

[54] **BLADE FOR ENDOSSEOUS IMPLANTS FOR SUPPORTING AND RETAINING DENTAL PROTHESES**

[76] Inventors: **Ugo Pasqualini**, Via Borgonuovo, 26, Milan, Italy 20121; **Tullio Pasqualini**, Castello Tesino, Castello Tesino-Trento, Italy 38053; **Celestino Zambelli**, Via Pinerolo, 66, Milan, Italy 20151

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

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

[56] **References Cited**

OTHER PUBLICATIONS

Publication - "Implants International" - 1971.

Primary Examiner—Louis G. Mancene

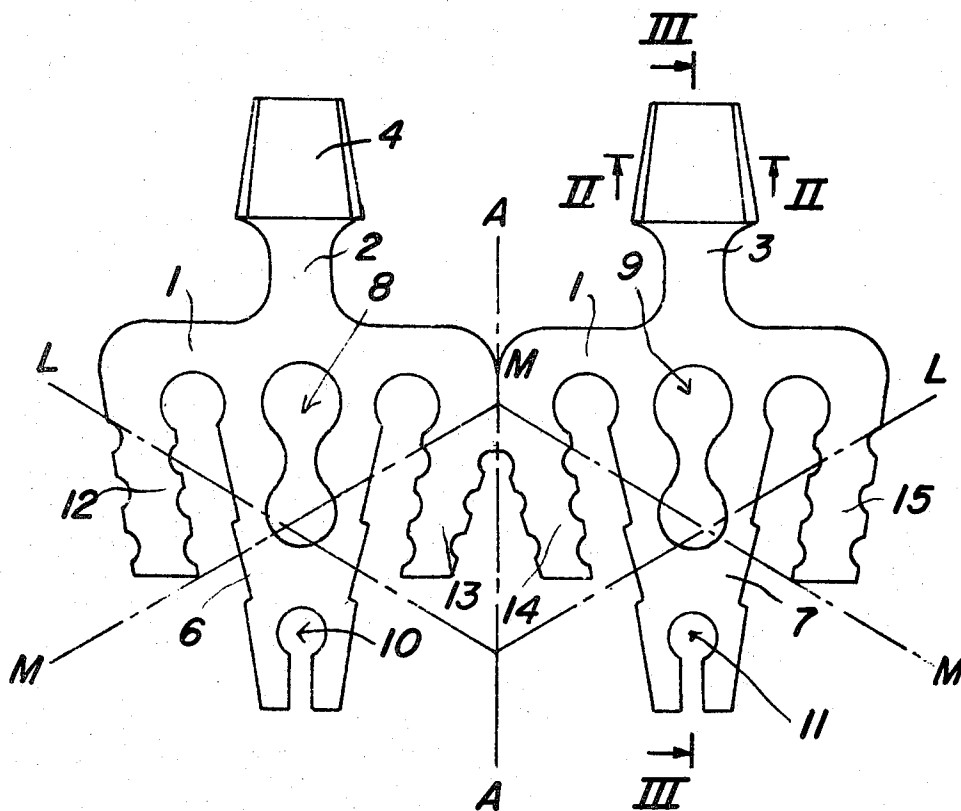
Assistant Examiner—J. Q. Lever

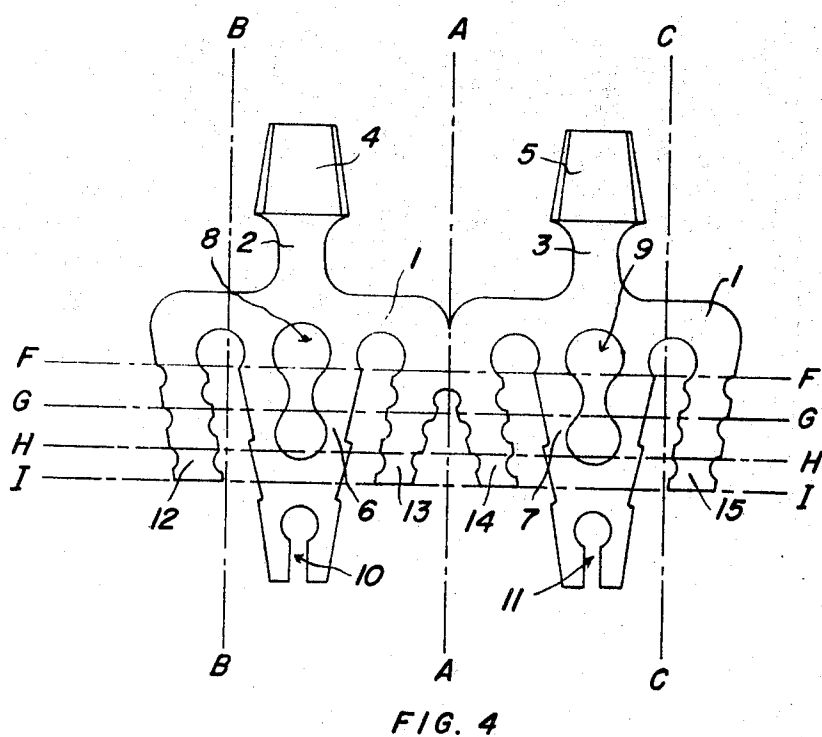
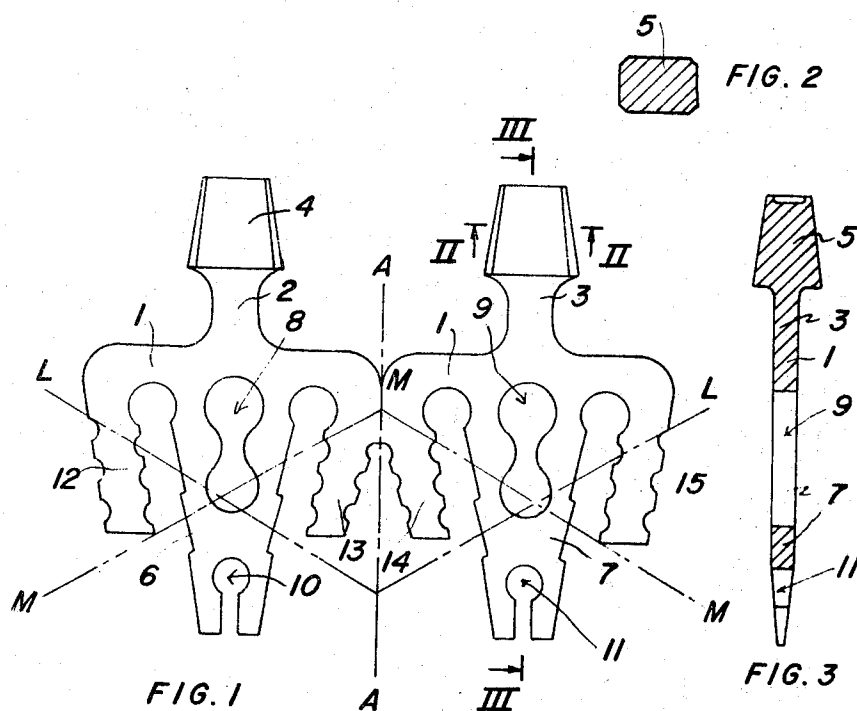
Attorney, Agent, or Firm—Waters, Roditi, Schwartz & Nissen

[57] **ABSTRACT**

Blade for endosseous implants for supporting dental prostheses, having two pins for supporting dental prostheses and six lengthened appendices, two of which being longer than the other ones, with shaped surfaces suitable to be fixed into an osseous groove for retaining the blade. The blade may be cut in order to assume a large number of different conformations which render it suitable for any implant in the jawbone or in the mandibular bone.

6 Claims, 35 Drawing Figures





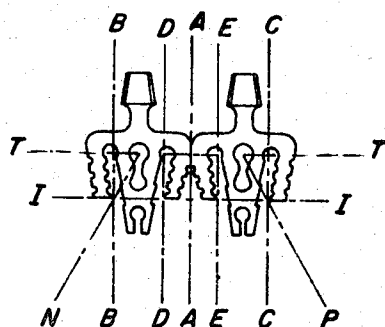


FIG. 5

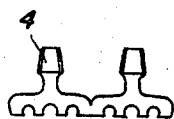


FIG. 6

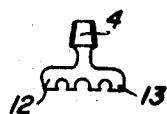


FIG. 7

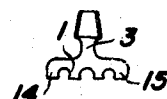


FIG. 8

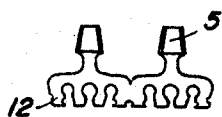


FIG. 9

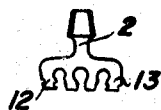


FIG. 10



FIG. 11



FIG. 12



FIG. 13



FIG. 14

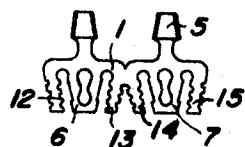


FIG. 15



FIG. 16

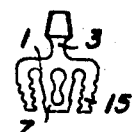


FIG. 17



FIG. 18

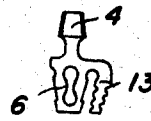


FIG. 19

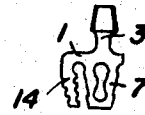


FIG. 20

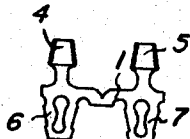


FIG. 21



FIG. 22



FIG. 23

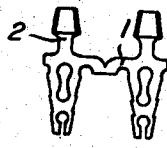


FIG. 24



FIG. 25



FIG. 26

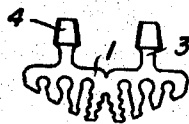


FIG. 27



FIG. 28

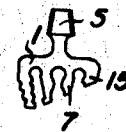


FIG. 29

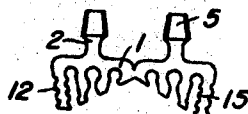


FIG. 30

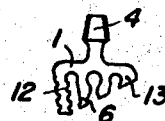


FIG. 31

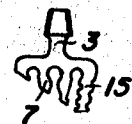


FIG. 32



FIG. 33



FIG. 34



FIG. 35

BLADE FOR ENDOSSEOUS IMPLANTS FOR SUPPORTING AND RETAINING DENTAL PROTHESES

The present invention aims to a blade for endosseous implants for supporting and retaining dental protheses.

The skilled in the art knows that since several years, for supporting and retaining fixed dental protheses, use is made, more and more, of alloplastic artificial roots. Some kinds of alloplastic artificial roots have the shape of small baskets or like elements perforated and reproducing in one way the anatomy of natural roots: a serious drawback of this kind of roots is given by the fact that they must have a conformation similar to the one of the natural roots which may have very different size and shape. Further kinds of artificial roots, the ones now in common use, have the shape of flattened blades which may be fixed into slots made in the osseous structure of the jaw and of the mandible and which present the advantage of being able to be used even where the toothless zones are thin or curved, as such blades may be adjusted to the different morphologies of the same zones.

The alloplastic artificial roots are made of biologically neutral metal materials such as tantalum, titanium, stellite, platinized gold, platinum-iridium, and have retentive structural characteristics constituted by holes or surfaces with a toothed or corrugated shaping which allow the fibro-osseous regeneration and therefore the retention of the artificial roots. The artificial roots are provided with one or more pins which protrude into the oral cavity through the mucous membrane, the fixed dental protheses being applied thereon.

According to what said hereinbefore, the blade-shaped alloplastic artificial roots are used much more than the ones having other conformations. Blade-shaped artificial roots are at present realized with profiles and size of many kinds allowing their use according to the different anatomic possibilities of the jawbones.

In order to make clear what this means it is suitable to mention shortly and summarily that the implant technique of a blade of the cited kind consists in incising and uncovering the mucous membrane, in effecting a longitudinal slot on the maxillary osseous crest by means of a miller, in fixing into such a slot the blade and in suturing the mucous membrane. When fixing the endosseous blade it is strictly necessary to avoid of going into the two maxillary sinus and of injuring or compressing the mandibular or chin nerve.

The implant of the blade is therefore a very delicate operation and requires the carrying out of many radiographs for determining the osseous structure, the distribution of nerves and finally the exact desired positioning of the blade in its groove.

The blades for endosseous implants are therefore of many kinds different among then, as each of them is already suitable to be implanted in a determined position of an osseous crest without injuring the adjacent or below structures. It results therefore that at present a skilled who carries out implants of endosseous blades, must have a complete series of many specimens, different among them, of such blades, which, among other things, are very expensive, in order to face all cases he intends to prothesize.

Every time a specimen of the series of blades has been used, it must be immediately replaced by a new specimen in order to have always all possibilities of intervention.

Main object of the present invention is to realize a blade for endosseous implants for supporting and retaining dental protheses, this blade, of a single kind, being able to be easily and quickly adjusted to be implanted in any point of a maxillary osseous crest having any conformation. Further scope is to obtain a blade assuring a firm and stable anchoring to the osseous structure and being cheap, given that it may be used for any kind of morphology of the jawbones by simple modifications carried out thereon.

These and other scopes are attained by means of a blade comprising a lengthened cross-arm having shaped appendices protruding from one of its sides and two pins from the other, on which it possible to mount the usual fixed protheses, said cross-arm and appendices having a flattened conformation, characterized in that each of said pins is essentially coaxial with a lengthened main appendix located between a couple of side appendices, which are too rather lengthened but shorter than the main appendix towards which the free ends of the appendices of said couple of side appendices are inclined, that between the two main appendices there are two side appendices of two distinct couples which merge with each other in correspondence of said cross-arm, and that the blade is essentially symmetrical as to an axis parallel to and intermediate between the axes of said pins.

In order to make clearer the structure and the characteristics of the blade, it will be now described a realization given by way of unrestrictive example with reference to the enclosed drawings wherein:

FIG. 1 represents in frontal elevation the blade of which

FIGS. 2 and 3 are sections according to lines II—II and III—III respectively of FIG. 1,

FIGS. 4 and 5 are frontal elevations, in a different scale, of the blade of FIG. 1 and on which, as in FIG. 1, have been indicated lines along which the blade is sectionable, and

FIGS. from 6 to 35 are blades obtainable from the one of FIG. 1 by cutting same, as it will be specified hereinafter.

Let us refer to FIGS. 1 and 4 wherein one illustrates, in an enlarged scale and in frontal elevation, the blade and to FIGS. 2 and 3 wherein one represents sections of the same blade. It is possible to notice that the blade here claimed comprises a lengthened and shaped cross-arm 1 from one side of which two pins 2 and 3 protrude whose ends 4 and 5 respectively are thickened and round as it is possible to see clearly from the figures: arm 1, even if shaped, is essentially rectilinear and pins 2 and 3 extend perpendicularly to said arm.

From arm 1, on the side opposite to the one where from pins 2, 3 protrude, protrude six appendices two of which, for clearness sake called main appendices and indicated by reference numerals 6 and 7 respectively, are coaxial with pins 2 and 3 respectively.

Main appendices 6 and 7 have a remarkably flattened conformation and their peripheral edge limited by a toothed profile defining a succession of verteces turned toward arm 1 (FIGS. 1 and 4).

In each of main appendices 6 and 7 there is a lengthened and shaped hole, indicated by reference numeral

8 and 9 respectively, while a shaped cavity 10, 11 is made in correspondence of the free end of the main appendices, as it is possible to see from FIGS. 1 and 3.

Main appendices 6 and 7 are each located between a couple of side appendices, protruding too from cross-arm 1, and indicated with reference numerals 12, 13, 14 and 15. From FIG. 1 it is possible to point out that the side appendices too are rather lengthened, even being shorter than the main appendices and that the free ends of the couple of side appendices 12, 13 and 14, 15 respectively are inclined towards main appendix 6 and 7 respectively comprised therebetween.

It is also possible to notice that the side appendices have a profile shaped according to a plurality of successive undulations having an essentially semicircular conformation (FIG. 1) and that appendices 13 and 14, intermediate between main appendices 6 and 7, merge with each other in correspondence of arm 1 and diverge from each other leaving said arm. The specified blade, except the ends 4 and 5 of pins 2 and 3, has a rather thin thickness, as it is possible to see in particular in FIG. 3. The same blade is essentially symmetrical as to an axis A—A parallel and intermediate between the axes of pins 2 and 3 and appendices 6 and 7 and represented in dashed lines in FIGS. 1, 4 and 5.

The blade, which has been described, is suitable to support and retain fixed dental prostheses of a known kind, is implantable according to the usual technique and has the characteristic that it may be easily and quickly cut, e.g. by cutting nippers, for assuming conformations allowing the implant in any point of jawbones and for any structure of the bones, i.e. for any anatomic possibility to be considered.

Cutting the blade according to lines F—F, G—G, H—H and I—I respectively (indicated by dashed lines in FIG. 4), we obtain the derived blades with two pins represented in FIGS. 6, 9, 12 and 15 respectively: if each one of these blades is then cut according to symmetry line A—A (FIG. 4), we obtain therefrom the couples of blades having a single pin represented in FIGS. 7 and 8, 10 and 11, 13 and 14, and 16 and 17 respectively.

Cutting the blade according to lines I—I, B—B and C—C (FIG. 4) we obtain the blade of FIG. 18, from which, by a cut according to symmetry line A—A, we obtain the two blades of FIGS. 19 and 20.

Cutting the blade according to lines I—I, B—B and C—C and then cutting the only appendices 13 and 14 according to dashed line T—T (FIG. 5), the blade assumes the shape of FIG. 21, and cutting same along the symmetry line we obtain two blades with a single pin of FIGS. 22 and 23.

Cutting the original blade according to lines B—B and C—C and cutting the only appendices 13 and 14 according to line T—T (FIG. 5), the blade becomes the one of FIG. 24 from which, cutting according to lines D—D and E—E, we have two blades having a single pin of FIGS. 25 and 26.

The blade having two pins of FIG. 27 is obtained cutting the original blade according to broken line L—L (FIG. 1) and therefrom the blades of FIGS. 28 and 29 are obtained cutting according symmetry line A—A.

Cutting the new blade according to broken line M—M (FIG. 1) we have a blade with two pins of FIG. 30 wherefrom it is possible to obtain the two blades with a single pin of FIGS. 31 and 32 cutting the blade of FIG. 30 according to the symmetry line.

Finally cutting the blade according to line I—I and removing a portion of appendix 6 according to intersecting lines N and T and a portion of appendix 7 according to intersecting lines P and T (FIG. 5) one obtains the blade of FIG. 33 after having cut also appendices 13 and 14 according to line T—T; from the blade of FIG. 33 it is possible to obtain the ones of FIGS. 34 and 35 cutting the blade according to lines D—D and E—E, represented too in FIG. 5.

The blade represented in FIG. 1 is therefore easily and quickly transformable, by means of simple cutting operations, for assuming any configuration shown in FIGS. 6 to 35: by means of the blades of FIGS. 6 to 35 it is possible to carry out the endosseous implant, according to the usual techniques of alloplastic artificial roots for any anatomic possibility of the jawbones.

It must be pointed out that for facing every implant possibility, the blades obtained by cutting the original one are suitable to be combined among them in an appropriate way. So the blades of FIGS. 7, 10, 13, 16, 19, 22, 25, 28 or 31 and 34 are suitable to be combined among them for facing the blades of FIGS. 8, 11, 14, 17, 20, 23, 26, 29, 32 and 35 which are practically symmetrically equal to the ones above mentioned. It is clear too that the blades of FIGS. 6, 9, 12, 15, 18, 21, 24, 27, 30 and 33 may be combined with one or more of the other blades represented in FIGS. 6 to 35. Even if for realizing the specified blade use may be made of any metal or metal alloy known as biologically neutral, it has been noticed that it is better to chose alloys on the basis of titanium which do not cause any reaction of the tissues with which they are in contact, and which have a very high strength against the mechanical stresses which they undergo during the mastication. As it occurs too for blades of known type, the specified blade, thanks to its very thin thickness, may be implanted on very thin edges with a least rupture of the osseous structures. The blade retention is assured by its large surface area adjacent to the surrounding alveolar bone and by the fact that the osseous regeneration easily occurs through the apertures and in correspondence with the shaped edges of the blade. From what said it results clear the great advantage of the blade shown in the drawings herein annexed, as a skilled, carrying out the implant of endosseous blades, may have a limited number of blades all equal to each other and therefore cheaper than the current blades.

What we claim is:

1. Blade for osseous implants for supporting and retaining dental prostheses, constituted of a biologically neutral metal material and comprising a lengthened cross-arm having two sets of shaped appendices protruding from one of its sides and two axially spaced pins from the other on which it is possible to mount said prostheses, each of said pins and respectively one of said sets of appendices forming a structure identical to and being a mirror-image of the other pin and set of appendices, said cross-arm and appendices being of essentially flat coplanar configurations, each said set of appendices including an elongate main appendix extending coaxially with and opposite to respectively one of said pins and being located between a pair of elongate side appendices, a shaped cavity being formed at the free end of said main appendix, said side appendices being shorter than the main appendix and having the free ends thereof inclined toward said main appendix, adjacent side appendices of said two sets of appendices

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merging with each other in the region of said cross-arm whereby the blade is essentially symmetrical about an axis parallel to and intermediate the axes of said pins.

2. Blade for endosseous implants according to claim 1, characterized in that said two main appendices have a toothed profile and that at least a hole is made in said main appendices.

3. Blade for endosseous implants according to claim 1, characterized in that the profiles of said side appendices are shaped according to a plurality of successive undulations.

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4. Blade for endosseous implants according to claim 3, characterized in that said successive undulations have essentially the shape of successive semicircles.

5. Blade for endosseous implants according to claim 2, characterized in that said toothed profiles of the main appendices define vertices turned towards said cross-arm.

6. Blade for endosseous implants according to claim 1, characterized in that the free ends of said pins are thickened and round.

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