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Acetal resin crowns for children

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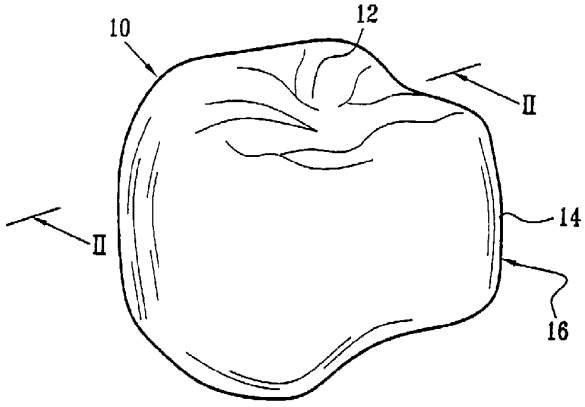
(54) Title: ACETAL RESIN CROWNS FOR CHILDREN



(57) Abstract: An injection molded dental crown formed of an acetal homopolymer resin. A method for mass producing dental crowns is also disclosed.

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ACETAL RESIN CROWNS FOR CHILDREN

FIELD OF THE INVENTION

The present invention relates to tooth prostheses generally and more particularly to crowns.

BACKGROUND OF THE INVENTION

The following U.S. Patents and publications are believed to represent the current state of the art: 4,129,946; 5,552,390; 5,487,663; 5,624,261; 5,709,548; 6,106,295;

SUMMARY OF THE INVENTION

The present invention seeks to provide a mass-produced, tooth colored pre-fabricated crown, particularly useful in pediatric dentistry for treatment of primary teeth and permanent molars having extensive carious lesions.

There is thus provided in accordance with a preferred embodiment of the present invention an injection molded dental crown formed of an acetal homopolymer, which includes Polioxymethylene (POM) Thermoplastic Homopolymer.

In accordance with a preferred embodiment of the present invention, the injection molded dental crown is formed with depending side surfaces at least one of which defines an undercut.

Preferably, the depending side surfaces are flexible.

There is also provided in accordance with a preferred embodiment of the present invention a method for mass producing dental crowns comprising: providing a multi-element mold, employing the multi-element mold to injection mold the crown including depending side surfaces, at least one of which defines an undercut.

In accordance with a preferred embodiment of the present invention, the multi-element mode includes an ejector which is operative to eject the molded crown following opening of the multi-element mold.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description, taken in conjunction with the drawings in which:

Fig. 1 is a simplified pictorial illustration of a dental crown formed of

acetal homopolymer;

Fig. 2 is a sectional illustration of the dental crown of Fig. 1, taken along lines II - II in Fig. 1; and

Figs. 3A, 3B and 3C are each simplified pictorial illustrations of apparatus for manufacturing a dental crown from acetal homopolymer resin in accordance with a preferred embodiment of the present invention in three operative orientations.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Reference is now made to Fig. 1, which is a simplified pictorial illustration of a dental crown formed of acetal homopolymer resin and to Fig. 2, which is a sectional illustration of the dental crown of Fig. 1, taken along lines II - II in Fig. 1.

As seen in Figs. 1 and 2, there is provided in accordance with a preferred embodiment of the present invention an injection molded dental crown 10 formed of an acetal homopolymer resin. A preferred material for the crown is acetal homopolymer resin (DELRIN®) which is commercially available from DuPont.

As can be readily seen in Figs. 1 and 2, the dental crown 10 is formed with a generally conventionally tooth shaped top surface 12 and depending side surfaces 14 at least one of which defines an undercut 16. Preferably, the depending side surfaces 14 are flexible. Crown 10 may readily be mounted, by conventional methods, such as through the use of dental cement in the mouth of a patient, typically a child, as part of treatment of primary teeth and permanent molars having extensive carious lesions. It is a particular feature of the invention that crown 10 is of a color which generally matches of the patient's teeth.

The crown of the present invention is characterized by high tensile strength, high impact resistance and stiffness, excellent fatigue endurance and resistance to moisture, excellent dimensional stability and sufficient resilience and resistance to creep. It has the natural appearance of a vital tooth

Reference is now made to Figs. 3A, 3B and 3C, which are each simplified pictorial illustrations of apparatus for manufacturing a dental crown from acetal homopolymer resin in accordance with a preferred embodiment of the present invention in three operative orientations.

As seen in Figs. 3A, 3B and 3C, the crown 10 is molded in a mold cavity 20 which is defined by a top mold element 22, a bottom mold element 24 and an ejector

26. The ejector 26 forms part of an internal mold element 32.

Fig. 3A shows the stage of molding when the top mold element 22 lies in tight engagement with the bottom mold element 24 and the ejector 26. The dental crown 10, which is fabricated on the ejector 26, is formed by the injection of acetal homopolymer resin material from a source of acetal homopolymer resin (not shown) into the mold cavity 20, via a channel 30 cut in the top mold element 22.

Fig. 3B shows an initial release stage wherein the bottom mold element 24 is separated from the top mold element 22, thus permitting removal of the molded crown 10 from cavity 20.

Fig. 3C shows an ejection stage wherein ejector 26, driven by a piston 28 moves upwardly relative to bottom mold element 24 and pushes crown 10 out of cavity 20. Due to the resilience of the depending side surfaces 14, the action of the ejector 26 is able to disengage the internal mold element 32 from the crown 10 notwithstanding the presence of undercut 16.

It will be appreciated by persons skilled in the art that the present invention is not limited by what has been particularly shown and described hereinabove. Rather the scope of the present invention includes both combinations and subcombinations of the various features described hereinabove as well as variations and modifications which would occur to persons skilled in the art upon reading the specification and which are not in the prior art.

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CLAIMS:

1. A dental crown, wherein said dental crown is configured as a single-layer structure made of a thermoplastic polymer material, having a natural appearance of a vital tooth and being configured for readily mounting on a specifically prepared patient's tooth, the crown including: a tooth shaped top surface, and depending flexible side surfaces extending from said tooth shaped top surface, at least a part of an inner surface of the depending side surfaces defining an undercut at the bottom portion.

2. A dental crown according to claim 1 wherein said thermoplastic polymer material includes an acetal homopolymer resin.

3. A dental crown according to claim 2, wherein said acetal homopolymer resin includes polyoxymethylene thermoplastic homopolymer.

4. A dental crown according to Claim 2, being fabricated by providing a multi-element mold; and employing the multi-element mold to injection mold the dental crown from acetal homopolymer resin.

5. A dental crown for use in pediatric dentistry for treatment of primary teeth and permanent molars, the dental crown being configured as a single-layer structure formed of a thermoplastic polymer material, having a natural appearance of a vital tooth and being configured for readily mounting on a specifically prepared patient's tooth, and the dental crown including

a tocth shaped top surface and

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depending flexible side surfaces extending from said tooth shaped top surface, at least a part of an inner surface of the depending side surfaces having an undercut at the bottom portion.

6. A dental crown as described in the specification, with reference to and as illustrated in the accompanying representations.

FIG. 1

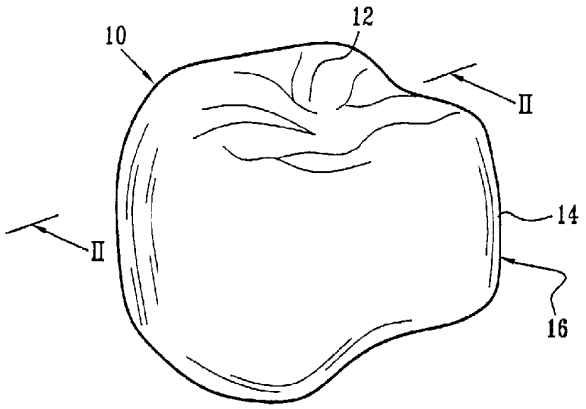
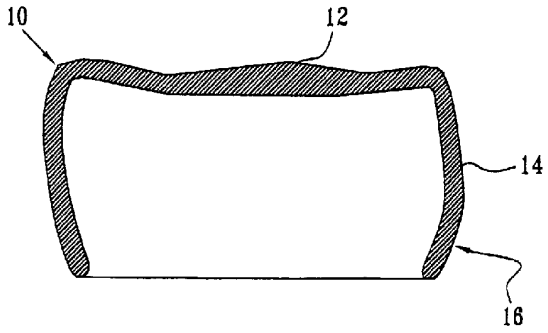


FIG. 2



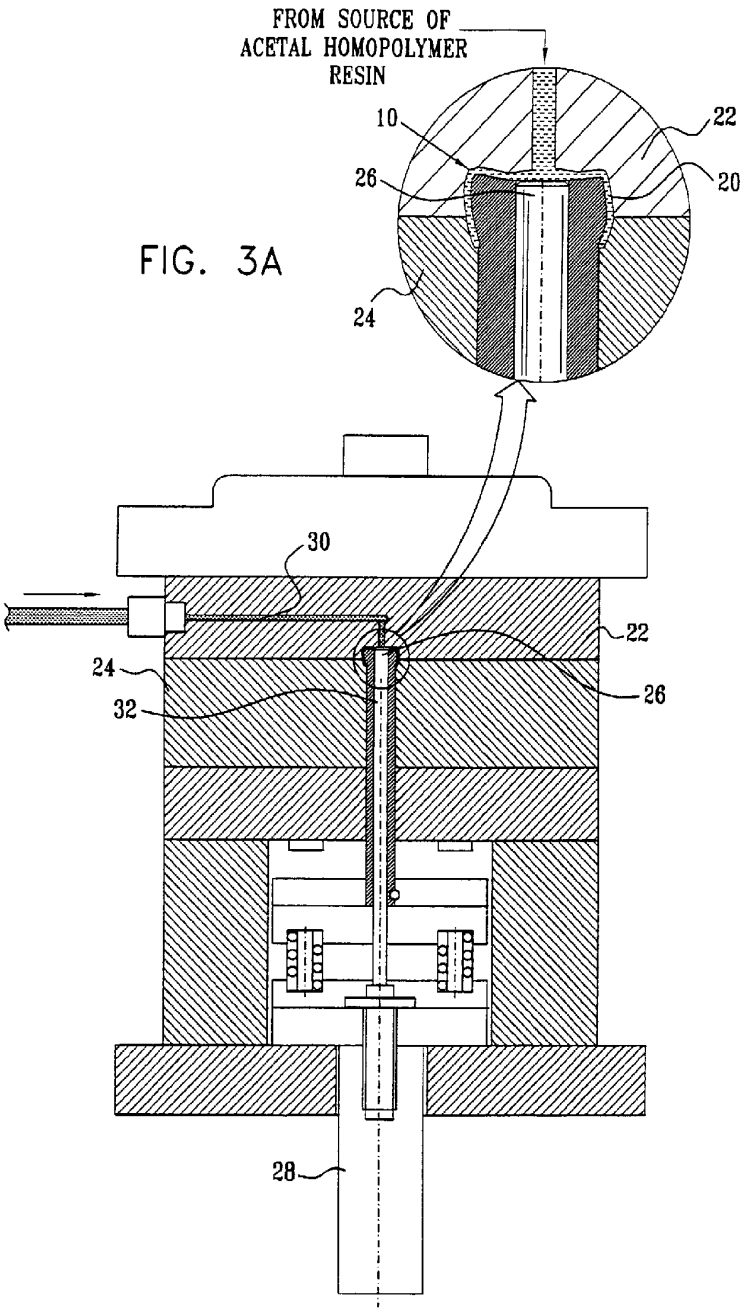

FROM SOURCE OF
ACETAL HOMOPOLYMER
RESIN
10
22
26
20
24
30
22
24
26
32
28

FIG. 3A

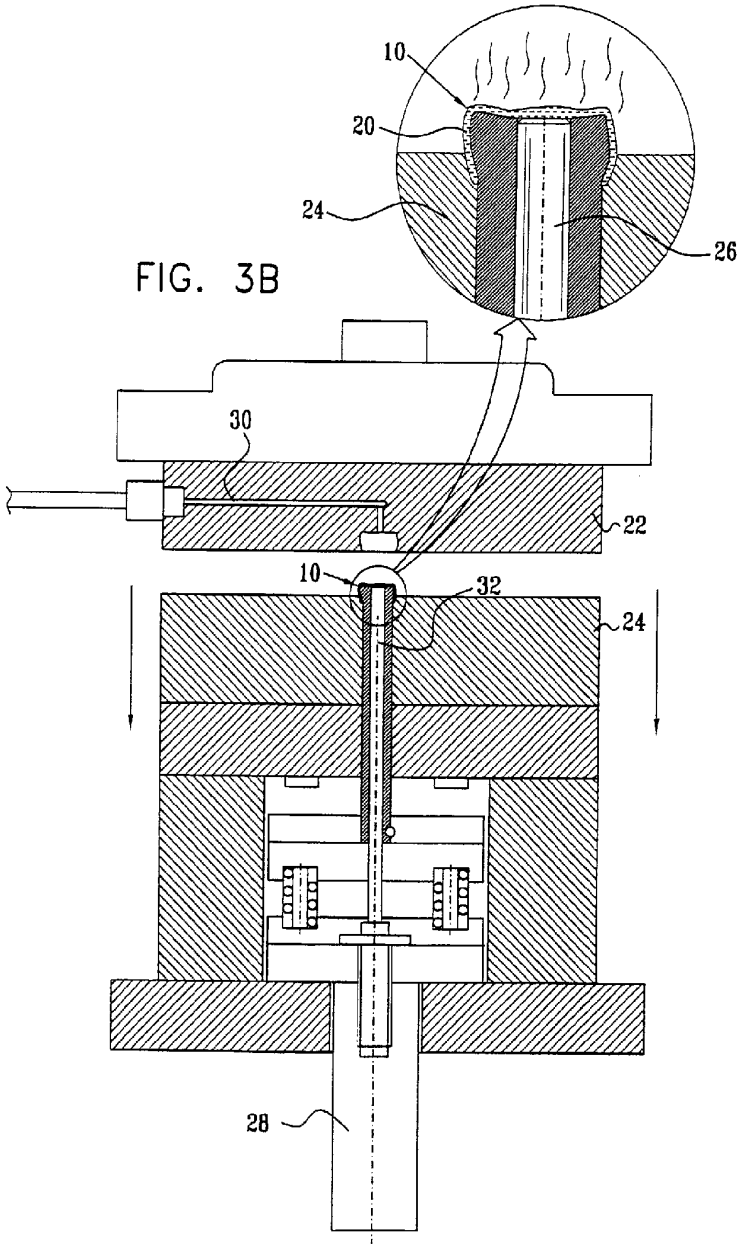


FIG. 3B

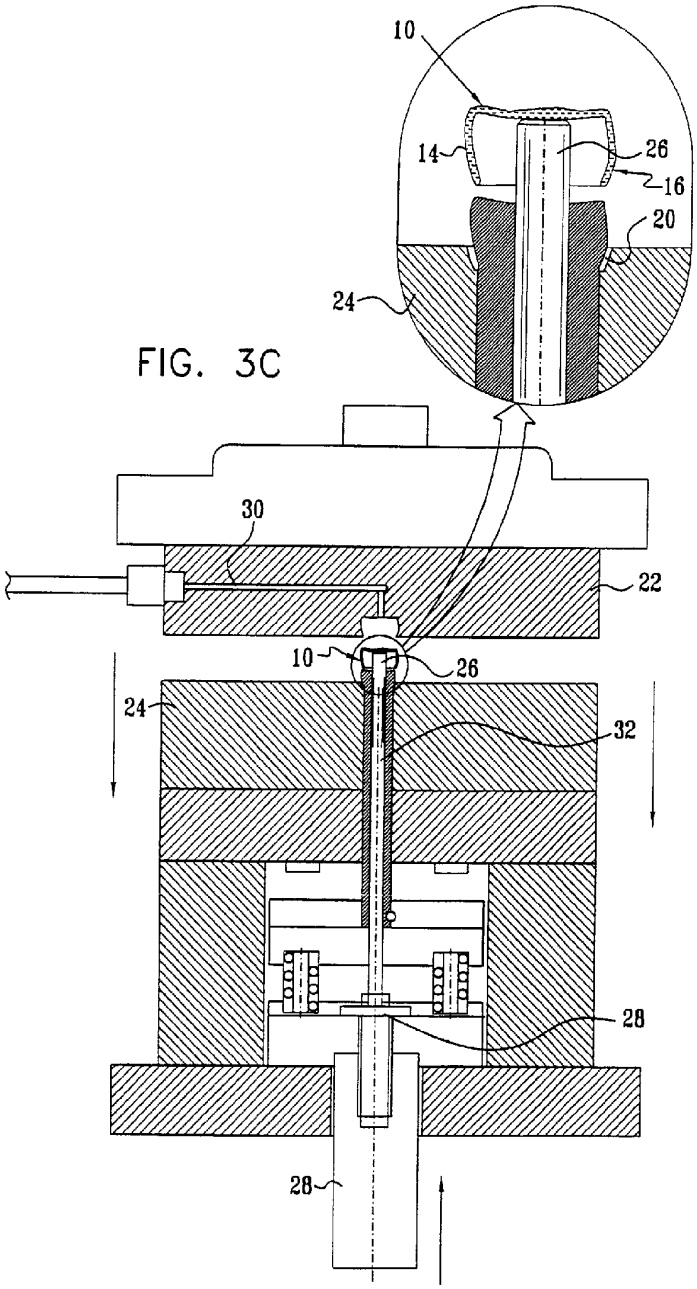


FIG. 3C