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[54] **DENTAL PIN FOR TOOTH RESTORATION**
5 Claims, 8 Drawing Figs.

[52] U.S. Cl. 32/15
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[50] Field of Search. 32/15, 13,
12, 8

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ABSTRACT: A serrated metal dental pin, the external surface of which is silver, with the lower portion thereof being adapted to be disposed in an opening of slightly larger transverse cross section formed in a broken tooth to be restored by amalgam. The amalgam is shaped to conform to the configuration of the broken-away portion of the tooth. That portion of the amalgam packed in the hole surrounding the lower portion of the pin positioned therein serves to anchor the pin to the tooth. The amalgam restoration is bonded to the pin mechanically for the amalgam engages the serrated outer surface of the pin, and it is bonded chemically as well, due to the fact that the amalgam combines with the silver of the pin.

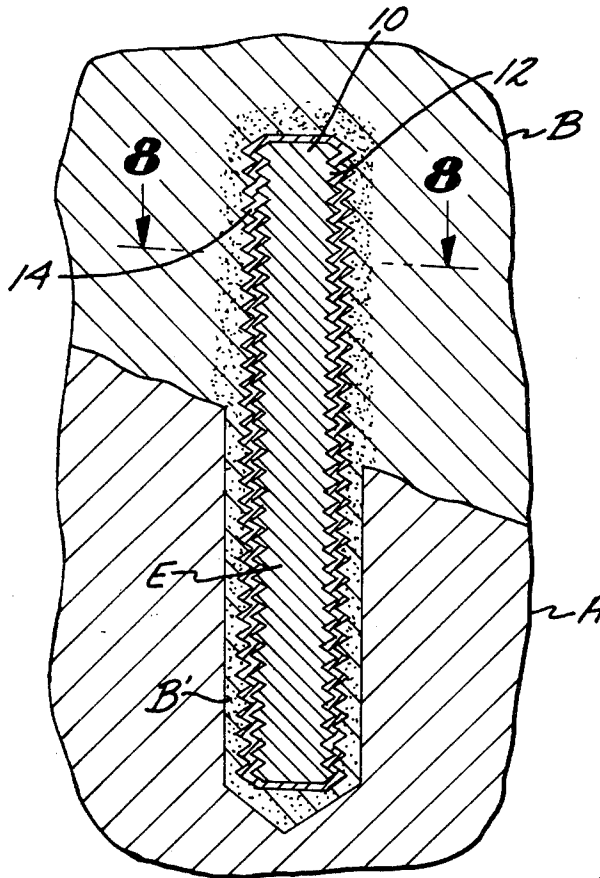


FIG.1

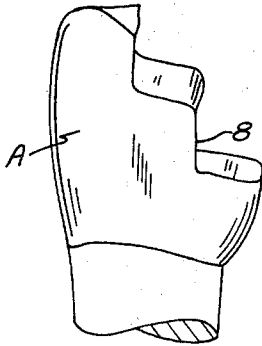


FIG.2

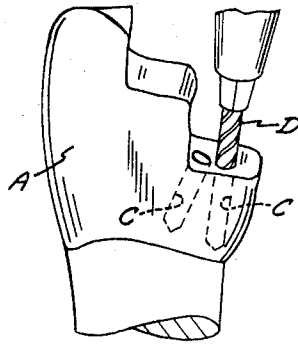


FIG.3

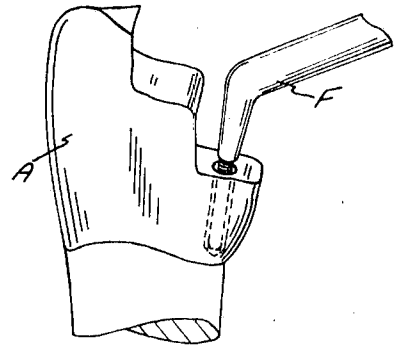


FIG.4

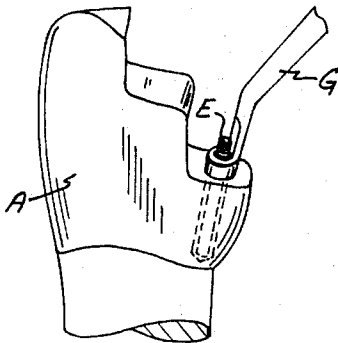


FIG.5

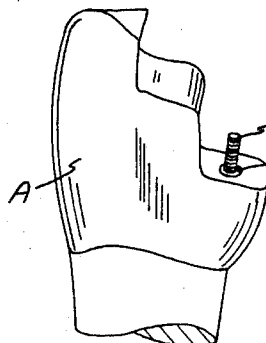


FIG.6

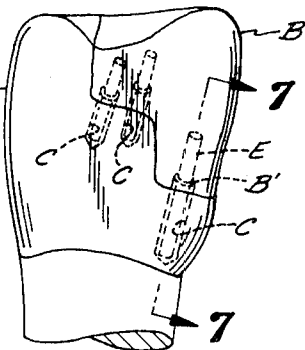


FIG.7

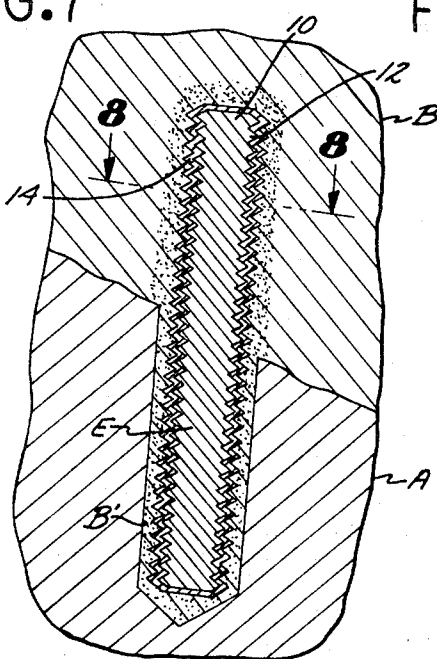
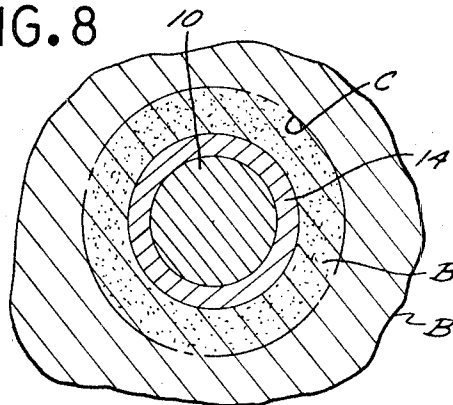


FIG.8



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DENTAL PIN FOR TOOTH RESTORATION

BACKGROUND OF THE INVENTION

1. Field of the Invention

An improved dental pin for holding an amalgam restoration in position on a tooth that has been partially broken away.

2. Description of the Prior Art

Heretofore in the amalgam restoration of a broken tooth, it has been common practice to drill holes in the tooth in which stainless steel wires or pins are positioned. The pins have been cemented in such drilled holes, or held therein by a friction fit. The exterior surfaces of these pins usually have been serrated.

The usual practice was to pack the amalgam about the projecting portions of the pins to restore the tooth to its original configuration, with the amalgam engaging the serrations formed in the pin, whereby a mechanical bond with the pin was effected when the amalgam solidified. The mercury of the amalgam does not combine chemically with the stainless steel of the pin, and as a result, no cohesion is effected between the amalgam and the stainless steel.

The present invention comprises a serrated dental pin provided with an external silver surface, which pin overcomes the disadvantages found in prior art devices of the type described, for the amalgam serves to not only anchor the pin hereinafter described to a tooth, but also results in not only a mechanical but a chemical bond of the amalgam with the pin.

SUMMARY OF THE INVENTION

A serrated metal dental pin having an external silver surface, the lower end of which pin is disposed in a hole drilled in a broken tooth. Amalgam is packed around that portion of the pin positioned in the hole to mechanically and chemically bond this pin portion to the tooth. The body of amalgam that is used to fill the broken-away portion of a tooth to effect the restoration is mechanically and chemically bonded to the projecting section of the pin. The mechanical bond occurs when amalgam in a plastic state is forced into the serrations whereby the amalgam mechanically interlocks with the pin when the amalgam solidifies.

The chemical bond occurs when the amalgam dissolves a part of the silver to form a silver-enriched amalgam zone which merges both into the silver and the original amalgam, with the amalgam and silver-enriched amalgam, when solidified, being integrally and metallurgically connected to said silver.

A major object of the present invention is to provide an improved dental pin in which a circumferentially serrated wire of stainless steel or other corrosion-resistant metal or metal alloy is enveloped in a layer of silver, which pin is anchored in a drilled hole in a broken tooth, both mechanically and chemically by amalgam, with the body of amalgam serving to restore the broken-away portion of the tooth and providing the restoration that is likewise mechanically and chemically bonded to the pin.

Another object of the invention is to provide a silver-enveloped dental pin for use in repairing broken teeth wherein the body of amalgam defining the restoration and the silver layer surrounding the projecting portion of the pin metallurgically merge, with the amalgam restoration being longitudinally movable relative to the pin, only if the silver envelope about the pin is actually broken at a position intermediate the ends thereof.

Yet still another object of the invention is to provide a silver-enveloped dental pin with which amalgam is used to not only mechanically and chemically anchor a lower portion of the pin in a hole drilled in a broken tooth, but also to define the restoration and mechanically and chemically bond the same to a projecting portion of the pin.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a tooth, a portion of which has been broken away, which tooth is to be restored by amalgam;

FIG. 2 is the same view of the tooth shown in FIG. 1 illustrating one of a number of openings drilled therein;

FIG. 3 is the same perspective view of the tooth shown in FIG. 2, showing the improved dental pin disposed therein;

FIG. 4 is the same perspective view of the tooth and pin shown in FIG. 3 illustrating the manner in which amalgam is forced around the lower portion of the pin in the hole to mechanically and chemically bond the pin to the tooth;

FIG. 5 is a perspective view of the tooth, with one of the improved pins projecting upwardly from a hole in the tooth, and in which hole the lower portion of the pin is supported and anchored by amalgam;

FIG. 6 is a perspective view of the tooth and amalgam restoration, with the restoration being held on the tooth by a number of spaced, upwardly projecting pins;

FIG. 7 is a fragmentary, vertical, cross-sectional view of the tooth and restoration, taken on the line 7-7 of FIG. 6, illustrating the manner in which the pin and a portion of the amalgam hold the tooth and restoration together as an integral unit; and

FIG. 8 is a fragmentary, transverse cross-sectional view of the device, taken on the line 8-8 of FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A molar A is shown in FIG. 1, a portion 8 of which has been broken away. In FIG. 6 it will be seen that the broken-away portion 8 has been filled with a body of amalgam, which is shaped to the same configuration as the portion of the molar A which had been broken away.

Restoration of the molar A from the condition shown in FIG. 1 to that illustrated in FIG. 6 may be accomplished by the following procedure. During the restoration operation, a number of spaced holes C (FIGS. 2 and 6) are drilled in the dentine of the molar A. The holes C preferably are not in parallel relationship, and one of the holes is shown (FIG. 2) being drilled in the molar A by use of a power-driven drill D.

The dental pin E of the present invention is substantially longer than the depth of the hole C in which it will be positioned. Pin E includes a wire 10, preferably about 0.020 inch in diameter, on the exterior surface of which circumferentially extending serrations 12 are formed. Wire 10 is preferably formed from stainless steel or other high strength metal alloy that is corrosion-resistant. By electrodeposition, the wire 10 is completely enveloped in a layer 14 of silver or a high content silver alloy.

After the holes have been drilled into the tooth A, a pin E is placed in each hole. Each hole is slightly large in transverse cross section than that of the pin E to be inserted therein by use of a suitable instrument F, as illustrated in FIG. 3. After each pin E has been inserted in a hole C, the annulus-shaped space (not shown) existing between the exterior surface of the pin and the wall of the hole is tamped full of amalgam B' by the use of the instrument G shown in FIG. 4. When the amalgam B' is tamped into the annulus-shaped space in a plastic state, it is easily forced into full surface contact with the silver layer 14.

The mercury in the amalgam B' dissolves an exterior portion of the silver layer 14, and by so doing, forms a second silver-enriched amalgam at the interface of the silver and the amalgam B'. The silver-enriched amalgam and the original amalgam embody substantially the same physical properties when they solidify. Thus, it will be seen that the silver-enriched amalgam merges into that portion of the silver in layer 14 that has not been dissolved, and also merges into the original amalgam B'. Upon solidification of the silver-enriched amalgam and the amalgam B', the remaining silver in layer 14 is metallurgically bonded to the amalgam B'.

The amalgam B' and silver-enriched amalgam in each hole C are mechanically bonded to the pin E inasmuch as they en-

gage mechanically bonded to the pin E inasmuch as they engage and interlock with the serrations 12 defined thereon. When the amalgam B' and silver-enriched amalgam solidify, they tend to expand slightly, whereby the amalgams frictionally grip the wall of the hole C with great tenacity and are difficult to remove therefrom.

After the pins E have been anchored in the holes C in the manner described, a quantity of amalgam is shaped to define the body B, as illustrated in FIG. 6. The body B completely envelops the upwardly projecting portions of the pins E. The amalgam of body B partially dissolves the silver in layers 14 on the upwardly projecting portions of the pins E, with the zone of silver-enriched amalgam resulting therefrom merging both into the silver of layer 14 and the amalgam defining the body B. Thus, when the amalgam of body B and the zone of silver-enriched amalgam solidify, the layer 14 of silver enveloping the serrated stainless steel wire 10 is metallurgically bonded to the amalgams. The body B can only be moved longitudinally relative to the wires 10 by breaking the enveloping silver layers at some position intermediate the ends thereof.

Due to the metallurgical bond between the amalgam defining body B and the silver enveloping the serrated wires 10, it is highly desirable that the layers of silver 14 be sufficiently thick that the inner portions thereof remain in the unamalgamated state. Longitudinal movement of the body B relative to the upwardly projecting portions of the pins E is also difficult due to the positive interlocking of the solidified amalgam of body B and the silver-enriched amalgam with the serrations 12, which form a mechanical as well as chemical bond with the pins.

In the manufacture of the pins E, the serrated wire 10 is first formed, with the layer 14 of silver or silver alloy being thereafter electrodeposited thereon to a thickness to achieve the operational advantages described herein. The instrument G includes an elongate handle 20 having an angularly disposed lower portion 22, which develops into body 24 of larger transverse cross section. A bore 26 extends transversely through body 24. The bore 26 is of such transverse cross section that it slidably engages the projecting portion of each pin E. The lower surface 28 of body 24 may be used to tamp amalgam into the hole C about pin E, when the body is alternately moved upwardly and downwardly relative to the tooth A.

We claim:

1. In combination with a tooth having a broken-away portion, which tooth is restored to its original configuration by a body of amalgam, with at least one hole being drilled into the dentine of said tooth that is in communication with said broken-away portion, a dental pin for holding said body in position in said tooth, which pin includes:

- a. a circumferentially serrated wire substantially longer than the depth of said hole, with said wire being formed from a rigid metallic material that is substantially corrosion-resistant;
 - b. a layer of high content silver metal which envelops said wire, with the transverse cross section of said wire and said layer enveloping same being substantially less than that of said hole; and
 - c. a quantity of plastic amalgam in said hole that is in surface contact with said layer when a lower portion of said pin is disposed in said hole with an upper part of said pin projecting from said hole and completely disposed in said body when in a plastic state, which amalgam in said hole and in said plastic amalgam body dissolves a part of said silver in said layer to form a zone of silver-enriched amalgam that merges both into the undissolved silver of said layer as well as into said amalgam that has been so enriched, with said amalgam and silver-enriched amalgam, when metallurgically solidified, bonding said body to said pin by said silver, silver-enriched amalgam, and the non-silver-enriched amalgam forming an integral mass that prevents longitudinal movement of said body relative to said pin, and with said body being further restrained from longitudinal movement relative to said pin due to the mechanical engagement of said solidified amalgams which engage said serrations defined by said silver layer.
2. A dental pin as defined in claim 1 wherein said wire is of stainless steel.
3. A dental pin as defined in claim 1 wherein said high silver content metal is silver.
4. A dental pin as defined in claim 1 wherein said layer is sufficiently thick that a portion thereof remains unamalgamated after contact with said amalgam.
5. A dental pin as defined in claim 1 wherein said layer is electrodeposited on said wire.

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