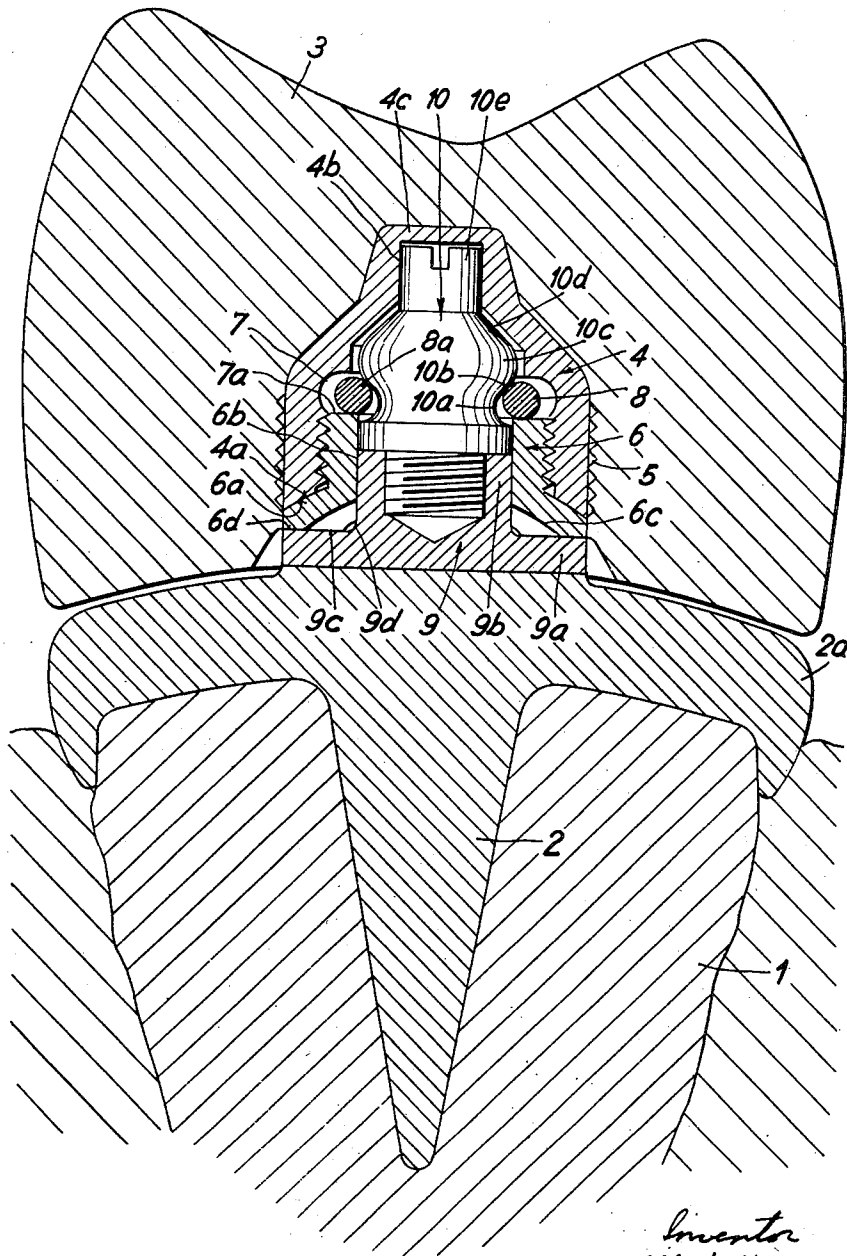


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DEVICE FOR RELEASABLY MOUNTING AN
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DEVICE FOR RELEASABLY MOUNTING AN ARTIFICIAL TOOTH OR THE LIKE

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The present invention relates to devices for releasably mounting artificial teeth or the like.

It is often necessary to clean the space between an artificial tooth or the like and the mucuous membrane of the mouth next to such an artificial tooth. If the artificial tooth is so fastened in the mouth that only a dentist can release the artificial tooth, then it is not possible to clean this latter space as often as might be desired.

One of the objects of the present invention is to provide a device for releasably mounting an artificial tooth or the like in such a way that the wearer of the artificial tooth can remove the latter whenever desired for cleaning purposes or the like.

Another object of the present invention is to provide a device of the above type which is composed of small elements which nevertheless are fully capable of withstanding stresses resulting from chewing or biting.

A further object of the present invention is to provide a device of the above type with parts which do not become noticeably worn even after a considerable amount of removal and replacement of the artificial tooth.

With the above objects in view, the present invention mainly consists of a device for releasably mounting an artificial tooth or the like, this device including a rigid post having a base end adapted to be fixed permanently to a root cap so that the post extends from the cap and has a free end distant therefrom, this post being formed between its ends with an annular groove. A hollow cap means is adapted to be fixed to the artificial tooth or the like and formed with an axially extending recess into which the post extends. This cap means is formed in its interior with an annular groove located intermediate the ends of the recess. A snap ring is located in the annular groove in the recess of the cap means and this snap ring extends into the groove of the post for releasably maintaining the cap means on the post.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

The drawing illustrates an enlarged sectional elevational view a preferred embodiment of a device according to the present invention.

The drawing shows a natural tooth root 1 in the root cavity of which is located a root pin 2 having permanently fixed thereto in a conventional manner a root cap 2a. An artificial tooth or the like 3 receives in its interior a hollow cap means 4 which is permanently fixed to the artificial tooth or tooth crown 3. Thus, the hollow cap means 4 has an outer knurled surface 5 engaging the artificial crown 3 in a recess of the latter. The hollow cap means 4 is cemented into the artificial tooth crown 3 or is otherwise permanently fixed thereto.

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The hollow cap means 4 includes an outer hollow member into which an inner hollow member 6 is threaded, the member 6 having at its bottom end, as viewed in the drawing, an outwardly extending annular flange having an upper convex surface 6a which bears flush against a bottom concave annular surface 4a of the outer hollow member of the cap means 4, the surfaces 4a and 6a forming parts of an identical sphere, for example.

The outer hollow member of the cap means 4 together with the inner member 6 forms a unit, and these inner and outer members function together as if they were made in one piece. This cap means 4 is formed in its interior with an elongated axially extending recess having a pair of axially spaced cylindrical portions. Thus, the drawing shows the cylindrical portion 4b of the recess in the interior of the hollow cap means, this cylindrical portion 4b being axially spaced from and of a smaller diameter than the coaxial cylindrical portion 6b of the recess of the cap means, this cylindrical portion 6b of the recess being formed by an inner cylindrical surface of the inner member 6. The inner member 6 terminates in the interior of the hollow cap means in an end face 7a which is flat and located in a plane normal to the axis of the recess of the cap means 4, and the outer member of the cap means 4 is formed with a shoulder spaced from and directed toward the end face 7a so that this shoulder and the end face 7a cooperate together to form an annular groove 7 in the interior of the cap means 4, this groove 7 being located intermediate the ends of the elongated recess of the cap means 4. It will be noted that the cylindrical recess portion 4b is closed by an end wall 4c of the cap means 4.

A snap ring 8 is located within the annular groove 7 with a relatively large amount of radial play, as is evident from the drawing. This snap ring 8 is formed by a springy member which extends almost completely along a circle, the free ends of the member being located closely adjacent to each other. In the illustrated example the snap ring 8 has a circular cross section, as is evident from the drawing, but the only important part of the cross section of the snap ring 8 is the upper inner portion 8a of the snap ring which should preferably form part of a torus. It will be noted that the snap ring 8 has an inner diameter which is smaller than the diameter of the cylindrical portion 6b of the recess of the cap means 4, while the outer diameter of the snap ring 8 is larger than the diameter of the recess portion 6b.

The two-part construction of the cap means 4 facilitates the introduction of the snap ring 8 into the annular groove 7. This two-part construction may be done away with if one does not desire to remove the snap ring 8 from the recess 7. The inner member 6 is formed by a suitable milling cutter or the like with a transverse groove 6c at the base end of the cap means 4, so that the tip of a screwdriver or the like may be located in the groove 6 to facilitate assembly and disassembly of the cap means.

The above-described cap means 4 receives in its interior a post 9, 10 which has a base end permanently affixed as by soldering, for example, to the root cap 2a. The post is disclosed as made of the two parts 9 and 10, the part 10 having a bottom threaded portion threaded into a threaded recess of the part 9, although if desired the post 9, 10 may be made of one piece. At its base the post 9 is provided with an outwardly extending annular flange 9a. Next to this flange the post has a cylindrical portion 9b which is of the same cross sectional size and configuration as the cylindrical recess 6b so that the portion 9b of the post extends with a sliding, precise fit into the inner member 6 of the cap means 4. Just above its portion 9b the post is formed with a neck or annular groove 10a which is located in partly overlapping relation with the groove 7, as is evident from

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the drawing. It will be noted that the groove 10a has a lower side face nearer to the flange 9a than the end face 7a of the inner member 6. Furthermore, the groove 10a has an opposite side face 10b more distant from the flange 9a and forming a frusto-conical shoulder against which the portion 8a of the snap ring 8 presses. Just above the groove 10a the post is provided with an annular bulging portion 10c whose maximum diameter is equal to the diameter of the cylindrical portion 9b, and the upper surface portion 10d of the bulging portion 10c has a frusto-conical configuration. The free end portion of the post 9, 10 which is distant from the base end thereof is of a cylindrical configuration, as shown at 10e, and this free cylindrical end portion 10e of the post has the same diameter as the cylindrical portion 4b of the recess of the cap means 4, so that the cylindrical portion 10e fits with a precise sliding fit into the cylindrical portion 4b. It will be noted that the cylindrical portions 9b and 10e of the post are coaxial with each other, the cylindrical portion 10e being of a smaller diameter than the cylindrical portion 9b.

With the parts in the position shown in the drawing, the snap ring 8 is maintained in a stressed condition where the diameter of the snap ring is larger than the diameter thereof when unstressed. The flange 9a forms a stop means which engages the cap means to limit the movement thereof toward the base end of the post. The end position of the cap means which is shown in the drawing is such that the snap ring 8 presses against the portion 10b of the groove 10a and resiliently tends to move inwardly toward the axis of the post. However the post prevents such inward movement of the snap ring 8, and as a result the snap ring 8 cooperates with the side 10b of the groove 10a and the end face 7a of the member 6 to resiliently press the cap means 4 against the flange 9a. It will be noted that the inner member 6 has an exterior end face 6d which is located in a plane perpendicular to the axis of the post, and this exterior end face 6d presses against the upper face 9c of the flange 9a. It will be noted that with the arrangement shown in the drawing the snap ring 8 can only extend part way into the annular groove 10a of the post. Furthermore, it will be noted that the snap ring is maintained with no axial play between the surface 7a and the surface 10b.

During removal of the artificial tooth crown 3 or the like, the cap means along with the crown and the snap ring 8 is moved upwardly over the bulging portion 9c which widens the snap ring until it moves over the maximum diameter portion of the bulging portion 10c. During replacement of the crown or the like, the frusto-conical portion 10d of the post 9, 10 spreads the snap ring 8 until it moves over the portion of part 10c which is of the largest diameter and then resiliently tends to move into the groove 10a.

The fact that the structure of the invention is provided with an upper recess portion 4b which is of a relatively small diameter so as to receive the portion 10e of the post which is of a smaller diameter than the portion 9b is of considerable significance. It will be noted that this portion 9b is joined to the flange 9a by a rounded portion 9d. Because the upper portion 10e is of a relatively small diameter, it is possible to taper the cap means 4 in the vicinity of its top end; as viewed in the drawing, so that in this way the artificial crown 3 or the like need be weakened to only a small extent in order to receive the cap means. At the same time, the portion 9b of the post has a relatively large diameter so as to provide a strong support. Furthermore, this feature of the invention permits the artificial tooth or the like to be very easily replaced. The wearer of the tooth ordinarily cannot see whether or not the end 10e of the post is entering into the recess of the cap means. With the structure of the invention the cylindrical portion 6b of the recess is so much greater than the cylin-

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drical portion 10e of the post that the latter portion of the post is easily introduced into the cylindrical recess portion 6b, and as a result it is a very simple matter to replace the artificial tooth or the like.

It will be further noted that when the artificial tooth or the like is removed with the cap means from the post 9, 10 the snap ring 8 can freely move in the annular groove 7, so that the snap ring 8 can turn easily about the axis of the recess of the cap means 4. As a result, there is almost no possibility that the artificial tooth will be repeatedly replaced with the snap ring having the same angular position with respect to the axis of the post, and as a result the ends of the snap ring will not rub along the same part of the post repeatedly so that the wear on the post is reduced to a minimum, and in any event what little wear occurs will be uniform.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of supports for artificial teeth or the like different from the types described above.

While the invention has been illustrated and described as embodied in devices for releasably mounting an artificial tooth or the like, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. A device for releasably mounting an artificial tooth or the like, comprising, in combination, a rigid post having a base end adapted to be fixed permanently to a root cap so that said post extends from the cap and has a free end distant therefrom, said post being formed between its ends with an annular groove; hollow cap means adapted to be fixed to an artificial tooth or the like and formed with an axially extending recess into which said post extends, said cap means being formed in its interior with an annular groove located intermediate the ends of said recess; a snap ring located in the latter annular groove and extending into said groove of said post for releasably maintaining said cap means on said post; and stop means carried by said post and engaging said cap means for limiting the movement of the latter toward said base end of said post, said stop means locating said snap ring in a position where said post maintains said snap ring larger than the diameter which said snap ring has when it is unstressed so that said snap ring presses said cap means against said stop means.

2. A device for releasably mounting an artificial tooth or the like, comprising, in combination, a rigid post having a base end adapted to be fixed permanently to a root cap so that said post extends from the cap and has a free end distant therefrom, said post being formed between its ends with an annular groove; hollow cap means adapted to be fixed to an artificial tooth or the like and formed with an axially extending recess into which said post extends, said cap means being formed in its interior with an annular groove located intermediate the ends of said recess, the portion of said recess extending between said annular groove of said cap means and said base end of said post and the portion of said post extending between said groove of said post and the base end thereof respectively having identical cross sectional configurations so that said portion of said post extends slidably into said portion of said cap means; a snap ring located in the latter annular groove and extending into said groove of

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said post for releasably maintaining said cap means on said post; and stop means carried by said post and engaging said cap means for limiting the movement of the latter toward said base ends of said post, said stop means locating said snap ring in a position where said post maintains said snap ring larger than the diameter which said snap ring has when it is unstressed so that said snap ring presses said cap means against said stop means.

3. A device for releasably mounting an artificial tooth or the like, comprising, in combination, a rigid post having a base end adapted to be fixed permanently to a root cap so that said post extends from the cap and has a free end distant therefrom, said post having an outwardly directed annular flange at its base end, having a first cylindrical portion next to said flange, having a second cylindrical portion at its free end coaxial with and of a smaller diameter than said first cylindrical portion, having an annular bulging portion next to said second cylindrical portion, and having between said first cylindrical portion and said annular bulging portion an annular groove; hollow cap means adapted to be fixed to an artificial tooth or the like and being formed with an axially extending recess into which said post extends, said cap means having a base end engaging said flange of said post and said recess of said cap means having a cylindrical portion located next to said base end of said cap means and being of the same diameter as said first cylindrical portion of said post to slidably receive said first cylindrical portion of said post, said recess of said cap means having distant from the base end of the latter a diameter equal to the diameter of said second cylindrical portion of said post for slidably receiving said second cylindrical portion of said post, and said cap means being formed in its interior between said cylindrical portions of said recess thereof with an annular groove; and a snap ring located in the latter annular groove and extending partly into said groove of said post for releasably maintaining said cap means on said post and for urging said cap means against said flange of said post.

4. A device for releasably mounting an artificial tooth or the like, comprising, in combination, a rigid post having a base end adapted to be fixed permanently to a root cap so that said post extends from the cap and has a free end distant therefrom, said post having an outwardly directed annular flange at its base end, having a first cylindrical portion next to said flange, having a second cylindrical portion at its free end coaxial with and of a smaller diameter than said first cylindrical portion, having an annular bulging portion next to said second cylindrical portion, and having between said first cylindrical portion and said annular bulging portion an annular groove, said annular bulging portion of said post having a maximum diameter substantially equal to but not greater than the diameter of said first cylindrical portion of said post; hollow cap means adapted to be fixed to an artificial tooth or the like and being formed with an axially extending recess into which said post extends, said cap means having a base end engaging said flange of said post and said recess of said cap means having a cylindrical portion located next to said base end of said cap means and being of the same diameter as said first cylindrical portion of said post to slidably receive said first cylindrical portion of said post, said recess of said cap means having distant from the base end of the latter a diameter equal to the diameter of said second cylindrical portion of said post for slidably receiving said second cylindrical portion of said post, and said cap means being formed in its interior between said cylindrical portions of said recess thereof with an annular groove; and a snap ring located in the latter annular groove and extending partly into said groove of said post for releasably maintaining said cap means on said post and for urging said cap means against said flange of said post.

5. A device for releasably mounting an artificial tooth or the like, comprising, in combination, a rigid post hav-

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ing a base end adapted to be fixed permanently to a root cap so that said post extends from the cap and has a free end distant therefrom, said post having an outwardly directed annular flange at its base end, having a first cylindrical portion next to said flange, having a second cylindrical portion at its free end coaxial with and of a smaller diameter than said first cylindrical portion, having an annular bulging portion next to said second cylindrical portion, and having between said first cylindrical portion and said annular bulging portion an annular groove; hollow cap means adapted to be fixed to an artificial tooth or the like and being formed with an axially extending recess into which said post extends, said cap means having a base end engaging said flange of said post and said recess of said cap means having a cylindrical portion located next to said base end of said cap means and being of the same diameter as said first cylindrical portion of said post to slidably receive said first cylindrical portion of said post, said recess of said cap means having distant from the base end of the latter a diameter equal to the diameter of said second cylindrical portion of said post for slidably receiving said second cylindrical portion of said post, and said cap means being formed in its interior between said cylindrical portions of said recess thereof with an annular groove, each of said annular grooves having a pair of opposed side faces one of which is located nearer to said flange of said post than the other, said one side face of said groove of said cap means being located more distant from said flange of said post than said one side face of said annular groove of said post; and a snap ring located in said annular groove of said cap means, extending partly into said annular groove of said post, and respectively pressing against said one side face of said annular groove of said cap means and the side face of said annular groove of said post which is more distant from said flange of said post, and said snap ring being maintained by said cap means and post in a stressed condition where said snap ring has a diameter larger than the diameter of said snap ring when it is unstressed so that said snap ring urges said cap means against said flange.

6. A device as recited in claim 5 and wherein said one side face of said annular groove of said cap means is flat and located in a plane normal to the axis of said recess of said cap means.

7. A device for releasably mounting an artificial tooth or the like, comprising, in combination, a rigid post having a base end adapted to be fixed permanently to a root cap so that said post extends from the cap and has a free end distant therefrom, said post being formed between its ends with an annular groove; hollow cap means adapted to be fixed to an artificial tooth or the like and formed with an axially extending recess into which said post extends, said cap means being formed in its interior with an annular groove located intermediate the ends of said recess, said cap means including an outer hollow member adapted to be fixed directly to the artificial tooth or the like and an inner hollow member threaded into one end portion of said outer hollow member, said inner member having within said outer member an end face and said outer member having in its interior a shoulder spaced from and directed toward said end face, said end face and said shoulder defining between themselves said annular groove of said cap means; and a snap ring located in the latter annular groove and extending into said groove of said post for releasably maintaining said cap means on said post.

8. A device for releasably mounting an artificial tooth or the like, comprising, in combination, a rigid post having a base end adapted to be fixed permanently to a root cap so that said post extends from the cap and has a free end distant therefrom, said post being formed between its ends with an annular groove, said post having an outwardly directed annular flange at its base end; hollow cap means adapted to be fixed to an artificial tooth

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or the like and formed with an axially extending recess into which said post extends, said cap means being formed in its interior with an annular groove located intermediate the ends of said recess, said cap means including an outer hollow member adapted to be fixed directly to the artificial tooth or the like and an inner hollow member threaded into one end portion of said outer hollow member, said inner member having within said outer member an end face and said outer member having in its interior a shoulder spaced from and directed toward said end face, said end face and said shoulder defining between themselves said annular groove of said

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cap means, said inner member having an exterior end face engaging said flange of said post; and a snap ring located in the latter annular groove and extending into said groove of said post for releasably maintaining said cap means on said post.

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