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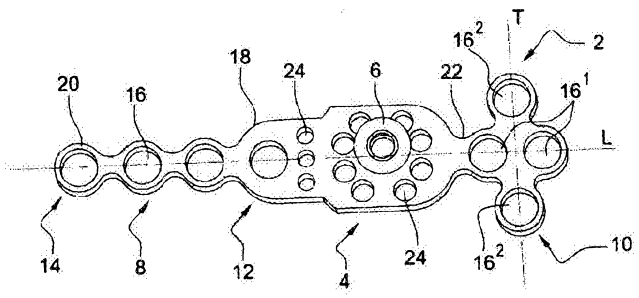
(54) **DENTAL IMPLANT PLATE.**

(57) Abstract: The invention is directed to a dental implant plate (2) for bonding a dental prosthesis to a mandible or maxilla of a patient comprising a central portion (4) with a fixation element (6) for supporting the dental prosthesis, a first arm (8) extending from the central portion (4) along a longitudinal axis (L), said arm comprising several fixation holes (16) along said axis; and a second arm (10) extending from the central portion (4) in a direction opposite to the first arm (8), said second arm (10) comprising at least one fixation hole (16). The second arm (10) extends essentially along the longitudinal axis (L) and comprises at least one axial fixation hole (161) on said axis and at least two lateral fixation holes (162) laterally to, and on opposite sides of, said axis. (Fig.1) 93019



№ 93019

93019

Description

DENTAL IMPLANT PLATE

Technical field

[0001] The invention is directed to the field of dentistry. More specifically, the invention is directed to a dental implant plate.

Background art

[0002] In the field of dentistry, dental implants are usually directly fixed in the maxilla or in the mandible by a screw configured to carry the artificial tooth. However, in case of an atrophic maxilla or mandible, the fixation of the dental implant become difficult because of the lack of sufficient bone volume and it require sometime a bone graft.

[0003] Prior art patent document published WO2013/093927 discloses a dental implant consisting of a metal plate. This plate is used for dental implants in case of atrophic maxilla or mandible. The plate is moulded in the mouth of the patient and is fixed in the mouth at three different points. In case of the maxilla, the plate is fixed on the palatal side, on the alveolar crest and on the zygomatic buttress. In case of the mandible, the plate is fixed on the buccal bone, on the alveolar crest and on the lingual bone. However, it requires each time to mould and to create a specific plate according to the patient.

[0004] Prior art patent document published WO2015/001137 discloses a system for securing a dental prosthesis in case of severe osseous atrophies. A plate is positioned in the oral cavity and is fixed in a single bone at a distance of the alveolar crest by means of at least one anchorage in the form of a screw. However, this construction is voluminous and invasive, and its application is limited.

[0005] Prior art patent document published US5052930 discloses a juxtaosseous implant for application to the mandible or maxilla. The dental implant has a central portion supporting the artificial tooth and branches configured to be screwed into a bone at points removed from the central portion. This configuration is limited to fixations in maxilla or mandible with a sufficient bone volume and cannot be used in case of atrophic mandible or maxilla.

[0006] Prior art patent document published WO2015/063625 discloses a dental implant comprising a main body configured to be implanted in a mandibular or maxillary bone and protruding portions projecting radially outwardly. However, with this configuration, the dental implant is directly fixed in the maxilla or mandible and cannot be used in case of atrophic mandible or maxilla.

Summary of invention

Technical Problem

[0007] The invention has for technical problem to provide a solution to at least one shortcoming of the above mentioned prior art. More specifically, the invention has for technical problem to provide a dental implant in case of maxillary or mandibular atrophy without performing any bone graft or sinus lift for example. The invention has also for technical problem to provide a cost and time effective solution for bonding a dental prosthesis to a mandible or maxilla when the bone volume is not sufficient.

Technical solution

[0008] The invention is directed to a dental implant plate for bonding a dental prosthesis to a mandible or maxilla of a patient, comprising a central portion with a fixation element for supporting the prosthesis; a first arm extending from the central portion along a longitudinal axis, said arm comprising several fixation holes along said axis; and a second arm extending from the central portion in a direction opposite to the first arm, said second arm comprising at least one fixation hole; wherein the second arm extends essentially along the longitudinal axis and comprises at least one axial fixation hole on said axis and at least two lateral fixation holes laterally to, and on opposite sides of, said axis.

[0009] According to a preferred embodiment of the invention, the second arm is shorter than the first arm and is generally cross-shaped.

[0010] According to a preferred embodiment of the invention, the length of the second arm is less than 70%, preferably less than 60% of the length, more preferably less than 50%, of the first arm.

[0011] According to a preferred embodiment of the invention, the first arm comprises a proximal portion and a distal portion to the central portion, said proximal portion having a width that is greater, preferably by at least 50%, than the width of the distal portion.

[0012] According to a preferred embodiment of the invention, the proximal portion of the first arm comprises at least one, preferably one, of the fixation holes of said arm.

[0013] According to a preferred embodiment of the invention, the proximal portion of the first arm comprises lateral edges which are generally straight.

[0014] According to a preferred embodiment of the invention, the width of the proximal portion of the first arm is less, preferably by at least 10%, than the width of the central portion.

[0015] According to a preferred embodiment of the invention, the distal portion of the first arm comprises at least two, preferably three, of the fixation holes of said arm.

[0016] According to a preferred embodiment of the invention, the distal portion of the first arm comprises lateral edges which are generally corrugated around the fixation holes of said portion.

[0017] According to a preferred embodiment of the invention, the central portion and/or the proximal portion of the first arm comprises holes for promoting growth of osteoblasts therethrough, said holes having a diameter that is less than the diameter of the fixation hole, preferably comprised between 1 and 2mm.

[0018] According to a preferred embodiment of the invention, the second arm comprises at least two, of the axial fixation holes.

[0019] According to a preferred embodiment of the invention, the at least two lateral fixation holes of the second arm are aligned along a transversal direction that crosses the longitudinal axis between two of the axial fixation holes of said second arm.

[0020] According to a preferred embodiment of the invention, the second arm comprises a portion interconnecting said arm to the central portion, said interconnecting portion having a reduced width compared with the second arm and the central portion.

[0021] According to a preferred embodiment of the invention, the reduced width of the interconnecting portion is comprised between 2 and 4mm, preferably between 2.5 and 3.5mm.

[0022] According to a preferred embodiment of the invention, each of the first and second arms is dimensioned and configured such that said each arm can be folded, twisted or cut in order to conform said arm to the contours of the implantation site.

Advantages of the invention

[0023] The invention is particularly interesting in that the dental implant plate can be used in case of atrophic maxilla as well as in case of atrophic mandible. More particularly, the longer and the shorter arms allow the fixation of the dental implant at points removed from the atrophic bone. The shorter arm which comprises two axis of fixation allows an easy and a stable fixation of the dental implant plate. The invention is also interesting in that the two arms can be adapted according to the available osseous space and the bone anatomy.

Brief description of the drawings

[0024] Figure 1 is a top view of the dental implant plate in accordance with the present invention.

[0025] Figure 2 is a representation of a profile view of the dental implant plate according to Figure 1.

[0026] Figure 3 is a representation of possible fixations of the dental implant plate in the maxilla and in the mandible.

[0027] Figure 4 is a detailed representation of the dental implant on the atrophic maxilla of figure 3.

[0028] Figure 5 is a detailed representation of the dental implant on the atrophic mandible of figure 3.

Description of an embodiment

[0029] With reference to the attached figures 1 and 2, reference 2 shows a dental implant plate. The dental implant plate 2 comprises a central portion 4 with a fixation element 6 protruding from the central portion 4 and configured to support a dental prosthesis. The dental implant plate 2 comprises a first arm 8 and a second arm 10.

[0030] The first arm 8 is extending from the central portion 4 along a longitudinal axis L and has a proximal portion 12 and a distal portion 14 to the central portion 4. The first arm 8 comprises several fixation holes 16 extending along the longitudinal axis L which are configured to receive fixation means such as fixation screws. Each of the fixation holes 16 has a diameter between 2.2mm and 3mm, more specifically approximatively 2.6mm and their centers are preferably spaced of approximatively 5mm. The proximal portion 12 comprises at least one of the fixation holes of the first arm 8 and the distal portion 14 comprises at least two of the fixation holes of the first arm. Preferably, one fixation hole 16 is on the proximal portion 12 and three of the fixation holes 16 are on the distal portion 14. The proximal portion 12 has a width that is greater, preferably by at least 50%, than the width of the distal portion 14 and less, preferably by at least 10%, than the width of the central portion 4. More specifically, the proximal portion 12 has a width of 7mm, the central portion 4 has a width of 9mm and the distal portion 14 has a width of 4.4mm. The proximal portion 12 comprises lateral edges 18 which are generally straight. Each edge has a width comprises between 2 and 2.5mm, more preferably 2.2mm. The distal portion 14 also comprises lateral edges 20 which are generally corrugated around the fixation holes 16 of said portion.

[0031] The second arm 10 extends from the central portion 4 in a direction opposite to the first arm 8. The second arm 10 extends essentially along the longitudinal axis L. The second arm 10 is shorter than the first arm 8 and has a length that is less than 70% of the length of the first arm, preferably less than 60%, more preferably less than 50%. More specifically, the first arm 8 has a length of approximatively 22.5mm and the second arm 10 has a length of approximatively 10mm. The second arm 10 is generally cross-shaped and comprises fixation holes 16 axial and lateral to the longitudinal

axis L. More particularly, the second arm 10 comprises at least one axial fixation hole 16^1 on the longitudinal axis and at least two lateral fixation holes 16^2 laterally to, and on opposite sides of, said axis. The second arm 10 comprises at least two of the axial fixation holes. The at least two lateral fixation holes 16^2 of the second arm 10 are aligned along a transversal direction or axis T that crosses the longitudinal axis L between two of the axial fixation holes of said second arm. The second arm 10 is connected to the central portion 4 by an interconnecting portion 22 having a reduced width compared with the second arm 10 and the central portion 4. The reduced width of the interconnecting portion 22 is comprised between 2 and 4mm, more specifically between 2.5 and 3.5mm, the width is preferably approximatively 2.9mm.

[0032] The dental implant plate 2 has a length comprises between 40 and 45 mm, preferably 43 mm and is made of a biocompatible material having sufficient malleability and flexibility in order to allow the deformation of each arm without breaking, or the cutting of each arm when desired. The thickness of the plate is comprised between 0.5 and 0.8mm more specifically 0.6mm. The dental implant plate 2 can be made in titanium, more preferably in titanium grade 2.

[0033] Each of the first and second arms 8;10 is dimensioned and configured such that said each arm can be folded, twisted or cut in order to conform said arms to the contours or the shape of the implantation site.

[0034] In order to allow a spontaneous regeneration of the patient's bone after the implant installation, the central portion 4 and/or the proximal portion 12 of the first arm 8 comprises holes 24 for promoting growth of osteoblasts therethrough. The holes 24 have a diameter that is less than the diameter of the fixation hole 16. The diameter is preferably comprised between 1 and 2mm. The central portion 4 of the dental implant plate 2 can comprise a plurality of holes 24 extending radially outward the fixation element 6 of the prosthesis and defining a circle with a diameter of approximatively 7mm. A row of holes 24 can also be present on the proximal portion 12 of the first arm 8. Preferably the holes 24 of the first arm 8 have a diameter of

approximatively 1mm. The protruding element 6 has a height between 4.5 and 6.5mm and is configured to receive the dental prosthesis.

[0035] Figure 3 illustrates possible fixations of the dental plate 2 in the maxilla and in the mandible. In case of the maxilla, the dental implant plate 2 can be fixed in the palatine bone (not represented) and in the zygomatic bone 26. In case of the mandible, the dental implant plate 2 can be placed along the crestal bone 28 and fixed in the retromolar trigone 30 and in the crestal bone 28 with fixation means 32 such as osteosynthesis screws. The two fixations will be described in more details in the following figures.

[0036] Figure 4 illustrates the fixation of the dental implant plate 2 according to Figure 3 in case of an atrophic (not shown) maxilla. The dental implant plate 2 is placed such that the fixation element 6 is where the dental prosthesis should be. The central portion 4 is over the crestal bone 28 and is placed transversally to the crestal bone 28. The first arm 8 is extending to the zygomatic bone 26 and is folded relative to the central portion 4 in order to conform to the bone. The first arm 8 is fixed in the zygomatic bone 26 by means of fixation elements 32 through the fixation holes, such as osteosynthesis screws. At the opposite side, the second arm 10 is directed to the palatine bone 34 and is folded relative to the central portion 4, by means of the interconnecting portion 22 which has a reduced width. The second arm 10 is fixed to the palatine bone 34 by means of four fixation means 32. The cross-shaped of the second arm 10 allows a fixation of the dental implant plate 2 according to the anterior-posterior sense of the maxilla.

[0037] Figure 5 illustrates the fixation of the dental implant plate 2 according to Figure 3 in case of an atrophic (not shown) mandible. The dental implant plate 2 is placed on the desired implantation site by placing the central portion 4 over the crestal bone 28. The second arm 10 is directed to the retromolar trigone 30. The first and the second arm 8 and 10 are twisted relative to longitudinal axis in order to comply with the bone anatomy. The first arm 8 is fixed in the crestal bone 28 and the second arm is fixed in the retromolar trigone 30. Each of the lateral fixation holes 16^2 (not apparent) of the second arm10 is folded in order to fix the dental plate in the retromolar

trigone. This fixation is particularly interesting when the bone under the mandibular nerve is less than 5mm.

Revendications

1. Plaque d'implant dentaire (2) pour la fixation d'une prothèse dentaire à la mandibule ou au maxillaire d'un patient, comprenant :

   - une portion centrale (4) avec un élément de fixation (6) pour supporter la prothèse;

   - un premier bras (8) s'étendant de la portion centrale (4) le long d'un axe longitudinal (L), ledit bras comprenant plusieurs trous de fixation (16) le long dudit axe; et

   - un second bras (10) s'étendant de la portion centrale (4) dans une direction opposée au premier bras (8), ledit second bras (10) comprenant au moins un trou de fixation (16) ;

   caractérisé en ce que

   le second bras (10) s'étend essentiellement le long de l'axe longitudinal (L) et comprend au moins un trou de fixation axial (16^1) sur ledit axe et au moins deux trous de fixation latéraux (16^2) latéralement et sur des côtés opposés, audit axe.
2. Plaque d'implant dentaire (2) selon la revendication 1, dans lequel le second bras (10) est plus court que le premier bras (8).
3. Plaque d'implant dentaire (2) selon la revendication 2, dans lequel la longueur du second bras (8) est inférieure à 70%, de préférence inférieure à 60% de la longueur, plus préférentiellement inférieure à 50%, du premier bras (8).
4. Plaque d'implant dentaire (2) selon l'une quelconque des revendications 1 à 3, dans lequel le premier bras (8) comprend une portion proximale (12) et une portion distale (14) à la portion centrale (4), ladite portion proximale ayant une largeur qui est plus grande, de préférence d'au moins 50%, que la largeur de la portion distale.
5. Plaque d'implant dentaire (2) selon la revendication 4, dans lequel la portion proximale (12) du premier bras (8) comprend au moins un, de préférence un, des trous de fixation (16) dudit bras.
6. Plaque d'implant dentaire (2) selon l'une des revendications 4 et 5, dans lequel la portion proximale (12) du premier bras (8) comprend des bords latéraux (18) qui sont généralement droits.

7. Plaque d'implant dentaire (2) selon l'une quelconque des revendications 4 à 6, dans lequel la largeur de la portion proximale (12) du premier bras (8) est inférieure, de préférence d'au moins 10%, à la largeur de la portion centrale (4).
8. Plaque d'implant dentaire (2) selon l'une quelconque des revendications 4 à 7, dans lequel la portion distale (14) du premier bras (8) comprend au moins deux, de préférence trois, des trous de fixation (16) dudit bras.
9. Plaque d'implant dentaire (2) selon la revendication 8, dans lequel la portion distale (14) du premier bras (8) comprend des bords latéraux (20) qui sont généralement ondulés autour des trous de fixation (16) de ladite portion.
10. Plaque d'implant dentaire (2) selon l'une quelconque des revendications 4 à 9, dans lequel la portion centrale (4) et/ou la portion proximale (12) du premier bras (8) comprend des trous (24) pour favoriser la croissance d'ostéoblastes au travers, lesdits trous ayant un diamètre qui est inférieur au diamètre du trou de fixation (16), de préférence compris entre 1 et 2 mm.
11. Plaque d'implant dentaire (2) selon l'une quelconque des revendications 1 à 10, dans lequel le deuxième bras (10) est généralement en forme de croix.
12. Plaque d'implant dentaire (2) selon l'une quelconque des revendications 1 à 11, dans lequel le second bras (10) comprend au moins deux des trous de fixation axiaux (16^1).
13. Plaque implant dentaire (2) selon la revendication 12, dans lequel les au moins deux trous de fixation latéraux (16^2) du second bras (10) sont alignés le long d'une direction transversale (T) qui croise l'axe longitudinal (L) entre deux des trous de fixation axiaux (16^1) dudit second bras.
14. Plaque d'implant dentaire (2) selon l'une quelconque des revendications 1 à 13, dans lequel le second bras (10) comprend une portion (22) interconnectant ledit bras à la portion centrale (4), ladite portion d'interconnexion (22) ayant une largeur réduite par rapport au second bras (10) et à la portion centrale (4).
15. Plaque d'implant dentaire (2) selon la revendication 14, dans lequel la largeur réduite de la portion d'interconnexion (22) est comprise entre 2 et 4 mm, de préférence entre 2,5 et 3,5 mm.
16. Plaque d'implant dentaire (2) selon l'une quelconque des revendications 1 à 15, caractérisé en ce que chacun des premier et second bras (8 ;10) est dimensionné et configuré de telle sorte que chacun desdits bras peut être plié,

tordu ou coupé afin de conformer lesdits bras aux contours du site d'implantation.

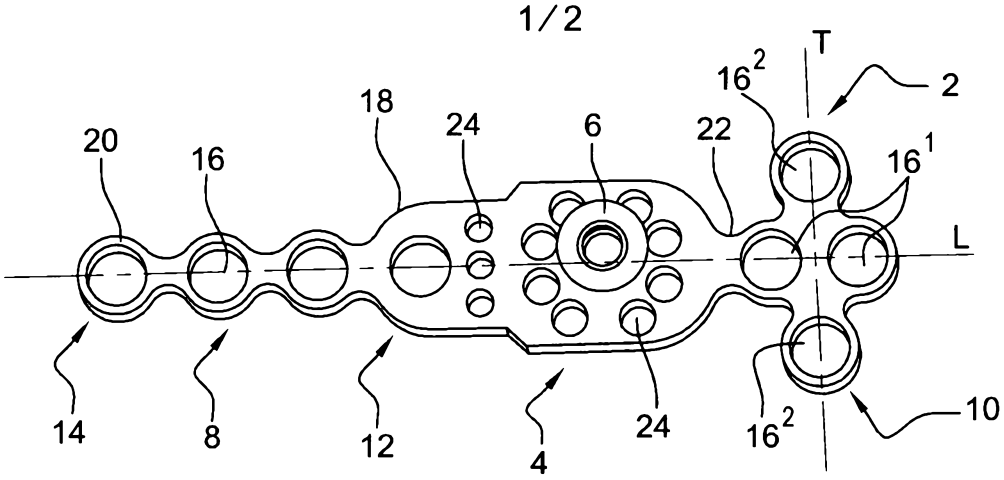


Fig. 1

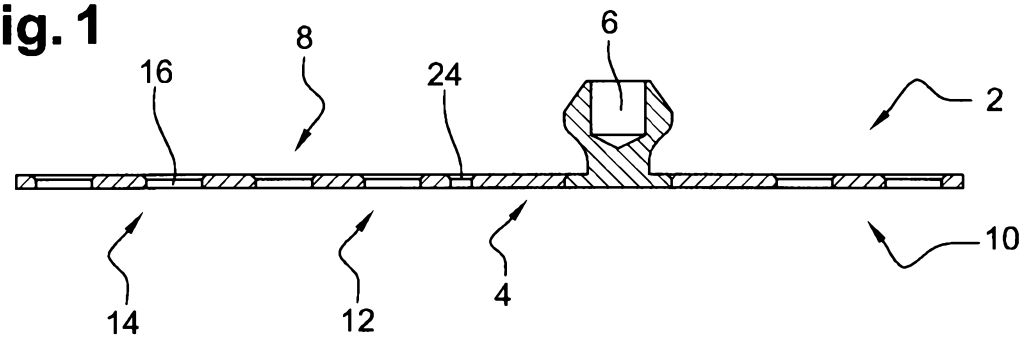


Fig. 2

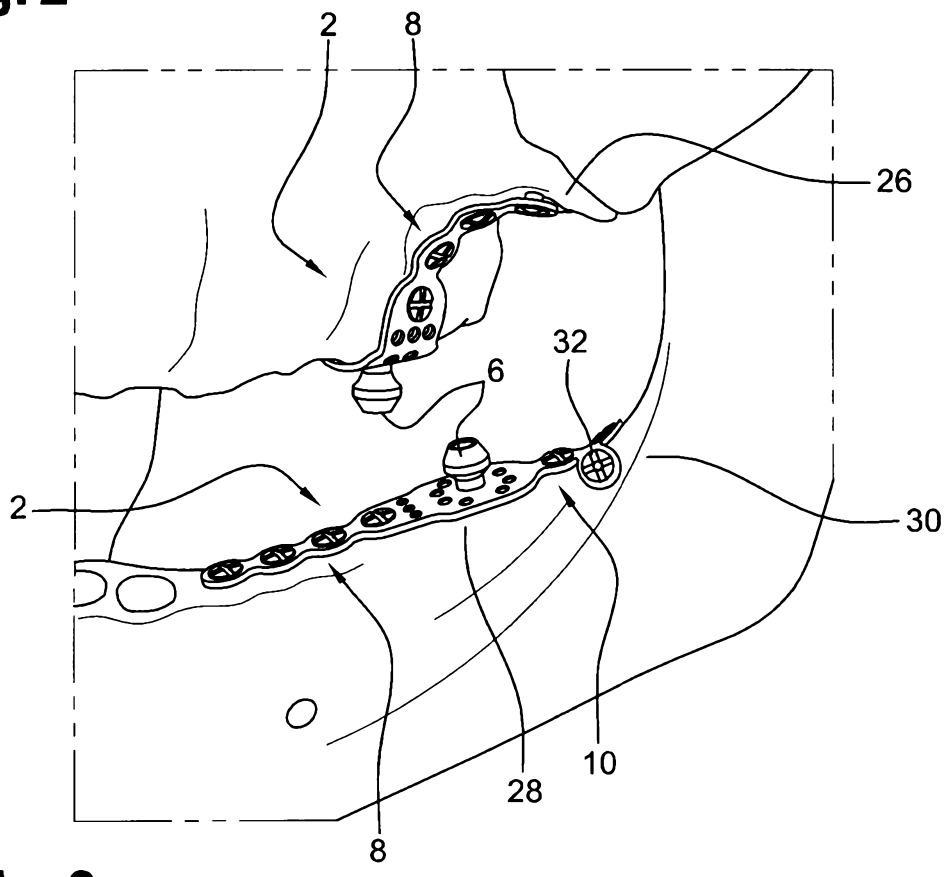


Fig. 3

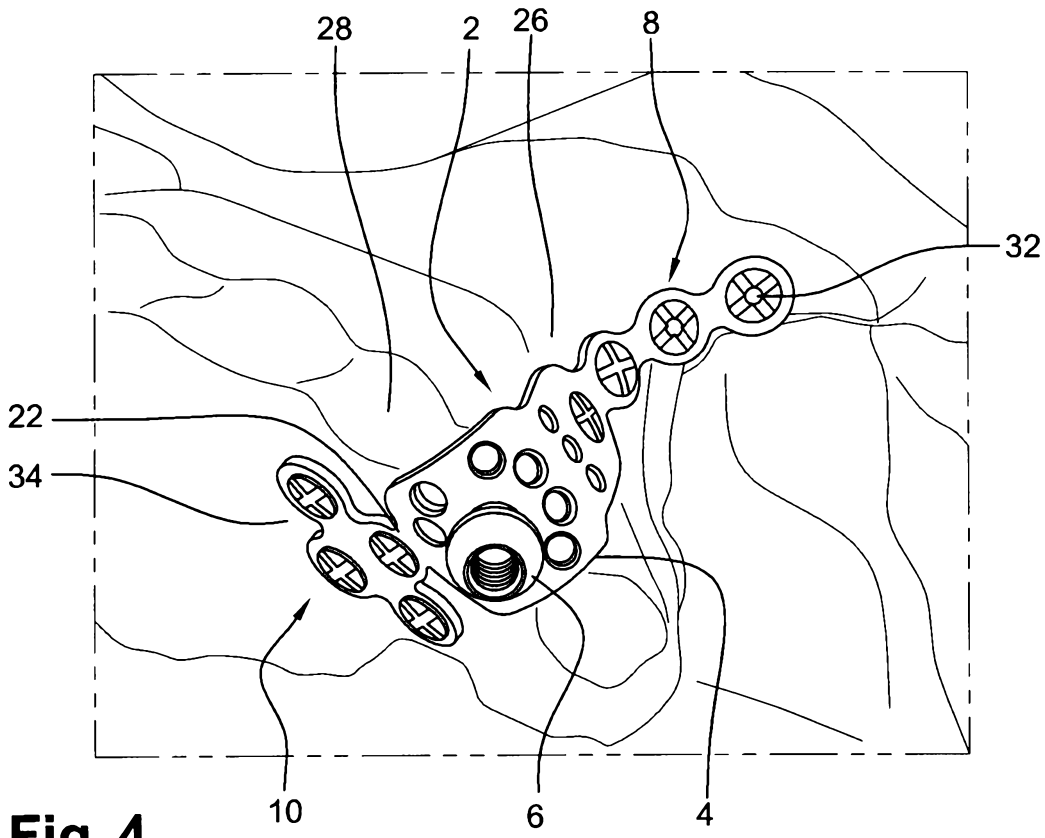


Fig. 4

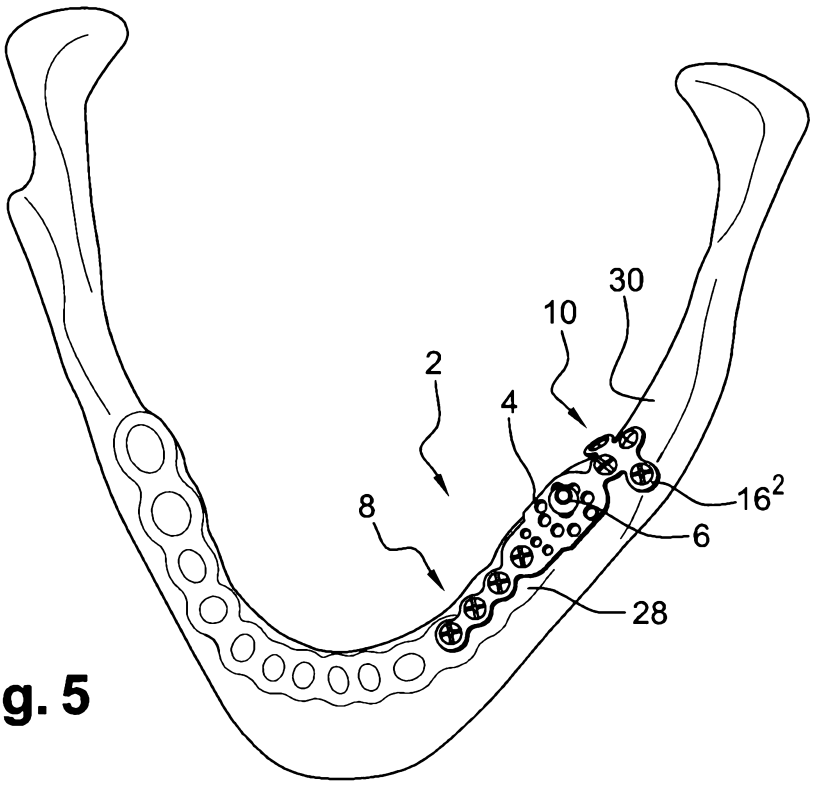


Fig. 5

Abstract

DENTAL IMPLANT PLATE

The invention is directed to a dental implant plate (2) for bonding a dental prosthesis to a mandible or maxilla of a patient comprising a central portion (4) with a fixation element (6) for supporting the dental prosthesis, a first arm (8) extending from the central portion (4) along a longitudinal axis (L), said arm comprising several fixation holes (16) along said axis; and a second arm (10) extending from the central portion (4) in a direction opposite to the first arm (8), said second arm (10) comprising at least one fixation hole (16). The second arm (10) extends essentially along the longitudinal axis (L) and comprises at least one axial fixation hole (16^1) on said axis and at least two lateral fixation holes (16^2) laterally to, and on opposite sides of, said axis.

(Fig.1)

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie
et du Commerce extérieur

National Application Number

LO 1324
LU 93019

SEARCH REPORT

in accordance with Article 35.1 a)
of the Luxembourg law on patents
dated 20 July 1992

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 702 697 A (LINKOW LEONARD I [US]) 27 October 1987 (1987-10-27) * column 1 - column 6, line 50; figures 1-7 *	1-16	INV. A61C8/00 A61B17/80 A61C8/02
X	JP 2004 313488 A (MAEDA HIROTOSHI) 11 November 2004 (2004-11-11) * abstract; figures 1-3 *	1-16	
X,D	WO 2013/093927 A1 (MADAN GUATAM [IN]) 27 June 2013 (2013-06-27) * pages 1-10; figures 1-5 *	1-16	
X,D	WO 2015/063625 A1 (ZANNA MASSIMO [IT]) 7 May 2015 (2015-05-07) * pages 2-8; figures 1-7 *	1-16	

TECHNICAL FIELDS SEARCHED (IPC)

A61C
A61B

The present search report has been drawn up for all claims

	Date of completion of the search	Examiner
	24 November 2016	Oelschläger, Holger

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C55)

ANNEX TO THE SEARCH REPORT ON LUXEMBOURG PATENT APPLICATION NO.

LO 1324
LU 93019

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-11-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4702697 A	27-10-1987	NONE	
JP 2004313488 A	11-11-2004	NONE	
WO 2013093927 A1	27-06-2013	NONE	
WO 2015063625 A1	07-05-2015	EP 3062731 A1	07-09-2016
		US 2016250001 A1	01-09-2016
		WO 2015063625 A1	07-05-2015

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie
et du Commerce extérieur

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
LO1324	08.04.2016		LU93019

International Patent Classification (IPC)
INV. A61C8/00 A61B17/80 A61C8/02

Applicant
DIEDERICH Henri

This report contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☒ Box No. VIII Certain observations on the application

Examiner
Oelschläger, Holger

Application No.

WRITTEN OPINION

LU93019

Box No. I Basis of the opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ on paper

   ☐ in electronic form

   c. time of filing/furnishing:

   ☐ contained in the application as filed.

   ☐ filed together with the application in electronic form.

   ☐ furnished subsequently.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes:	Claims	7-9, 11, 14, 15
	No:	Claims	1-6, 10, 12, 13, 16
Inventive step	Yes:	Claims	
	No:	Claims	1-16
Industrial applicability	Yes:	Claims	1-16
	No:	Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Box No. VIII Certain observations on the application

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents D1-D4:

D1 US 4 702 697 A (LINKOW LEONARD I [US]) 27 October 1987 (1987-10-27)

D2 JP 2004 313488 A (MAEDA HIROTOSHI) 11 November 2004 (2004-11-11)

D3 WO 2013/093927 A1 (MADAN GUATAM [IN]) 27 June 2013 (2013-06-27), also cited by Applicant

D4 WO 2015/063625 A1 (ZANNA MASSIMO [IT]) 7 May 2015 (2015-05-07), also cited by Applicant

2 Furthermore, the below-mentioned (see Item VIII) lack of clarity notwithstanding, the subject-matter of claim 1 is not new, and the criteria of patentability are therefore not met.

2.1 Document D1 discloses, see the references cited in the search report:
a dental implant plate (see Fig. 1 and 2) for bonding a dental prothesis (see fig. 1) to a mandible or maxilla (see fig. 1) of a patient (see fig. 1), comprising:
- a central portion (at 16) with a fixation element(16) for supporting the prothesis (see fig. 1);
- a first arm (see fig 2, left arm) extending from the central portion (at 16) along a longitudinal axis (implicit), said arm comprising several fixation holes (e.g. 14) along said axis; and
- a second arm (see fig. 2, right arm) extending from the central portion (at 16) in a direction opposite (see fig. 2) to the first arm, said second arm comprising at least one fixation hole (e.g. 14);
wherein the second arm extends essentially along the longitudinal axis (see fig. 2) and at least two lateral fixation holes (e.g. 14) laterally to (see fig. 2), and on opposite sides of (see fig. 2), said axis.

2.2 Document D2 and D3 disclose, see the references cited in the search report, the same subject-matter of claim 1.

2.3 The subject-matter of claim 1 is therefore not new.

3 Dependent claims 2-16, as far as they can be understood, see item VIII below, do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of novelty and/or inventive step.

The features of these claims are either explicitly or implicitly disclosed (hence not new) in one or more of documents D1-D3, see the references cited in the search report, or they suggest only slight constructional changes in the plate of claim 1 which come within the scope of the customary practice followed by persons skilled in the art, or see document D4 and the references cited in the search report, especially as the advantages thus achieved can readily be foreseen.
Consequently, the subject-matter of these claims also lacks an inventive step.

Examples for lack of novelty:
claims 2, 3: se e.g. Fig. 1 of D3;
claim 4: see e.g. Fig. 2 of D1;
claim 5: see e.g. Fig. 2 of D1;
claim 6: see e.g. Fig. 2 of D1;
claim 10: smaller holes in Fig. 2 of D1;
claim 12: see e.g. Fig. 2 of D1;
claim 12: see e.g. Fig. 2 of D1;
claim 16: see e.g. Fig. 2 of D2.

Lack of inventive step:
claim 7: see e.g. Fig. 2 of D4; the skilled person would apply this knowledge without inventive skill;
claim 8: see e.g. Fig. 2 of D4; the skilled person would apply this knowledge without inventive skill;
claim 9: see e.g. Fig. 2 of D4; the skilled person would apply this knowledge without inventive skill;
claim 11: cross-shape is merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances,

without the exercise of inventive skill, in order to solve the problem posed;
claim 14: see e.g. Fig. 5 and 6 of D4; the skilled person would apply this knowledge without inventive skill;
claim 15: the dimension range, taking into account the possible real dimensions of the mandible and the maxilla of a patient, is a straightforward possibility which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed;

Re Item VIII

Certain observations on the application

4 The claims are not clear.

4.1 Claims 1, 6 and 11 use words such as "essentially" and "generally" which introduce ambiguity since the meaning is not sufficiently clear in the context of the application read as a whole. The use of such words suggest that deviations are included which are larger than those accepted tolerances, and hence the wording becomes vague and undefined.

4.2 Claims 3, 4, 5, 7, 8, 10 and 15 contain expressions like "preferably" and "more preferably" which also introduce ambiguity. Expressions of this kind have no limiting effect on the scope of a claim; that is to say, the feature following any such expression is to be regarded as entirely optional.

4.3 Claim 16 does not meet the requirement of clarity because the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the *technical* features necessary for achieving this result.