United States Patent [19]

Padeh

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[54] **DENTAL CAP BRIDGE LOCK**

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[52] **U.S. Cl.** **32/5,** 32/12
[51] **Int. Cl.** **A61c 13/22**
[58] **Field of Search** 32/5, 6, 7, 13, 12

[56] **References Cited**

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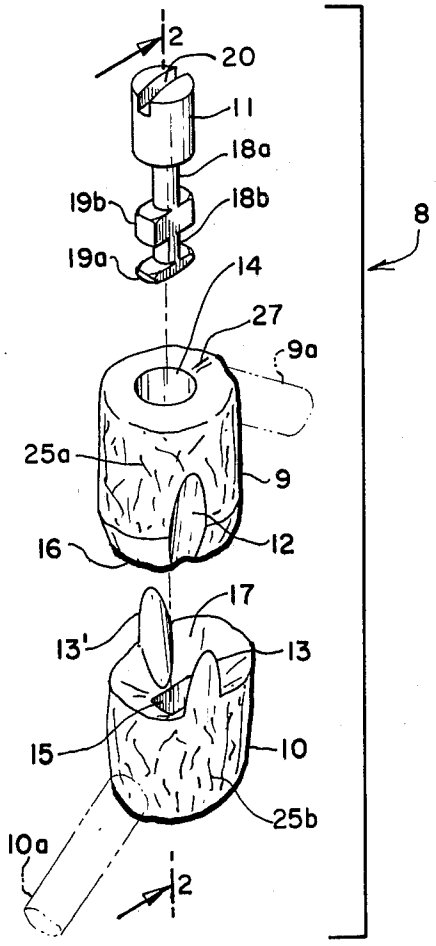
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Primary Examiner—Robert Peshock

[57] **ABSTRACT**

In a preferred embodiment of the invention, there is provided a gold coping for a prepared tooth having fused thereto a gold base vessel having a downwardly extending key hole with two lower axially spaced-apart lateral recesses in one dimension of the hole's diameter equal to the hole diameter in another dimension, and seated on top of the coping there being a tooth cap having gold composition thereof fused to a gold annulus defining a passage therethrough in axial alignment with the key hole of the base vessel, an upper portion of the passage having a larger diameter than the lower portion of the passage, and a key having an enlarged upper-portion head and distally axial thereof there being two axially-spaced-apart laterally-extending key elements from the key shaft, the key-elements being wedge-lockable within respectively the two recesses thereby lockable-together the base vessel and the annulus, the key shaft being of a length such that the top surface of its head is substantially flush with the top edge of the annulus, and the top surface of the head including a squared screw-slot receivable of a screwdriver blade for rotating the shaft to and fro in locking and unlocking the cap to and from attachment to the tooth coping.

6 Claims, 7 Drawing Figures



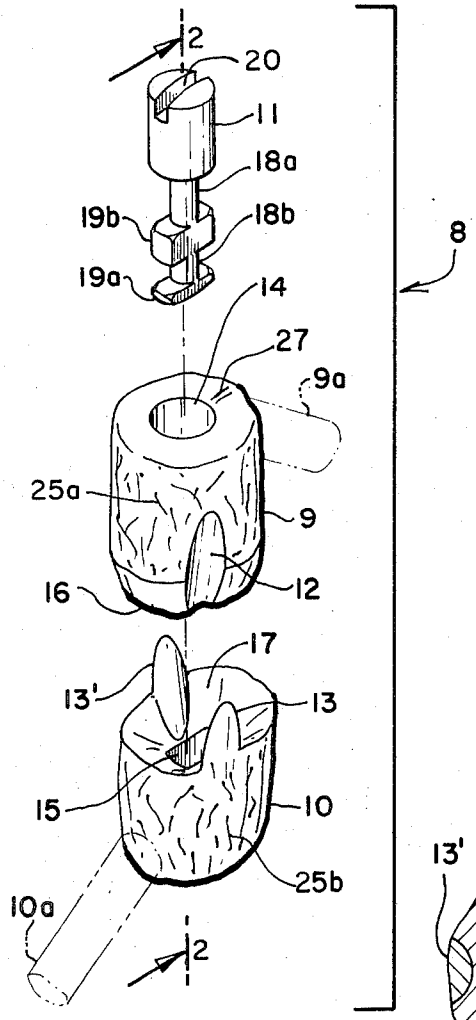


Fig. 1.

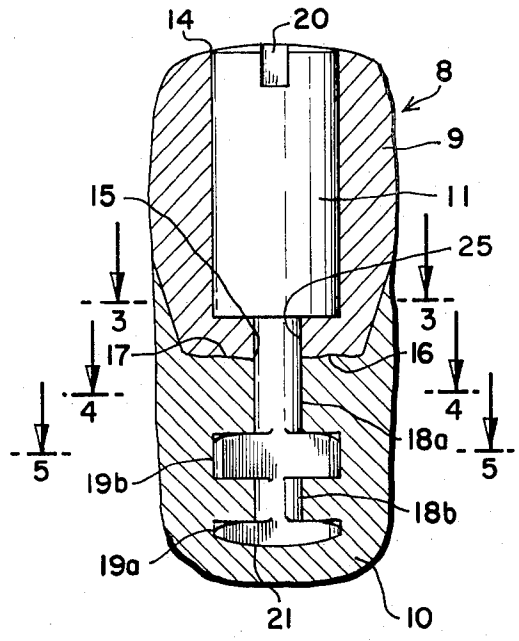


Fig. 2.

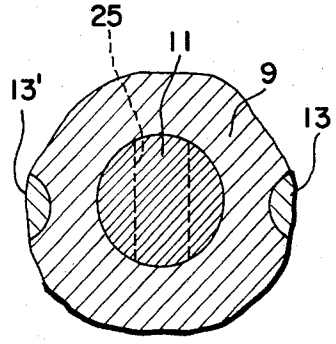


Fig. 3.

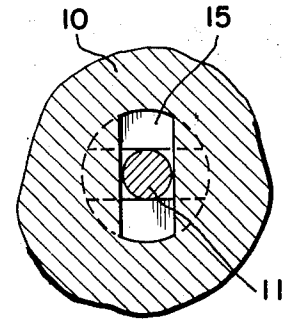


Fig. 4.

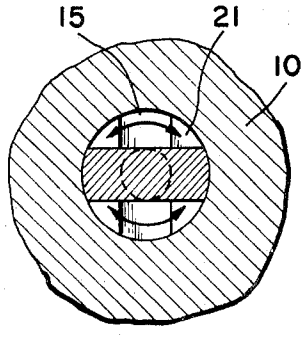


Fig. 5.

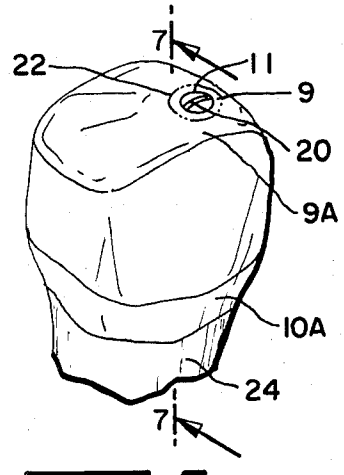


Fig. 6.

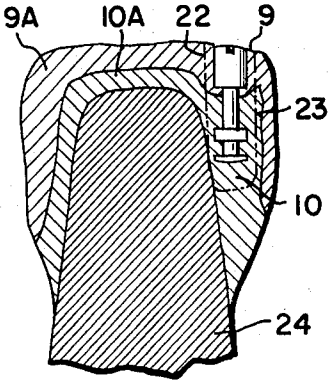


Fig. 7.

DENTAL CAP BRIDGE LOCK

This invention relates to a novel dental tooth or bridge lock for locking to a prepared tooth coping.

BACKGROUND TO THE INVENTION

Prior to the present invention there has existed a German dental device for locking a tooth cap with or without an associated bridge of other false teeth or other tooth coping. The German device requires the coping to have a laterally-extending aperture for extending a rotatable lever shaft into the cap and along an inner wall thereof and for the lever shaft to include a lateral projection or flange in one dimension perpendicular to the shaft thereof for locking-under an over-hang of an edge of a prepared tooth when the coping is mounted thereon. It is solely the minor overhang which anchors the tooth, and the lever includes a laterally-extending handle which seats on one side of the cap when the lever is turned to securably under-pin itself in the under-pinning position below the overhang, the lever being subject to sheering and/or to being accidentally opened by tongue-movement thereagainst, as well as the handle and seat therefor being each food-collecting structures and space therebetween, and the minor overhang providing a relatively weak and less-than-sturdy locking-structure. Also, such lever mechanism is relatively complex, and the lever arm or handle provides an excessive amount of "exterior" surface area of the locking lever mechanism itself — adding considerable bulk.

SUMMARY OF THE INVENTION

Broadly the invention includes a combination of three elements in the simplest form of the invention, namely an annulus structure of metal composition, preferably gold, or a metal alloy having a top and bottom with a passage extending therebetween but the upper portion of the passage being larger in at least one dimension of diameters in different directions, and a key element having a head structure which has an enlarged upper diameter such that the head structure is snugly and flushly seatable within the annulus structure, and the key element additionally including a downwardly extending shaft having spaced-axially-away from the head one or more, preferably two key elements extending laterally from the key shaft in spaced relationship to one-another, and a third element in the nature of a receptacle or vessel having a key hole opening on its upper surface shaped to receive both the key shaft and — in one key-hole-diameter dimension — the key element(s) such that upon turning of the key shaft with the upper annulus structure and the receptacle vessel become locked together when the annulus structure is seated on the vessel with their respective channels lineally aligned and the key inserted therethrough. The head's upper face preferably includes a squared slot receivable of the blade of a screwdriver for the turning of the key shaft to and from locking positions when the annulus is properly seated on top of the vessel. Accordingly, this is the form in which the combination will be and is normally produced for sale to dentists and/or dental labs for the fusing of the outer wall of the annulus to the inner wall of a passage through the tooth cap edge, preferably gold (where the fusion is to take place), and for the fusing of the annulus outer wall to the wall of a concavity or edge of a

prepared-tooth coping preferably of gold. The term "gold" means either gold or any conventional and/or operative gold composition or alloy.

Preferred combinations of the invention obviously also include the novel larger combination of the annulus with the tooth cap and of the lower lockable vessel fused with the prepared-tooth coping.

It is also important and preferred that the upper face of the annulus structure include some sort of indicia or mark indicative of the state of alignment of the key element(s) in one or the other of the locked or unlocked state, as the cae may be.

As a matter merely of making the handling thereof more convenient and practical, the annulus structure has a stick-like fused projection extending therefrom normally before the fusing thereof of the annulus to the tooth cap, and similarly the vessel includes a handle stick fused and extending therefrom until the vessel is fused with the tooth coping. Thereafter, both handle structure are removed.

It is also important that the bottom gold lock-vessel have an irregular seating shape corresponding to an irregular base seat of the annulus in order that the annulus will seat-itself or be seatable solely in the proper alignment of the greater and lesser diameter-dimensions of each, with one-another rather than improper alignment which would prevent insertion of the key shaft and its element(s).

THE FIGURES

FIG. **1** illustrates in exploded side perspective view of the combination of the basic three members, namely the annulus and the base vessel and the locking key.

FIG. **2** illustrates a side cross-sectional view as taken along lines **2—2** of FIG. **1** in the non-exploded assembled view of the three component members of FIG. **1,** in a locked state (i.e. after the shaft is both inserted and turned).

FIG. **3** illustrates an overhead cross-sectional view as taken along lines **3—3** of FIG. **2** through the irregular side flanges of the vessel and through the base and enlarged upper hole of the annulus structure through the head of the key.

FIG. **4** illustrates an overhead cross-sectional view as taken along lines **4—4** of FIG. **2** through the upper portion of the vessel above the level of the recesses laterally.

FIG. **5** illustrates an overhead cross-sectional view as taken along lines **5—5** of FIG. **2** through the upper recess and upper key element and shaft thereof in the locked state in the base vessel.

FIG. **6** illustrates a perspective view of a capped tooth of the present invention, including the prepared-tooth coping and (not visible) fused thereto the base vessel, and the cap mounted over the coping and having fused as set-in the annulus as visible on the upper cap surface with the flushly aligned upper flat-faced top head surface and upper cap surface, with the slotted head.

FIG. **7** illustrates a side cross-sectional view as taken along lines **7—7** of FIG. **6,** illustrating the overall relationships of the upper annulus and the base vessel relative to the thereby locked-together cap and prepared-tooth coping.

DETAILED DESCRIPTION OF THE INVENTION

In greater detail, FIG. **1** illustrates the basic combina-

tion **8** in exploded unlocked positions, the key having its shaft **18***a* and **18***b* aligned with the annulus passage **14** and aperture **15** of the base vessel **10.** The annulus structure **9** seats within the upper-face recess **17** of the base vessel **10,** and the key head **11** seats itself within the hole **14** while the shaft **18** and **18***b* and the key elements **19***a* and **19***b* thereof extend downwardly into the opening **15** and space **21** thereof (see FIG. **2**). The base vessel irregularly shaped flanges **13** and **13'** fit into conformig indentations **12** and **12'** (not shown) of the annulus structure thereby the two members being always properly aligned when one is seated within the other; it is to be understood however that such flanges **13** are merely representative, and that less pronounced irregular seating shapes may exist assuring proper aligned seating always. The annulus convexly shaped lower surface **16** is received flushly by the recessed surface **17** of the upper face of the base vessel **10.** The annulus structure normally would have an attached (fused) handle limb **9***a* for temporary manipulation of the annulus structure, and similarly the base vessel **10** would normally include a handle structure **10***a* fused thereto until the respective member **9** and **10** are placed into their respective tooth-cap and tooth coping seats respectively for fusing, at which time the handles would be removed. For a tooth, it is important that the upper face of the head of the key include a surface which is substantially flush with or recessed below the tooth surface when in an inserted state, and for the head to include a manipulation means such as the preferred squared groove **20** for receiving of the blade of a screwdriver. Members **9** and **10** include irregular surfaces and/or cuts **25***a* and **25***b* to facilitate and avoid shifting and add strength against shifting relative to the tooth cap and tooth coping respectively. The curved edges **26***a* and **26***b* facilitate ease of locking and avoid chipping or scarring of edges. The marking **27** is for "open" position alignment of the slot **20.** It is possible to include a seated lever (handle) continuous with the head **11** of the key member.

FIGS. **2** through **5** show the above-noted members and elements in their relative locked relationships. As is amply noted in the several cross-sections, the channel and passage is of a slotted or rectangular shape — i.e. of narrow or small diameter across one dimension and of large diameter in another dimension, but being of large diameter totally at the recesses for receiving the key elements as they are pressed into locking engagement upon the turning of the key shaft.

FIG. **6** in perspective view shows the combination of the elements and members of FIGS. **1** through **5** with the tooth coping and with the tooth cap, including the tooth **24,** the tooth coping **10A,** the cap **9A,** the fusepoints **22** and **23** and the elements above identified.

It is within the scope of the invention to make obvious modifications and substitution of equivalents.

I claim:

1. A dental cap bridge-lock device comprising in combination: a first annulus structure defining upper and lower surfaces and a stepped passage wall partially circumscribing a passage extending between the upper and lower surfaces such that in one dimension the upper and lower portions of the passage have substantially equal diameters and in another dimension the upper portion of the passage has a greater dimension than the lower portion of the passage; a second aperture structure having an upper surface and defining about centrally there an aperture channel extending downwardly, the aperture channel being stepped in the walls thereof such that in an upper portion the diameter is greater in one dimension than in another dimension and in a lower portion the diameter is the same in more than one dimension and larger than the smaller diameter of the upper portion; and a headed shaft structure of which the head diameter in at least one dimension is greater than the smaller diameter of the lower portion of the first annulus structure, and the headed shaft structure defining an elongated shaft having a diameter less than diameters of a lower portion of the first annulus structure and less than diameters of the upper portion of the second apertured structure and defining a key element extending laterally from the shaft such that the headed shaft structure is insertable shaft-first through the passage of the first annulus structure and into the channel of the second apertured structure and in the inserted state being revolvable such that the key element locks beneath the step structure within the lower portion of the second apertured structure thereby anchoring the first annulus structure to the second apertured structure; said headed shaft structure defining a head structure having a substantially flat-faced surface including shaped therein instrument manipulation means for utilizing an accessory instrument therewith to turn said head structure within said channel; said first annulus structure and said second apertured structure being seatable one on the other with the lower surface of the annulus structure in substantially flush contact with the upper surface of the second apertured structure with the passage of the first annulus structure substantially lineally aligned with the channel of the second apertured, and the first annulus structure lower surface and the second apertured structure upper surface each including mating structure positioned such that the lesser diameter of the lower portion of the passage of the first annulus structure is substantially aligned with lesser diameter of the upper portion of the channel of the second apertured structure; each of said first annulus structure and said second apertured structure being of a metallic composition heat-fusable with fusable metal compositions of the tooth crown and the prepared-tooth coping such that the first annulus structure is fusably attachable to a tooth crown and such that the second apertured structure is fusably attachable to a prepared-tooth coping.

2. A dental cap bridge-lock device of claim **1,** in which wall structure of the channel of the second apertured structure defines two laterally extending separate recesses spaced apart along the shaft and spaced from the upper surface of the second apertured structure, and the headed shaft including two of said laterally extending key elements spaced from said head and from each other and positioned such that upon insertion of the shaft and turning thereof each of the key element lockably meshes with one of the two spaced recesses.

3. A dental cap bridge-lock device of claim **2,** in which said instrument manipulation means comprises a squared slot extending across the head structure's flat-faced surface receivable of a screw-driver blade for turning the shaft to and fro.

4. A dental cap bridge-lock device of claim **3,** including a mark on said first annulus structure's upper surface aligned with the greater diameter of the lower portion of the passage of the first annulus structure, whereby when the headed shaft structure is inserted it

is possible to be aware of the position of the locking recesses relative to the squared slot of the head structure.

5. A dental cap bridge-lock device of claim **4,** including a tooth cap having gold composition fused with said first annulus structure, and including a tooth coping of gold composition for a prepared-tooth with the gold composition of the coping fused with said second apertured structure.

6. A dental cap bridge-lock device of claim **4,** including a fused handle structure fused one handle structure to the first annulus structure and including another fused handle structure fused to the second apertured structure, for the manipulation thereof prior to and during the mounting of the structures in the tooth cap and in the coping respectively.

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