



- (51) International Patent Classification:
A61B 17/70 (2006.01)
- (21) International Application Number:
PCT/IB2010/055379
- (22) International Filing Date:
23 November 2010 (23.11.2010)
- (25) Filing Language: Italian
- (26) Publication Language: English
- (72) Inventor; and
(71) Applicant : CALVOSA, Giuseppe [IT/IT]; Via Giovanni
Randaccio 24, I-56123 Pisa (IT).
- (72) Inventors; and
(75) Inventors/Applicants (for US only): BARTALESI,
Raphael [IT/IT]; Via Dante Alighieri, 14, I-50122 Firenze
(FI) (IT). TENUCCI, Miria [IT/IT]; Via Teodoro Bor-
gognoni, 117, I-55100 Lucca (LU) (IT).
- (74) Agents: PAPA, Elisabetta et al.; Società Italiana Brevetti
S.p.A., Piazza di Pietra 39, I-00186 Roma (IT).
- (81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG,
SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ,
UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG,
ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: INTERSPINOUS VERTEBRAL DISTRACTOR

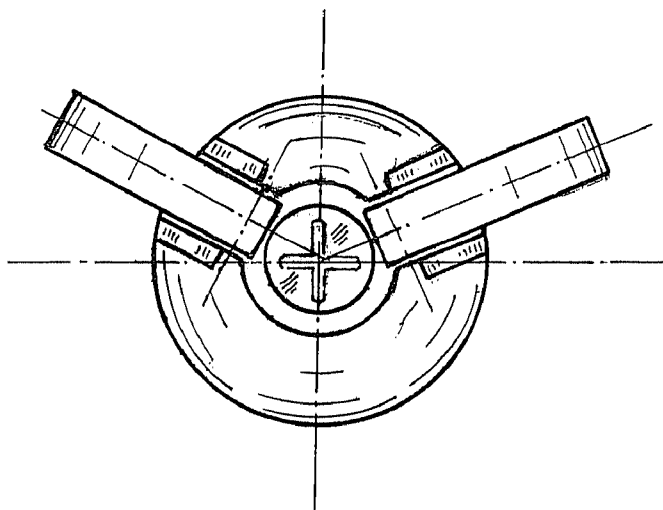


FIG.4A

(57) Abstract: An interspinous distractor (1) of interspinous type, comprising: - a distraction main body (2), apt to be inserted between two adjacent spinous processes to provide a corresponding support; and - a first (31, 32) and a second (33, 34) pair of lateral stabilizers, rotatably connected to the main body (2), which pairs are arranged respectively in correspondence of or near to a first and a second end of the latter, the stabilizers of each pair being able to assume a spread apart configuration projecting with respect to the main body (2) so as to be able to engage from a respective side the spinous apophyses, holding in position the main body (2) itself, wherein, in said projecting configuration, each stabilizer has a tilt (α) with respect to the frontal plane that is equal to about 30 degrees (Figure 4A).



- 1 -

INTERSPINOUS VERTEBRAL DISTRACTOR**DESCRIPTION**

5 The present invention refers to an intervertebral distractor of interspinous type suitable for a percutaneous insertion, and in particular to a distractor of the type comprising a double pair of lateral stabilizers, applied on a main body and preferably selectively spreadable apart with respect to the latter to hold the body itself in position between two adjacent spinous processes.

10 Intervertebral distractors are devices apt to space apart two adjacent vertebrae. In particular, the distractors subject-matter of the present invention are prostheses conceived to be permanently implanted in the space comprised between the spinous processes of adjacent vertebrae, in order to maintain an intervertebral distraction such as to limit the loads transmitted between said vertebrae by effect, e.g., of degenerative
15 pathologies of the intervertebral discs, and to contain the associated painful manifestations.

With respect to other vertebral prostheses, the interspinous distractors can be easily inserted in their seat, thanks to the relative ease with which the spinous processes of two adjacent vertebrae allow slight spreading apart.
20 For the same reason, such distractors do not compromise local mobility of the rachis in flexion, but reduce hyperextension thereof.

Against such advantages, however, known stabilization problems subsist. In fact, the distractor has to be maintained in position, in particular has to be constrained with respect to displacements such as to compromise its
25 functionality or even cause its ejection from the seat, with movements in the frontal plane of the patient. Such a stabilization function is generally carried out by lateral fins of the distractor, apt to abut on the spinous apophyses.

However, such fins risk damaging the surrounding bone and joint tissues, especially in the presence of specific pathologies.

30 Therefore, the technical problem set and solved by the present invention is that of providing an intervertebral distractor of the above-mentioned type, allowing to overcome the drawbacks mentioned above with reference to the known art.

- 2 -

Such a problem is solved by an intervertebral distractor according to claim 1. Preferred features of the present invention are set forth in the dependent claims thereof.

5 In the present context – and coherently with the current anatomical terminology – by “*frontal plane*” (or “*coronal plane*”) is meant a plane which runs parallel to the forehead (or to the coronal suture) of the subject.

The present invention provides some relevant advantages. One of the main advantages lies in the fact that in the distractor of the invention the tilt of the stabilizers with respect to the frontal plane, i.e. the deployment thereof not on
10 an exactly vertical plane but on an oblique plane, allows a moving away from the anatomical frontal plane where there are, to the right and left of the spinous processes, the corresponding articular processes of the vertebral level concerned.

The moving away of the lateral stabilizers of the distractor of the invention
15 from the articular saliences (prominences) is particularly advantageous in case of degenerative pathologies in which the articular processes are arthrosic and hypertrophic.

The distractor of the invention therefore allows a movement among the muscles of the stabilizers, to overcome any conflict with the articular bone
20 plane.

Other advantages, features, and the operation steps of the present invention will be made apparent in the following detailed description of some embodiments thereof, given by way of example and not for limitative
25 purposes. Reference will be made to the figures of the annexed drawings, wherein:

- Figure 1 shows a perspective view of a preferred embodiment of the intervertebral distractor of the invention, in a first inserting configuration for insertion into a patient's body, in which the lateral stabilizers are
30 closed;
- Figure 1A shows a perspective view of the distractor of Figure 1, in which two lateral protective shells have been removed for greater clarity;
- Figure 2 shows a front view of the distractor of Figure 1, again with two

lateral shells removed;

- Figure 3 shows a longitudinal sectional view of the distractor of Figure 1;
- Figures 3A and 3B show each another longitudinal sectional view of the distractor of Figure 1, in a respective intermediate configuration for opening the distal stabilizers with respect to the surgeon;
- Figure 4 shows a perspective view of the distractor of Figure 1, in a second configuration for holding *in situ* into a patient's body, in which the lateral stabilizers are spread apart;
- Figure 4A shows a side view of the distractor of Figure 4, from the distal side thereof;
- Figure 5 shows a front view of the distractor of Figure 1, in the configuration of Figure 4, with two lateral shells removed;
- Figure 6 shows a longitudinal sectional view of the distractor of Figure 1, in the configuration of Figure 4;
- Figure 7 shows a perspective view of a variant embodiment of the distractor of the invention, in a further extracting configuration in which the lateral stabilizers arranged proximally with respect to the surgeon's position are further spread apart, and those arranged distally are closed; and
- Figure 8 shows a longitudinal sectional view of the distractor of Figure 7.

Referring initially to Figures 1, 1A, 2 and 3, an intervertebral distractor of interspinous type according to a preferred embodiment of the invention is generally denoted by 1.

- 25 The distractor 1 has a generally tapered configuration, fostering a percutaneous insertion thereof.

The distractor 1 comprises first of all a main body 2, apt to be inserted between two adjacent spinous processes to provide a corresponding support. In the present embodiment, the body 2 has a substantially elongated configuration with generally substantially elliptic cross sections. The body 2 bears, topwise and bottomwise, a respective depression or concavity 21, 22, substantially forming a saddle, apt to foster its own

30

- 4 -

stabilization *in situ* between two spinous processes. It will be understood that in the present context the definitions of "top" and "bottom" are referred to the position of the distractor 1 when used *in situ* with the subject in standing position.

5 The main body 2 has a longitudinal axis denoted by A.

The main body 2 is implemented in two portions, respectively 23 and 24, slidably coupled to each other according to modes that will be detailed hereinafter. For greater clarity, such two portions 23 and 24 will be denoted respectively as first and second portion, or respectively as distal and proximal portion. These latter two terms are to be understood, here and hereinafter, as referred to the position of the distractor 1 with respect to the surgeon during insertion into a patient's body.

The first portion 23, of greater extension, has a tubular prolongation, or appendage 25, with a substantially cylindrical development, extending symmetrically along the longitudinal axis A and engaging a corresponding seat of the second portion 24.

As will be illustrated hereinafter, such tubular appendage 25 implements an abutment means against the means for spreading apart (retractors) that will be described hereinafter.

20 To the second portion 24 of the body 2 it is also integrally associated a substantially C-shaped member 28, implementing a means for stopping a rod of the distractor, rod which will it also be introduced hereinafter.

Moreover, the main body 2 bears, in correspondence of or near to a first longitudinal end thereof associated to the above-mentioned first portion 23, two pairs of flanges 26 for coupling with lateral stabilizers that will be described below. An analogous double pair of flanges 26 is provided in correspondence of or near to the second longitudinal end of the body 2 associated to the second portion 24 thereof.

Moreover, in correspondence of each of said first and second end, the main body 2 has a pair of protective shells transversally placed side by side, denoted by 27, which have a configuration tapered in the direction of the longitudinal axis A, thereby fostering the percutaneous insertion of the distractor 1.

The first portion 23 of the body 2 bears also a pair of pins 29 integral to one

- 5 -

of said shells 27 and internally projecting therefrom, the function of which will be made clear hereinafter.

As seen, e.g., in Figure 2, in the present embodiment the first portion 23 is in turn formed by a frame 230 bearing the above-mentioned appendage 25, the shells 27, the pins 29 and the flanges 26, and by a distractor body 233
5 bearing the saddles 21 and 22, arranged externally to the frame 230 itself and integral therewith. Preferably, the frame 230 is made of Titanium, whereas the distractor body 233 is made of PEEK.

The distractor 1 further comprises a first - distal - pair of stabilizers, denoted
10 by 31 and 32, and a second - proximal - pair of stabilizers, denoted by 33 e 34, associated respectively to said first and second portion 23, 24 of the distractor 1. In particular, each stabilizer 31-34 is rotatably connected to the respective portion 23, 24 of distractor in correspondence of a flange 26 thereof. More specifically, each stabilizer 31-34 is hinged on said flange in
15 correspondence of an end thereof.

Each stabilizer 31-34 has a substantially elongated, curved fin-like configuration, with a first convex profile and a corresponding concave profile. By way of example, the convex profile of the proximal stabilizer 33 is denoted by 331, and the concave one by 332.

The rotatable connection with the main body 2 enables the stabilizers 31-34
20 of each pair to rotate between a first closed position, shown in Figure 1, in which they implement a minimal encumbrance configuration, fostering a percutaneous insertion of the distractor 1 into a patient's body, and a second opened configuration, shown in Figure 4, in which they are spread apart so
25 as to be able to engage from a respective side the spinous apophyses, holding *in situ* the main body 2.

As shown in Figures 1, 1A, 2 and 3, the overall arrangement is such that in the closed configuration the stabilizers 31 and 32 of the first pair have their own concave profile facing towards the main body 2, i.e. giving onto axis A,
30 and the stabilizers 33 and 34 of the second pair have instead their own convex profile in such position.

On the contrary, in the spread apart configuration of Figures 4, 5 and 6, the stabilizers 33 and 34 of the second pair have, in general, their own concave profile facing towards the main body 2, i.e. giving onto axis A.

- 6 -

As shown in the drawings, preferably the bottom stabilizers 32 and 34 of the two pairs have an extension generally lower than the corresponding top stabilizers 31 and 33 of the same pair. This contrivance allows to prevent interferences of the distractor 1 with the laminae and/or the articular facets of the lower vertebra concerned by the distractor itself. This is particularly useful in case of bone hypertrophies or deformations, scoliosis, and in the case of vertebral levels comprised in the range L5-S1.

As best seen in Figure 4A, according to the invention each stabilizer has a tilt with respect to the frontal plane. By way of example, in Figure 4A such tilt is denoted by α for the stabilizer 31.

Preferably, for each stabilizer 31-34 the above-mentioned tilt is comprised in a range of about 8-35 degrees. In an even more preferred embodiment, such tilt is equal to about 30 degrees.

While in the present embodiment all four stabilizers 31-34 provide the above-mentioned tilt with respect to the frontal plane, variant embodiments may provide a subgroup, and at least only one of the stabilizers present, to have the above-mentioned tilt; this always in order to locally solve the technical problem set forth in the introduction.

Turning to the embodiment disclosed in the figures described hereto, the distractor 1 further comprises an elongated element, or rod, generally denoted by 4, percutaneously actuatable to cause the passage of the stabilizers 31-34 from the first to the second configuration illustrated above.

Such rod 4 is housed within the main body 2, and in particular within the frame 230, in correspondence of the longitudinal axis A and slidably coupled to such body 2, so that the related movement be carried out precisely along such axis A. In particular, the rod 4 extends within the first and the second portion 23 and 24 of the body 2, engaging also the above-mentioned tubular appendage 25 of the first portion 23.

In the present example, the slidable coupling is of screw-nut screw threaded type, the rod 4 bearing, in correspondence of its own distal portion, a threading 41 complementary to a corresponding nut screw threading 231 obtained internally to the first portion 23.

The rod 4 further has, in correspondence of a distal end thereof, spreading means for spreading apart the stabilizers 31 and 32 of the first pair, which in

- 7 -

the present embodiment are implemented by a shaped profile 42 apt to form a shape coupling with such stabilizers 31 and 32 so as to cause precisely, when needed, the spreading apart.

5 Always in the present example, the shaped profile 42 of the rod 4 is of cam type. In particular, the shaped profile 42 is of concave type and the stabilizers 31 and 32 of the first pair have, in correspondence of the rotatable connection to the main body 2, a corresponding convex profile 30 conjugated with the concave profile 42.

10 Moreover, the rod 4 has, substantially oppositely to the shaped profile 42, means for coupling with a percutaneously actuatable manipulation instrument. In the present example, such means is implemented by a further shaped profile 43, obtained on a head 44 and apt to be engaged by a screwdriver instrument. To a technician in the field it will be obvious that the end 44 may have other forms of coupling for the actuation instrument.

15 The rod 4 may also be made hollow in order to allow, e.g., the insertion of a guide wire or the like.

The above-mentioned member 28 also increases the rigidity of the rod 4, limiting its flexure.

20 Hereinafter, the operation of the distractor 1 will be described with regard to the passage of the stabilizers 31-34 from the first to the second position illustrated above.

25 At the percutaneous insertion of the distractor 1, the latter appears in closed configuration, as shown in Figures 1, 1A, 2 and 3. The stabilizers are therefore rotated into a minimal encumbrance position, with their own convex/concave profiles arranged as already described above.

30 The rod 4 appears in a position maximally set back in the proximal direction. In particular, its concave profile 42 engages the complementary convex profile 30 of the stabilizers 31 and 32 of the first pair, so that said stabilizers may assume the above-mentioned closed position. In the maximally set back position, the concave profile 42 is such as to oppose to an accidental opening up of the stabilizers 31 and 32, opening up that the tissues might cause during an insertion of the device.

The percutaneous insertion of the distractor can occur by cannula and/or guide wires according to procedures already known to the technician in the

- 8 -

field, or to innovative procedures subject of a separate patent application.

During such insertion, the main body 2 can be held by engagement of a dedicated instrument into suitable lateral seats of the second portion 24, one of which is exemplarily denoted by 241 in Figure 1. Concomitantly, the advancement of the distractor may be obtained by acting with a conventional instrument on the head 44 of the rod 4.

Once completed the actual inserting step, the main body 2 is housed between two adjacent spinous processes. Then, the rod 4 is percutaneously actuated by a screwdriver instrument in order to produce the selective spreading apart of the stabilizers 31-34, and this according to the procedure illustrated hereinafter.

First of all, the rod 4 is slid along the longitudinal axis A of the main body 2 in a distal direction, as per arrow reported in Figure 3. In such movement, the rod slides with respect to both portions 23 and 24 of the main body 2, which therefore remains stationary. Following such sliding, the concave profile 42 of the rod 4 engages the corresponding convex profile 30 of the latter stabilizers 31 and 32 so as to cause their spreading apart, as shown in Figure 3A.

The further sliding therefore causes the full spreading apart of the stabilizers 31 and 32, shown in Figures 4 to 6. In such a spread apart configuration, such stabilizers are externally abutted on the lateral spinous apophyses, preventing movement of the distractor 1 in the proximal direction. As shown in Figures 5 and 6, further distal movement of the rod 4 is prevented, always in the configuration considered herein, by the engagement of the concave profile 42 thereof with the pins 29, implementing therefore means for the distal stopping of the rod itself.

Always in the fully spread apart configuration of the stabilizers 31 and 32, the head 44 of the rod 4 is abutted against the stopping means 28 associated to the second portion 24 of the body 2. Such means 28 is therefore it also apt to cause the stopping of the distal movement of the rod 4.

In the configuration presently considered, a further rotation of the screwdriver instrument engaging the rod 4 causes a reversion of the related motion, in the sense of producing the sliding in the proximal direction of the first portion 23 of the main body 2 with respect to the rod 4 itself and to the second

portion 24, as indicated by the arrow reported in Figure 6. Therefore, such proximal sliding causes the approaching of the tubular appendage 25 to the stabilizers 33 and 34 of the second pair, the subsequent abutting of the former on corresponding convex profiles of the latter, and then the spreading
5 apart thereof shown in Figures 4 to 6.

In the completely spread apart position, the first and the second portion 23 and 24 of the main body are abutted against each other, forming one body.

Upon reaching such spreading apart, the stabilizers 33 and 34 of the second pair are abutted on the spinous apophyses contralateral with respect to
10 those of the first pair 31, 32.

Incidentally, it has to be noted that during the insertion of the distractor and the opening up of the distal stabilizers 31 and 32 it is not possible to accidentally open the proximal ones 33 and 34, as these are retained by the cannulation. Only when the distal stabilizers 31 and 32 have opened up, the
15 cannula is slightly unthreaded and the opening up of the proximal stabilizers is allowed.

By now, it will be better appreciated that the rod 4 allows a reversible spreading apart of the stabilizers 31-34, in the sense of allowing, by reversing the hereto-described procedure, the reclosing thereof.

20 It will also be appreciated that the arrangement described allows an independent spreading of the stabilizers of the first pair with respect to those of the second pair (and vice versa).

Moreover, it should be noted that the arrangement described allows a continuous change of the position of the stabilizers of the two pairs.

25 It will also be appreciated that a single instrument, in the case considered herein a screwdriver, is required to perform the spreading apart of both pairs of stabilizers.

Furthermore, the technician in the field will appreciate that it is possible to provide, in combination with the hereto-described components of the
30 distractor, also specific means for holding one or more stabilizers in the above-described extreme spread apart and closed positions, means that can be disengaged when needed.

Referring to Figures 7 and 8, on the basis of a variant embodiment it is

- 10 -

provided that the stabilizers 33 and 34 of the second pair may rotate with respect to the main body 2 of an angle greater than about 90 degrees, and in particular preferably of an angle comprised in a range of about 120-180 degrees.

- 5 Such increased angle is advantageous since it is possible, when it is necessary to extract the distractor 1, to bring said stabilizers 33 and 34 into a further minimal encumbrance configuration in which they are substantially “upturned” on the distractor body 233 and expose their convex profile so as to facilitate the extraction itself.
- 10 Therefore, overall the stabilizers of the first pair may be continuously rotated among three reference positions; specifically, a closed position of insertion, a spread apart position of holding *in situ* and a further spread apart extracting position. The stabilizers of the first pair can be rotated between the first two positions mentioned above.
- 15 The present invention has been hereto described with reference to preferred embodiments thereof. It is understood that other embodiments might exist, all falling within the concept of the same invention, as defined by the protective scope of the claims hereinafter.

CLAIMS

1. An intervertebral distractor (1) of interspinous type, comprising:
- a distraction main body (2), apt be inserted between two adjacent spinous processes to provide a corresponding support; and
 - 5 - a first (31, 32) and a second (33, 34) pair of lateral stabilizers, connected to said main body (2) and arranged respectively in correspondence of or near to a first and a second end of said main body (2), the stabilizers of each pair having or being able to assume a spread apart configuration projecting with respect to said main body (2)
 - 10 so as to be able to engage from a respective side the spinous apophyses, holding in position said main body (2),
- wherein, in said projecting configuration, at least one of said stabilizers has a tilt (α) with respect to the frontal plane.
2. The intervertebral distractor (1) according to claim 1, wherein said tilt (α) is
- 15 comprised in a range of about 8-35 degrees.
3. The intervertebral distractor (1) according to the preceding claim, wherein said tilt (α) is comprised in a range of about 10-30 degrees.
4. The intervertebral distractor (1) according to claim 2 or 3, wherein said tilt (α) is equal to about 30 degrees.
- 20 5. The intervertebral distractor (1) according to any one of the preceding claims, wherein each stabilizer of said pairs is movable with respect to said main body (2) between a closed position, in which the stabilizers of the pair implement a minimal encumbrance configuration, fostering a percutaneous insertion of the distractor into the patient's body, and said projecting spread
- 25 apart configuration.
6. The intervertebral distractor (1) according to the preceding claim, wherein the stabilizers (31, 32) of said first pair have each a concave profile that is facing, in said closed position, towards said main body (2).
7. The intervertebral distractor (1) according to claim 5 or 6, wherein the
- 30 stabilizers (33, 34) of said second pair have each a convex profile that is facing, in said closed position, towards said main body (2).
8. The intervertebral distractor (1) according to any one of the claims 5 to 7,

wherein each stabilizer of said pairs is rotatably connected to said main body (2).

9. The intervertebral distractor (1) according to the preceding claim, wherein the stabilizers (31-34) of said pairs are hinged on said main body (2) in
5 correspondence of respective ends.

10. The intervertebral distractor (1) according to any one of the claims 5 to 9, wherein the stabilizers (33, 34) of said second pair are apt to assume a third, further spread apart, extracting position.

11. The intervertebral distractor (1) according to the preceding claim,
10 wherein the stabilizers (33, 34) of said second pair are rotatably connected to said main body (2) and apt to rotate with respect to said main body (2) of an angle greater than about 90 degrees, so as to take a further minimal encumbrance configuration.

12. The intervertebral distractor (1) according to the preceding claim,
15 wherein said angle of rotation is comprised in a range of about 120-180 degrees.

13. The intervertebral distractor (1) according to any one of the claims 5 to 12, comprising actuation means (4) percutaneously actuatable and apt to cause, when required, the spreading apart of the stabilizers (31, 32) of said
20 first and/or second pair.

14. The intervertebral distractor (1) according to the preceding claim, wherein the overall arrangement is such as to cause a continuous change of the position of the stabilizers (31-34) of said pairs.

15. The intervertebral distractor (1) according to claims 13 or 14, wherein
25 the overall arrangement is such as to cause an independent spreading apart of the stabilizers respectively of said first (31, 32) and second (33, 34) pair.

16. The intervertebral distractor (1) according to any one of the claims 13 a 15, wherein said actuation means is percutaneously actuatable and have spreading means (42) apt to cause, when required, a spreading apart of the
30 stabilizers (31, 32) of said first pair.

17. The intervertebral distractor (1) according to the preceding claim, wherein said spreading means comprises a shaped profile (42) apt to form a shape coupling with the stabilizers (31, 32) of said first pair.

18. The intervertebral distractor (1) according to the preceding claim, wherein said shaped profile (42) is of cam type.
19. The intervertebral distractor (1) according to claim 17 or 18, wherein said shaped profile (42) is of concave type and the stabilizers (31, 32) of said first pair have a corresponding convex profile (30) conjugated with said concave profile.
20. The intervertebral distractor (1) according to any one of the claims 13 to 19, wherein said main body (2) comprises a first (23) and a second (24) portion slidably coupled and bearing respectively said first (31, 32) and second (33, 34) pair of stabilizers, the overall arrangement being such that the actuation of said actuating means (4) causes a relative sliding between said first (23) and second (24) portion which in turn produces the spreading apart of the stabilizers (33, 34) of said second pair.
21. The intervertebral distractor (1) according to any one of the claims 13 to 20, wherein said actuation means comprises an elongated element (4) slidably coupled with said main body (2).
22. The intervertebral distractor (1) according to the preceding claim, wherein said elongated element (4) is movable within said main body (2) along a longitudinal axis (A) of the latter.
23. The intervertebral distractor (1) according to any one of the preceding claims, wherein a stabilizer (32, 34) of each of said pairs has an extension lower than the other stabilizer (31, 33) of the same pair.

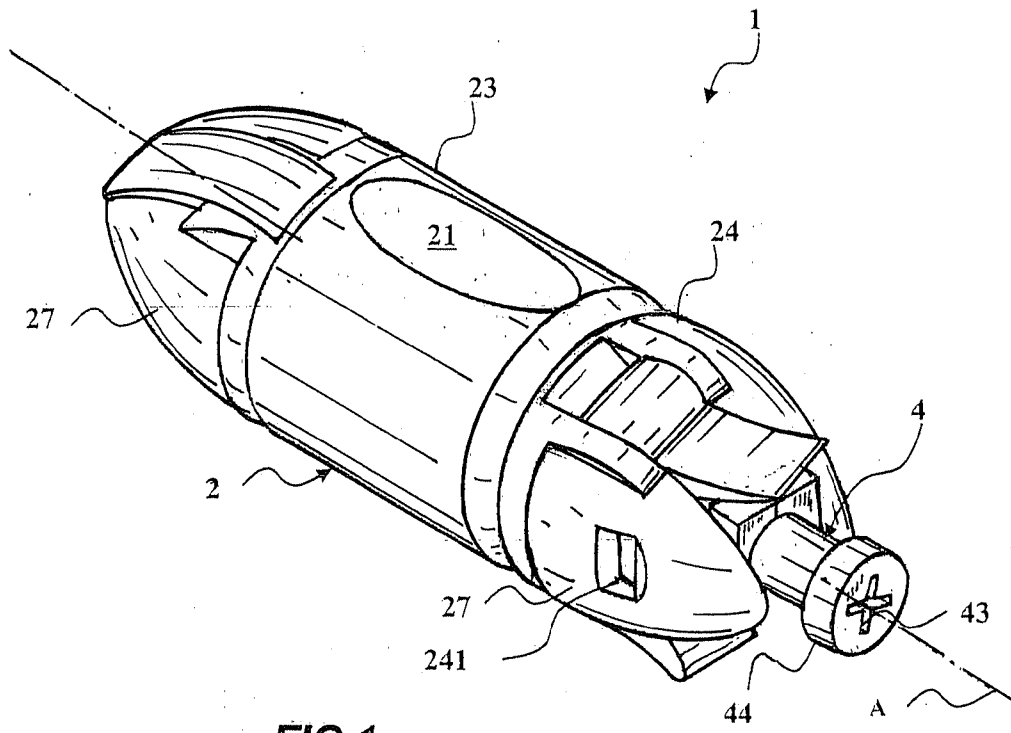


FIG. 1

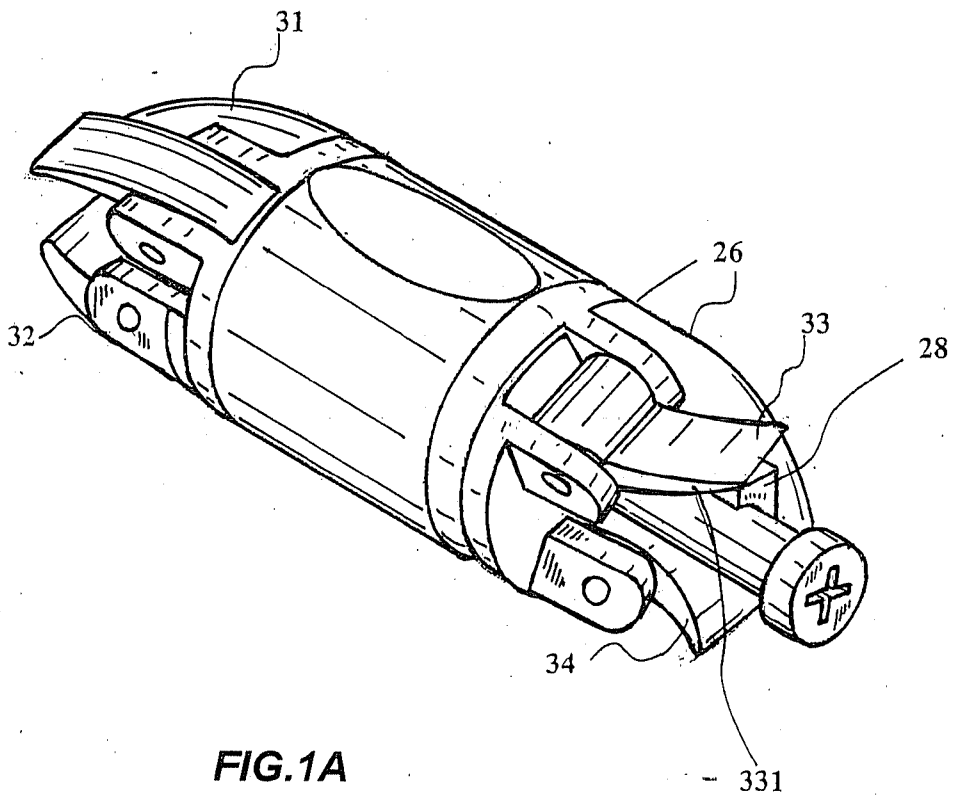


FIG. 1A

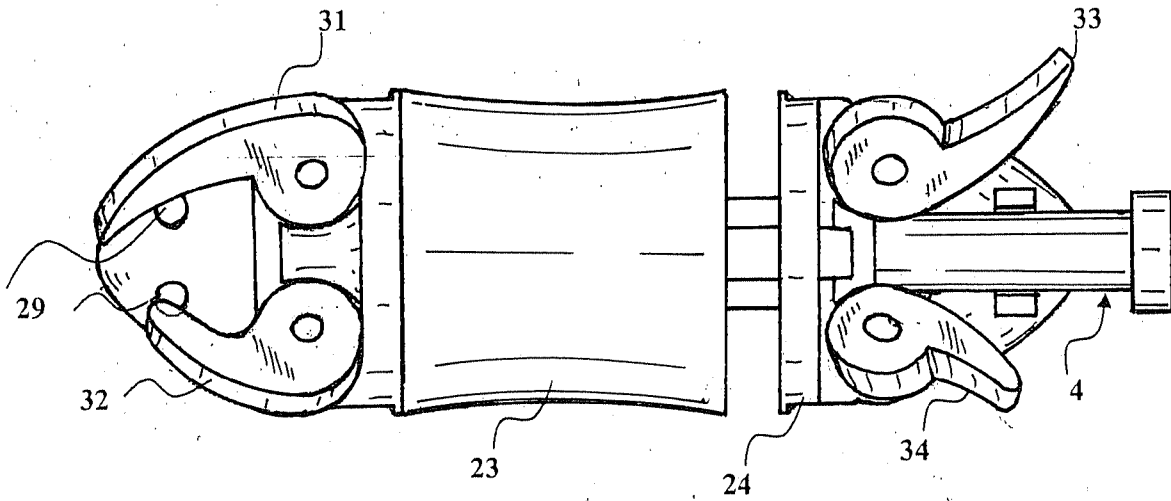


FIG. 2

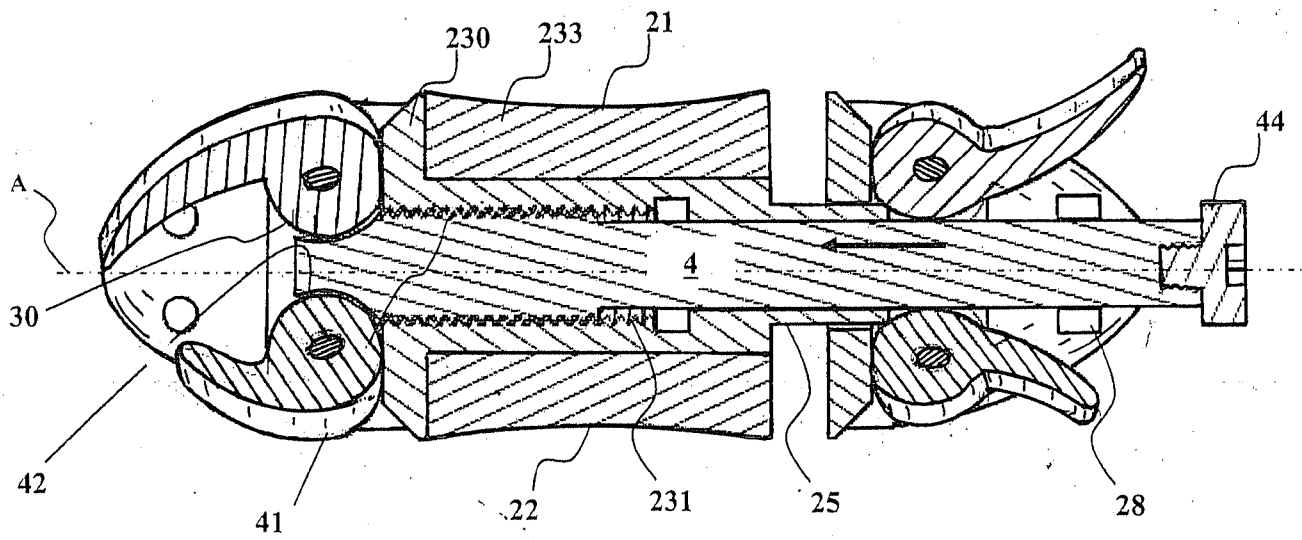


FIG. 3

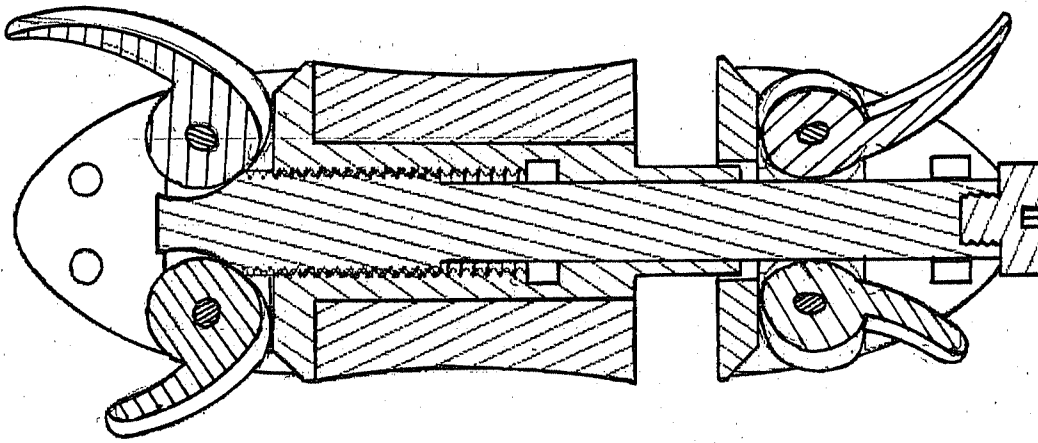


FIG. 3A

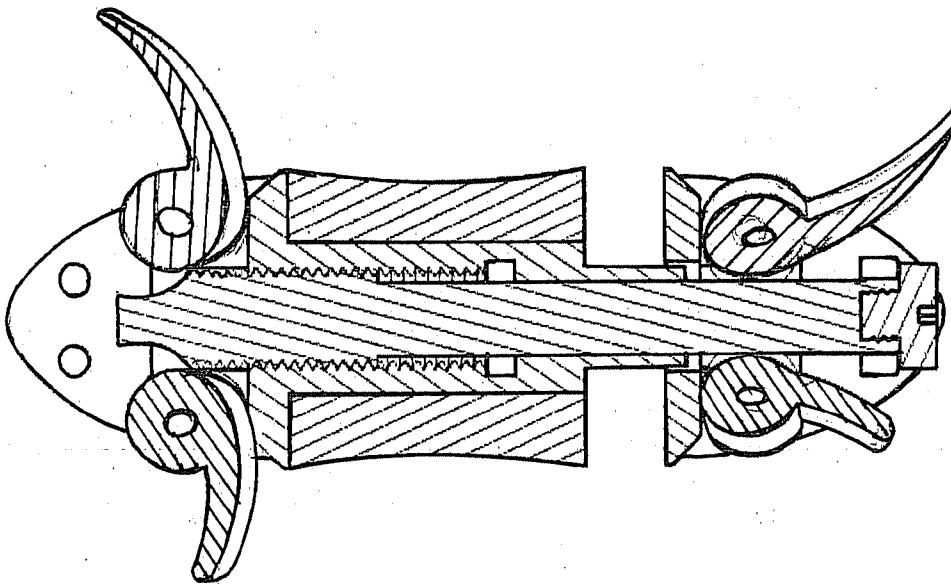


FIG. 3B

4/6

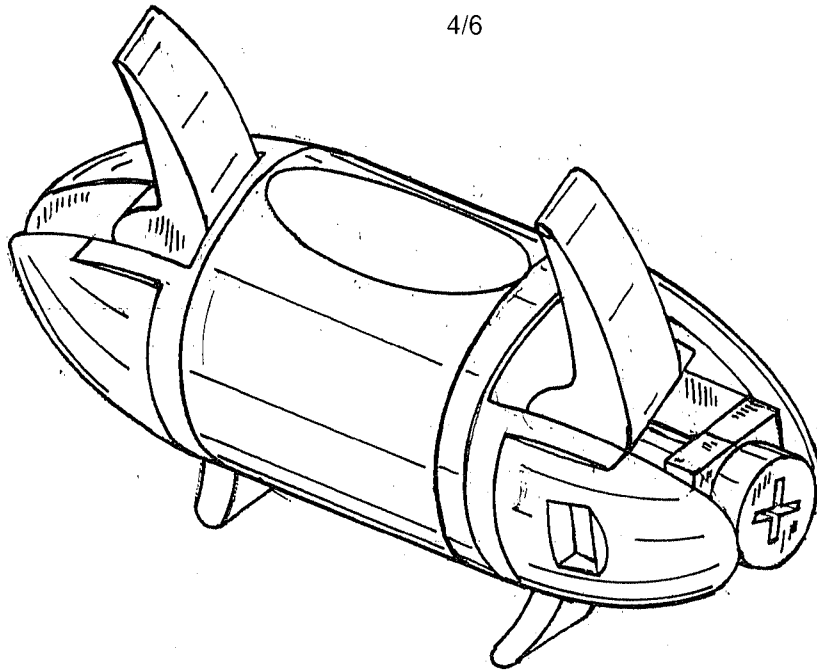


FIG. 4

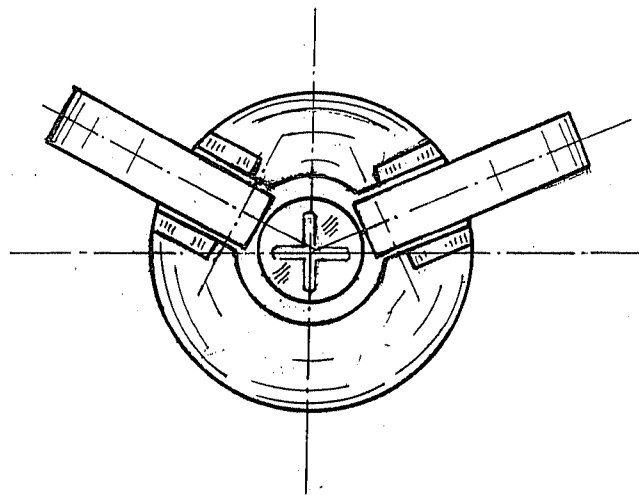


FIG. 4A

5/6

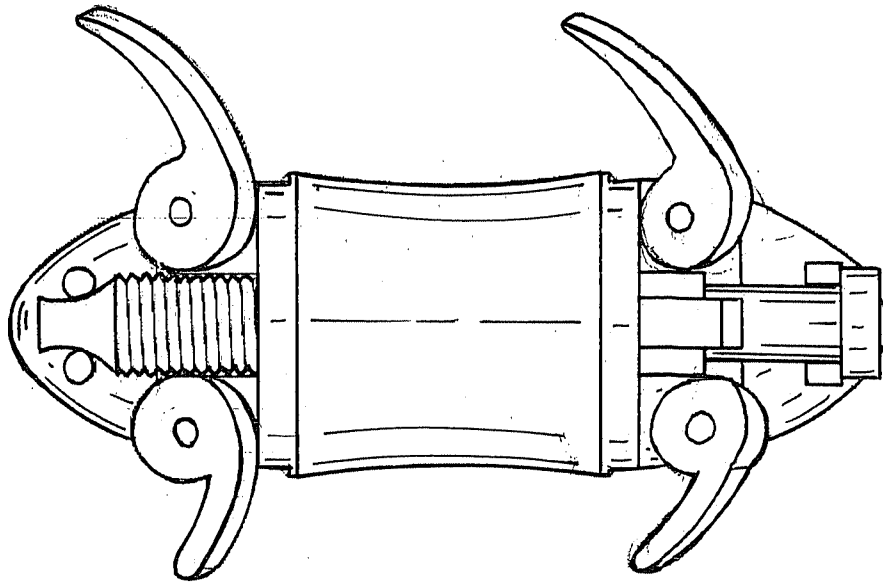


FIG. 5

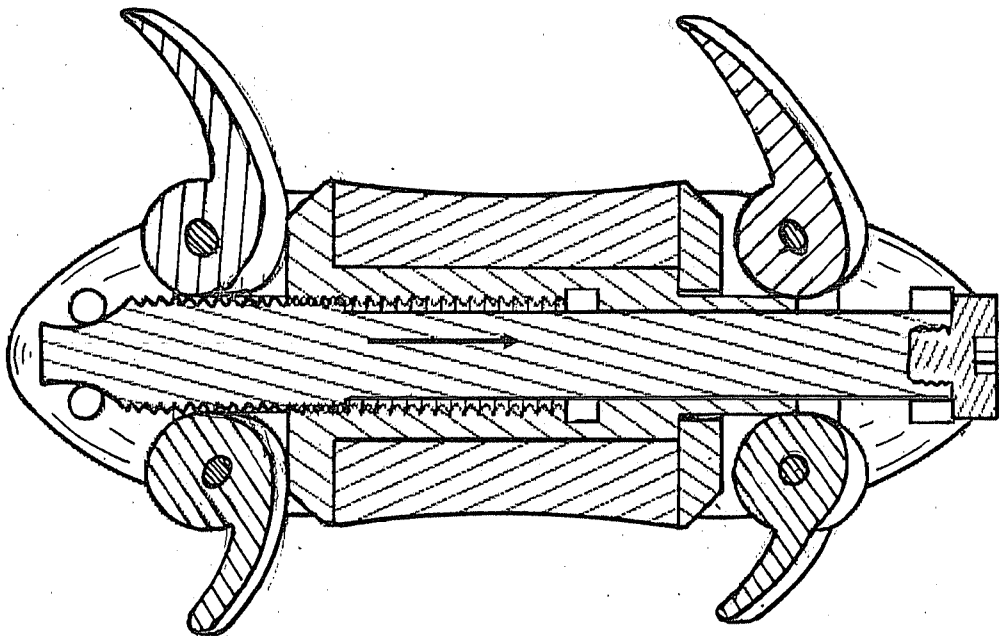


FIG. 6

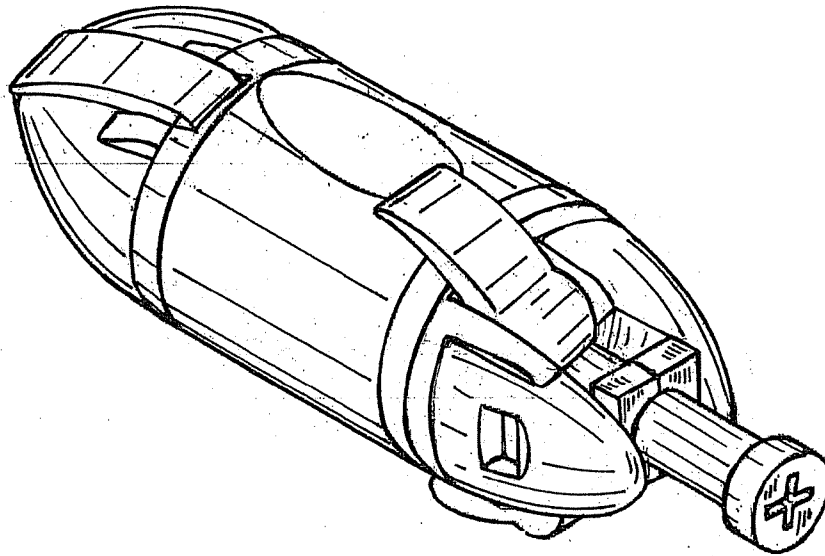


FIG. 7

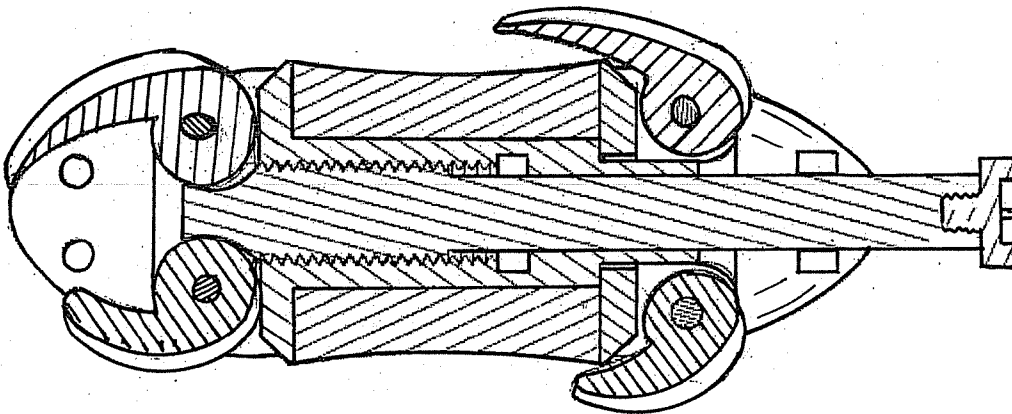


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No PCT/IB2010/055379

A. CLASSIFICATION OF SUBJECT MATTER INV. A61B17/70 ADD.				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) A61B				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 2007/075788 A (VERTIFLEX INC [US]; ALTARAC MOTI [US]; TEBBE SHAWN [US]; FLAHERTY CHRI) 5 July 2007 (2007-07-05) figures 22a-27,29a-33c,41-46 paragraphs [0128] - [0130], [0142] - [0155]	1-5, 8-10, 13-16, 20-23		
X	US 2007/032790 A1 (ASCHMANN FELIX [CH] ET AL) 8 February 2007 (2007-02-08) figures 1-20,38-41 paragraphs [0055] - [0067], [0089] - [0094]	1-10,13, 14,16-22		
----- -/--				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.</td> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> See patent family annex.</td> </tr> </table>			<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.			
* Special categories of cited documents :				
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family			
Date of the actual completion of the international search <div style="text-align: center; font-weight: bold;">15 August 2011</div>	Date of mailing of the international search report <div style="text-align: center; font-weight: bold;">23/08/2011</div>			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer <div style="text-align: center; font-weight: bold;">Stach, Rainer</div>			

INTERNATIONAL SEARCH REPORT

International application No PCT/IB2010/055379

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>US 2008/108990 A1 (MITCHELL STEVEN T [US] ET AL) 8 May 2008 (2008-05-08)</p> <p>figures 1-2b,9a,9b paragraphs [0034] - [0037], [0039], [0044], [0054], [0055]</p> <p align="center">-----</p>	<p>1-5, 7-10, 13-16, 20-22</p>
X	<p>US 2007/225807 A1 (PHAN CHRISTOPHER U [US] ET AL) 27 September 2007 (2007-09-27)</p> <p>figures 1-10,17-23,37-48 paragraphs [0118] - [0129], [0164] - [0171]</p> <p align="center">-----</p>	<p>1-6,8, 10, 13-16, 20-22</p>
A	<p>US 2006/264938 A1 (ZUCHERMAN JAMES F [US] ET AL) 23 November 2006 (2006-11-23)</p> <p align="center">-----</p>	<p>1</p>
X	<p>WO 2009/098536 A (CALVOSA GIUSEPPE [IT]; BARTALESI RAPHAEL [IT]; TENUCCI MIRIA [IT]) 13 August 2009 (2009-08-13) claims 1-5,8,11-16; figures page 21, line 17 - page 24, line 12 page 29, line 1 - page 31, line 18</p> <p align="center">-----</p>	<p>1,5-19, 23</p>

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/IB2010/055379

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
WO 2007075788	A	05-07-2007	NONE	

US 2007032790	A1	08-02-2007	AU 2006278462 A1	15-02-2007
			BR PI0614139 A2	09-03-2011
			CA 2617545 A1	15-02-2007
			EP 1945117 A2	23-07-2008
			JP 2009502444 A	29-01-2009
			WO 2007019391 A2	15-02-2007

US 2008108990	A1	08-05-2008	AU 2007317512 A1	15-05-2008
			EP 2094176 A2	02-09-2009
			WO 2008057838 A2	15-05-2008

US 2007225807	A1	27-09-2007	AU 2008232900 A1	09-10-2008
			CN 101674788 A	17-03-2010
			EP 2134299 A2	23-12-2009
			JP 2010522615 A	08-07-2010
			KR 20100016022 A	12-02-2010
			WO 2008121613 A2	09-10-2008

US 2006264938	A1	23-11-2006	AU 2006227185 A1	28-09-2006
			CA 2599459 A1	28-09-2006
			EP 1861046 A2	05-12-2007
			KR 20080031852 A	11-04-2008
			US 2007010813 A1	11-01-2007
			US 2008177272 A1	24-07-2008
			WO 2006102269 A2	28-09-2006

WO 2009098536	A	13-08-2009	EP 2249726 A1	17-11-2010
			KR 20100123709 A	24-11-2010
			US 2011046674 A1	24-02-2011
