

[54] **BRIDGE STABILIZING SYSTEM**

[72] Inventor: **Leonard I. Linkow**, 30 Central Park South, New York, N.Y. 10019

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 [51] Int. Cl. .... **A61c 13/22**  
 [58] Field of Search .... **32/5, 10 A**

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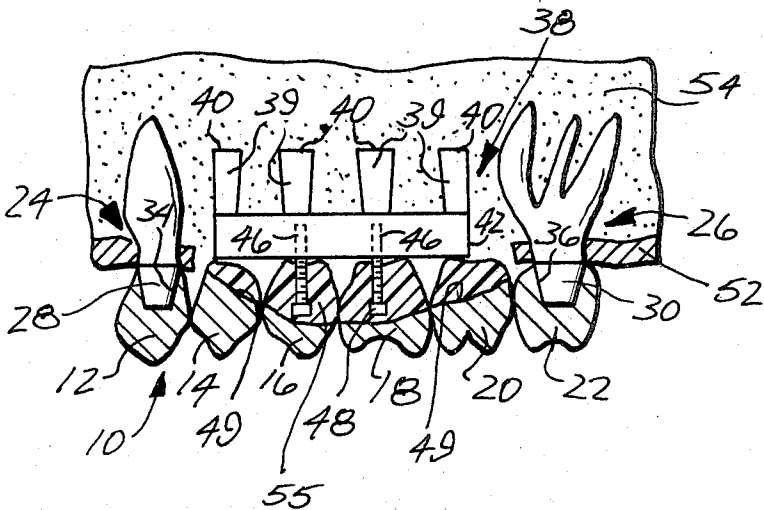
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*Primary Examiner*—Robert Peshock  
*Attorney*—James and Franklin

[57] **ABSTRACT**

A bridge stabilizing system and method of using same is provided wherein an existing bridge structure may be stabilized directly in the underlying bone structure without the necessity of removing the bridge from its operative engagement with the stubs of natural abutment teeth. To this end, the system comprises a bridge stabilizing implant having a blade edge at one end thereof and a shoulder portion at the other end thereof provided with means for receiving one end of a shaft. The other end of the shaft is adapted to be received in a hollowed out portion of the existing bridge structure. The implant is tapped into the bone and the shaft is placed in its operative position extending into a hollowed-out portion of the bridge structure, after which the hollow is filled with a cold cure acrylic resin to provide operative stabilizing engagement between the implant and the bridge.

**10 Claims, 7 Drawing Figures**



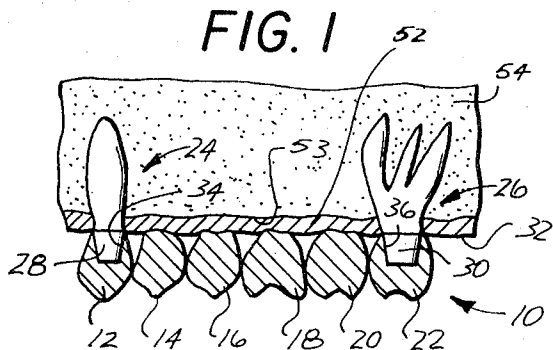


**FIG. 1A**

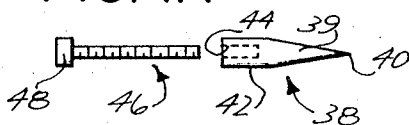


**FIG. 2**

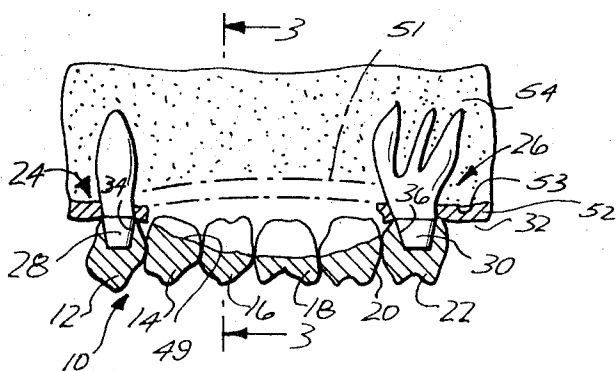
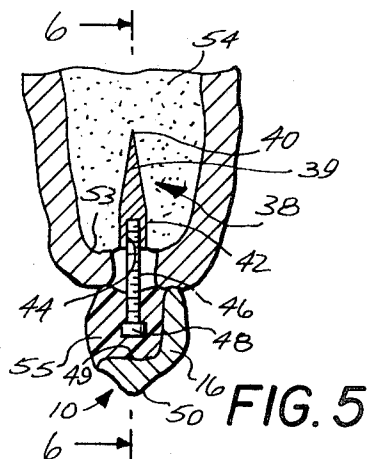
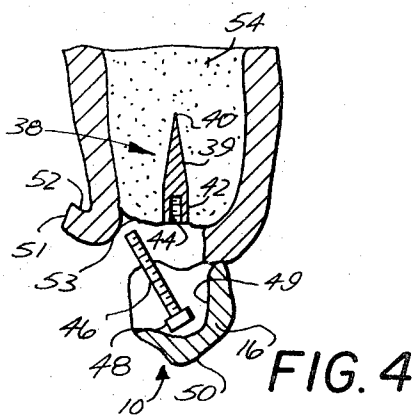
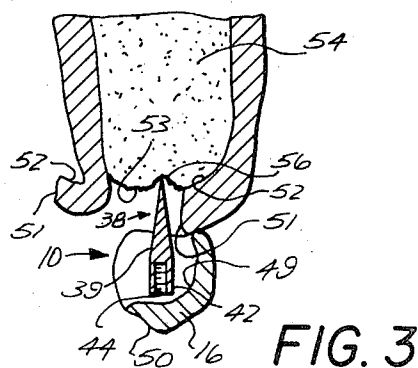
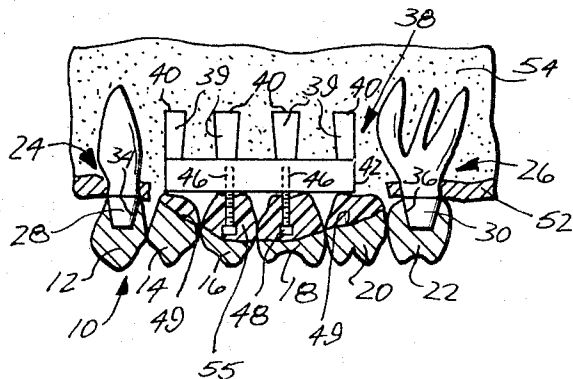


**FIG. 6**



INVENTOR  
LEONARD I. LINKOW  
BY *James and Franklin*  
ATTORNEY

## BRIDGE STABILIZING SYSTEM

The present invention relates to a bridge stabilizing system and in particular to a permanent implant structure and a method of using said structure in connection with existing permanent bridges.

To replace lost teeth, the dentist or oral surgeon generally utilizes one of two basic techniques, depending upon the condition of the remaining natural tooth structure. If there are insufficient natural teeth remaining upon which to construct a fixed bridge, or the remaining teeth are not sturdy enough for this task, the dentist resorts to what is generally described as a removable bridge. In a typical removable denture, a resilient metal clasp is provided which is sprung around the adjacent natural tooth. A major difficulty in the use of such removable bridges is that food particles tend to accumulate in the areas between the removable bridge and the gum, thus requiring the frequent removal of the bridge from the patient's mouth to properly cleanse both the bridge and gum area adjacent thereto. This operation is cumbersome, unpleasant and somewhat unsanitary.

For these reasons, where natural teeth remain on both sides of the lost tooth or teeth, dentists prefer to utilize a fixed or permanent bridge. Typically, in a construction of a fixed bridge, the adjacent natural teeth are ground down to form stubs. The superstructure, formed of artificial teeth, includes at either end a crown hollowed out to snugly receive the natural tooth stub, these crowns being cemented permanently over the stubs, thereby permanently securing the entire bridge superstructure in proper position within the edentulous span between these natural tooth stubs.

While such fixed or permanent bridges have been relatively successful in the past it has been found that the supporting bone structure on either side of such a fixed bridge tends to deteriorate over a period of time and the abutment teeth may no longer be capable of supporting such a bridge structure. As a result, the bridge becomes mobile due to the loosening of the supporting teeth, creating difficulty and discomfort for the patient particularly when biting into hard objects. In these situations the bridge stabilizing system of the present invention may be utilized to secure or stabilize an existing bridge directly on the underlying bone structure, providing there exists a fairly long edentulous span between the abutment teeth.

It is a primary object of the present invention to provide a bridge stabilizing system designed for use with existing bridge structures operatively attached to the stubs of abutting natural teeth.

It is a further object of the present invention to provide an implant structure which may be readily driven into the jawbone of the patient and is provided with means to secure an existing bridge structure thereto for stabilization thereof and long lasting retention.

It is another object of the present invention to provide a bridge stabilizing structure which is economical and easily manufactured and utilized.

It is yet a further object of the present invention to provide a method of securing a bridge stabilizing structure in proper position without the necessity of removing the bridge structure from its engagement with deteriorating abutment teeth.

It is still a further object of the present invention to provide an oral surgery technique for stabilizing an existing permanent bridge which is simple, inexpensive and results in an extremely stable bridge maintained in its original position in the patient's mouth.

To these ends, the present invention provides a specially constructed blade adapted to be driven into the jawbone of the patient underlying a hollowed out area of an existing bridge structure. The implant comprises a sharp tapered blade portion having a shoulder portion with one or more bores therein. One end of a long shaft is adapted to be received in the bore of the implant, the other end of said shaft being received in the hollowed out pontic. The hollow is then filled with an adhesive resin material which when dry provides a

secure engagement between the shaft and the pontic, thereby securing the entire bridge structure directly to the patient's jawbone to stabilize the weakening bridge.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to a bridge stabilizing system and method of using same as defined in the appended claims and as described in this specification, taken together with the accompanying drawings, in which:

FIG. 1 is a cross-sectional view on a greatly enlarged scale of an artificial bridge structure positioned in a patient's mouth and supported by the stubs of natural abutment teeth on either side;

FIG. 1A is an enlarged side elevational view of my blade implant structure;

FIG. 2 is a cross-sectional view similar to FIG. 1 showing the gum tissue adjacent the bridge structure incised and retracted exposing the ridge of the underlying bone;

FIG. 3 is a cross-sectional view taken along the line 3—3 of FIG. 2 and in addition, showing the blade implant structure being positioned for tapping into the patient's jawbone;

FIG. 4 is a cross-sectional view similar to FIG. 3 in which the blade implant is in proper position within the patient's jawbone showing the method of inserting a headed screw within the hollow in the bridge structure;

FIG. 5 is a cross-sectional view similar to FIG. 0 SHOWING the bridge stabilizing structure properly inserted in the patient's jawbone and secured to a permanent bridge; and

FIG. 6 is a cross-sectional view taken along the line 6—6 of FIG. 5.

Referring to the drawings, and more particularly to FIG. 1, there is illustrated a fixed or permanent bridge generally designated 10, which, in the embodiment shown, is formed of six artificial teeth or pontics 12, 14, 16, 18, 20 and 22, secured to one another in known manner. It will be seen that the terminal pontics 12 and 22 are secured on natural tooth structure generally designated 24 and 26 respectively. To these ends natural teeth 24 and 26 have been ground down so that only stubs 28 and 30 respectively remain above the gum line 32. Recesses 34 and 36 are formed in artificial teeth 12 and 22, respectively, said recesses being adapted to snugly receive the stubs 28 and 30 of natural abutment teeth 24 and 26. During the initial building of the bridge structure the recesses 34 and 36 would normally be coated with an adhesive or cement-like material and the terminal pontics 12 and 22 of the bridge structure would be inserted over stubs 28 and 30 and securely cemented thereon as illustrated.

It will be apparent that the stability of this bridge structure depends exclusively on the cemented engagement of pontics 12 and 22 to stubs 28 and 30 and the secure retention of these stubs in the underlying structure. Over a period of time the stubs 28 and 30 of the natural abutment teeth may become weakened by the loss of bone or the pontics 12 and 22 may work loose on stubs 28 and 30. In either case the bridge structure becomes unstable, causing considerable difficulties for the patient.

I have found that the above situation may be corrected by use of a blade implant structure without the need for removing the bridge from its engagement with the weakening abutment teeth. As best shown in FIG. 1A my blade implant structure comprises a blade implant generally designated 38 and having tapered body 39 with a razor-sharp blade edge 40 at one end and a relatively broader shoulder portion 42 at the other end. In the embodiment shown, shoulder portion 42 is provided with an internally threaded aperture 44 adapted to receive a threaded shaft or the like. A long threaded screw 46 is adapted to be threadedly engaged within aperture 44 in blade portion 38 and has a head portion 48 of a larger cross section. Head portion 48 is adapted to be received in a hollowed out pontic of the existing bridge. The tapered body 39 may be designed in a variety of configurations. Several such configurations are disclosed in my prior U.S. Pat. No. 3,465,441 entitled "Ring-Type Implant For Artificial Teeth" and issued on Sept. 9,

1969. The choice of blade configuration will depend upon the shape and size of the underlying bone structure. In the configuration illustrated in FIG. 6, for example, the tapered body 39 is in the form of a plurality of fingers, this configuration being best suited for areas of the bone containing sinus cavities so as to avoid cutting into such cavities with the blade edge 40.

Moreover, the blade portion 38 may be made somewhat curved to facilitate the initial tapping of the blade into the bone. This is particularly advantageous where the pontic in question is of such shape or size so as to substantially restrict the size of the hollow which may be formed therein. With the use of a curved blade the blade edge 40 may be inserted in the groove 56 with the shoulder portion extending out from the side of the hollow for easy access.

As illustrated in FIGS. 2-6, the manner of securing the foregoing structure in proper position in the patient's mouth is as follows: As best shown in FIGS. 2 and 3 the tissue-bearing surface of the pontics within the endentulous span is hollowed out by means of a round burr or fissure burr as shown at 49. Normally this will be done from the cheek side for convenient access to the underlying bone. When a straight blade implant is utilized, the hollowed out portion 49 must be large enough to receive the blade implant 38 in a vertical position below (or in the case of a lower bridge, above) the bone with some clearance but in no case should it extend to the occlusal or bite surface 50 of the pontics. It should be noted that the blade implant and screw may be manufactured in a variety of sizes to account for different shapes and sizes of the bridge pontics.

An incision 51 is made in the fibromucosal tissue 52 just below the tissue-bearing surface of the existing pontics along the entire endentulous span. This fibromucosal or buccal tissue is then retracted to expose the alveolar ridge crest 53 of the underlying bone 54. Using an appropriate tool a groove 56 is formed along the alveolar crest of the bone along the entire endentulous span (FIG. 3). The blade 38 is then inserted in position as shown in FIG. 3 with the blade edge 40 inserted into the groove 56 and the shoulder portion thereof extending into the hollow 49 in pontic 16. It will be noted that the groove 56 serves to stabilize the blade edge on the bone 54 prior to its being driven therein. Moreover, in cases where there may not be sufficient clearance between the shoulder portion 42 of implant 38 and the hollowed out surface of the pontic, groove 56 may be made deeper to provide the needed additional clearance.

Again using an appropriate tool the blade is tapped into the bone 54 until the shoulder portion 42 is buried 1 to 2 millimeters below the alveolar crest. As best shown in FIG. 4 the screw 46 is then inserted head first into hollow 49 in pontic 50 and brought into generally vertical registry (shown in broken lines) with the internally threaded bore 44 of shoulder portion 42 of the blade implant. The screw is then screwed into the blade implant 38 as shown in FIG. 5, until the end of the screw engages the bottom of bore 44. This will normally be accomplished by the use of a tool in the nature of tweezers inserted into hollow 49 from the cheek side.

As shown in FIG. 5 the screw now extends from the bone 54 a substantial distance, the head portion 48 extending completely into hollow 49. A suitable cement, such as a cold cure acrylic resin 55, is then placed into the hollow 49 in the pontic, preferably using the brush-on technique, until the entire hollow 49 is filled. The acrylic resin is preferably methyl methacrylate which is rather fast setting and hardens within a few minutes. When hard, the resin is carefully trimmed and polished to blend with the remainder of the artificial pontic. Sutures are then applied to rejoin the incised tissues. These sutures may be removed in 5 to 7 days at which time the operation is complete.

While the embodiment illustrated utilizes a threaded engagement between the screw 46 and the blade implant 38, this is merely for illustrative purposes and there are several other modes of attachment which may be satisfactory or even desirable. Thus, in many situations, the bridge need only be

stabilized laterally within the underlying bone. In this case a simple unthreaded cylindrical shaft may be used in place of screw 46 with an unthreaded cylindrical aperture of corresponding cross-section in shoulder portion 42. In any case, however, the shaft is preferably provided with a broader head portion corresponding to head 48 on screw 46 adapted to be fully inserted within hollow 49, thereby to enhance the effectiveness of the cemented engagement of the shaft to the bridge.

It will be appreciated from the foregoing that I have provided a bridge stabilizing system which enables the dentist or oral surgeon to stabilize a weakening permanent bridge directly on the underlying bone by means of a simple, inexpensive and expedient oral surgery technique. This technique provides a saving in time and expense of removing the existing bridge from its engagement with the deteriorating stubs of natural abutment teeth, with the attendant advantage of avoiding further deterioration of such stubs as a result of this removal process. Moreover, the problem of reaffixing the bridge in the precise position in which it was originally disposed so as to maintain the same "bite" is obviated.

While only one embodiment of my invention has been specifically disclosed herein, it will be apparent that many variations may be made therein, all within the scope of the present invention as defined in the following claims.

I claim:

1. A bridge stabilizing system adapted to stabilize a hollowed bridge permanently affixed to natural tooth structure in the endentulous span between said natural tooth structure, comprising a stabilizing implant adapted to be embedded in the bone structure underlying said endentulous span and having a blade edge, fastening means one end of which is adapted to be received in a hollow formed in said bridge and the other end of which is adapted to be secured to said stabilizing implant, means on said stabilizing implant remote from said blade edge for engaging said other end of said fastening means, and an adhesive filler material for filling said hollow in said bridge and permanently retaining said one end of said fastening means within said hollow, whereby said bridge is permanently affixed to the bone underlying said endentulous span.

2. The bridge stabilizing system of claim 1, wherein said engaging means on said implant comprises a recess therein facing oppositely from said blade edge.

3. The bridge stabilizing system of claim 2, wherein said stabilizing implant is provided with a shoulder portion remote from said blade edge, said recess being formed in said shoulder portion.

4. The bridge stabilizing system of claim 2, wherein said recess is internally threaded and wherein said one end of said fastening means is externally threaded, whereby said one end of said fastening means is adapted to be threadedly received and retained within said recess.

5. The bridge stabilizing system of claim 3, wherein said recess is internally threaded and wherein said one end of said fastening means is externally threaded, whereby said one end of said fastening means is adapted to be threadedly received and retained within said recess.

6. The bridge stabilizing system of claim 1, wherein said adhesive filler means is a cold cure acrylic resin.

7. The bridge stabilizing system of claim 2, wherein said adhesive filler means is a cold cure acrylic resin.

8. A method of stabilizing a bridge in the endentulous span between abutment teeth utilizing the system of claim 1 comprising:

- forming said hollow in the tissue-bearing surface of said bridge;
- moving said stabilizing implant into said bone through the tissue along said endentulous span; and then performing the following steps in appropriate sequence:
- inserting said one end of said fastening means into said hollow in said bridge;
- securing said other end of said fastening means to said engaging means on said stabilizing implant; and

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e. filling said hollow in said bridge with said adhesive filler material, whereby said bridge is permanently affixed to said bone.

9. A method of stabilizing a bridge in the endentulous span between abutment teeth utilizing the system of claim 4 comprising:

- a. forming said hollow in the tissue-bearing surface of said bridge;
- b. moving said stabilizing implant into said bone through the tissue alone said endentulous mucosal span; and then performing the following steps in appropriate sequence:
- c. inserting said one end of said fastening means into said hollow in said bridge;
- d. threadedly engaging said other end of said fastening means with said implant in said recess; and
- e. filling said hollow in said bridge with said adhesive filler material, whereby said bridge is permanently affixed to said bone.

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10. A method of stabilizing an existing bridge in the endentulous span between abutment teeth, utilizing the system of claim 1, comprising the following steps in appropriate sequence:

- a. forming a hollow in said bridge at the tissue-bearing surface thereof;
- b. moving said blade through the tissue at the ridge crest adjacent to the tissue-bearing surface of said existing bridge into the underlying bone;
- c. inserting said one end of said fastening means in said hollow formed in said bridge;
- d. securing said other end of said fastening means to said bridge stabilizing implant; and
- e. filling said hollow in said bridge with said adhesive filler material whereby said bridge is permanently affixed to said bone.

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