

[54] **ONE PIECE PERMANENT SUPPORT
FRAME FOR UPPER DENTURES AND
PROCESS OF MOUNTING THE SAME**

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[58] Field of Search **32/10 A**

[56] **References Cited**

UNITED STATES PATENTS

3,641,671 2/1972 Roberts 32/10 A

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Attorney, Agent, or Firm—Eugene M. Eckelman

[57] **ABSTRACT**

A frame portion is implanted in a correspondingly shaped upwardly extending channel cut longitudinally in the alveolar ridge of the upper jaw. The frame portion has a rear extension arranged to project through an aperture cut in the pterygoid bone and more particularly in an aperture cut just above the pyramidal process. Support means are provided on the main frame portion for connecting denture means thereto. The frame portion may be U-shaped if desired to extend fully around the alveolar ridge from pterygoid bone to pterygoid.

11 Claims, 7 Drawing Figures

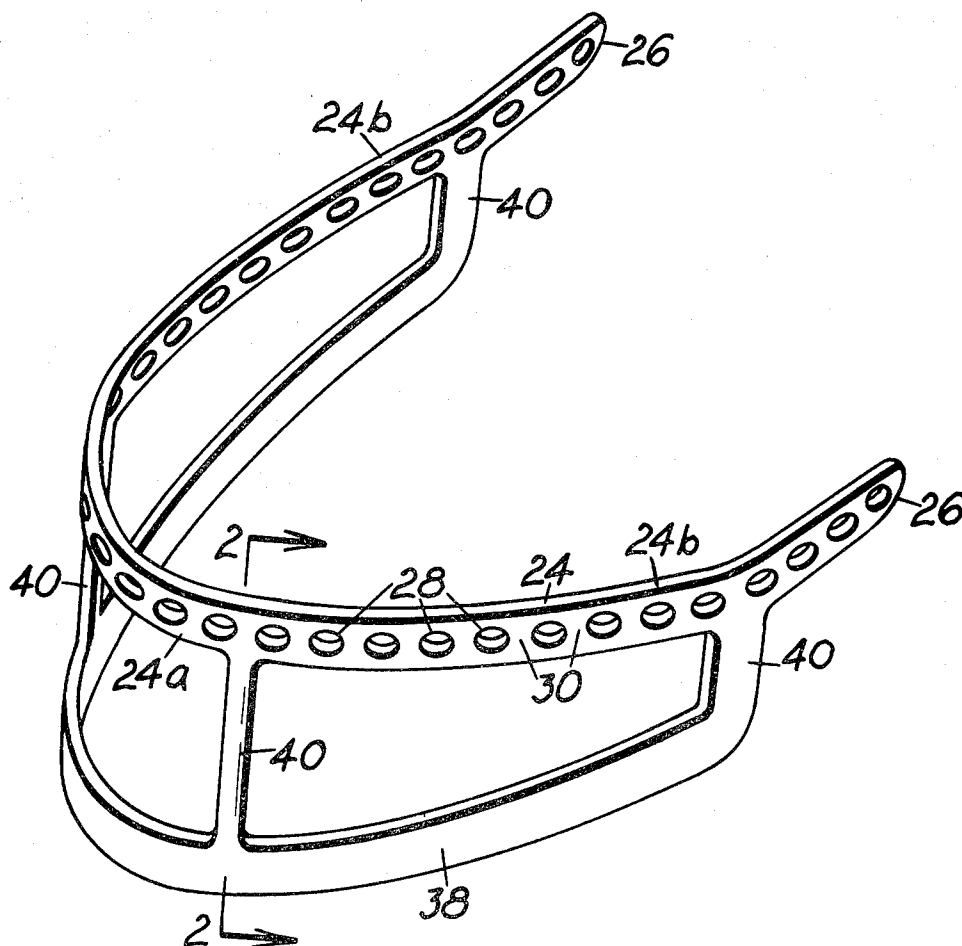


FIG. 1

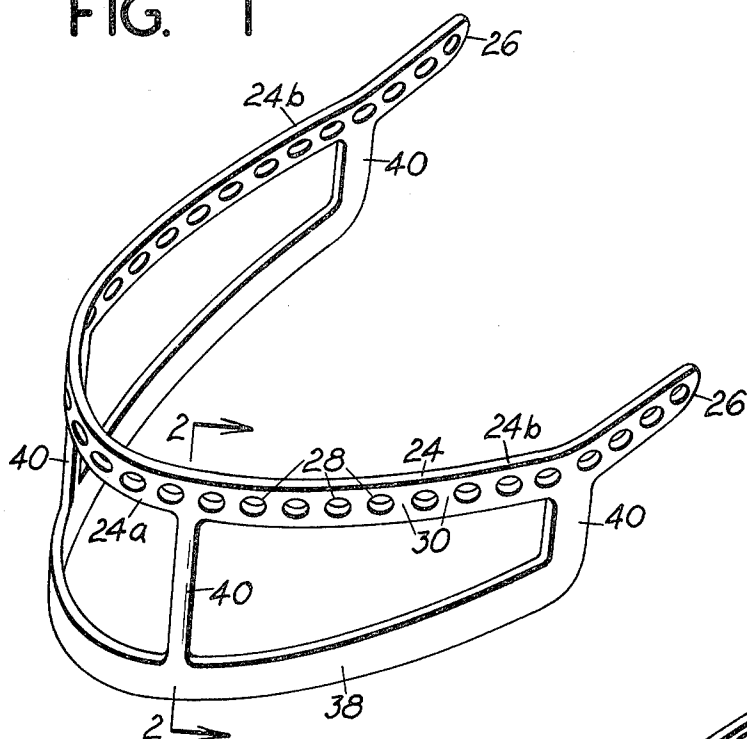


FIG. 2

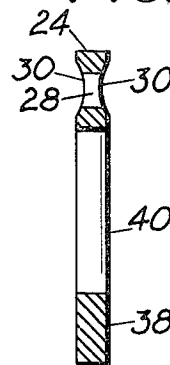


FIG. 3

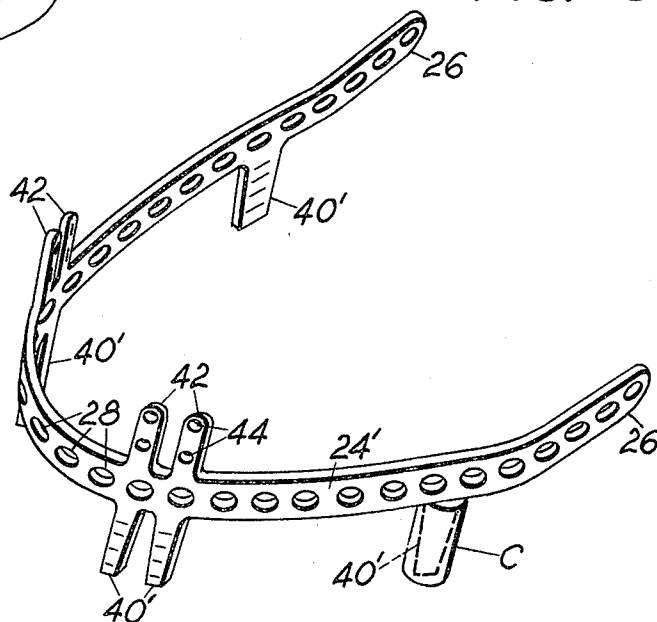


FIG. 7

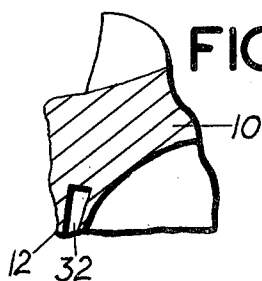


FIG. 6

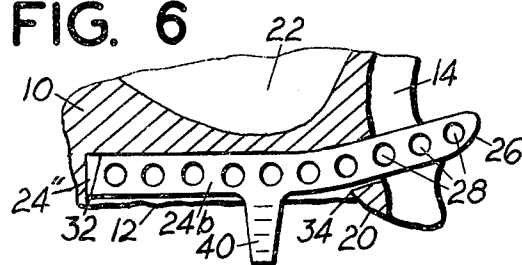


FIG. 5

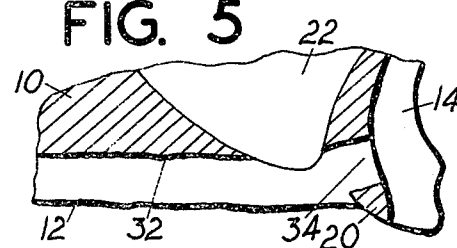
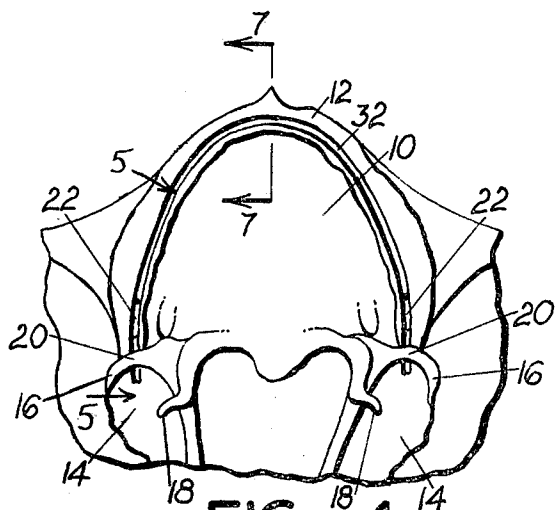


FIG. 4



ONE PIECE PERMANENT SUPPORT FRAME FOR UPPER DENTURES AND PROCESS OF MOUNTING THE SAME

BACKGROUND OF THE INVENTION

The present invention relates to a one-piece permanent support frame for upper dentures and to a process of mounting the same, and more particularly is concerned with implants to be placed and securely mounted in the upper jaw.

Upper jaw implants have heretofore been provided for the purpose of permanently supporting dentures thereon. Some of such prior structures have a plurality of implant portions extending upwardly in the alveolar ridge. Such locations for the implants, however, are not always satisfactory in that the desired stability is not achieved in view of thin bone portions that exist in the sinus areas. Also, applicant has previously proposed, as shown in his U.S. Pat. No. 3,739,476, to use a rigid bar having forwardly turned end portions arranged maxilla, be implanted into the posterior extension of the maxilla, with the anterior portion of the support bar being provided with single implants to be placed in a corresponding anterior portion of the jaw. Such prior structures provide adequate support for dentures in some instances but in other instances they are not sufficiently anchored in the jaw bone to keep from working loose. This is due sometimes to an insufficient amount of bone available in the implant area or sometimes due to the difficulty of holding the implant secured to the bone.

SUMMARY OF THE INVENTION

According to the present invention and forming a primary objective thereof, a one piece permanent support frame for an upper denture is provided which is arranged to have an improved implant connection in strong portions of the jaw and which is not likely under ordinary conditions to loosen from its implanted position, and to a process of mounting the implant.

A more particular object of the present invention is to provide a support frame having a main frame portion dimensioned and arranged to be implanted in a correspondingly shaped and dimensioned channel cut in the alveolar ridge of the upper jaw and with at least one free end portion thereof extending through the pterygoid bone immediately above the palatine process thereof.

Another object is to provide a support frame of the type described having post means thereon facilitating ready attachment of artificial dentures to the implant portion by conventional laboratory procedures.

The invention will be better understood and additional objects and advantages will become apparent from the following description taken in connection with the accompanying drawings which illustrate preferred forms of the device.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of one embodiment of support frame embodying features of the instant invention;

FIG. 2 is a vertical sectional view taken on the line 2-2 of FIG. 1;

FIG. 3 is a perspective view of a second embodiment of the invention;

FIG. 4 is a fragmentary bottom plan view of the upper jaw bone;

FIG. 5 is an enlarged fragmentary sectional view taken on the line 5-5 of FIG. 4;

FIG. 6 is a view similar to FIG. 5 but showing a variation in jaw bone structure that may exist and also showing a variation of the present implant in place; and

FIG. 7 is an enlarged fragmentary sectional view taken on the line 7-7 of FIG. 4.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

To best understand the present invention, reference is first made to FIGS. 4, 5, 6 and 7 which depict somewhat generally jaw bone structure with which the present implant is associated. For example, FIG. 4 is a view looking upwardly at the upper jaw or maxilla, with the reference numeral 10 representing the palatine bone of the maxilla. The numeral 12 in FIGS. 4 and 7 represents the tooth supporting area or the alveolar ridge. At the posterior of the alveolar ridge of the jaw bone structure and intersecting the longitudinal line of this ridge is the pterygoid bone 14, FIGS. 4-6. This latter bone includes buccal and mesial wings 16 and 18, respectively, and important to the invention, this bone has a cortical bridge 20 referred to as the pyramidal process at the lower anterior portion thereof, this bridge being substantially in the same horizontal plane or a little lower than the lower surface of the alveolar ridge. The reference numeral 22 designates a sinus cavity, and with reference to FIGS. 5 and 6, there is illustrated a variation in bone structure wherein the sinus may be closer to the lower surface of the alveolar ridge in different patients or even in the two sides of the same patient.

The pterygoid bone, and particularly the pyramidal process thereof, comprises compact bone to provide a good anchoring point for an implant frame portion, as will be more fully described hereinafter. The alveolar ridge has an exterior portion or covering of compact bone, and the interior thereof comprises a spongy bone which has a vast amount of blood supply and therefore heals fast.

With particular reference now to FIG. 1, one form of implant of the invention comprises a support frame 24 having a U-shape with a curved front end 24a and side extensions 24b. Rearward end portions 26 of the free or shank ends of side extensions 24b are angled upwardly for a purpose to be described. The angle of end portions 26 relative to the plane of the main frame portion is about 15°.

The main frame portion 24 comprises a bar-like structure of greater height than its width, FIG. 2, and has a plurality of horizontal apertures 28 therein spaced around the full length of the frame. As best seen in the cross sectional view of FIG. 2, the sides of the frame have concaved portions 30, such concaved portions providing areas for bone growth, along with the apertures 28, in an implant securement. The forward end 24a of the main frame portion is inclined rearward toward the top a slight amount for a purpose to be described.

In the process of installing the main frame portion 24 as an implant and first with reference to FIGS. 4-7, the alveolar ridge 12 of the jaw is provided with a channel or groove 32 extending around the full length thereof, namely, from one pterygoid bone to the other, an incision first having been made in the gum or epithelium and the latter laid open to expose the bone. In view of

the thinness of bone at the front of the jaw, it may be necessary to angle the channel parallel to the general angle of the bone as seen in FIG. 7. With particular reference to FIGS. 5 and 6, extensions 34 of channels 32 are drilled rearwardly through the pterygoid bone 14 and more particularly, such extensions are cut selectively through such bone at an upward angle to pass directly above the pyramidal process of the pterygoid bone. The angle of cut is substantially similar to the angle at which extensions 26 extend upwardly from the main frame portion 24.

Depending upon the jaw bone structure of the patient, the channels 32 may or may not intersect the sinuses 22, but if in fact they do, there is no damage to the patient. As stated above, FIG. 5 shows jaw bone structure of a thickness wherein the channel 32 intersects the sinus and FIG. 6 shows jaw bone structure of a thickness wherein the channel does not intersect the sinus.

The main frame 24 is custom made so as to have a length and shape to fit snugly in the channel 32 with the angled end portions thereof projecting upwardly through the apertures 34 in the pterygoid bone. To install the frame in the channel 32, it is moved rearwardly while being inclined downwardly at the front a slight amount relative to the plane of the alveolar ridge with the angled ends 26 being inserted into apertures 34 in the pterygoid bone. Thereupon, with suitable manipulation rearwardly and upwardly, the frame is urged for seating engagement into the channel 32. When properly shaped, the frame will require a slight forcing movement to seat it in the channel 32, particularly in view of the angled disposition of the frame at the front curved portion thereof and the angled disposition of channel portions 32 at the front. The shaping of the frame is such that when it is seated fully in the channel 32, the upper edge of angled extensions 26 thereof will slightly pry upwardly against the upper defining walls of the apertures 34, and in particular against the strong pyramidal process of the pterygoid bone, to securely lock the frame at the rear portion of the jaw. The prying connection of the ends 26 against the bone, together with a friction engagement of the frame against wall portions of the channel 32, holds the frame sufficiently secure against occlusal movement until the bone heals around the frame as well as into apertures 28. In the custom construction of the frame 28 to fit a selected patient, the extensions 26 may be cut off to provide the proper length.

In the embodiment of FIG. 1, an auxiliary bar 38 is secured to the main frame 24 by means of a plurality of supporting posts 40. The bar will form the usual base foundation for acrylic compound or other suitable denture material in which the artificial teeth are secured in a well known manner.

With reference to FIG. 3, a second embodiment of the invention utilizes a main frame portion 24' identical to the frame 24 of FIG. 1. The variation in structure comprises the means for supporting the artificial denture or dentures. In this structure, a plurality of posts 40' project downwardly from the frame in edge alignment with the frame. These posts are not connected by frame means as in FIG. 1 but rather are utilized to support individual gold copings C for the support of denture portions such as individual teeth under custom conditions. Posts 40' are provided at selected spacings along the frame 24' and are also of selected size and an-

gle, to facilitate the custom formation of the denture portions depending upon the verticle and the over jet of the patient's upper and lower anterior teeth position. When the implant is installed all the posts 40' have been pre-aligned on a surveyor instrument in a well known manner before the gold copings are cast to fit each individual post. Such procedure saves considerable time and is far more accurate than installing and aligning a plurality of implants.

The structure of FIG. 3 illustrates the feature also that the frame at the front portion thereof may have one or more upwardly extending edge aligned posts 42 providing auxiliary implant portions in the upper jaw, and for this purpose suitably located upwardly extending sockets, not shown, are provided to receive the posts. These posts have apertures 44 therein for receiving bone growth as healing occurs. Posts 40' and 42 may be bent as necessary during installation of the frame for custom fitting.

With particular reference to FIG. 6, the disposition of a frame of the invention in the channel 32 and apertures 34 is shown in detail. This view also suggests an embodiment wherein an implant frame 24'', similarly having end extensions 26, apertures 28 and posts 40, is of only partial length relative to the structures of FIGS. 1 and 3. It does, however, utilize the same principles of mounting in the jaw, namely, it is seated in a channel 32 in the alveolar ridge, it has an extension 26 that is adapted to extend through an aperture 34 in the pterygoid bone, and such aperture and extension are arranged such that the extension prys against a strong portion of the pterygoid bone in the aperture. The channel 32 for the FIG. 6 embodiment is cut to the proper partial length from the pterygoid bone to receive the frame 24''.

According to the present invention, a denture support frame and process of installation is provided which is intended to utilize the strongest portions of the jaw to hold the implant, thus firmly supporting dentures in the mouth. The frame readily facilitates use thereof with conventional fitting equipment and being of one-piece is simple to install and to manufacture.

It is to be understood that the forms of my invention herein shown and described are to be taken as preferred examples of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A permanent implant support frame for an upper denture comprising

- a. a frame portion having forward and rearward ends,
- b. said rearward end including an extended shank portion,
- c. said frame portion forward of said extended shank portion being shaped longitudinally so as to be insertable in a channel cut longitudinally in the alveolar ridge of the upper jaw and said shank portion being of a length to extend through an aperture cut longitudinally in the pterygoid bone to accomplish a permanent implant mounting in the jaw,
- d. and depending support means on said frame portion arranged for connection thereto of artificial denture means.

2. The support frame of claim 1 wherein said shank portion is angled upwardly relative to the general longitudinal line of said frame portion in order to extend

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through the pterygoid bone above the pyramidal process.

3. The support frame of claim 1 wherein said frame portion has horizontal perforations therethrough to facilitate bone growth connection thereto.

4. The support frame of claim 1 wherein said frame portion is U-shaped, having a curved front end similar to the curvature of the alveolar ridge of the jawbone and side extensions terminating in one of said shank portions on each side.

5. The support frame of claim 4 wherein the curved front end of said frame portion is inclined rearwardly toward the bottom to provide a hooking engagement with a correspondingly inclined wall in the channel cut in the anterior portion of the alveolar ridge.

6. The support frame of claim 1 wherein said support means comprises an auxiliary bar selectively contoured for holding the artificial denture means, and upright posts securing said frame portion and said auxiliary bar in spaced relation.

7. The support frame of claim 1 wherein said support means comprises a plurality of integral posts extending downwardly at selected angles and at selected locations

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for securement thereto of denture means.

8. The support frame of claim 1 including at least one implant post projecting upwardly from said frame portion at the front thereof for engagement in sockets cut upwardly in the jaw bone.

9. The process of implanting a bar-like frame in the upper jaw for securing denture means thereto comprising first cutting a channel in the bone along the alveolar ridge of the upper jaw as well as cutting an aperture in the pterygoid bone above the pyramidal process in alignment with said channel, and then inserting the bar-like frame in the channel with a rearward extended shank portion of the bar-like frame extending into said aperture.

10. The process of claim 9 wherein the rearward extended shank portion of the bar-like frame bears upwardly against a pyramidal process of the pterygoid bone in the installed position of the frame.

11. The process of claim 10 wherein the channel is cut around the alveolar ridge from one pterygoid bone to the other for inserting a barlike frame that extends fully the length of the upper jaw.

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