United States Patent [19]

Zahn

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[54] **DENTAL MODEL CONSTRUCTION**

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[52] **U.S. Cl.** **32/11**

[51] **Int. Cl.** **A61c 13/00**

[58] **Field of Search** 32/40, 11, 32, 71

[56] **References Cited**

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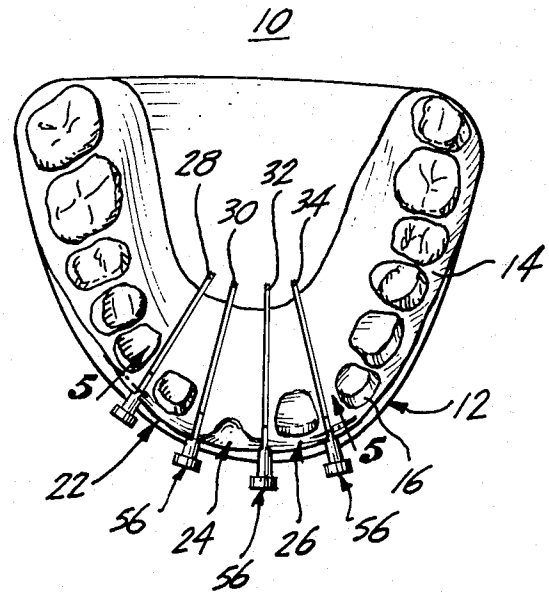
Primary Examiner—Robert Peshock

[57] **ABSTRACT**

In a dental model in which at least one tooth portion is separable it is disclosed to provide interlocking pin and socket means between the separable portion and the remainder of the model to insure proper alignment and to preclude accidental dislodgement.

5 Claims, 7 Drawing Figures



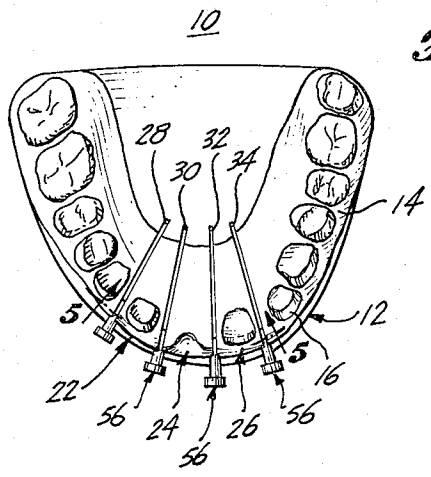


Fig. 1.

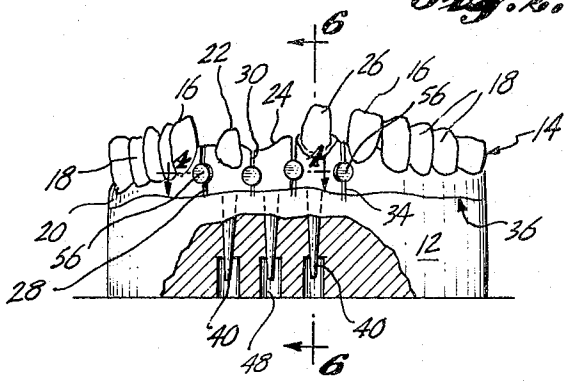


Fig. 2.

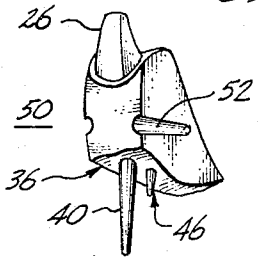


Fig. 3.

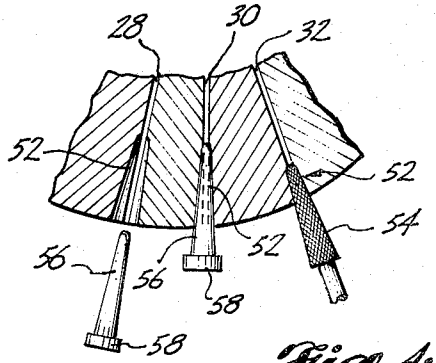


Fig. 4.

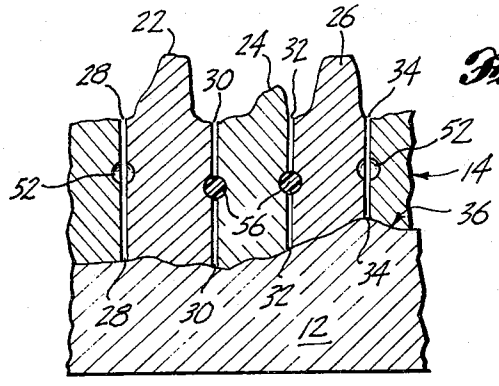


Fig. 5.

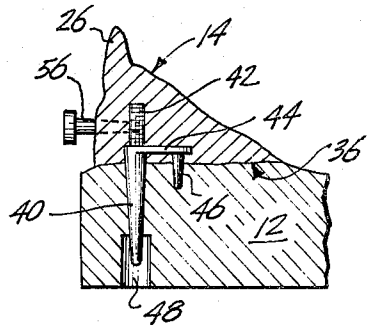


Fig. 6.

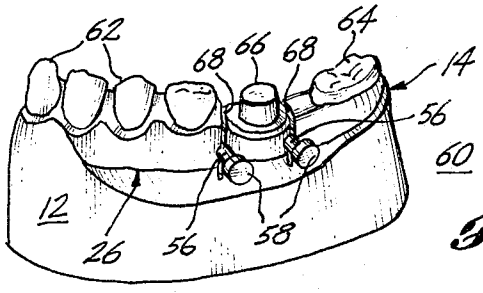


Fig. 7.

DENTAL MODEL CONSTRUCTION

FIELD OF THE INVENTION

Background

In the production of dental prosthetic means it is common practice to make an impression or negative likeness of all or a portion of the jaw in a plastic material. From the impression a cast or positive likeness is produced by pouring a hardenable batter into the cavities and conours of the impression. One or more tapered dowel pins are suspended in negative impressions of selected teeth or tooth preparations prior to pouring. These become anchored in the cast with portions projecting therefrom. When the hardened cast is separated from the impression and a stone or plaster base has been attached to the backside of the cast or model, the protruding tapered portions of the dowel pins will be embedded in the base. There they will extend from the model across the line of joinder into the base. By well-known techniques the line of joinder of the base and cast becomes a parting line. Thereafter the model will be cut, as by sawing, between certain of the positive tooth likenesses. Such cuts extend at least to or slightly through the described parting line. By careful manipulation and prying one of said tooth reproductions may be removed from the cast model. The tapered portion of the dowel pin is withdrawn from its seat or socket in said base. This permits the operator to have access and to view the tooth reproductions from all angles.

It is important that when the removed tooth model is returned to the cast, it return accurately in all respects to its proper position relative to other adjacent tooth models.

It is an important object of this invention to insure that the tooth model is thus accurately returned to and retained on the model. Other objects and advantages will be more apparent during the course of the following disclosure.

Brief Summary

A socket is formed between the separable portion of the model and at least one of the contiguous model portions which may or may not be similarly separable. The socket extends inward of the buccal surface of the model at an intervening parting line cut as described. The socket thus spans the said parting line. A pin is fitted to said socket and because it is substanding across the direction of withdrawal of the separable portion, it precludes separation as long as it remains socketed. By forming such socket and pin with an inward matching taper, a wedging and aligning action is obtained to doubly insure the accurate return of the separable portion to the main portion of the model.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a dental model;

FIG. 2 is a front elevational view of the model of FIG. 1;

FIG. 3 is a perspective view of a separable portion of the cast of the dental model;

FIG. 4 is a cross-section on line 4—4 of FIG. 2;

FIG. 5 is an enlarged vertical section of a separable portion of the model and laterally contiguous portions;

FIG. 6 is a vertical section on line 6—6 of FIG. 2; and

FIG. 7 is a perspective view of a dental partial model incorporating this invention.

DESCRIPTION OF A PREFERREDD EMBODIMENT

The dental model **10** of FIG. **1** and **2** is typical and shows a base **12** supporting a cast or reproduction **14** of all or a portion of a patient's jaw, structure and tooth arrangement. The model of FIG. **7** is a partial cast. Customarily the cast or reproduction is produced by casting fluid plaster in a wax or similar impression taken from within the patient's mouth. It will be noted that the full jaw cast or reproduction illustrating this invention includes the anterior teeth **16** and the posterior teeth **18** and a portion **20** of the patient's jaw at the gum line. The reproduction **14** is mounted on the base **12** by a subsequent casting operation usually of dental stone. In this instance certain anterior teeth models **22,24** and **26** are separable: from the remainder of the cast by reason of the intervening parting lines or slits **28, 30, 32** and **34**; and from the base **12** at parting line **36.** Parting line **36** results from dissimilarity and non-bonding of the material forming the reproduction **14** and the stone material forming base **12.**

It is common practice in making dental models to embed or anchor tapered dowel pins **40** in the initial reproduction **14** during its casting. A preferred dowel arrangement is that shown in FIG. **6** wherein pin **40** having anchor stem **42** is joined by web or arm **44** to a supplemental pin **46** and the same is partially embedded in reproduction **14** in appropriate alignment with tooth stub **26.** When on the reproduction **14,** the base **12** is formed, the dowel pins **40,46** will extend into the base **12** and a preferred cavity **48** to facilitate punching the pin **40** loose from the base causing the base and repoduction to be separated at parting line **36.** However, to insure separation and removal of separable tooth unit, as **50** in FIG. **3,** the lines or slits **28–34** are made in the model, usually by the use of a very fine-toothed saw passed between tooth locations.

It is very important that a removed or separated tooth reproduction **50** not only be retained when assembled in the model but also accurately aligned exactly as in the patient's mouth. For this purpose sockets **52** are formed at parting lines **28–34** as, for example, by the introduction of a burr **54** of desired shape to a desired depth. Preferably the sockets are tapered and therefore self-aligning but it will be obvious that the sockets may be straight bores or even molded with square cross-sections. A socket **52** spans the parting line and, when the tooth reproduction is separated, a portion, less than half of the socket, appears at the side as shown in FIG. **3.**

Pins **56,** shaped to fit the sockets **52,** are introduced along the parting lines to key or lock contiguous portions of the model together. The pins are provided with enlarged shouldered heads **58** by which they are grasped as between the finger nails or by the use of a pliers or similar tool, for each withdrawal.

The partial model **60** shown in FIG. **7** includes a few anterior teeth **62,** one posterior molar **64** and a prepared molar stub **66** which, in this reproduction, is separable from the base **12** at parting line **36** and from the adjacent contiguous portions of the model by slits **68,68.** Pins **58** as described retain the parts of the model assembled and locked together. On occasion only one pin **58** need by employed although two for each removable model portion are generally to be desired.

In compliance with the statute, the invention has been described in language more or less specific as to structural features. It is to be understood, however, that the invention is not limited to the specific features shown, since the means and construction herein disclosed comprises a preferred form of putting the invention into effect. The invention is, therefore, claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims, appropriately interpreted in accordance with the doctrine of equivalents.

What is claimed is:

1. In a dental model in which a reproduction of tooth and jaw structure of a patient is mounted on a base, and at least one portion of said reproduction is dowelled to and separable from the base and from laterally contiguous non-separable portions of said reproduction by reason of intervening parting lines, the improvement comprising:

means forming a pair of opposed recesses in a face of a separable portion and the juxtaposed face of a non-separable portion of said reproduction, said recesses defining an inward extending socket disposed in spanning relation to the intervening parting line; and

a pin fitted to said socket and cooperable with said recesses to prevent separation of said separable portion from the base.

2. The structure of claim **1** in which said socket is inwardly tapered and said pin is taper-fitted thereto.

3. The structure of claim **1** in which there is a recess between each face of said separable portion and two laterally contiguous portions, and a pin is fitted to each said socket.

4. The structure of claim **2** in which the tapered pin is provided with an enlarged head to facilitate gripping of the pin for withdrawal.

5. The structure according to claim **1** in which there is at least a pair of said separable portions and there is a pair of opposed recesses defining an inward extending socket in spanning relation to each intervening parting lines, and there is a pin fitted to each socket.

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