

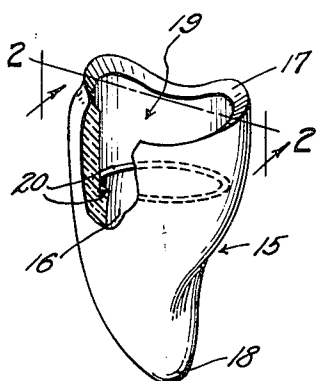
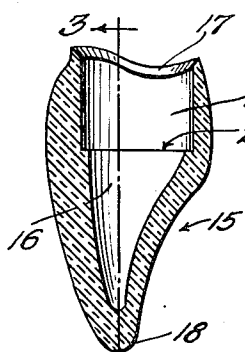
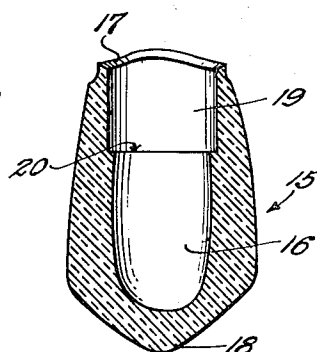
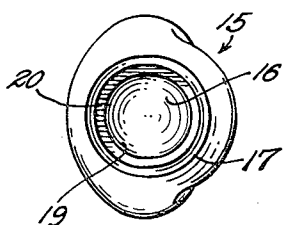
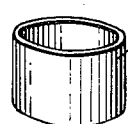
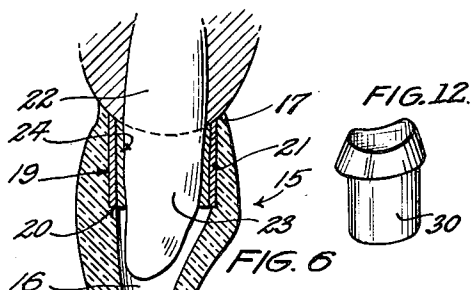
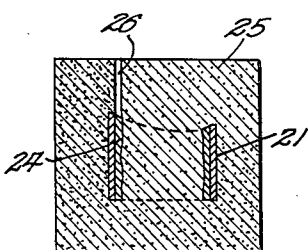
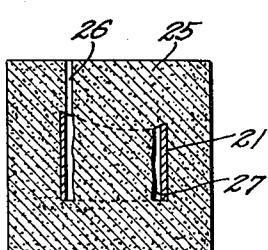
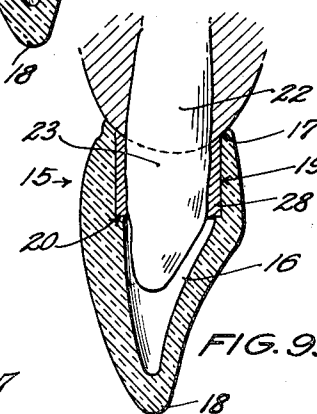
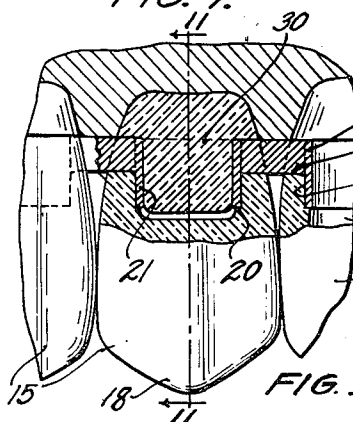
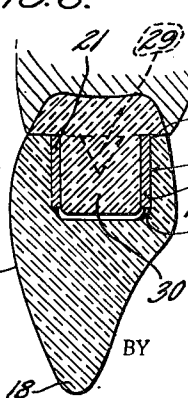
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J. H. MOYER

2,770,040

INTERCHANGEABLE TOOTH CROWN

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J. H. Moyer

W. V. Rambo

ATTORNEY

1

2,770,040

INTERCHANGEABLE TOOTH CROWN

James H. Moyer, Columbus, Ohio, assignor to The Columbus Dental Manufacturing Company, Columbus, Ohio, a corporation of Ohio

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5 Claims. (Cl. 32—12)

This invention relates to artificial teeth, the same having particular reference to artificial teeth of the type known generally as jacket crowns.

Such crowns are formed to comprise hollow bodies of porcelain, or other tooth-forming materials, and, as presently employed, are adapted to be placed on and around especially prepared, reduced crown regions of natural teeth. Jacket crowns of this type are particularly desirable when used in the restoration or replacement of natural teeth which are exposed to view upon normal opening of the mouth, as such jacket crowns, when expertly made and fitted in the mouth, present a most natural and attractive appearance. Such crowns are, however, at present severely restricted or limited in their general use in dental practice in comparison with other standardized and more economical but, in certain aspects, less desirable forms of artificial teeth. With a jacket crown a restoration is produced in which a prepared jaw-retained natural tooth is employed as the base on which the crown is mounted, eliminating thereby the usual practice of removing fully from the jaw a defective natural tooth to permit of the substitution therefor of the conventional backing-mounted, interchangeable, artificial tooth or facing of common usage.

The relatively high cost of jacket crown restorations, as they are now formed, is due primarily to the technical skill required by dental specialists to prepare correctly the crown portions of jaw-retained natural teeth in adapting the same to receive such crowns. Another part of this cost is attributable to the skill required by dental technicians trained in tooth molding and who usually are associated with dental specialists in producing jacket crowns. Another cost factor resides in crown formation which will not only conform to the physical requirements of prepared natural teeth receiving the same, but will be so formed as to harmonize esthetically with the general form, color and characteristic markings of adjacent natural teeth. The absence of such harmony is due in part to the fact that dental technicians seldom have the opportunity of inspecting patients' mouths to ascertain correct tooth formations in which such jacket crowns are to be used. Because of individual variations in the preparation by dentists of the natural tooth formations necessary in receiving jacket crowns, it has been deemed impracticable for manufacturers of artificial teeth to produce commercially jacket crowns of standardized forms, hence the present high-cost practice of individually making such crowns for each patient as the need therefor arises.

In positioning jacket crowns in the mouth, a present practice followed by many dentists is to grind away the defective portions of the crown region of a natural tooth to form what is known as a "preparation" for the reception of a jacket crown. Such a "preparation" usually possesses when completed an outwardly tapering form and is provided adjacent the gum line thereof with a ground in shoulder or ledge against which is seated the gingival edge surfaces of an associated jacket crown when the latter is applied to the preparation. The form and position of such preparation-provided shoulders constitute a variable which has been another deterrent factor in precluding the factory manufacture of properly fitting, standardized, interchangeable jacket crowns.

It is a primary object of the invention to provide a standardized, low cost, factory-produced jacket crown in

2

which the construction thereof is such as to enable the crown to be accurately mounted on a simply and economically formed receiving preparation therefor.

Another object is to provide a jacket crown having a hollow interior which in part defines a receiving socket for the reception of a base or mounting preparation, and wherein the inner end of the socket is provided, in predetermined relation to the gingival edges of the crown, with a shoulder formation adapted for the positive seating of the crown on a complementary preparation-carried shoulder formation.

A further object is to provide a jacket crown having a shouldered preparation-receiving socket, and one wherein the complementary shoulder on the receiving preparation is formed without grinding by a metallic band or collar fitted on and cemented to the preparation and received in the socket of an associated jacket crown.

Another object of the present invention is to provide a standardized, factory made jacket crown which, as a result of its uniform preparation-receiving socket construction, is adapted for use in the field of prosthetic dentistry in capacities other than restorations produced on the prepared crowns of jaw-retained natural teeth, such added applications including the formation of abutment teeth for fixed replacements, dummy teeth in dental bridges, thimble crown constructions and in other capacities wherein an axially disposed preparation-type mounting for such jackets is advantageous. Therefore, by the term "jacket crown," I intend to include within its definition all such specifically different uses to which the crown of the present invention is applicable.

For a further understanding of my invention including additional objects and advantages thereof, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a perspective view disclosing my improved jacket crown, parts thereof being broken away and shown in cross section;

Fig. 2 is a vertical transverse sectional view taken through the crown on substantially the line 2—2 of Fig. 1;

Fig. 3 is a vertical longitudinal sectional view of the crown taken substantially on the line 3—3 of Fig. 2;

Fig. 4 is a top plan view of the crown;

Fig. 5 is a detail perspective view of a metallic mounting band for the reception of an interchangeable jacket crown of the present invention;

Fig. 6 is a vertical sectional view disclosing a jacket crown and band when positioned on the prepared stub of a natural tooth and disclosing a body of impression-receiving molding wax interposed between the adjacent inner surfaces of the band and the outer surfaces of the tooth stub;

Fig. 7 is a detail sectional view disclosing the band with the stub-molded wax body thereon invested in a mold preparatory to removing or volatilizing the wax body;

Fig. 8 is a similar view of the mold disclosing the cavity formation therein developed as a result of the removal of the wax body;

Fig. 9 is a vertical sectional view similar to Fig. 6 and disclosing the final crown restoration;

Fig. 10 is a detail view of the crown when used on an abutment tooth;

Fig. 11 is a view in vertical section, showing the crown of the present invention when used as a dummy tooth in dental bridge construction;

Fig. 12 is a detail perspective view of a bridge plug for receiving a dummy crown.

Referring to constructional features of my improved jacket crown as disclosed in the above-defined figures of the drawings and by reference character identification of

parts found therein, the numeral 15 designates the jacket crown of the present invention in its entirety. Preferably, the crown comprises a ceramic body molded to provide artificial teeth for the individual or group restoration or replacement of natural teeth composed of centrals, laterals, cuspids, bicuspid and molars. Each of such crown types is further formed, as is customary in the commercial manufacture of artificial teeth, to provide the same in various sizes, shapes, character markings and color characteristics. This is done so that dentists will have at their disposal and selection a wide line of crowns from which one or more of such crowns will be available and in harmony with the physical peculiarities of natural teeth of a patient's mouth into which the crown is to be mounted. Such crowns may be made from any suitable materials adaptable for the formation of artificial teeth and by any standard process of manufacture. At present, I prefer that said crowns, when composed of ceramic materials and following molding thereof, be fired while the same are maintained in an atmosphere in which negative pressures are caused to prevail. However, other standard processes and materials may be utilized advantageously and, therefore, the tooth crowns of the present invention are not limited to any specific composition or process of formation, except as hereinafter specifically defined.

The material of each crown, in the process of molding the same, is formed to produce a substantially hollow crown body, having an internal chamber 16 open at the gingival or proximal region 17 of the crown and closed at its incisal, occlusal, medial, distal, buccal or labial and lingual regions 18. The chamber 16 at the gingival end thereof is volumetrically enlarged to provide a band-receiving socket 19 having ground wall surfaces maintained within close dimensional limits or tolerances. The inner end of the socket terminates in a shoulder or ledge 20 offset inwardly and laterally from the surfaces of the socket disposed in substantially perpendicular relationship to the shoulder or ledge. The latter is arranged approximately midway between the gingival and incisal ends 17 and 18, respectively, of the crown and extends entirely around its socket or chamber. The disposition of this ledge or shoulder in relation to the ground gingival edges 17 is mechanically standardized to exact dimensions in all crowns of a given series by gauged grinding operations performed by the tooth or crown manufacturer. It is this standard which in large measure accounts for the interchangeability of the crowns of the present invention when used in the mouth.

In connection with crowns so formed, I employ with each crown a mounting band or collar 21 composed, preferably of high-fusing, non-oxidizing precious metals, including platinum and alloys thereof. Each of these bands or collars is made to exacting dimensional standards, so that it will fit closely into each of the crown sockets 19 adapted for the reception thereof. This is done in a manner enabling the inner edge of the band to be seated in engagement with the standardized shoulder 20, and the outer wall surfaces of the band in close-fitting engagement with the ground inner wall surfaces of each socket 20 of a crown.

In forming one type of a preparation to receive the mounting band, an associated natural tooth, indicated at 22, has its crown portion conveniently ground to present a prepared stub or stump 23 which may be of substantially tapering or frusto-conical form, the same being devoid of the usual ground-in shoulder formation around the gum line of the tooth which has hitherto been widely employed in jacket crown mountings. In this regard, all that is required of the dentist in preparing a natural tooth for the reception of the jacket crown construction of the present invention, is that the crown portion of the natural tooth be reduced in size so that the metal band or collar 21, which normally is supplied by the manufacturer with each jacket crown, and may fit loosely on

the stub preparation 23 receiving the crown. The dentist may then examine the temporarily inserted jacket crown to make color, size and configuration determinations, thereby reaching a decision as to the applicability of a given jacket crown, or crowns, to the individual requirements of each patient. If suitable, the dentist may then make any adjustments deemed to be needed in adapting the selected jacket crown to the jaw-retained teeth on which the crown or crowns are to be disposed. Thereafter, the dentist places the band or collar 21 into the jacket crown 15 receiving the same and on the inner surfaces of the band or collar he may place a small quantity of dental wax or other volatile impression-receiving material, as indicated at 24 in Fig. 6. The dentist may then place the crown 15, with the band 21 positioned in the socket thereof, on the prepared tooth stub or stump 23 in a correct position of application.

When the impression material 24 has set and caused to conform with the surface peculiarities of the tooth stub or stump on one side, and the inner surface configuration of the band of collar on its outer side, the crown, its band and the impression compound are removed bodily and unitarily from the tooth stub. The band or collar is then carefully removed from its position in the crown socket in a manner avoiding marring or deforming the wax compound.

As shown diagrammatically in Fig. 7, the collar, with the impression material thereon, is then placed in a conventional investment 25 and provided with the usual sprue or sprues 26. The impression material, through the aid of heat, is then burned out or volatilized, producing in the investment, immediately adjacent the band, a cavity 27 which conforms precisely to the shape of impression material prior to its volatilization. This cavity is then pressure cast with a suitable casting metal in a molten state. This may be done through one of the sprues or gates 26, so that the added metal is cast directly against the inner surface of the band or collar to unite upon solidification with the latter and to thus produce a composite or final band or collar, as disclosed at 28 in Fig. 9, which has an inner surface faithfully conforming to the exterior surface of the tooth stump or stub 23 or other material or artificial base formation receiving the band or collar. The latter will now accurately fit the prepared natural tooth and may be cemented in operative position thereon. After removing any excess cement from the outer surfaces of the final band or collar following the mounting thereof on the prepared tooth, the dentist will then cement the crown 15 to the final mounted band or collar 28.

In the event a crown so mounted should thereafter fracture or otherwise prove defective, all that is necessary to restore the case to its original form is for the dentist to secure another duplicative crown of the same series as the damaged crown from his source of artificial tooth supply and substitute the new for the impaired crown. As the interior of each crown of a given series is mechanically standardized, the replacement crown will fit accurately the original band or collar which maintains its position on the natural tooth at all times. Such crown substitution may be quickly, conveniently and inexpensively performed.

When the crown of the present invention is used as an abutment tooth or as a thimble crown, the dentist proceeds exactly in the same manner, as above defined, in the formation and mounting of a jacket crown, except, as shown in Fig. 10, he will grind a substantially V-shaped cut, notch or slot 29 either mesially or distally, or both, in a manner exposing the band or collar in one or both areas for a solder attachment.

When the crown is used on a dental bridge, as indicated in Fig. 11, the procedure will be similar to its use as a thimble crown. V-shaped cuts 29 are made at the gingival on both the mesial and distal areas of the crown to expose a part of the band or collar 28 to provide

5

solder-receiving surfaces. In addition, accurately ground porcelain or other plugs 30 which will fit the inside of the band or collar are supplied by the crown manufacturer. These plugs can be ground at the gingival end of each to conform to ridge contours and the complete restoration will thus appear to be one of an all-porcelain character.

In view of the foregoing, it will be apparent that the present invention enables virtually any practicing dentist to produce and apply all porcelain jacket and thimble crowns in a properly fitting, mechanically perfected manner and to utilize from a wide selection of possible choices the particular crown or crowns best suited for esthetic conformity with the color, shape, size and characteristic markings of the patient's natural teeth. Then, in the event of breakage or damage of the originally applied crown, the present invention makes possible the quick, convenient and low-cost substitution of a new crown on the original mounting band replacing the damaged one. By such means the present high costs of jacket crown restorations are capable of being very substantially reduced and brought within the range of presently more commonly employed restorations.

It will be noted that it is unnecessary in the mounting preparation of the crown of the present invention for a dentist to first grind in the tooth stump a precisely located seating shoulder, as has been the prior practice. With the crown of the present invention the seating shoulder is carefully formed by the manufacturer in the interior of the crown itself, thus eliminating one of the outstanding difficulties hitherto faced by dentists; namely that of accurately grinding the seating shoulder on a natural tooth stump to be received in the chamber of a jacket crown. For the further convenience of the dentist each metallic band or collar 21 is formed by the manufacturer and supplied commonly to the dental profession with the particular crown adapted to receive the same. The dentist is thus merely required to grind the natural tooth stub or stump 23 until the band will fit loosely and with some play thereon. The wax or other molding material is then applied to the inner surface of the band and placed on the prepared tooth stump so that the molding material will produce in its inner face a true pattern of the tooth stump. This pattern, while contained in the band and protected and reinforced thereby, is placed in the investment 25.

Following cavity formation in the investment, after the wax has been burned out of the same, additional metal is cast into the cavity left as a result of the burning or volatilization of the molding material, the new metal being cast directly against the band. This operation enables the inside of the band to be truly formed so that it will fit perfectly on the prepared tooth stump adapted to receive the same. Further, since the wax in my preferred procedure is at all times reinforced by the band during the operations of placing the same in pattern-forming engagement with the tooth stump, followed by the removal of the band and wax pattern from the stump and investing the same in a mold, there is little likelihood of accidentally deforming the pattern.

The present invention thus enables such jacket crown of a dental restoration to be readily produced, provides ready crown interchangeability, and enables a restoration to possess an appearance which constitutes an improvement over that heretofore produced by a relatively few highly skilled dentists who have specialized in such a field of practice.

As previously indicated, the jacket crowns of the present invention may be employed in various capacities to which, so far as I am aware, custom made jacket crowns of the prior art have not been adapted. While, of course, my standardized jacket crown finds a wide field of use in single tooth restorations in which the jacket crown is mounted on a preparation in the form

6

of a natural tooth stub, and to which I have referred in considerable detail, yet it is, also, well adaptable as abutment, bridge and dummy teeth constructions or in other original dental replacements as it is in restoration practice.

I claim:

1. Jacket crown construction for dental bridges, comprising: a molded heat-hardened body, said body including an internal cavity closed on all sides thereof and terminating in a cervical extension which opens to the gingival end of the body, said cavity being formed with an inwardly and laterally projecting shoulder placed in predetermined spaced relationship to the open end of said extension; a metallic mounting band positioned in said extension for close-fitting cemented engagement with the walls thereof, said band having an edge thereof arranged in seating contact with said shoulder; and a stationary mounting plug axially disposed within said band for cemented union therewith.

2. A jacket crown comprising a dentiform body adapted for placement on a prepared natural tooth, said body having a closed internal cavity of a size to receive freely such a tooth, the cavity being formed with a cervical extension of uniform diameter throughout its length and which opens to the gingival end of the crown; an inwardly and laterally projecting positioning shoulder formed at the inner end of said extension, said shoulder occupying a plane substantially perpendicular to that of the side walls of the cavity extension midway of the length of the cavity and in inwardly spaced determinate relation from the gingival end of the crown; and a cylindrical metallic band adapted for mounting on a prepared tooth formation, said band being positioned wholly within the confines of said extension for close-fitting cemented engagement of its outer wall surfaces with the side wall surfaces of the extension and having its inner end disposed in seating, thrust-receiving engagement with said shoulder.

3. A jacket crown as defined in claim 2, and wherein the inner surfaces of the band conform to the configuration of the prepared natural tooth on which the band is to be mounted.

4. A jacket crown for use on dental preparations, comprising: a body formed with an internal cavity having a cervical extremity open to the gingival end only of the body, said cavity being formed with an inwardly and laterally projecting shoulder disposed intermediately of the depth of the cavity in predetermined spaced relation to the gingival edges defining the open end of the cervical extremity of said cavity; and a metallic mounting formed for application to a natural tooth prepared to receive the same for the support of said crown, said shoulder having engagement with an outer end of said mounting, the shoulder of the crown cavity being disposed in a single plane perpendicularly intersecting the longitudinal axis of the cavity.

5. A jacket crown comprising a dentiform body adapted for placement on a prepared natural tooth, said body having a closed internal cavity of a size to receive freely such a tooth, the cavity being formed with a cervical extension of uniform diameter throughout its length and which opens to the gingival end of the crown; and an inwardly and laterally projecting positioning shoulder formed at the inner end of said extension, said shoulder occupying a plane substantially perpendicular to that of the side walls of the cavity extension midway of the length of the cavity and in inwardly spaced determinate relation from the gingival end of the crown.

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