

[54] ORAL IMPLANT STABILIZER AND DENTURE SUPPORT

2,599,044 6/1952 Brennan..... 32/2

[76] Inventor: John N. Thibert, 264 Beacon St., Boston, Mass. 02116

Primary Examiner—Robert Peshock
Attorney—A. Yates Dowell, Jr.

[22] Filed: Oct. 4, 1971

[21] Appl. No.: 186,132

[57] ABSTRACT

[52] U.S. Cl..... 32/10 A

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

[58] Field of Search..... 32/10 A, 2, 8

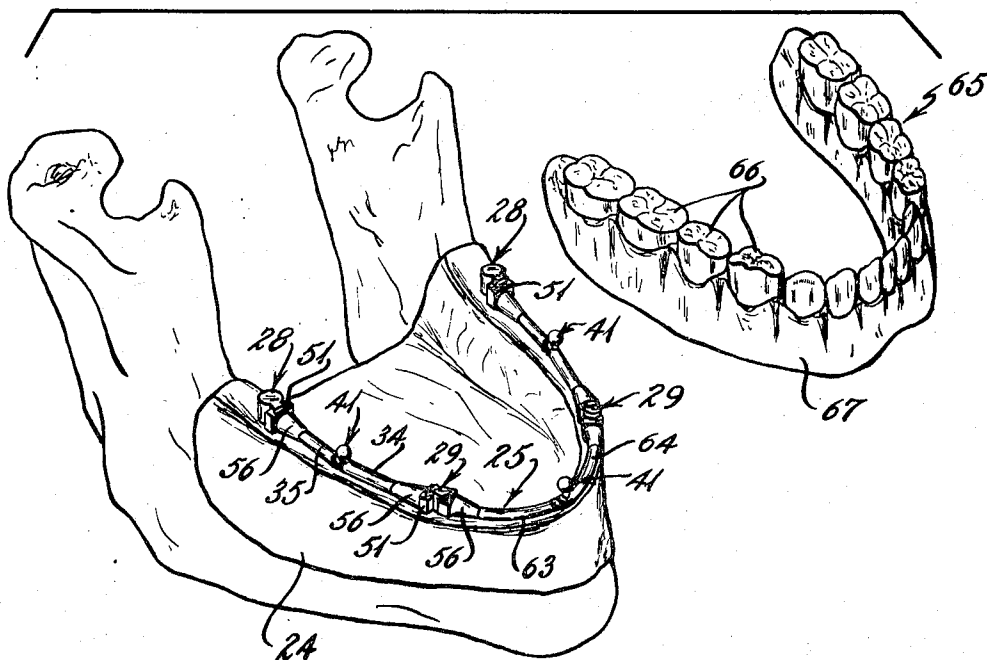
Apparatus for adjustably stabilizing dental implant blades and forming a meso-structure on which a super-structure or denture is mounted in a manner that the denture is not directly supported by the gingival tissue of a patient's jaw.

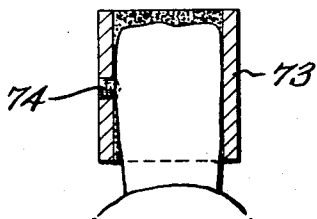
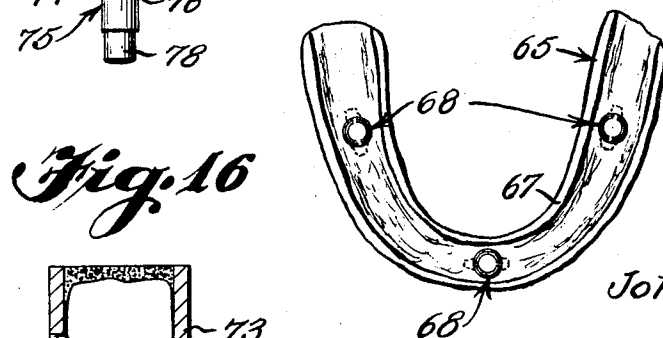
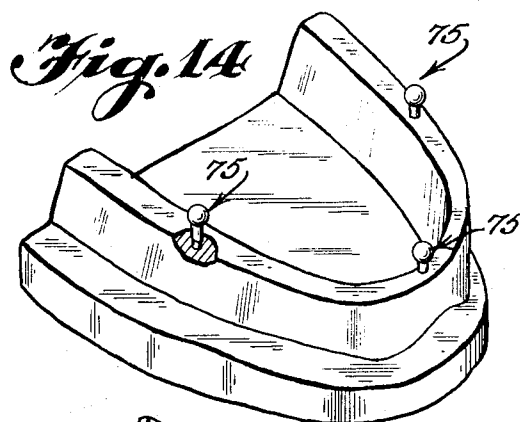
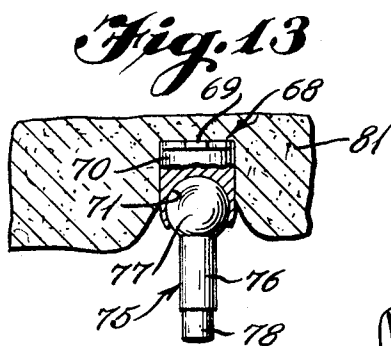
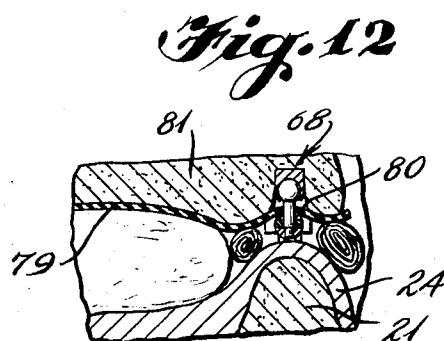
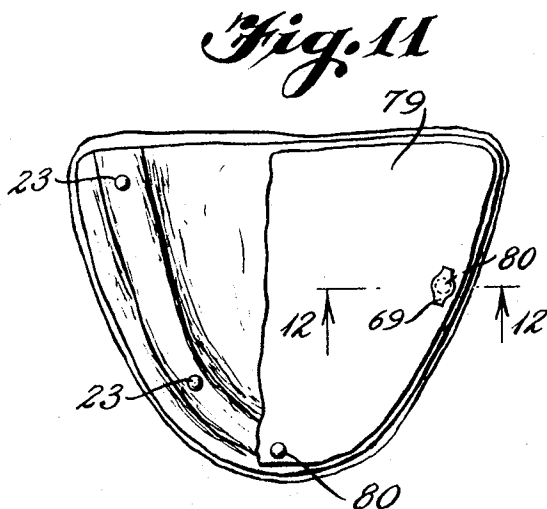
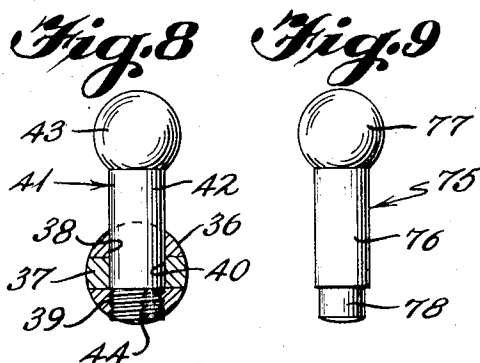
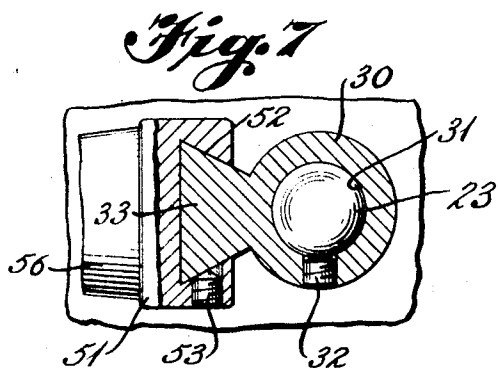
[56] References Cited

UNITED STATES PATENTS

3,514,858 6/1970 Silverman 32/10 A

8 Claims, 16 Drawing Figures





INVENTOR

John N. Thibert

BY

G. J. [illegible] & G. J. [illegible]
ATTORNEYS

ORAL IMPLANT STABILIZER AND DENTURE SUPPORT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to dentistry and the application of dentures to a human's mouth and relates particularly to oral implantology and the stabilizing of implant blades as well as providing a support for dentures.

2. Description of the Prior Art

For many years the loss of permanent teeth by a person resulted in the need of a denture to replace the natural teeth to assist a person to chew as well as to insure the proper functioning of the remaining natural teeth. In these prior art structures, the denture has rested on the gingival tissue and where possible has been anchored to existing natural teeth to maintain the denture in position. In cases where all of the teeth have been extracted from either the upper or lower jaw or both, a full denture has been applied directly to the gingival tissue as soon as the natural teeth were extracted or at some later date, depending upon the skill and desire of the individual dentist.

Although this was the only course available at the time, it was not satisfactory and success depended upon many variables including the patient's perseverance and ability to tolerate the discomfort as well as the greatly diminished chewing capability. Also, since the denture was merely resting on the gingival tissue, the alveolar bone resorbed causing shrinkage of the tissue, which in turn made it necessary to relin or rebase the denture to provide a proper fit.

When a patient could not or would not wear his denture, any remaining natural teeth would tend to drift and any opposing teeth in the opposite jaw would tend to loosen and become elongated due to lack of resistance. Also if a patient still had natural teeth on one side of his jaw, he did substantially all of his chewing on that side and this caused a strain on the temporomandibular joint on the other side which was edentulous and eventually caused substantial pain.

In recent years major advances have been made in the field of dentistry by providing endosseous and subperiosteal implants having clamping fingers or a penetrating blade in which the gingival tissue has been laid open by surgery and the implant has been clamped to or imbedded in the alveolar and cortical bone structure of the patient's jaws. These implants include a head which extends upwardly from the fingers or blade for a distance sufficient that the head extends above the gingival tissue when the tissue is sutured in its normal position. Thereafter a meso-structure or bar has been cemented or otherwise attached to the heads and used to support a superstructure or denture. Examples of this type of device are the patents to Brennan U.S. Pat. No. 2,644,231; Linkow et al. U.S. Pat. No. 3,499,222; Silverman U.S. Pat. No. 3,514,858; and the Italian U.S. Pat. No. 526,441.

These prior art devices have not been entirely satisfactory since the critical period for maintaining the implant in fixed position is immediately after the implant is inserted; however, the bar or meso-structure which is applied to the implant must be formed after the implant is in position which necessarily indicates a delay in the application of the bar to the implant blade heads. Some efforts have been made to stabilize the implant

blades during this critical period; however, these structures have been on a temporary basis and have not always satisfactorily performed the function for which they were intended. Also in these prior art structures the dentist is required to spend considerable time and effort with the patient and it is necessary that the dentist not only insert the implants, but also substantially take over the care of the patient and form the support bar as well as the subsequent denture which is applied thereto. This has caused substantial apprehension in some patients, particularly since their own dentist with whom they are familiar is not involved in the operation.

SUMMARY OF THE INVENTION

The present invention is an oral implant stabilizer and denture support having portions connected to implant blades and including adjustable structure which is applied at the time of the implant operation. The stabilizer is fixed in adjusted position in such a manner that the patient's general practitioner can form the superstructure or denture at his convenience, and in which subsequent dentures can be formed by the general practitioner. The present concept and technique are a radical departure from known procedures in that the dentist inserting the implants and the adjustable stabilizer structure allows the general practitioner to complete the case. This obviously reduces the time required by the dentist who is a specialist and therefore reduces the inherent cost to the patient. The present structure has many advantages over existing structures and techniques including:

1. The immediate stabilization of all implant blades which substantially prevents movement of the blades and thereby promotes bone regeneration and reduces failures. 2. It supports a superstructure or denture which is not tissue borne and thereby eliminates impingement and irritation to the gingival tissue.

3. It supports a superstructure or denture which is not tissue borne and thereby eliminates impingement and irritation to the gingival tissue.

4. It minimizes the stress on the tissue and bone of the opposing jaw thereby preventing bone resorption.

5. It reduces strain on the temporomandibular joint and therefore conforms to the requirements established by gnathologists.

6. It prevents the start of periodontal problems due to the lack of irritation to the tissues and encourages the maintaining of good dental hygiene.

7. It permits the general practitioner and his Laboratory technician to prepare the superstructure or denture without difficulty or error by simple impression techniques.

8. There is no loss of alveolar bone since the foundation of the implant blade is attached to the bone in a manner similar to natural tooth roots and therefore the bone regenerates as the denture is used.

9. The meso-structure has the versatility of working in combination with endosseous and subperiosteal implants, as well as with natural teeth.

10. The meso-structure can be removed at any time desired without injury to the soft tissue or bone.

11. Dummy transfer pins are provided which are set in a permanent model and can be used at any time to form a denture and such denture will fit the individual patient without alteration.

It is an object of the invention to provide an oral implant stabilizer and denture support for use with an im-

plant blade which will immediately stabilize the implant blade and provide the sole support for a denture so that the denture does not engage the gingival tissue.

Another object of the invention is to provide an oral implant stabilizer which can be easily and quickly adjusted in accordance with the positioning of implant blades and which will remain in adjusted position to provide a fixed support for a denture.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective illustrating a jaw with a denture in place.

FIG. 2 is an exploded perspective thereof illustrating one application of the invention.

FIG. 3 is an enlarged section on the line 3—3 of FIG. 1.

FIG. 4 is an enlarged section on the line 4—4 of FIG. 1.

FIG. 5 is a fragmentary top plan view of the meso-structure of the present invention.

FIG. 6 is a section on the line 6—6 of FIG. 5.

FIG. 7 is an enlarged fragmentary section on the line 7—7 of FIG. 6.

FIG. 8 is an enlarged section on the line 8—8 of FIG. 6 and illustrating one of the transfer pins.

FIG. 9 is a side elevation of a dummy transfer pin.

FIG. 10 is a bottom perspective of a mounting cap.

FIG. 11 is a top plan view illustrating the first step in preparing a denture.

FIG. 12 is an enlarged section on the line 12—12 of FIG. 11 and illustrates the removal of the dummy transfer pins from the meso-structure.

FIG. 13 is an enlarged section similar to FIG. 12 of the dummy transfer pins after removal from the meso-structure.

FIG. 14 is a perspective illustrating the dummy transfer pins applied to a stone impression.

FIG. 15 is a bottom plan view of a denture.

FIG. 16 is an enlarged section of a modified form of coping.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With continued reference to the drawings, an implant member 20 is provided which is inserted in the alveolar bone 21 of a dental patient. The implant member includes an upwardly extending post 22 with a substantially spherical head 23 at the outer end thereof. After the member 20 is implanted, gingival tissue 24 is sutured over the member and around the post 22 with the head 23 located above such tissue. In the absence of any natural teeth, at least three implant members are attached to the alveolar bone and normally at least four of such members are used to form a firm foundation for a meso-structure 25 and a superstructure or denture, as well as to distribute chewing pressures along the length of the jaw bone.

Implant members per se are known in the prior art for both endosseous and subperiosteal implants and therefore the term "implant member" is intended to mean endosseous implants having a blade portion imbedded in the alveolar bone, as well as subperiosteal implants seated on the cortical bone.

As illustrated, four implant members have been provided for supporting the meso-structure 25. Such meso-structure includes a pair of posterior copings 28 connected to the two rearmost members and a pair of ante-

rior copings 29 connected to the two forward implant members. Both the posterior and anterior copings 28 and 29 include a generally cylindrical body 30 having a substantially spherical cavity 31 in one end in which the spherical head 23 of the implant member is received. Preferably the lower walls of the copings are crimped to the head 23 to prevent separation of the copings from the implant members. The body 30 of each of the copings 28 and 29 is rotatably mounted on the spherical head 23 and a set screw 32 is provided in each of the bodies for fixing the body 30 in adjusted position relative to the head 23. Each of the bodies 30 includes a dovetail 33 extending generally axially of the outer periphery for substantially the full length of the body.

In order to connect the posterior and anterior copings, a pair of connecting links or rods 34 and 35 are provided with one of the links having a bifurcated end 36 and the other link having a tongue 37 forming a close sliding fit with the bifurcated end 36. The upper portion of the bifurcated end is provided with a smooth opening 38 and the lower portion is provided with a threaded opening 39 with the axis thereof generally in alignment with the axis of the opening 38 and normal to the axis of the associated link. The tongue 37 is provided with an opening 40 adapted to be disposed in axial alignment with the openings 38 and 39 for the reception of a transfer pin 41. Such transfer pin includes a shank 42 having a spherical head 43 at one end and a reduced threaded portion 44 at the opposite end. The shank 42 extends through the openings 38 and 40 and the reduced portion 44 is threaded into the opening 39 so that the transfer pin will function as a hinge for the connecting links 34 and 35. As illustrated in FIGS. 6 and 8, the head 43 of each of the transfer pins 41 is spaced above the connecting links.

At the opposite end of each of the links 34 and 35, a threaded bore 47 is provided for the reception of one end of a turnbuckle or adjustable connector 48 having a knurled adjusting portion 49 generally centrally thereof. The opposite end of the turnbuckle 48 is received within a threaded bore 50 of a slide member 51 having a dovetail groove 52 along one side. The turnbuckle 48 has right and left-hand threads at opposite ends so that the links and slide members are moved toward each other when the turnbuckle is rotated in one direction, and moved away from each other when the turnbuckle is rotated in the opposite direction.

The slide member 51 has a set screw 53 in the area adjacent to the dovetail groove so that when the groove 52 slidably engages the dovetail 33 of the posterior and anterior copings, the slide members 51 of the connecting links 34 and 35 can be adjusted vertically and fixed in adjusted position by the set screws 53. As illustrated in FIGS. 5 and 6, the turnbuckle 48 is adapted to be secured in fixed position by a set screw 54 carried by the links 34 and 35.

In order to prevent foreign material, such as particles of food and the like, from becoming lodged in the area of the turnbuckle, a reduced threaded portion 55 is provided on each of the slide members 51 and such reduced portion threadedly engages one end of a tapered sleeve or cover 56. The opposite end of the sleeve 56 has a bore 57 which slidably and rotatably receives the connecting links.

As illustrated best in FIG. 5, the anterior copings 29 are provided with a sliding block 60 having an arcuate

recess of a size to slidably engage the body 30 and with the walls of the sliding block extending around over one-half the diameter of the body of the anterior coping. The sliding block 60 has one or more set screws 62 for securing the sliding block 60 in fixed position on the anterior coping 29. The anterior copings 29 on opposite sides of the body are connected to each other by a pair of arcuate connecting links 63 and 64. Such links are connected to the sliding blocks 60 by turnbuckles 48 and are connected to each other by a hinge-forming transfer pin 41 as previously described. Due to the relatively sharp curvature of the front of the jaw bone 21, as well as varying configurations of such bone, it is contemplated that several connecting links 63 and 64 of various lengths can be provided to accommodate substantially all bone structures. Also it is contemplated that the links 63 and 64 may be replaced by a single arcuate connecting member (not shown) which is connected in any desired manner to the anterior copings 29.

A denture or superstructure 65 is adapted to be supported by the transfer pins 41 of the meso-structure 17. As illustrated in FIGS. 3 and 4, the denture includes a set of artificial teeth 66 integrally formed with artificial gums 67. The distal ends of the gums 67 are spaced slightly from the gingival tissue 24 so that there is substantially no contact which could cause irritation.

In order to mount the denture 65 on the meso-structure, a plurality of T-shaped caps 68 are provided (FIG. 10) and such caps include an upper cross member 69 fixed to one end of a generally cylindrical body 70. The body is constructed of resilient material and has a spherical recess 71 in the end remote from the crossmember 69. The recess 71 is substantially the same size as the spherical head 43 of the transfer pins 41 and such recess extends around slightly more than one-half the diameter of the spherical heads 43. A slot 72 is provided in the body 70 in the area of the recess 71 to permit the resilient body 70 to spread slightly and clampingly engage the spherical head 43 of the transfer pins 41. The crossmembers 69 are imbedded within the artificial gums 67 so that the caps 68 remain in fixed position relative to the denture 65.

With reference to FIG. 16, a modified form of the invention is disclosed in which at least one natural tooth remains in the patient's mouth and such tooth is utilized as an anchor for the meso-structure. In this modification the natural tooth preferably is ground down and a generally tubular coping 73 is applied over the stump of the tooth and is attached thereto by a set screw 74. The tubular coping 73 is provided with at least one dovetail (not shown) similar to the copings 28 and 29 and adapted to receive at least one sliding member 51 as previously described. In the event that the natural tooth should be lost at a later date, an implant member 20 could be substituted for the tooth and the meso-structure could be adjusted to the new implant.

The technique involved in the fitting of the meso-structure, as well as the preparation of the denture, is as follows:

A patient and his local practitioner visit a specialist in oral implantology and after extensive mental and physical examinations of the patient have been completed, the implant members 20 with the posterior and anterior copings 29 attached thereto are surgically applied to the alveolar and cortical bone 21 of the patient and the gingival tissue 24 is closed by suturing. There-

after the meso-structure 27 is assembled and adjusted in such a manner that the connecting links 34 and 35 and the links 63 and 64 do not engage the tissue 24 of the patient. The meso-structure stabilizes the implant members and the bone immediately begins to regenerate to firmly anchor the implant member. The local practitioner is carefully instructed as to the structure and use of the meso-structure, as well as the proper techniques for forming the denture 65. A temporary splint (not shown) is applied to the meso-structure after which the local practitioner and the patient return home.

After a short period of time, the transfer pins 41 are removed from the meso-structure and are replaced by dummy transfer pins 75 each of which has a shank 76 with a spherical head 77 at one end and a reduced portion 78 at the opposite end. The shank 76 and the spherical head 77 are substantially identical with the shank 42 and spherical head 43 and the reduced portion 78 is of a size to be slidably received within the threaded opening 39.

When the dummy transfer pins 75 are in position, a rubber sheet or dam 79 having openings 80 located in a position to be received over the dummy transfer pins 75 is applied to the patient's mouth. The T-shaped caps 68 are placed on the spherical heads 77 of the dummy transfer pins 75 after which a mass 81 of quick-setting material such as wax or the like (FIGS. 12 and 13) is applied to the dam 79 in such a manner that the caps 68 are imbedded within the mass. When the mass has set, it is removed from the patient's mouth and such removal pulls the dummy transfer pins 75 from the meso-structure 27 and the transfer pins 41 are reapplied thereto.

The mass 81 with the caps 68 and the dummy transfer pins 75 forms a female mold into which a moldable material such as artificial stone is poured. The dummy transfer pins 75 which were projecting outwardly of the mass 81 are imbedded within the artificial stone so that when the stone has set the dummy transfer pins will be fixed in the exact location of the transfer pins 41. Thereafter the mass 81 is melted or broken to recover the T-shaped caps 68 and leaves a stone impression of the patient's mouth with portions of the dummy transfer pins 75 fixed therein.

The caps 68 again are applied to the dummy transfer pins which are now in the stone impression and the denture 65 is molded about the impression in such a manner that the caps are imbedded within the denture. When the denture has cured, it is removed from the stone impression by separating the caps 68 from the dummy transfer pins and thereafter the denture can be applied to the transfer pins 41 within the patient's mouth with substantially no alterations since the denture does not engage the gingival tissue 24 of the patient and the caps 68 should be in exact alignment with the transfer pins 41. A slight force applied to the denture will cause the caps 68 to snap onto the spherical heads 43 of the transfer pins where they will remain until the denture is removed.

The local practitioner normally preserves the stone impression with the dummy transfer pins mounted therein so that in the event of loss or damage to the denture 65, a new denture can be formed without the necessity of another impression being taken or without the patient's being present.

I claim:

1. An adjustable support structure for use in stabilizing an oral implant and for removably supporting a denture, said support structure comprising a plurality of spaced post means, means for attaching said post means to the implant or to an existing tooth of a patient, link means adjustably fixed to at least two of said post means for stabilizing said post means, at least one denture receiving pin carried by said link means, and means for removably connecting the denture to said pin.

2. The structure of claim 1 in which said link means is adjustable axially of said post means so that said link means is in spaced relation to the gingival tissue of the patient.

3. The structure of claim 1 in which said link means includes a pair of links hingedly connected together by said pin.

4. The structure of claim 1 in which said link means includes a slide member adjustably mounted on each of said post means.

5. The structure of claim 1 in which said means for removably connecting the denture to said pin includes a cap having a first portion imbedded within the denture and a second portion for clampingly engaging said

pin.

6. The structure of claim 1 in which said link means is adjustably connected to each of said post means by turnbuckles.

7. The structure of claim 6 including sleeve means slidably mounted on said link means for covering said turnbuckles.

8. An adjustable support structure for use in stabilizing an oral implant and for removably supporting a denture, said support structure comprising a plurality of generally cylindrical post members having substantially vertical axes, means for attaching said post members to the implant or to an existing tooth of a patient, at least one slide member slidably mounted on each of said post members, a pair of longitudinally adjustable link means, each of said link means being connected at one end to one of said slide members and the opposite ends of said link means being hingedly connected together by a pin, said pin having a head, cap means clampingly engaging said pin head, and said cap means having portions imbedded within the denture, whereby the denture is supported by said pin and said pin is supported by said link means and said post members.

* * * * *

25

30

35

40

45

50

55

60

65