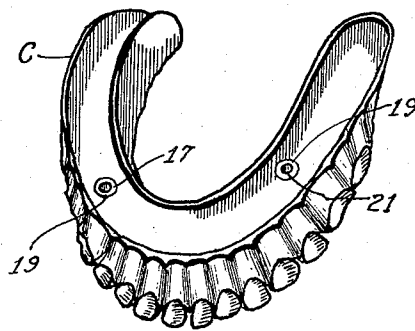


FIG. 7



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DENTURE ATTACHMENT

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This invention relates to dentures generally, but more especially to the construction of the same so that they will be accurately fitted into the mouth so as to minimize accidental displacement from their originally fitted position.

One of the important objects of our invention is to so construct said denture, with an attachment means, whereby there will be little or no tendency for the attached denture to rock, jump, rotate or wobble while in the mouth.

Another object of the invention is to so construct said denture that it is easily and readily attachable and removable from a predetermined fixed position in the mouth, with full assurance and certainty that each such replacement will always position the denture in its originally fitted position.

A further object of our invention is to so construct said dentures with attaching means, in such a way that there is a minimum of bulk that the wearer must carry in the mouth.

Other objects of the invention are to so construct such dentures that they will be extremely simple in construction, readily made by the dental technician, long-lasting, and which will be otherwise satisfactory and efficient for use wherever found applicable.

Many other objects and advantages of the construction herein shown and described, and the uses for the same, will be obvious to those skilled in the art to which the invention appertains, all as will be more clearly apparent from the disclosures hereinafter given.

To this end, our invention consists in the novel construction, arrangement, combination and form herein shown and described, and the uses mentioned, as will be more clearly pointed out in the specification and claims herein.

In the drawings, wherein like reference characters represent like or corresponding parts throughout the views,

FIGURE 1 is a perspective view, showing the lower jaw portion, with the dowels anchored in place therein;

FIGURE 2 is a cross-sectional detail, showing a tooth therein, cut down and having its top face planar, ready to be drilled to provide the dowel-receiving opening therein;

FIGURE 3 is an enlarged detail view of said tooth, with the dowel inserted in the same and anchored in place;

FIGURE 4 is a perspective view of the impression taken from that portion of the jaw having the dowels anchored therein, and showing a dowel detachably positioned head-end first into one of the cylindrical openings therein made by the dowel head previously anchored in the mouth;

FIGURE 5 is a model made from said impression, of the conformation indicated in FIG. 1, with one of the plastic caps removably mounted on one of the head ends of the dowels;

FIGURE 6 is an enlarged detail, showing the dowel with a cap mounted thereon; and

FIGURE 7 is a perspective view of the finished denture made to conform to said model, with the caps bonded in place therein.

Although the device hereinafter shown and described is equally applicable to the maxilla and the mandible portions, or to a portion of either, wherein it is necessary to fit a plate or denture thereto, yet the drawings and description are directed to the mandible, for the reason that dentures therefor are usually more difficult to retain in the mouth, on account of the relatively smaller contact area

thereat between the jaw and denture, as compared with dentures for the maxilla.

Referring more particularly to the drawings, wherein we have illustrated a preferred embodiment of the invention, A indicates a lower jaw or mandible portion, in which there is at least one tooth structure remaining, and in this instance there are two such teeth 1-1, indicated in dotted lines in FIG. 1, and in full lines in FIGS. 2 and 3, said pair of teeth being spaced apart laterally along the gum 4, these teeth being intended as anchorages for permanent implantation of attachment dowels, as will be more clearly set forth.

The first step in the preparation of the mouth to receive our device, is to cut down said selected tooth or teeth to a flat or planar upper face 5 to slightly below the crest or free marginal edge of the gum as indicated at 6, say to approximately .010" to .040" below said crest (as indicated in FIG. 2), exposing the root canal 7 of the tooth structures.

Then, each said root canal is drilled out to provide the cylindrical bore 8 thereinto, from said face 5, and the diameter of said bore may be slightly in excess of the maximum diameter of the shank portion 8 of a pin or dowel that is provided with a radially enlarged head 9, preferably cylindrical as shown, said shank being preferably tapered to its reduced free or terminal end and provided with threads or other suitable lateral projections 10 along said tapered portion. It might be again mentioned that it is necessary to have the depth of the bore 8 at least equal to the length of the shank portion 8 of the dowel, as indicated most clearly in FIG. 3.

A shoulder, collar or flange 11 is provided intermediate the ends of the dowel, at the juncture of its shank and head portions, said flange projecting radially outwardly thereat, the top and bottom faces of said flange being flat or planar as shown.

Although said dowel may be made of any metal that will not tarnish, rust or otherwise corrode, we have found it highly desirable that it be made of stainless or surgical steel, as this material is not only sufficiently sturdy and durable, is not unduly expensive, but in addition meets all of the purposes required of it.

One of the dowels is inserted, shank-first, into one of said bored holes 8, until its flange seats on the flat top face 5 of the previously prepared tooth, there being suitable cementitious substance 12 in said bore. Although said cement enters into the grooves or spaces between the adjacent threads of the shank portion of the dowel, this cement also fills the space between said shank and the side or bounding wall of the bore hole, and in this way more firmly anchors the dowel in its fixed intended placement relatively of the tooth, upon setting of the cement.

Where a second tooth is employed as an anchorage, said tooth is manipulated in the same manner as described for the first tooth, and a dowel permanently set therein.

The next step is to make an impression 13, of the jaw structure having the dowels permanently placed therein, and this is done in any manner thought advisable by the operator, and it is obvious that said impression will have the cylindrical holes, openings or recesses 14-14 formed therein, of precisely the same size, contour and depth as that of the projecting portions of the dowels already implanted in the jaw.

Now, a model B of the jaw structure must be made, using the impression previously made, to form a pattern from which the denture itself is to be made, said model being made by the operators in any well-known manner that is found most convenient at the time, said resultant model being indicated in FIG. 5 and being a workable replica of the jaw structure to which the denture is to be applied, said model having a replica of the jaw gum

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structure 15 extending therealong, with a replica of the gum line or crest 16 thereon.

However, before making said model and before filling said impression with the soft material out of which the model is to be formed, dowels that are exact replicas of those imbedded in the jaw, are inserted head-first into the holes 14—14 (one such dowel being shown as already inserted in one of said holes, in FIG. 4), so that the dowel shanks project axially above said holes. Now, when said impression tray or holder is filled with the hardenable material from which the model is made, and compacted into place, and left to set for the required period, and the impression then separated from the model, it will be found that the dowels will remain anchored in said model, as indicated in FIG. 5, inasmuch as there is a greater tendency for said threaded shanks to bond to the model material than for the heads to cling to said impression. Thus, it will be seen that the size, shape and spacing of the dowels in the model will be precisely the same as that of the dowels in the jaw structure itself.

Finally, the operator is ready to make the denture C itself, preferably of a suitable plastic, an acrylic resin being extremely suitable for the purpose, from said model that already has said dowels anchored therein.

Before performing this step however, caps 19 are detachably mounted on the projecting portions of the dowels that are in the model, one such cap being indicated as so mounted in FIG. 5, each such cap being approximately in the shape of a cup having a recess 21 axially thereinto from one end, said recess being cylindrical and with just enough clearance or tolerance to make a smooth or snug fit with the dowel head to permit ready mounting and dismounting of the cap from the dowel without binding.

These caps are preferably made of a suitable plastic, and it has been found desirable that they be inexpandible, for a reason soon to be more clearly set forth.

Each cap has its open end flat or planar to seat perfectly on the flange of the dowel with which it cooperates, said flat end being indicated at 17, and there is a diametrically reduced neck 20 intermediate the ends of the cap.

The acrylic or other plastic material that forms the denture is of course applied while soft, to engage and cover the desired portion of the model, so that after the denture material has set and the denture then removed from said model, said caps will be found to have become permanently anchored in the denture, and spaced apart to correspond precisely to the spacing apart of the dowels first implanted into the jaw.

One of the important reasons for making the cap of a plastic material is such material has a better bonding quality to the plastic of the denture itself, than if the two elements were of different materials, and there is practically no likelihood of any displacement of the caps from their anchorage in the denture. Further, the plastic cap will have a minimum of friction with the dowel head, thereby resulting in a minimum of wear between said parts.

No matter how many times the denture is replaced, there is assurance that it will have a perfect cooperating fit between the caps and dowels, thus maintaining exact relative positioning in the mouth and with consequent good stabilization of the denture, with no lateral rotation of the denture when mounted, and no possibility of the denture losing its predetermined relationship with the

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implanted dowels and that might result in said denture becoming jumpy or have other defects of an ill-fit.

Inasmuch as the interfitting dowels and caps are cylindrical at their cooperating portions, with substantially a minimum tolerance therebetween, there is less likelihood of food particles getting into said cooperating portions, than if there was a yieldably resilient interconnection between said elements, as in our device the cooperating elements must fit at each replacement and there is no danger of distortion of either element due to accidental springing of the parts.

We claim:

1. A detachable artificial denture means comprising a dowel permanently anchorable in the mouth and having an elongated shank with a head at one end, said head being of substantially same cross-sectional area throughout, the shank anchorable in a tooth-root canal so that said head will project outwardly beyond said canal, a denture, and a cup-shaped recessed cap permanently anchored in said denture with the depth and diameter of said recess of the cap being of fixed size substantially complementary to said projecting portion of said dowel head and snugly receiving said dowel head.

2. Means as set forth in claim 1, further characterized in that said dowel has a radially outwardly projecting flange seatable on the top face of said tooth.

3. Detachable artificial denture means comprising a pair of metal dowels to be permanently anchored in laterally spaced-apart relation in the mouth, each dowel having an elongated shank with a radially enlarged substantially cylindrical head at one end, to be anchored in a tooth root canal and a denture for fitting that portion of the mouth that has said dowels therein, and a pair of hollow cup-shaped caps permanently anchored in said denture and spaced apart to conform exactly to the spacing between said dowels and said caps having substantially cylindrical recesses of such depth and diameter to snugly receive the dowel heads substantially without lateral movement therebetween, the exterior of said cap provided with a diametrically reduced neck intermediate its ends to form an annular groove to receive the material of said denture therein and interlock therewith.

4. In the method of preparing a removable artificial denture, the steps of anchoring a metal dowel in a tooth in the mouth so that the head of said dowel projects permanently above said tooth, then making an impression whereby said projecting portion of the dowel forms a recess in the impression, inserting a metal dowel exactly of the size and shape as the first-mentioned dowel, head-first into said recess, making a model from said impression whereby the dowel held in the impression becomes anchored in said model upon separation of the model from the impression, placing a plastic cap removably on the dowel that is in the model, making a plastic denture to fit over said model as so capped, whereby said cap remains anchored in the denture on setting of the latter and removal from the model, and finally removing said denture from the model.

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