United States Patent [19]

Franklin et al.

[11] **3,874,081**

[45] **Apr. 1, 1975**

[54] **DENTAL PIN AND DISPENSER**

[76] Inventors: **Mark E. Franklin,** 29 Koster Dr., Freehold, N.J. 07728; **James R. Schmidt,** 33 Birmingham Dr., Englishtown, N.J. 07726

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[21] Appl. No.: **254,603**

[52] **U.S. Cl.** **32/15**

[51] **Int. Cl.** **A61k 5/02**

[58] **Field of Search** ..... 32/6, 7, 15, 40 R

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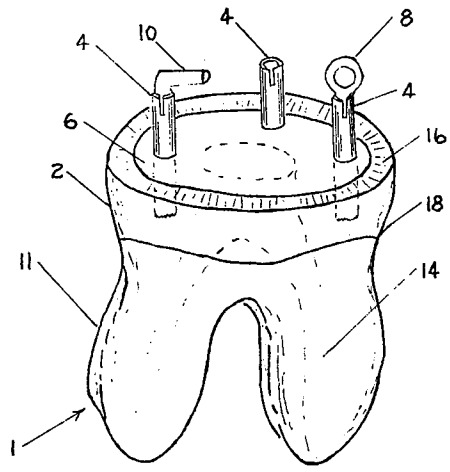
Primary Examiner—Robert Peshock

Attorney, Agent, or Firm—Kenyon & Kenyon Reilly Carr & Chapin

[57] **ABSTRACT**

A dental pin for use in the reinforcement of restorations used in the reconstruction of mutilated teeth and a reinforcing rod and mandrel to be used in conjunction with the dental pin. A dental dispenser for handling such pins.

13 Claims, 50 Drawing Figures



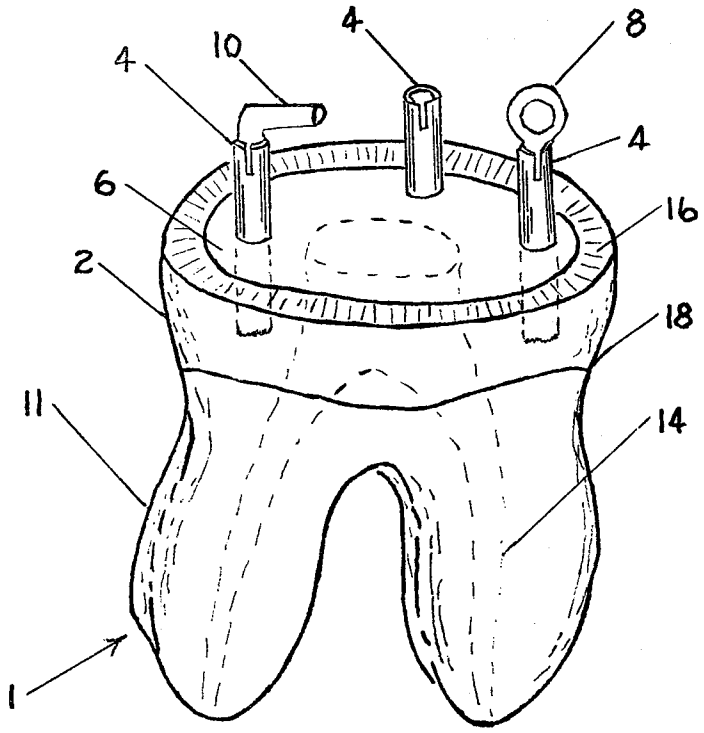


FIG. 1

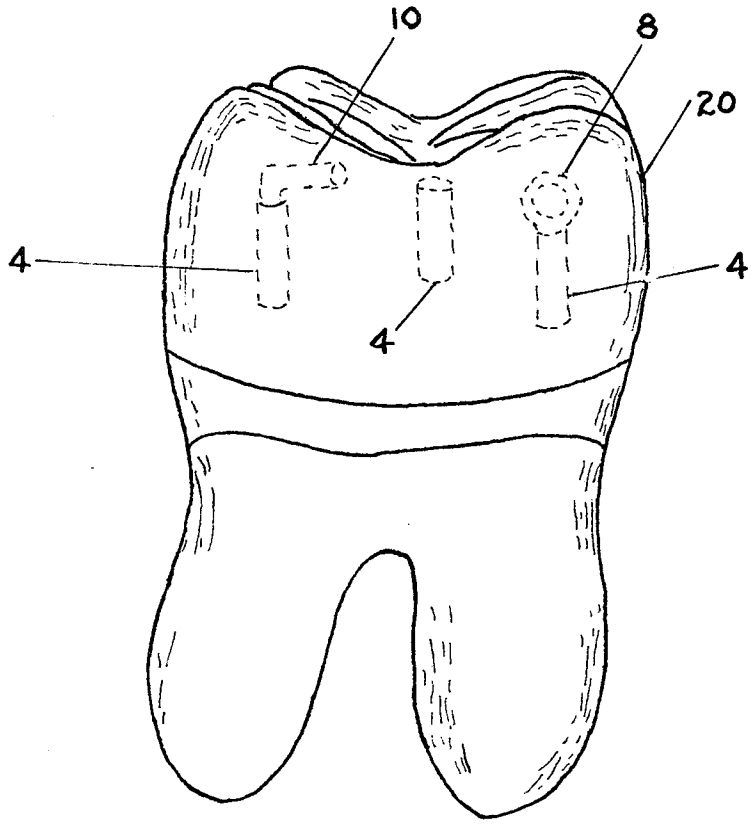


FIG. 2

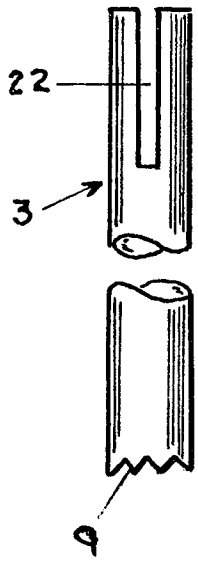


FIG. 3

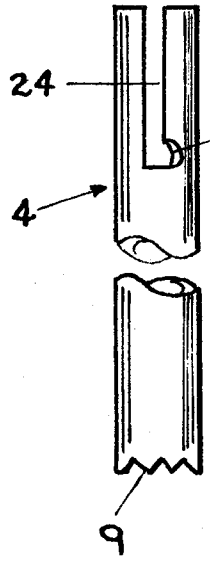


FIG. 4

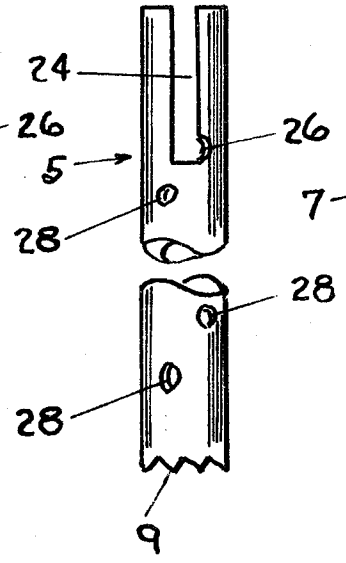


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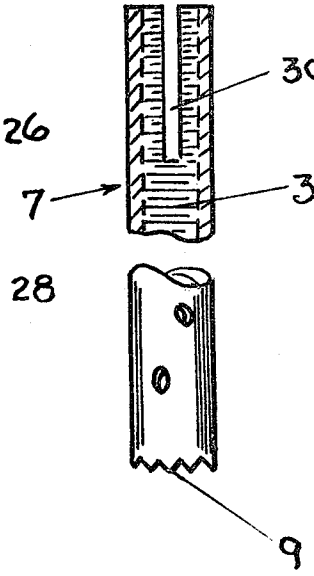


FIG. 6

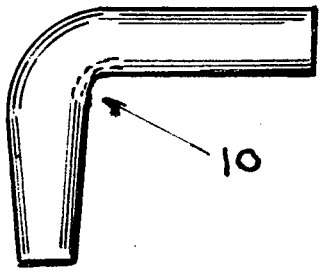


FIG. 7

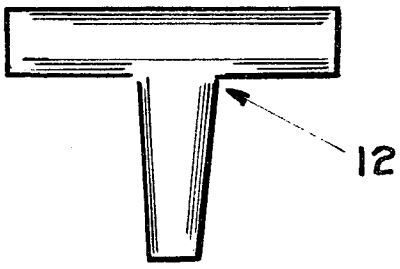


FIG 8

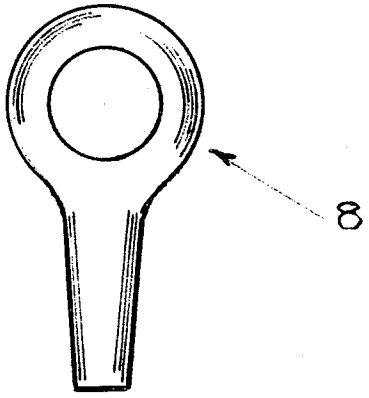


FIG. 9

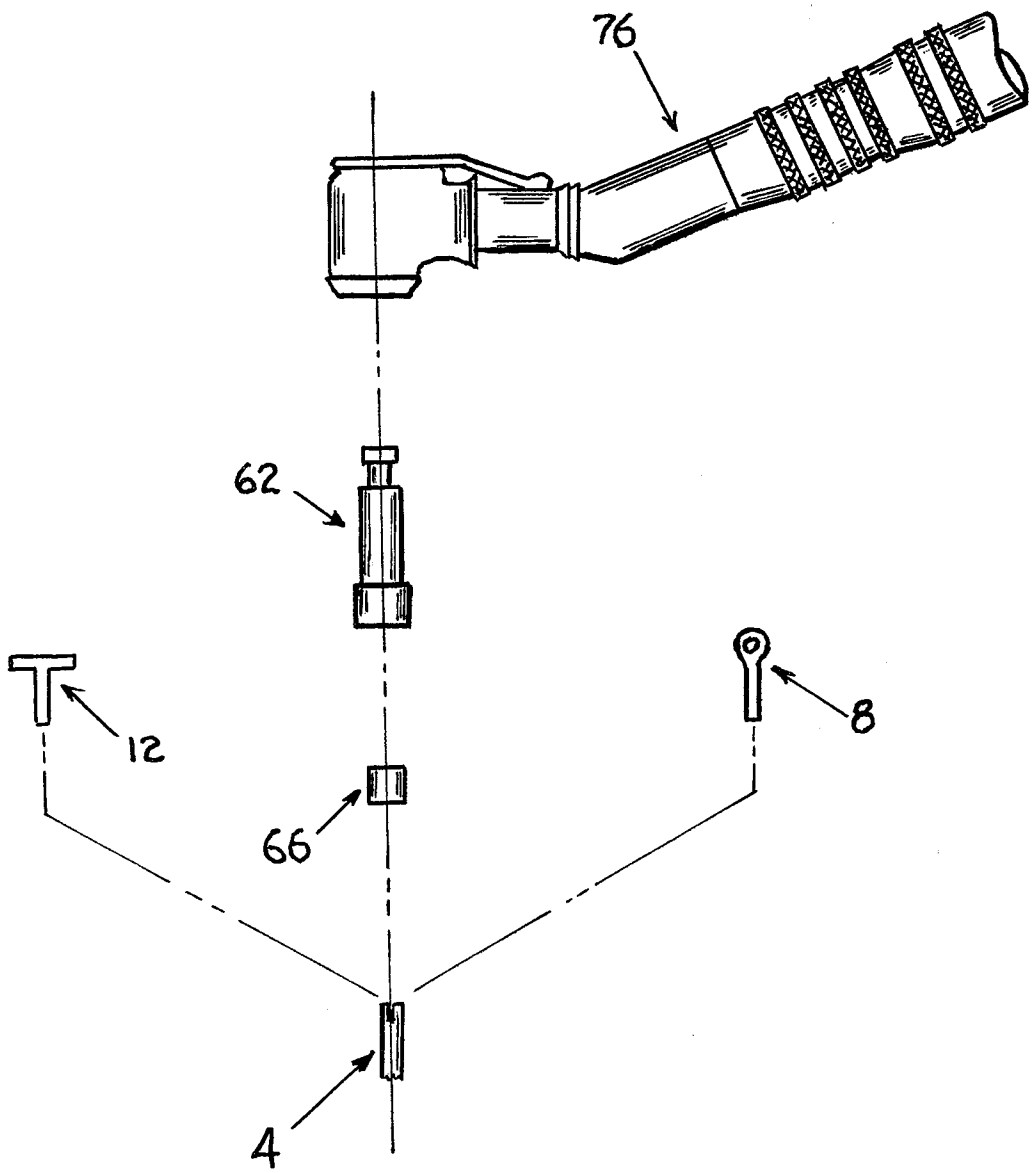


FIG. 10

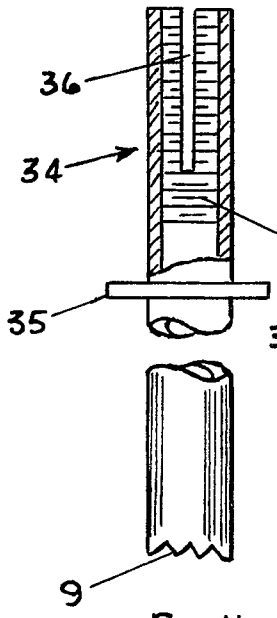


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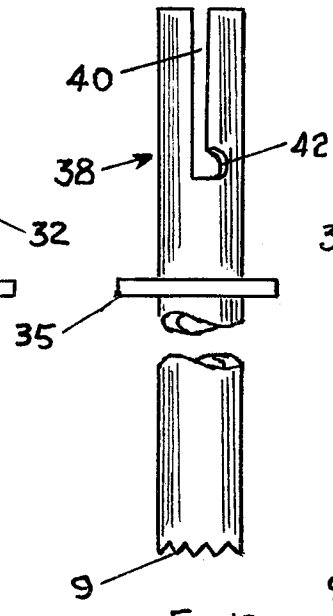


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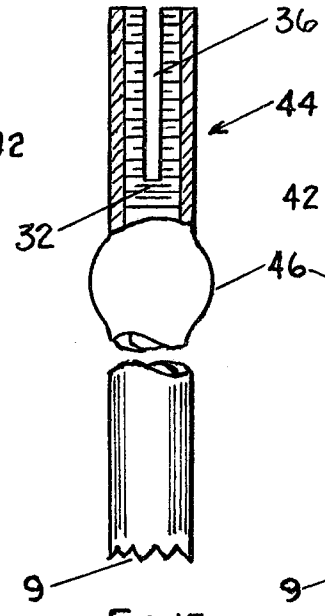


FIG. 13

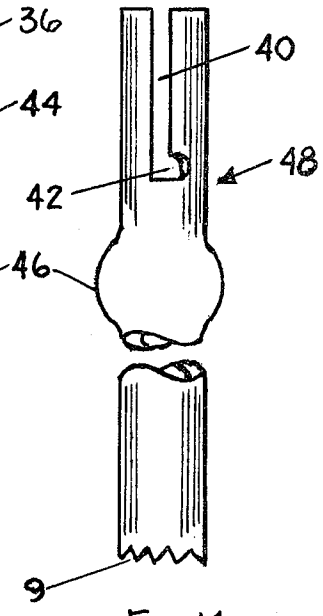


FIG. 14

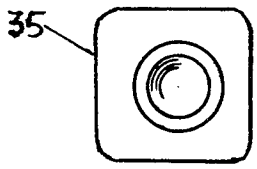


FIG. 15

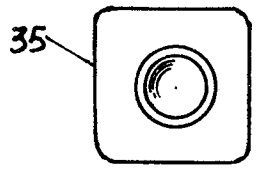


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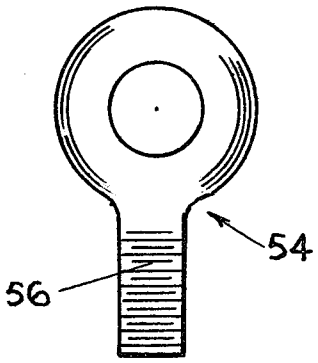


FIG. 19

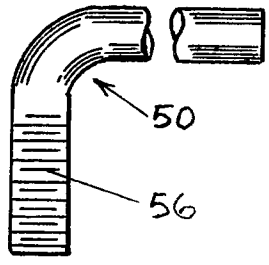


FIG. 17

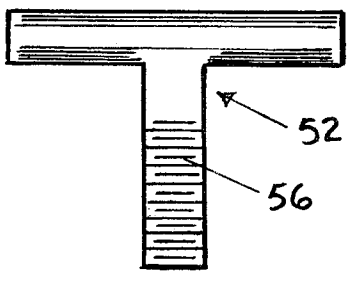


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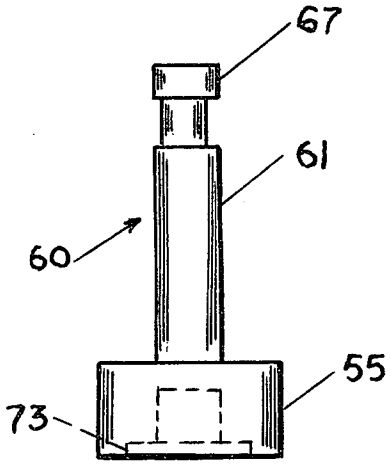


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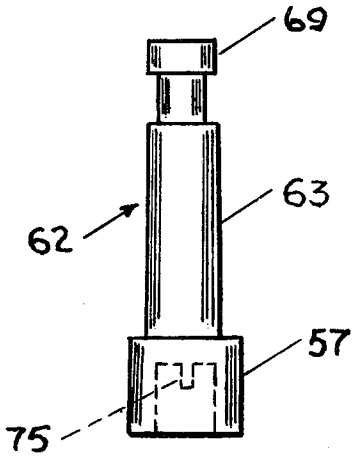


FIG. 21

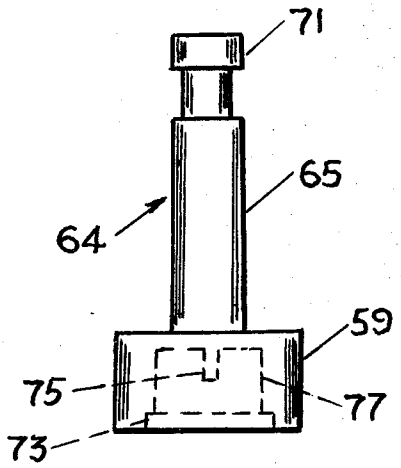


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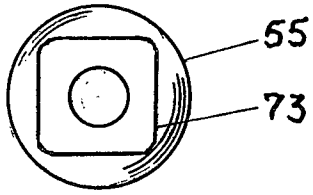


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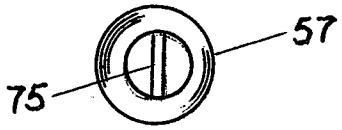


FIG. 24

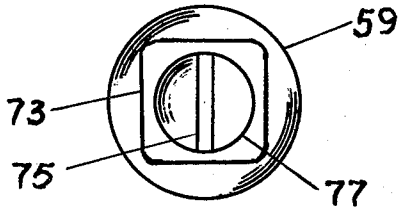


FIG. 25

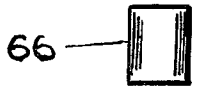


FIG. 26



FIG. 28



FIG. 27

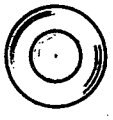


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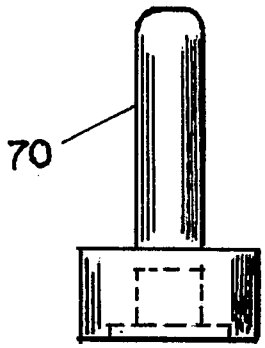


FIG. 30

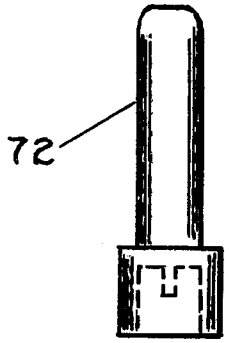


FIG. 31

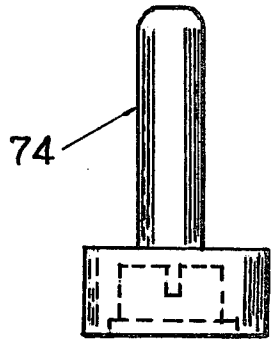


FIG. 32

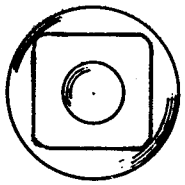


FIG. 33



FIG. 34

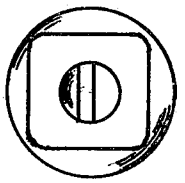


FIG. 35

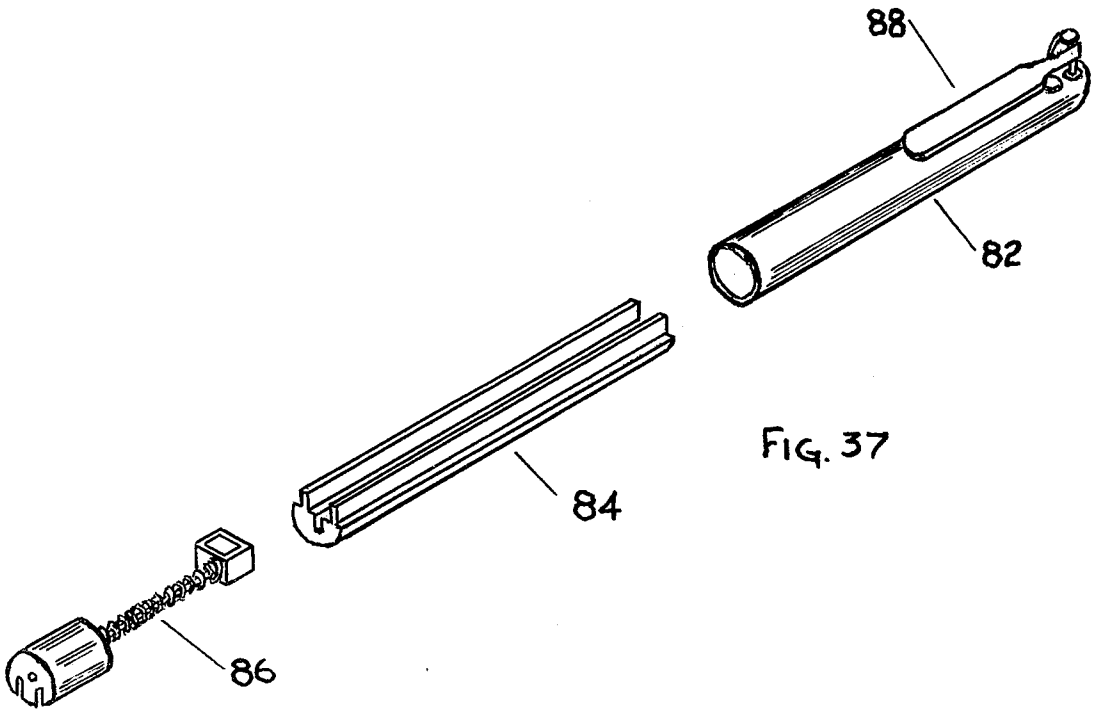


FIG. 37

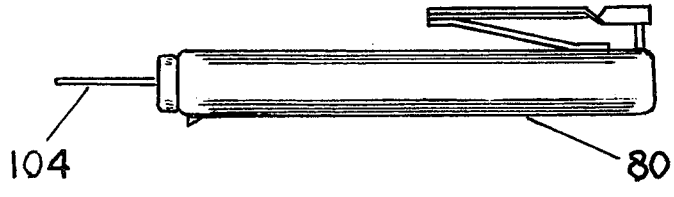


FIG. 36

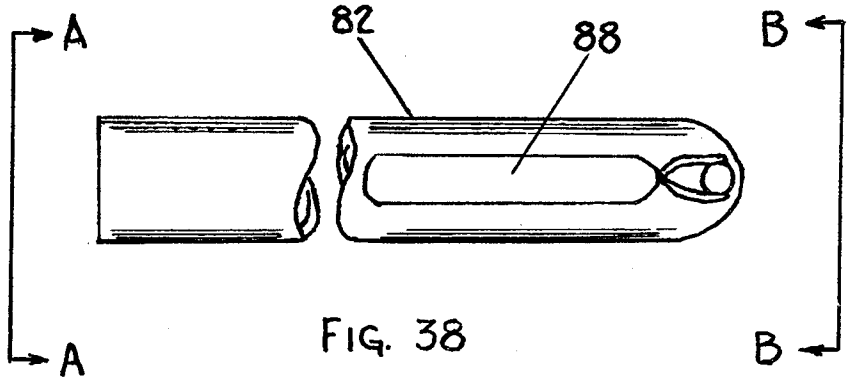


FIG. 38

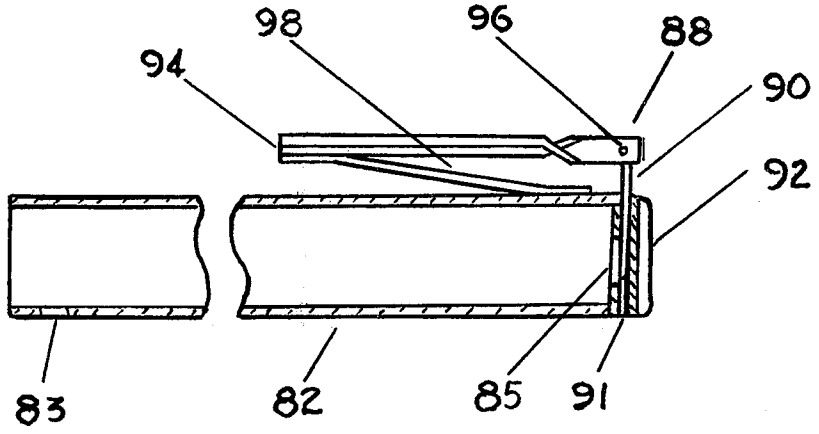


FIG 39

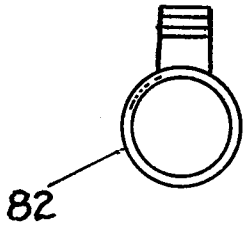


FIG. 40

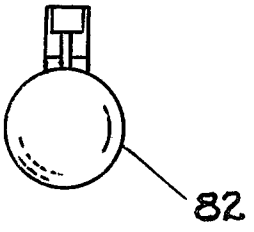


FIG. 41

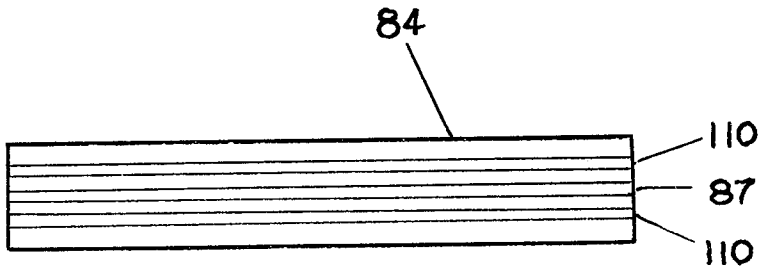


FIG. 42

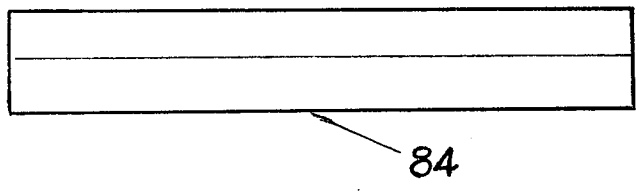


FIG. 43

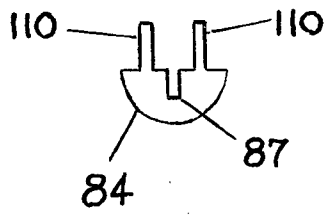


FIG. 44

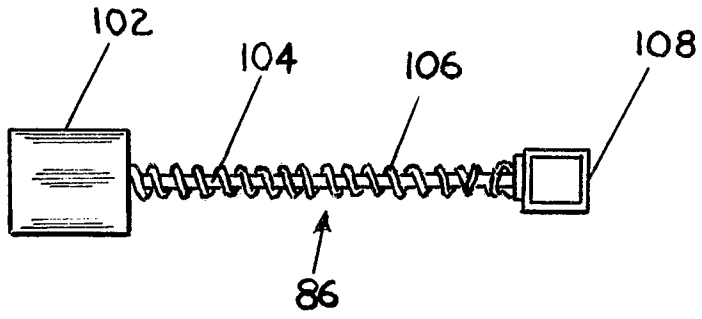


FIG. 45

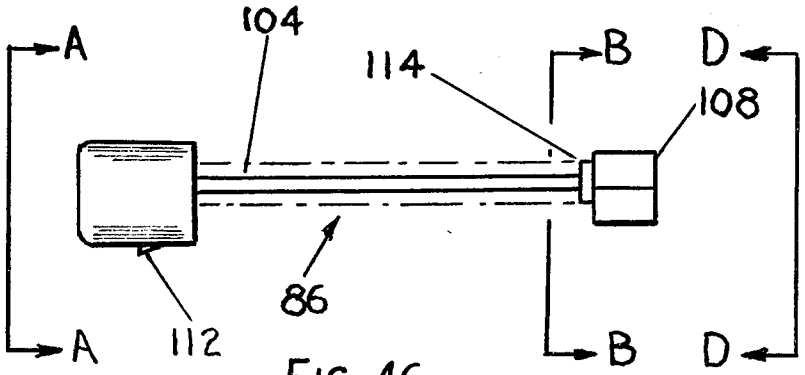


FIG. 46



FIG. 47

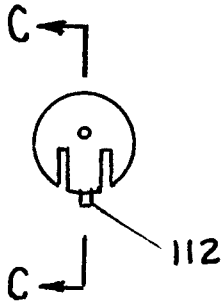


FIG. 48

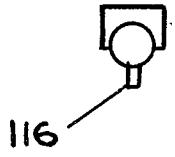


FIG 49

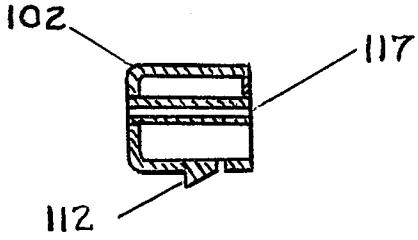


FIG. 50

DENTAL PIN AND DISPENSER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the practice of dentistry and in particular to apparatus for the reinforcement of restorations used in the reconstruction of mutilated teeth.

2. Description of the Prior Art

The preparation and reconstruction of a mutilated tooth in dentistry has heretofore required a laborious procedure to restore the tooth to normal functioning condition. Such preparation and reconstruction often requires the use of reinforcement pins placed in the tooth structure and has had very limited success. The lack of success of existing, conventional dental reinforcement pins is attributed to a number of factors. First, a two-step procedure is required, calling for drilling a hole in the tooth structure to receive a threaded, friction or cementable pin and then placing the dental pin in the hole. Second, there are voids between the pin and the tooth structure which form areas for entrance of impurities. Third, fractures occur at the threaded area of the tooth structure and such fractures become greater when friction pins are inserted. Fourth, manipulation in placing and positioning the pins is difficult and often results in breaking the pin. Fifth, metallic or chemical bonding to the restorative material has not been achieved. Sixth, the entire procedure for dental restorations by use of reinforcement pins is of limited dental application.

A great problem also exists in the control and use of the dental pins themselves. Dentists using these pins for restoring teeth have difficulty controlling these items by the conventional pin forceps or dental pliers. The pins are small and, as a result, are often dropped and lost in the process of handling from the pin container to the dental pliers or forceps and then to placement in the tooth. Most dentists do not attempt to recover the dropped pin, but start again with another pin. Even if the dropped pin were picked up, it would require sterilization before it could be used.

SUMMARY OF THE INVENTION

This invention relates to a newly designed dental pin, reinforcing rod and mandrel and to a newly designed dental dispenser for handling such pins.

The newly designed dental pin and mandrel incorporates several outstanding features not found in existing dental pins. The dental pin of this invention is called an "end cutting tube pin" and is designed with end cutting blades enabling it to be seated in one operation. Several shapes and forms have been designed to achieve ease of seating and manipulation.

The outstanding features of the end cutting tube pin of this invention are as follows. First, it can be used in a one-step procedure, instead of requiring pre-drilling of a hole in the tooth structure to receive the threaded, friction or cementable pins known in the prior art. Second, it eliminates all lateral voids and stresses because it creates its own crypt in the tooth structure and remains in that position. Thus, it eliminates the void between the male and female threads of the threaded pins known in the prior art which have heretofore provided areas for entrance of impurities. It also eliminates the problems resulting from incomplete seating of the pins known in the prior art. Third, the end cutting tube pin of this invention eliminates the fracture lines which

occur at the threaded areas of dental pins used in the prior art. It also avoids the incidence of fracture lines in the lateral and base walls of the tooth structure which resulted from the greater force required to seat the tapered friction pins of the prior art. The reinforcing rods can be placed in the tube of this invention without stress of the tooth structure. Fourth, it provides greater ease of placement and positioning. The end cutting blade of this invention involves less cutting surface and thereby reduces friction and heat. The mandrel of this invention is self-limiting thereby allowing proper placement in depth and position. Fifth, the dental pin of this invention provides greater strength because it achieves a lateral seal, eliminates fracture lines and provides air through the tube of the pin. Sixth, it provides greater durability because the tube pins of this invention bend without breaking due to the equal distribution of stress, whereas the solid pins of the prior art often break while the dentist is trying to position them within a particular area. Seventh, the dental pins of this invention provide a greater adaptability because they may be silver plated to accommodate metallic bonding with silver amalgam. In the alternative, they may be coated with resin to accommodate chemical attachment to the resins and composites. Eighth, the pins of this invention provide a greater spectrum of use in dental care because they allow all malleable and cast restoration. They allow a one appointment procedure. They also allow non-parallel and parallel pin procedures for inlays and splinting.

DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a mutilated tooth before restoration in which dental pins of this invention are inserted for purposes of restoring the tooth.

FIG. **2** illustrates the tooth shown in FIG. **1**, after restoration using the dental pins of this invention.

FIGS. **3, 4, 5** and **6** show various embodiments of the end cutting tube pin of this invention.

FIGS. **7, 8** and **9** show various embodiments of reinforcing rods of this invention designed to be used in conjunction with the pins shown in FIGS. **3, 4** and **5.**

FIG. **10** shows a typical assembly of the dental pin, bushing, mandrel and reinforcing rod of this invention and a dental hand piece.

FIGS. **11, 12, 13** and **14** show additional embodiments of the end cutting tube pins of this invention.

FIG. **15** is an end view of FIG. **11.**

FIG. **16** is an end view of FIG. **12.**

FIGS. **17, 18** and **19** show additional embodiments of reinforcing rods of this invention designed for use with end cutting tube pin illustrated in FIGS. **6, 11** and **13.**

FIGS. **20, 21** and **22** show various embodiments of a latch type mandrel designed for use with the dental pins of this invention.

FIG. **23** is an end view of the mandrel shown in FIG. **20.**

FIG. **24** is an end view of the mandrel shown in FIG. **21.**

FIG. **25** is an end view of the mandrel shown in FIG. **22.**

FIGS. **26** and **27** illustrate bushings adapted for use with the mandrels of this invention.

FIG. **28** is an end view of the bushing shown in FIG. **26.**

FIG. **29** is an end view of the bushing shown in FIG. **27.**

FIGS. 30, 31 and 32 illustrate additional embodiments of mandrels adapted for use with the dental pin of this invention.

FIG. 33 is an end view of the mandrel shown in FIG. 30.

FIG. 34 is an end view of the mandrel shown in FIG. 31.

FIG. 35 is an end view of the mandrel shown in FIG. 32.

FIG. 36 shows the dental pin dispenser of this invention as a complete assembly.

FIG. 37 shows the dental pin dispenser of FIG. 36 disassembled into its three major components.

FIGS. 38 and 39 show one of the major components, the main housing, of the dental pin dispenser shown in FIG. 37.

FIG. 40 shows an end view of FIG. 38 along the lines A—A.

FIG. 41 shows an end view of FIG. 38 along the lines B—B.

FIGS. 42 and 43 show another of the major components, the pin cartridge, of the dental pin dispenser shown in FIG. 37.

FIG. 44 shows an end view of FIG. 43.

FIGS. 45 and 46 show another major component, the pin activator, of the dental pin dispenser shown in FIG. 37.

FIG. 47 is an end view of FIG. 46 along the lines D—D.

FIG. 48 is an end view of FIG. 46 along the lines A—A.

FIG. 49 is a cross-sectional view of FIG. 46 along the lines B—B.

FIG. 50 is a cross-sectional view of FIG. 48 along the lines C—C.

DETAILED DESCRIPTION

Dental Pin, Reinforcing Rod and Mandrel

FIG. 1 illustrates a mutilated tooth 1 and mutilated crown 2 and shows the placement of three end cutting tube pins 4 of this invention inserted in the dentin 6 of the crown 2. Two of the three end cutting tube pins 4 have reinforcing rods 8 and 10. One of the end cutting tube pins 4 has an eyelet reinforcing rod 8 inserted into pin 4. Another end cutting tube pin 4 has an L-shaped reinforcing rod 10 inserted into it.

The dental pins 4 of this invention are called "end cutting tube pins" because they have a tube-like cylindrical structure, with the typical hollow opening of a cylinder running from one end of the pin 4 to the other end. A reinforcing rod 8 or 10 may be inserted in the upper portion of the dental pin 4. The pins also have cutting blades at the end which are inserted in the tooth structure.

FIG. 1 also shows the root 11, the pulp canal 14, the enamel 16, and the cemento-enamel junction 18 of the crown 2. FIG. 2 shows the restored crown 2 with the end cutting pins 4 and the reinforcing rods 8 and 10 covered by the restoration 20.

FIGS. 3 through 6 illustrate different variations of the end cutting tube pin of this invention. FIG. 3 shows a straight end cutting tube pin 3 with a slot 22 in the upper portion of the pin for insertion into the pin mandrel. This pin mandrel will be explained subsequently in reference to FIGS. 11–15. FIG. 4 illustrates a straight end cutting tube pin 4 with a slot 24 for insertion into the pin mandrel and the slot 24 has a notch 26 at the bottom of the slot 24 for retention of a reinforcing rod. The reinforcing rod will be explained subsequently in reference to FIGS. 7, 8 and 9.

FIG. 5 illustrates a straight end cutting tube pin 5 with a slot 24 and notch 26 and, in addition, having a plurality of randomly placed horizontal passageways 28 through the pin for the retention of restorative material. FIG. 6 illustrates a straight end cutting tube pin 7 with a slot 30 for insertion into the pin mandrel and internal threads 32 in the upper portion of the pin to receive a threaded reinforcing rod. The threaded reinforcing rod will be explained subsequently in reference to FIGS. 17, 18 and 19.

Each of the pins 3, 4, 5 and 7 shown in FIGS. 3, 4, 5 and 6 has a plurality of cutting blades 9 at the end of the pin which is to be inserted in the tooth structure.

FIGS. 7, 8 and 9 illustrate different shapes of reinforcing rods 8, 10 and 12 of this invention designed for placement in the end cutting tube pins illustrated in FIGS. 3, 4 and 5. FIG. 7 shows an L-shaped solid reinforcing rod 10. FIG. 8 shows a T-shaped solid reinforcing rod 12. FIG. 9 shows an eyelet solid reinforcing rod 8.

The typical assembly illustrated in FIG. 10 shows the use of either the T-shaped reinforcing rod 12 or, in the alternative, the eyelet reinforcing rod 8 in conjunction with straight end cutting tube pin 4.

FIGS. 11 through 14 illustrate additional variations of the end cutting tube pins of this invention. FIG. 11 illustrates an end cutting tube pin 34 which has a flange 35 positioned at approximately the midpoint along the length of the pin. Referring to FIG. 15, the flange 35 in this embodiment has a substantially square shape, but it will be understood that the flanges of other embodiments may be designed with a different shape. Referring to FIG. 11, end cutting tube pin 34 also has an internal thread 32 and a slot 36.

FIG. 12 illustrates an end cutting tube pin 38 with a slot 40 for insertion into the pin mandrel and a notch 42 at the bottom of slot 40. End cutting tube pin 38 also has a flange 35 positioned at approximately the midpoint along the length of the pin. The flange 35 is square in shape as shown in FIG. 16. End cutting tube pins 34 and 38 having a flange 35 are suitable for use where the tooth structure is flat.

FIG. 13 illustrates an end cutting tube pin 44 having a bellied portion 46 for use where the tooth structure warrants such a design. End cutting tube pin 44 also has a slot 36 and internal threads 32.

FIG. 14 illustrates an end cutting tube pin 48 which also has a bellied portion 46 consisting of a round ball-like protuberance, at approximately the midpoint along the length of the pin. End cutting tube pin 48 has a slot 40 with a notch 42 at the end of the slot 40.

Each of the dental pins 34, 38, 44 and 48 shown in FIGS. 11, 12, 13 and 14 has a plurality of cutting blades 9 at the end of the pin which is to be inserted in the tooth structure.

FIGS. 17, 18 and 19 illustrate additional reinforcing rods 50, 52 and 54, each having a threaded end 56 for insertion in an end cutting tube pin which has internal thread, such as end cutting tube pin 7 shown in FIG. 6, end cutting tube pin 34 shown in FIG. 11, and end cutting tube pin 44 shown in FIG. 13. FIG. 17 shows an L-shaped solid reinforcing rod 50. FIG. 18 shows a T-shaped solid reinforcing rod 52. FIG. 19 shows an eyelet solid reinforcing rod 54.

FIGS. 20, 21 and 22 illustrate latch type mandrels adapted for use in positioning the end cutting tube pins of this invention in the tooth structure of a tooth to be restored.

Each mandrel 60, 62 and 64 is comprised of a base portion 55, 57 and 59, a cylindrical mandrel tube 61, 63 and 65 adapted for receiving a portion of the dental pin in the mandrel tube and a plunger apparatus 67, 69 and 71 for ejecting the dental pin from the mandrel and embedding the pin in the tube structure. The base portions 55 and 57 of mandrels 60 and 62 are hollow to allow the insertion of a straight dental pin such as dental pin 3 of FIG. 3. FIG. 20 illustrates a dental pin mandrel (designated generally by the numeral 60) having an internal bevel 73 adapted for receiving an end cutting tube pin 34 and 38 of the type having a flange 35 as shown in FIGS. 11 and 12. FIG. 23 is an end view of mandrel 60 showing the substantially square shape of the bevel 73 for receiving the flange 35 of the end cutting tube pins 34 or 38.

FIG. 21 illustrates a dental pin mandrel (designated generally by the numeral 62) which has an internal tongue 75 in its base portion 57 adapted to engage the slot of a straight end cutting tube pin such as pins 3, 4, 5 and 7, shown respectively in FIGS. 3, 4, 5 and 6, which have a slot 22, 24 and 30 in the upper portion of the pin. FIG. 24 shows an end view of the mandrel 62 of FIG. 21.

FIG. 22 illustrates a pin mandrel (designated generally by the numeral 64) which has an internal tongue 75 in its base portion 59, an internal bevel 73 and an enlarged internal hollowed portion 77 adapted for receiving end cutting tube pins of a type having both flanges and a bellied portion (not illustrated). Such an end cutting tube pin is a combination which includes both the flanges 35 of pins 34 and 38 shown in FIGS. 11 and 12 and the bellied portion 46 of pins 44 and 48 shown in FIGS. 13 and 14. FIG. 25 shows an end view of a mandrel 64 of FIG. 22.

FIGS. 26 and 27 illustrate bushings 66 and 68 adapted for use with the mandrels of this invention. FIGS. 28 and 29 illustrate end views of the respective bushings 66 and 68. Each bushing 66 and 68 is a short tube-like cylinder, the outer circumference of which is adapted to fit within the mandrel. The inner circumference of the bushings 66 and 68 is adapted to receive the upper portion of a dental pin. Bushing 66 is dimensioned to fit into the base portion 55 of mandrel 60 or the base portion 57 of mandrel 62. Bushing 68 is dimensioned to fit into the enlarged hollow portion 77 of base portion 59 of mandrel 64. The use of a bushing is at the option of the dentist where necessary.

FIG. 30 illustrates a mandrel 70 which is similar to mandrel 60 of FIG. 20 except that mandrel 70 is adapted for use with a friction grip dental hand piece (not illustrated). The mandrel 70 is designed for end cutting tube pins 34 and 38 having flanges 35, shown in FIGS. 11 and 12. FIG. 33 is an end view of mandrel 70.

FIG. 31 also illustrates a mandrel 72 which is similar to mandrel 62 of FIG. 21 except that mandrel 72 is adapted for use with a friction grip hand piece (not illustrated). The mandrel 72 is designed for use with straight end cutting tube pins 3, 4, 5 and 7, shown in FIGS. 3, 4, 5 and 6. FIG. 34 is an end view of mandrel 72.

FIG. 32 illustrates a mandrel 74 which is similar to mandrel 64 of FIG. 22 except that mandrel 74 is adapted for use with a friction grip hand piece (not illustrated). The mandrel 74 is designed to be used with end cutting tube pins having both flanges and a bellied portion. FIG. 35 is an end view of mandrel 74.

The typical assembly of the foregoing apparatus illustrated in FIG. 10 shows a dental hand piece 76 into which mandrel 62 is placed. Bushing 66 may be placed inside of mandrel 62 but the use of a bushing is optional. An end cutting tube pin 4 is then inserted into mandrel 62 for use. After the pin 4 has been positioned in the tooth, a reinforcing rod 8 or 12 may be inserted into the tube pin 4, at the discretion of the dentist depending upon whether or not it is necessary.

Referring to FIGS. 1 and 2, a tooth is prepared in the usual manner including the removal of all carious lesions and undermined enamel, which could possibly entail removal of all cusp and large portions of the crown 2 of the tooth. An end cutting tube pin 4 is then placed to a depth of 2 millimeters into the dentin 6 approximately one-half millimeter pulpal of the cemento-enamel junction 18. After placing the pin or pins 4 into the tooth structure reinforcing rods 8 or 10 may be inserted in the tube pin 4 as shown in FIGS. 1 and 2. The tooth is then restored using standard procedures and materials as shown in FIG. 2. If the restoration is amalgam, then a silver plated end cutting tube pin 4 for metallic bonding is used. If the restoration 20 is a resin or composite, then a resin coated tube pin 4 is used for chemical bonding of the materials.

The end cutting tube pins and pin mandrels may be made of any hard non-corrosive metal. The bushings may be made of any soft non-corrosive metal, or teflon or plastic. The reinforcing rod may be made of any durable non-corrosive metal.

Dental Pin Dispenser

FIG. 36 shows the dental pin dispenser 80 as a complete assembly, which may be used to dispense any one of the types of dental pins disclosed in this invention. FIG. 37 shows the dental pin dispenser disassembled into its three major components: the main housing 82, the pin cartridge 84 and the pin activator 86.

FIGS. 38 and 39 illustrate the main housing 82 for the pin dispenser 80 (shown in FIG. 36). Referring to FIG. 39, the main housing 82 is an elongated hollow tube and has a piston assembly 88 positioned thereon at one end of the housing 82. The piston assembly 88 has a pin piston 90 which is a metal rod that causes a pin to be dispensed. The pin is dispensed downwardly through slot 91 of piston bushing 92 which cooperates with the piston 90 and has a passageway 85 which is dimensioned to allow a pin to pass through the passageway 85. The dental pin remains at all times in a vertical position. While in vertical position, the pin moves horizontally through passageway 85 and vertically down through slot 91.

A lever arm 94 is connected to the pin piston 90. The lever arm 94 is activated by finger pressure downwardly to cause the piston 90 to lift and allow a pin to be placed in bushing 92. A pinion 96 cooperates in the rotation of the lever arm 94 and the pin piston 90. A leaf spring 98 is connected to the lever arm 94 and maintains the pin piston 90 in a locked configuration at times when the lever arm 94 is not activated to prevent a pin from protruding through bushing 92. The housing 82 has a base slot 83 positioned at the opposite end

from the piston assembly **88** which slot **83** engages a spring lock **112** of the pin activator **86** shown in FIG. **46.**

FIG. **40** shows an end view of the main housing **82** along the lines A—A of FIG. **38.** FIG. **41** shows an end view of the main housing **82** along the lines B—B of FIG. **38.**

FIG. **42** shows the pin cartridge **84** which is an elongated structure that can be adjusted to different sizes to accommodate the desired size pin. FIG. **42** shows a top view of cartridge **84.** FIG. **43** shows a side view of cartridge **84.** FIG. **44** shows an end view of cartridge **84.** The dental pins are placed in a vertical position within cartridge **84** and move horizontally along cartridge channel **87.**

FIG. **45** illustrates the pin activator **86.** Cap **102** retains the pin activator **86** in the main housing **82.** The expansion spring **106** maintains pressure against the cap **102** and against the pin controller **108.** The spring rod **104** is used to stabilize and guide the expansion spring **106** and the spring rod **104** is calibrated in order to reflect the number of pins left in the cartridge **84** of the pin dispenser **80.** (See FIG. **36**) The pin controller **108** fits in the two elongated vertical arms **110** of the pin cartridge **84** shown in FIG. **44.**

Referring to FIGS. **46** and **48,** there is a spring lock **112** which prevents the pin activator **86** from forcing itself out of the housing **82.** The spring lock **112** is an appendage from cap **102** which fits into the base slot **83** of the housing **82** shown in FIG. **39.**

Referring to FIGS. **46** and **49,** a spring washer **114** is attached to the pin controller **108.** Referring to FIG. **49,** the slot positioner **116** is used to maintain the proper position of the pins in the pin cartridge **84.** The slot positioner **116** is used in conjunction with the pin controller **108** and is either an integral part of the pin controller **108** or is attached to the pin controller **108.** Referring to FIG. **50,** which shows a crosssectional view of FIG. **48** along the lines C—C, there is a bore **117** in cap **102** through which the spring rod **104** (shown in FIGS. **45, 47** and **36**) may protrude.

Referring to FIG. **37,** dental pins are loaded into cartridge **84.** Then the cartridge **84** is inserted into housing **82,** after which activator **86** is positioned and locked in housing **82.** With reference to the position of the cartridge **84** as shown in FIG. **37,** when the pins are within cartridge **84** they move in a direction from left to right within cartridge **84.** The pins are ejected from the pin dispenser by the activation of piston assembly **88.**

In the foregoing description, the invention has been described in reference to specific exemplary embodiments. However, variations and modifications may be made without departing from the broader scope and spirit of the invention as set forth in the appended claims. The specification and drawings are accordingly to be regarded in an illustrative rather than in a restrictive sense.

What is claimed is:

1. An end cutting dental pin which combines cutting and structural elements for use in the reconstruction of a mutilated tooth, the dental pin being adapted sequentially to cut the tooth material of the remaining portion of a mutilated tooth and thereafter to become permanently embedded in and retained as a structural element of the reconstructed tooth, the pin being further adapted for insertion into the remaining portion of a mutilated tooth by the use of a pin mandrel, and comprising a cylindrical structural element which integrally includes:

a. a plurality of passagewqys through the cylindrical structural element for the retention of restorative material;

b. cutting blades disposed at one end of the cylindrical element, the cutting blades being adapted for cutting a hole in tooth material in the shape and size sufficient to allow the penetration of the pin into the mutilated tooth; and

c. engagement means upon the cylindrical element to allow the temporary engagement of the element with a pin mandrel during the cutting of a hole by the blades and the penetration of the pin into the tooth material.

2. A dental pin combining cutting and structural elements adapted to be embedded in the structure of a mutilated tooth which is reconstructed, the dental pin being adapted for insertion in the mutilated tooth by the use of a pin mandrel and comprising:

a. a straight tube-like cylindrical structural element adapted for reception into a mutilated tooth and retention in a reconstructed tooth, the cylindrical element including a slot in the upper portion thereof, the slot being adapted for engagement of the pin mandrel when the pin is inserted in the mandrel, the cylindrical element further including internal threads in the upper portion of the cylindrical element, said threads being adapted to receive a threaded reinforcing rod; and

b. cutting blades adapted for cutting tooth material, the blades being included in the cylindrical element and being disposed at the end of the cylindrical element which is driven into the mutilated tooth by the use of a pin mandrel.

3. A dental pin combining cutting and structural elements adapted to be embedded in the structure of a mutilated tooth which is reconstructed, the dental pin being adapted for insertion in the mutilated tooth by the use of a pin mandrel and comprising:

a. a tube-like cylindrical structural element adapted for reception into a mutilated tooth and retention in a reconstructed tooth, the tube-like cylindrical structural element further including a bellied portion consisting of a round ball-like protuberance at approximately the midpoint along the length thereof; and

b. cutting blades adapted for cutting tooth material, the blades being included in the cylindrical element and being disposed at the end of the cylindrical element which is driven into the mutilated tooth by the use of a pin mandrel.

4. A dental pin combining cutting and structural elements adapted to be embedded in the structure of a mutilated tooth which is reconstructed, the dental pin being adapted for insertion in the mutilated tooth by the use of a pin mandrel and comprising:

a. a tube-like cylindrical structural element adapted for reception into a mutilated tooth and retention in a reconstructed tooth, the tube-like cylindrical element including:

i. a slot in the upper portion of the element which is adapted for engagement of a pin mandrel when the pin is subsequently inserted into the mandrel;

ii. a flange positioned at approximately the midpoint along the length of the cylindrical element; and

iii. internal threads in the upper portion of the tube-like cylindrical element, said threads therein being adapted to receive a threaded reinforcing rod; and

b. cutting blades adapted for cutting tooth material, the blades being included in the cylindrical element and being disposed at the end of the cylindrical element which is driven into the mutilated tooth by the use of a pin mandrel.

5. A dental pin combining cutting and structural elements, the dental pin being adapted to be embedded in the structure of a mutilated tooth which is reconstructed, the dental pin further being adapted for insertion in the mutilated tooth by the use of a pin mandrel and comprising:

a. a tube-like cylindrical structural element adapted for reception into a mutilated tooth and retention in a reconstructed tooth;

b. cutting blades adapted for cutting tooth material, the blades being included in the cylindrical element and being disposed at the end of the cylindrical element which is driven into the mutilated tooth by the use of a pin mandrel;

c. a slot in the upper portion of the cylidrical element which slot is a apted for engagement of a pin mandrel when the dental pin is inserted into the mandrel; and

d. a bellied portion consisting of a round ball-like protuberance at approximately the midpoint along the length of the cylindrical element.

6. A dental pin according to claim **5** and further including a notch at the bottom of the slot in the upper portion of the dental pin, said notch being adapted for engagement of the pin mandrel when the dental pin is subsequently inserted in the mandrel.

7. A dental pin according to claim **5** and further including internal threads in the upper portion of the pin, said threads being adapted to receive a threaded reinforcing rod.

8. A dental pin combining cutting and structural elements, the dental pin being adapted to be embedded in the structure of a mutilated tooth which is reconstructed and being further adapted for insertion in the mutilated tooth by the use of a pin mandrel and comprising:

a. a tube-like cylindrical structural element adapted for reception into a mutilated tooth and retention in a reconstructed tooth, the cylindrical structural element including therein, a separately formed reinforcing rod adapted to be inserted in the upper portion of the cylindrical structural element after said cylindrical structural element is inserted in the tooth; and

b. cutting blades adapted for cutting tooth material, the blades being included in the cylindrical element which is driven into the mutilated tooth by the use of a pin mandrel.

9. A dental pin according to claim **8** in which the reinforcing rod extends beyond the end of the upper portion of the cylindrical element.

10. A dental pin according to claim **9** wherein the portion of the reinforcing rod which extends beyond the upper portion of the cylindrical element is L-shaped.

11. A dental pin according to claim **9** wherein the portion of the reinforcing rod which extends beyond the upper portion of the cylindrical element is T-shaped.

12. A dental pin according to claim **9** wherein the portion of the reinforcing rod which extends beyond the upper portion of the cylindrical element is eyelet-shaped.

13. A dental pin combining cutting and structural elements, the dental pin being adapted to be embedded in the structure of a mutilated tooth which is reconstructed and being further adapted for insertion in the mutilated tooth by the use of a pin mandrel, and comprising:

a. a tube-like cylindrical structural element having internal threads in the upper portion thereof and being adapted for reception into a mutilated tooth and retention in a reconstructed tooth,

b. cutting blades adapted for cutting tooth material comprising a multiplicity of vertically disposed cutting edges, the blades being included in the lower portion of the cylindrical element which is driven into the mutilated tooth by the use of a pin mandrel; and

c. a separately formed externally threaded reinforcing rod having threads corresponding to the internal threads of the upper portion of the cylindrical element which is received into the tooth, the reinforcing rod being adapted to be engaged into the cylindrical element after the cylindrical element is first inserted and secured in the tooth.

* * * * *