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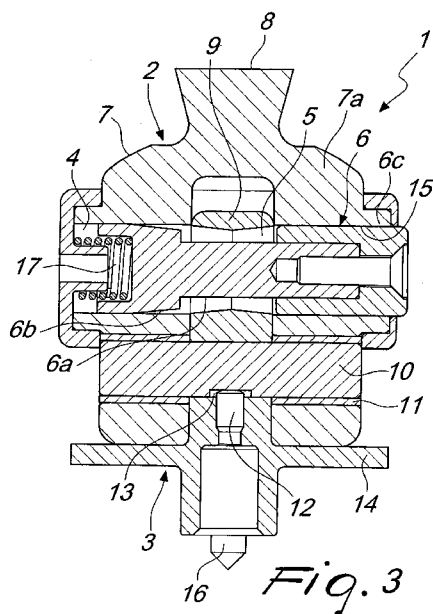
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(54) Title: PROSTHESIS JOIN, PARTICULARLY OF THE TYPE OF AN ANKLE



(57) Abstract: A prosthesis joint, particularly of the type of an ankle, which comprises at least one first member (2) which can be associated with a first prosthesis structure of a patient, and at least one second member (3), which can be associated with a second prosthesis structure of the patient. The second member (3) is articulated to the first member (2) about an axis of rotation. The first member (2) and the second member (3) respectively comprise at least one cavity (4) and at least one eyelet (5) for the at least partial accommodation of a contoured pin (6), which is arranged transversely to the rotation of the second member (3) with respect to the first member (2). The contoured pin (6) can move selectively between at least two limit positions: in the first limit position the contoured pin (6) is arranged, by interference, so as to mutually lock the first member (2) and the second member (3), in at least two different configurations of use, and in the second limit position the contoured pin (6) is arranged so as to allow the rotation of the second member (3) with respect to the first member (2), for the passage from one to the other of the two reciprocal configurations, and vice versa.

PROSTHESIS JOINT, PARTICULARLY OF THE TYPE OF AN ANKLE

Technical Field

The present invention refers to a prosthesis joint, particularly of the type of an ankle.

5 Background Art

As is known, following the partial or total loss of a limb or part thereof, it is common to use prostheses, which are components that can substitute the missing limb, thus at least partially restoring the body image and/or the lost functionalities to the patient.

10 In more detail, if a patient is deprived of one (or both) of his or her lower limbs, prostheses are available on the market that substantially replicate the skeletal structure of the foot, and optionally of the ankle, and/or of the leg.

The prosthetic ankle and/or foot can be fixed at the distal end of the
15 prosthesis that substitutes the lost leg, in such a configuration as to position foot and leg in a mutual inclination which allows the patient to walk easily.

This solution is not, however, without drawbacks.

The inclination thus produced, while allowing the patient to walk in an optimal manner, is however entirely unsuitable if the patient wishes to
20 practice sport activities (or the like) of various types, such as for example swimming or skiing.

According to a first possibility, before embarking on such activities, the patient is therefore required to uncouple the foot from the leg, perhaps by acting on the prosthetic ankle, and then proceed to associate a second
25 prosthetic foot with the leg, which is suitably preconfigured to be coupled to such leg according to a different inclination, which is adapted to the discipline that he or she is preparing to practice.

This possibility is obviously uncomfortable in practice, since it requires the patient to transport a second prosthesis and it imposes
30 inconvenient and laborious operations on him or her, in order to substitute

the prosthesis before and after each sporting session.

These drawbacks are partially remedied by a different solution, which uses prosthetic ankles which are fixed to the foot and which can be associated with the prosthetic leg, and which can operate in two different configurations. One of these configurations allows correct walking, while the other is adapted to the performance of various different sporting practices (which are appropriately predefined). The patient can therefore vary the mutual inclination of foot and leg by acting on the prosthetic ankle, in order to then stably lock the parts in the pre-selected configuration (as a function of the activity to be performed) by means of external hooks or other remote actuation devices.

It is precisely the need to use bulky external hooks, in order to ensure the locking and release of the ankle in the two configurations of use, that constitutes a major drawback that limits the application of the device. Indeed, such hooks protrude conspicuously from the leg, in a lateral direction, and therefore, in the first place, they confer an image and profile on the patient which are quite unnatural, thus causing acute discomfort for those who, instead, typically use prostheses to also regain an appearance that is as far as possible similar to that which they would have had with the missing limb.

Furthermore, it must be observed that frequently the patient, precisely in order to perform the sporting activity, makes use of wetsuits or other similar garments, which cover the legs, and often adhere to them. The presence therefore of bulky hooks makes it extremely complex to put on such garments and, if they are worn, it is at the very least uncomfortable for the patient to access the hooks, in order to vary the configuration of the ankle.

Disclosure of the Invention

The aim of the present invention is to solve the above-mentioned drawbacks, by providing a prosthesis joint that allows, in a practical and

comfortable manner, the variation between two different angular configurations of use.

Within this aim, an object of the invention is to provide a prosthesis joint that can be easily used both for walking and for other activities, such
5 as for example sporting practices of various types.

Another object of the invention is to provide a prosthesis joint that is constituted by a low number of simple elements, which can be easily assembled and disassembled.

Another object of the invention is to provide a prosthesis joint that
10 has reduced encumbrances.

A further object of the invention is to provide a prosthesis joint that ensures a high level of reliability in operation.

A further object of the invention is to provide a prosthesis joint that can be easily made from elements and materials that are easily sourced on
15 the market.

A further object of the invention is to provide a prosthesis joint that can be made at low cost and applied safely.

This aim, as well as these and other objects which will become better evident hereinafter, are achieved by a prosthesis joint, particularly of the
20 type of an ankle, that comprises at least one first member which can be associated with a first prosthesis structure of a patient, and at least one second member, which can be associated with a second prosthesis structure of the patient, said second member being articulated to said first member about an axis of rotation, characterized in that said first member and said
25 second member respectively comprise at least one cavity and at least one eyelet for the at least partial accommodation of a contoured pin, which is arranged transversely to the rotation of said second member with respect to said first member, said contoured pin being capable of moving selectively between at least two limit positions, in a first limit position said contoured
30 pin being arranged, by interference, so as to mutually lock said first member

and said second member, in at least two different configurations of use, in a second limit position said contoured pin being arranged so as to allow the rotation of said second member with respect to said first member, for the passage from one to the other of said at least two reciprocal configurations, and vice versa.

Brief description of the drawings

Further characteristics and advantages of the invention will become better apparent from the detailed description that follows of a preferred, but not exclusive, embodiment of the prosthesis joint according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of the prosthesis joint according to the invention, in a first reciprocal configuration of the first member and of the second member;

Figure 2 is a side elevation view of the prosthesis joint in the configuration of Figure 1;

Figure 3 is a sectional view taken along the line III-III of Figure 2;

Figure 4 is a rear view of the prosthesis joint in the configuration of Figure 1;

Figure 5 is a sectional view taken along the line V-V of Figure 4 ;

Figure 6 is a perspective view of the prosthesis joint according to the invention, in a second reciprocal configuration of the first member and of the second member;

Figure 7 is a side elevation view of the first member of the prosthesis joint;

Figure 8 is a rear view of the first member of the prosthesis joint;

Figure 9 is a sectional view taken along the line IX-IX of Figure 8;

Figure 10 is a top view of the first member of the prosthesis joint;

Figure 11 is a sectional view taken along the line XI-XI of Figure 10;

Figure 12 is a side elevation view of the second member of the

prosthesis joint;

Figure 13 is a top view of the second member of the prosthesis joint;

Figure 14 is a sectional view, taken along the line XIV-XIV of Figure 13;

5 Figure 15 is a perspective view of the contoured pin;

Figure 16 is a rear view of the contoured pin;

Figure 17 is a sectional view taken along the line marked XVII-XVII of Figure 16.

Ways of carrying out the invention

10 With reference to the figures, a prosthesis joint according to the invention, generally indicated with the reference numeral 1, comprises at least one first member 2 that can be associated with a first prosthesis structure of a patient, and at least one second member 3, which can in turn be associated with a second prosthesis structure of the patient. The second
15 member 3 is articulated to the first member 2 about an axis of rotation.

As will be better illustrated in the following paragraphs, the prosthesis joint 1 is in particular of the type of an ankle, and it is to this embodiment that constant reference will be made hereinafter. It should however be made clear that the possibility is not excluded, at least within
20 the scope of protection claimed herein, of using the invention for substituting different joints that are lost by the patient as a consequence of traumas or pathologies of various different types.

According to the invention, the first member 2 and the second member 3 respectively comprise at least one cavity 4 and at least one eyelet
25 5 for the at least partial accommodation of a contoured pin 6, which is arranged transversely to the rotation of the second member 3 with respect to the first member 2.

The contoured pin 6 can move selectively between at least two limit positions: in the first limit position the contoured pin 6 is arranged, by
30 interference, so as to mutually lock the first member 2 and the second

member 3, in at least two different configurations of use (shown respectively in Figures 1 and 6). The patient can therefore rely on the stability of the coupling and of the specific reciprocal configuration, which is assumed by the second member 3 with respect to the first member 2, since
5 the prosthesis joint 1 acts as a rigid coupling between them.

In the second limit position, shown in Figure 3, the contoured pin 6 is arranged so as to allow the rotation of the second member 3 with respect to the first member 2: in this arrangement, the prosthesis joint 1 thus allows the movement of the second prosthesis structure with respect to the first, in
10 order to pass in a practical and easy manner from one to the other of the at least two reciprocal configurations, and vice-versa.

According to the preferred embodiment, cited for the purposes of non-limiting illustration of the application of the invention, the first member 2 is substantially constituted by a cap 7 which preferably simulates, as
15 previously mentioned, a human ankle.

A protrusion 8 emerges from the cap 7 and can be removably coupled with the first prosthesis structure, which again according to the preferred embodiment, is of the type of a prosthetic leg.

In the non-limiting example of application of the invention shown in
20 Figures 1 to 9, the protrusion 8 has a truncated pyramid shape, and can be accommodated by slotting in a complementarily shaped receptacle which is provided at the distal end of the prosthetic leg.

In turn, the second member 3 comprises a leaf 9 which is substantially accommodated in the cap 7 and which is articulated to the cap 7 at a rotation
25 pin 10, which is substantially cylindrical, that defines the axis of rotation mentioned above.

The rotation pin 10, as can be seen in Figure 3, is coaxially contained within a bushing 11 and is locked in position by a hexagonal-head screw 12 which abuts on a recess 13 that is provided along the side of the rotation
30 pin 10.

The leaf 9 therefore is provided with the eyelet 5 and is rigidly supported by a base plate 14, which is arranged on the opposite side from the protrusion 8 and is provided with extensions (such as pins 16 which can be seen in the accompanying figures, for example), for removable coupling
5 with the second prosthesis structure, which preferably is of the type of a prosthetic foot.

For the sake of simplicity it should be made clear, in the previous paragraphs and also hereinbelow, that the first member 2 (which is associated with the prosthetic leg) is considered fixed and the second
10 member 3 movable (at least when the contoured pin 6 is in the second limit position). The possibility is not however excluded of implementing prosthesis joints 1 in which these roles are inverted.

Usefully, the eyelet 5 has an elongated shape: during the rotation of the second member 3 with respect to the first member 2, with the contoured
15 pin 6 arranged in the second limit position, respective parts of the eyelet 5 are brought subsequently into alignment with the cavity 4, each of these parts thus defining, together with the cavity 4, substantially a conduit in which the contoured pin 6 is accommodated. In more detail, a first section 6a of the contoured pin 6, in such second limit position, is accommodated
20 with play in the eyelet 5, thus allowing the rotation of the leaf 9 with respect to the cap 7 (while the contoured pin 6 is kept inside the conduit and the eyelet 5).

With further reference to the preferred but not exclusive embodiment, the eyelet 5 advantageously has at least two contoured portions 5a that can
25 be aligned with the cavity 4 at predefined reciprocal inclinations of the second prosthesis structure with respect to the first prosthesis structure (thus, for example, at two specific arrangements of the foot with respect to the leg, which are respectively optimal for walking and for swimming, or for other sporting activities).

30 The two contoured portions 5a are adapted to couple by shape with

the contoured pin 6, when the contoured pin 6 is arranged in the first limit position, in order to lock the rotation of the leaf 9 with respect to the cap 7.

In particular, the eyelet 5 has a profile that is substantially curvilinear and elongated. At the two end portions there are two widenings, which
5 define the respective contoured portions 5a.

Thus by rotating the second member 3 (and the eyelet 5), the patient can align one of the two contoured portions 5a with the cavity 4 and, with the contoured pin 6 arranged in the first limit position, obtain a rigid coupling between the prosthetic leg and the prosthetic foot. The patient can
10 thus alternately walk or swim optimally, as a function of the specific contoured portion 5a that is aligned with the cavity 4 (and therefore of the specific inclination between the first member 2 and the second member 3).

According to an embodiment of important practical interest, cited for the purposes of non-limiting illustration of the application of the invention,
15 the contoured pin 6 has (as can be clearly seen in Figure 15) both the first section 6a and an end section 6b, which can be alternately accommodated in the eyelet 5 following the translational movement of the contoured pin 6 (along a direction defined by its main axis) respectively between the second limit position and the first limit position, and vice versa.

20 In order to allow the above-mentioned accommodation with play in the eyelet 5, the first section 6a has a substantially cylindrical shape and a thickness that is less than the width of the above-mentioned parts of the eyelet 5 (and of the contoured portions 5a).

Vice versa, in order to produce the locking of the leaf 9 with respect
25 to the cap 7, the end section 6b has an enlarged flared portion that is substantially frustum-shaped and is adapted to the coupling by shape with the inner wall, which is complementarily shaped, of the contoured portions 5a of the eyelet 5, following the translational movement of the contoured pin 6 from the second limit position to the first limit position. Vice versa,
30 the width and shape of the end section 6b do not allow the translational

movement, even involuntarily, of the contoured pin 6 from the second limit position to the first limit position when the eyelet 5 is aligned with the cavity 4 with a part thereof that is different from the contoured portions 5a and this guards against the danger of mutual locking in an unwanted arrangement.

Usefully, the cap 7 comprises a through opposing cavity 15, which is defined in an outer wall 7a of the cap 7 and is arranged facing the cavity 4 on the opposite side with respect to the leaf 9. In the first limit position, the contoured pin 6 protrudes from the opposing cavity 15 with an end portion 6c thereof. From this arrangement, the contoured pin 6 can then elastically perform a translational motion, in a practical and easy manner, following a simple pressure on the protruding end portion 6c, in order to be brought into the second limit position, in which the contoured pin 6 is kept entirely in the cap 7 and the first section 6a is accommodated with play in one of the parts of the eyelet 5, in order to thus allow the rotation of the leaf 9 with respect to the cap 7.

More specifically, the prosthesis joint 1 according to the invention comprises a spring 17 which is accommodated within the cavity 4 and which elastically abuts against the end section 6b of the contoured pin 6.

Thus in order to produce the translational movement of the contoured pin 6 from the first limit position to the second limit position, the patient can apply a pressure on the protruding end portion 6c, so as to defeat the elastic resistance of the spring 17 which opposes the translational movement.

Subsequently, when the patient removes the pressure, and the eyelet 5 is facing the cavity 4 with its contoured portion 5a, the spring 17 produces the automatic return of the contoured pin 6 to the first limit position.

The possibility also exists that the first member 2 and the second member 3, and also the other components, are made of a material of the type of a titanium alloy, thus conferring a reduced weight (which can optionally be increased with ballast) on the prosthesis joint 1 according to the

invention.

The use of the prosthesis joint according to the invention is as follows.

A patient who is missing a limb (and in particular a foot and possibly
5 also a leg), who wishes to engage in at least two different activities (such as
for example simply walking and swimming, or other sport practice) which
correspond to a different optimal reciprocal inclination of the leg and of the
foot, can positively make use of the prosthesis joint 1 according to the
invention.

10 By means of the protrusion 8 and the extensions 16, the patient can in
the first place couple the prosthetic foot to the prosthetic leg, by interposing
the prosthesis joint 1 according to the invention between them.

Thanks to the presence of the spring 17, it is sufficient to align one of
the at least two contoured portions 5a of the eyelet 5 with the cavity 4 in
15 order to cause the automatic translational movement of the contoured pin 6,
until it is made to protrude with its end portion 6c from the cap 7, and so
arrive at the first limit position (in which, as previously observed, the spring
17 keeps it in position by virtue of its elastic resistance, thus impeding
accidental release). In this first limit position, the end section 6b is coupled
20 with one of the two contoured portions 5a of the eyelet 5 and the contoured
pin 6 can then lock the rotation of the second member 3 with respect to the
first member 2, thus producing a rigid coupling between them.

Such rigid coupling can therefore, as previously observed, be
obtained in at least two different reciprocal configurations of the first
25 member 2 and of the second member 3 (and therefore in two different
reciprocal inclinations of the prosthetic foot and of the prosthetic leg),
which respectively correspond to the alignment of one of the two contoured
portions 5a of the eyelet 5 with the cavity 4.

By suitably dimensioning the various components, the at least two
30 reciprocal configurations described above can correspond to the inclinations

of the prosthetic foot with respect to the leg such as to respectively allow easy walking and comfortable swimming.

During these activities therefore, the patient can rely on a joint 1 that has a design and an encumbrance which simulate that of a human ankle, without bothersome and unaesthetic protruding hooks or wires. All that protrudes from the cap 7 is the end portion 6c of the contoured pin 6 (which can be dimensioned to be small as desired), and the end portion 6c does not interfere with a wetsuit or other possible garments, even if body-hugging, which are chosen for performing the selected activity.

Obviously, the possibility exists of providing joints 1 in which the contoured pin 6 protrudes from one side, or from the other (in order to allow easy actuation both by right-handed patients and by left-handed patients).

In order to practically and easily vary the inclination of the prosthetic foot with respect to the leg, and hence in order to pass from the optimal configuration for walking to that designed for sports activity, it is sufficient to press the protruding end portion 6c of the contoured pin 6 (possibly even through the wetsuit, if worn, or other garment), in order to defeat the elastic resistance of the spring 17 and thus produce the translational motion of the contoured pin 6 from the first limit position to the second limit position.

Without needing to dismantle the joint 1, and without requiring the use of hooks or wires (for which it would be necessary to take off the wetsuit), the patient can thus rotate the foot by virtue of the disengagement of the contoured pin 6 from the eyelet 5, since, with the passage to the second limit position, the end section 6b is brought into the cavity 4 of the first member 2 while, following the translational movement, the first section 6a is brought into the eyelet 5, and is accommodated therein with play, thus allowing the rotation.

In the second limit position therefore, the patient can easily rotate the prosthetic foot (an action that corresponds to the rotation of the leaf 9, while subsequent parts of the eyelet 5 align with the cavity 4 by sliding about the

first section 6a), until a different contoured portion 5a of the eyelet 5 is brought into alignment with the cavity 4, thus allowing a new translational movement of the contoured pin 6 in the first limit position and a new locking of the prosthetic foot.

5 It should be noted that the choice to use conical surfaces for the coupling between the end section 6b of the contoured pin 6 and the contoured portion 5a of the eyelet 5 positively makes it possible to compensate for the effects of wear, by compensating for the formation of possible plays which otherwise could negatively influence the correct
10 functioning of the joint 1 according to the invention.

Furthermore, by means of an appropriate dimensioning of the components, and in particular a suitable choice of the angle of inclination, it is possible to ensure the irreversible nature of the relative motion between the contoured pin 6 and the eyelet 5, so preventing the unwanted release of
15 the joint 1 during its use.

As appears evident from the foregoing, the proposed solution offers high structural simplicity, modularity and a low number of components, thus ensuring ease of assembly/disassembly and low cost.

With reference to the use for sporting activities of the type of
20 swimming, it should be noted that the possibility exists of adopting wide dimensional tolerances, so as to allow immersion of the joint 1 in sea water.

Lastly it is noted that the prosthesis joint 1 according to the invention has high versatility, since it can be applied both on the right limb and on the left limb and, by taking advantage of the reduced axial encumbrance, it can
25 be adopted even by patients with long limb stumps.

In practice it has been found that the prosthesis joint according to the invention fully achieves the intended aim, thanks to the use of a contoured pin which can move between two limit positions, since in the first of such positions it reciprocally locks the first member and the second member of
30 such prosthesis joint, in at least two different configurations of use, while in

the other limit position it makes it possible in a practical and easy manner to rotate the second member with respect to the first member, in order to pass from one to the other configuration, and vice versa.

The invention thus conceived is susceptible of numerous
5 modifications and variation, all of which are within the scope of the appended claims. In addition, all the details may be replaced by other, technically equivalent elements.

For example, according to an alternative embodiment, it is possible for the contoured pin 6 to rotate about its main axis between the first limit
10 position and the second limit position, which therefore correspond to different angular orientations of the contoured pin 6 and of the first section 6a in particular.

The first section 6a, when it is oriented according to the first limit position, is therefore able to lock, by interference, the leaf 9 with respect to
15 the cap 7. Vice versa, in the second limit position the first section 6a allows the rotation of the leaf 9 with respect to the cap 7.

More specifically, according to this embodiment the first section 6a has the shape of a longitudinally sectioned cylinder, so as to obtain a variation of its transversal encumbrance following its rotation between the
20 first limit position and the second limit position.

In this way, in the first limit position (which corresponds to the maximum transversal encumbrance) the first section 6a is adapted to coupling by shape with the contoured portions 5a of the eyelet 5, thus producing the locking of the leaf 9 with respect to the cap 7. Vice versa, in
25 the second limit position (with minimum transversal encumbrance) the first section 6a is adapted to be accommodated with play in the parts of the eyelet 5, in order to allow the rotation of the leaf 9 with respect to the cap 7.

In the embodiments illustrated, individual characteristics shown in relation to specific examples may in reality be interchanged with other,
30 different characteristics, existing in other embodiments.

Moreover, it should be noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

In practice the materials employed, as well as the dimensions, may be
5 any according to requirements and to the state of the art.

Where the technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each
10 element identified by way of example by such reference signs.

CLAIMS

1. A prosthesis joint, particularly of the type of an ankle, that comprises at least one first member (2) which can be associated with a first prosthesis structure of a patient, and at least one second member (3), which
5 can be associated with a second prosthesis structure of the patient, said second member (3) being articulated to said first member (2) about an axis of rotation, characterized in that said first member (2) and said second member (3) respectively comprise at least one cavity (4) and at least one eyelet (5) for the at least partial accommodation of a contoured pin (6),
10 which is arranged transversely to the rotation of said second member (3) with respect to said first member (2), said contoured pin (6) being capable of moving selectively between at least two limit positions, in a first limit position said contoured pin (6) being arranged, by interference, so as to mutually lock said first member (2) and said second member (3), in at least
15 two different configurations of use, in a second limit position said contoured pin (6) being arranged so as to allow the rotation of said second member (3) with respect to said first member (2), for the passage from one to the other of said at least two reciprocal configurations, and vice versa.

2. The prosthesis joint according to claim 1, characterized in that said
20 first member (2) is substantially constituted by a cap (7) which simulates preferably a human ankle, a protrusion (8) protruding from said cap (7) and being removably coupled with the first prosthesis structure, which is preferably of the type of a prosthetic leg, said second member (3) comprising a leaf (9) which is substantially accommodated in said cap (7)
25 and is articulated thereto at a rotation pin (10), defining said axis of rotation, said leaf (9) being provided with said eyelet (5) and being rigidly supported by a base plate (14), which is arranged on the opposite side from said protrusion (8) and is provided with extensions for removable coupling with the second prosthesis structure, which is preferably of the type of a
30 prosthetic foot.

3. The prosthesis joint according to claims 1 and 2, characterized in that said eyelet (5) has an elongated shape, during the rotation of said second member (3) with respect to said first member (2), with said contoured pin (6) arranged in said second limit position, respective parts of said eyelet (5) being subsequently brought into alignment with said at least one cavity (4), for the accommodation with play of a first section (6a) of said contoured pin (6) and for allowing the rotation of said leaf (9) with respect to said cap (7).

4. The prosthesis joint according to one or more of the preceding claims, characterized in that said eyelet (5) has at least two contoured portions (5a), which can be aligned with said cavity (4) at predefined reciprocal inclinations of said second prosthesis structure with respect to said first prosthesis structure, said contoured portions (5a) being adapted to coupling by shape with said contoured pin (6), which is arranged in said first limit position, in order to lock the rotation of said leaf (9) with respect to said cap (7).

5. The prosthesis joint according to claim 4, characterized in that said eyelet (5) has a profile that is substantially curvilinear and elongated, two widenings being provided at the two end portions, so as to define respective contoured portions (5a).

6. The prosthesis joint according to one or more of the preceding claims, characterized in that said contoured pin (6) has said first section (6a) and an end section (6b), which can be alternately accommodated in said eyelet (5) following the translational movement of said contoured pin (6) respectively between said second limit position and said first limit position, and vice versa, said first section (6a) having a substantially cylindrical shape and a thickness that is less than the width of said parts of said eyelet (5), for the accommodation with play in said eyelet (5), said end section (6b) having an enlarged flared portion that is substantially frustum-shaped and is adapted to the coupling by shape with the inner wall, which is

complementarily shaped, of said contoured portions (5a) of said eyelet (5), for locking said leaf (9) with respect to said cap (7).

7. The prosthesis joint according to one or more of the preceding claims, characterized in that said cap (7) comprises a through opposing cavity (15), which is defined in an outer wall (7a) of said cap (7) and is arranged facing said cavity (4) on the opposite side with respect to said leaf (9), in said first limit position said contoured pin (6) protruding from said opposing cavity (15) with an end portion (6c) thereof, said contoured pin (6) being capable of elastically performing a translational motion following a pressure on said protruding end portion (6c), in order to be brought into said second limit position, in which said contoured pin (6) is kept entirely in said cap (7) and said first section (6a) is accommodated with play in one of said parts of said eyelet (5), in order to allow the rotation of said leaf (9) with respect to said cap (7).

8. The prosthesis joint according to one or more of the preceding claims, characterized in that it comprises a spring (17) which is accommodated within said cavity (4) and elastically abuts against said end section (6b) of said contoured pin (6), the elastic reaction of said spring (17) opposing the translational motion of said contoured pin (6), in the passage from said first limit position to said second limit position following pressure on said protruding end portion (6c), and thus producing the automatic return to said first limit position, in the absence of pressure.

9. The prosthesis joint according to claims 1 to 4, characterized in that it is possible for said contoured pin (6) to rotate about its main axis between said first limit position and said second limit position, which correspond to different orientations of said first section (6a), said first section (6a), by being oriented in said first limit position, being, by interference, adapted to lock said leaf (9) with respect to said cap (7), said first section (6a), oriented in said second limit position, being adapted to allow the rotation of said leaf (9) with respect to said cap (7).

10. The prosthesis joint according to claim 9, characterized in that said first section (6a) has the shape of a longitudinally sectioned cylinder, for the variation of its transversal encumbrance following its rotation between said first limit position and said second limit position, in said first
5 limit position said first section (6a) being adapted to coupling by shape with said contoured portions (5a) of said eyelet (5), in order to lock said leaf (9) with respect to said cap (7), in said second limit position said first section (6a) being adapted to be accommodated with play in said parts of said eyelet (5), in order to allow the rotation of said leaf (9) with respect to said cap (7).

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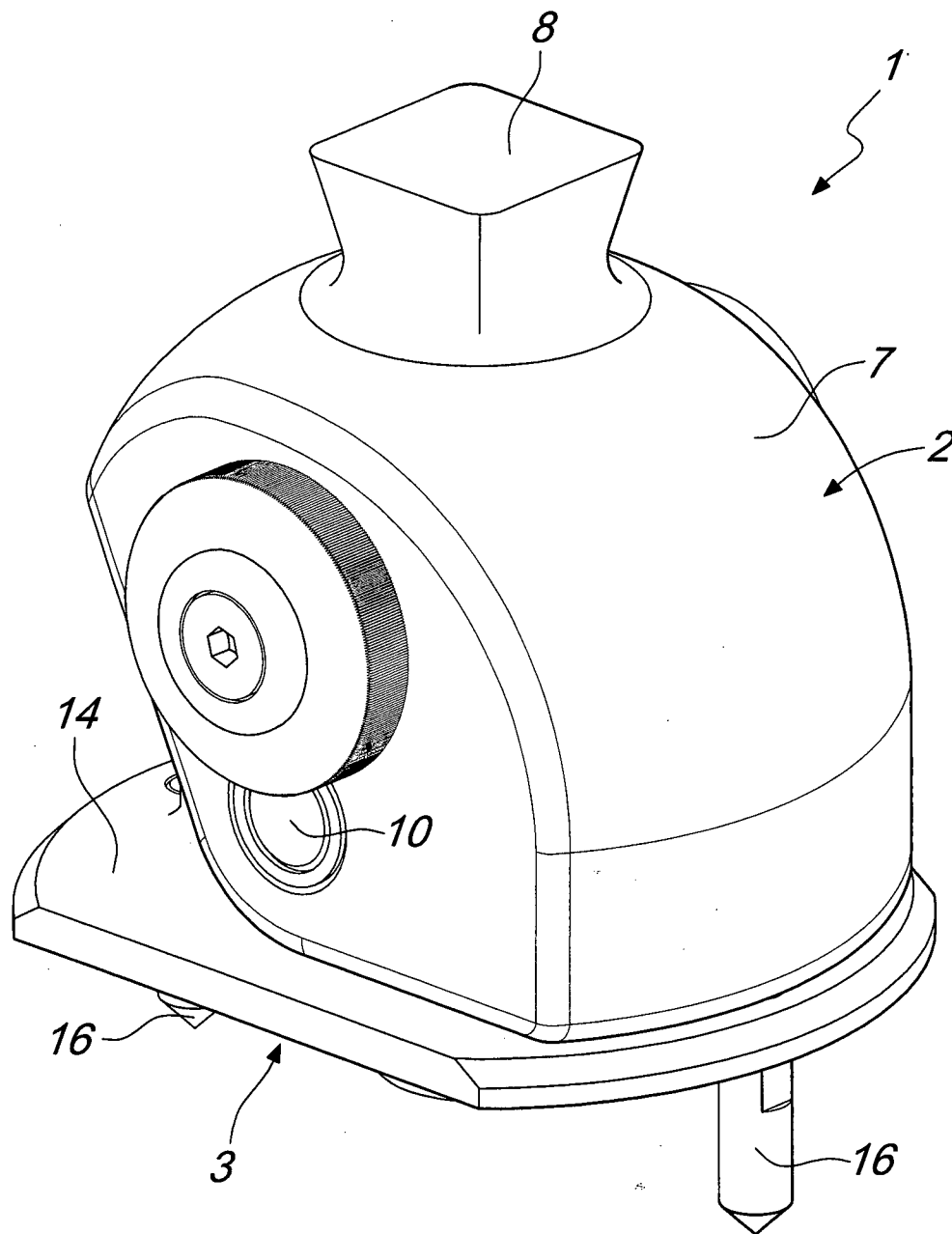


Fig. 1

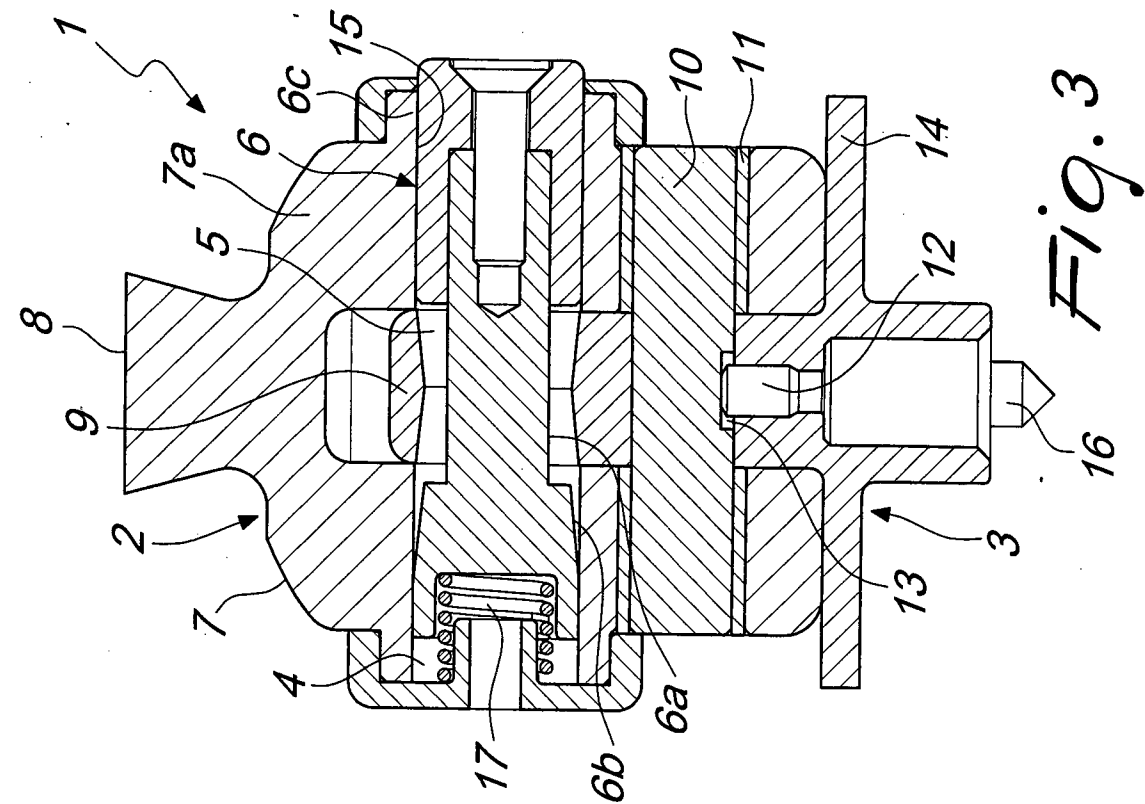


Fig. 3

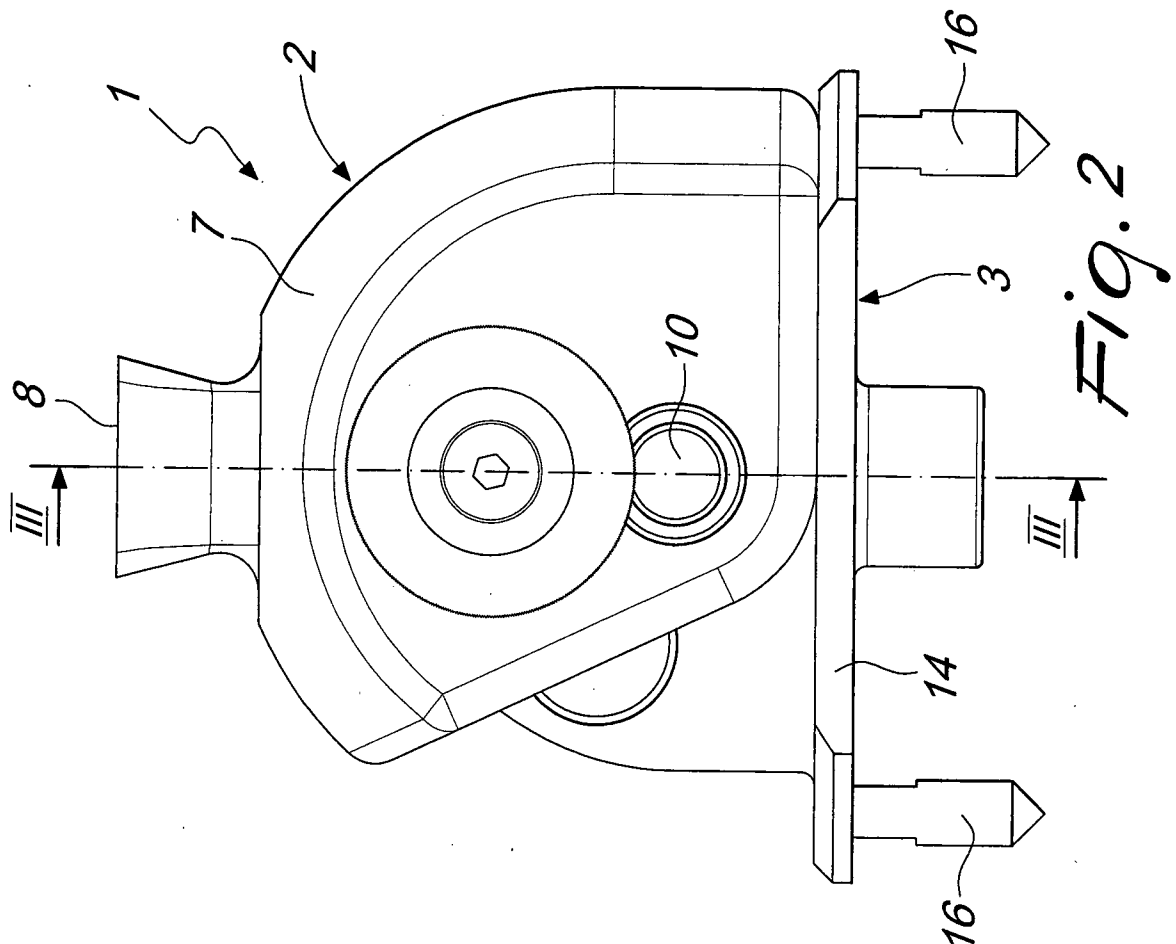


Fig. 2

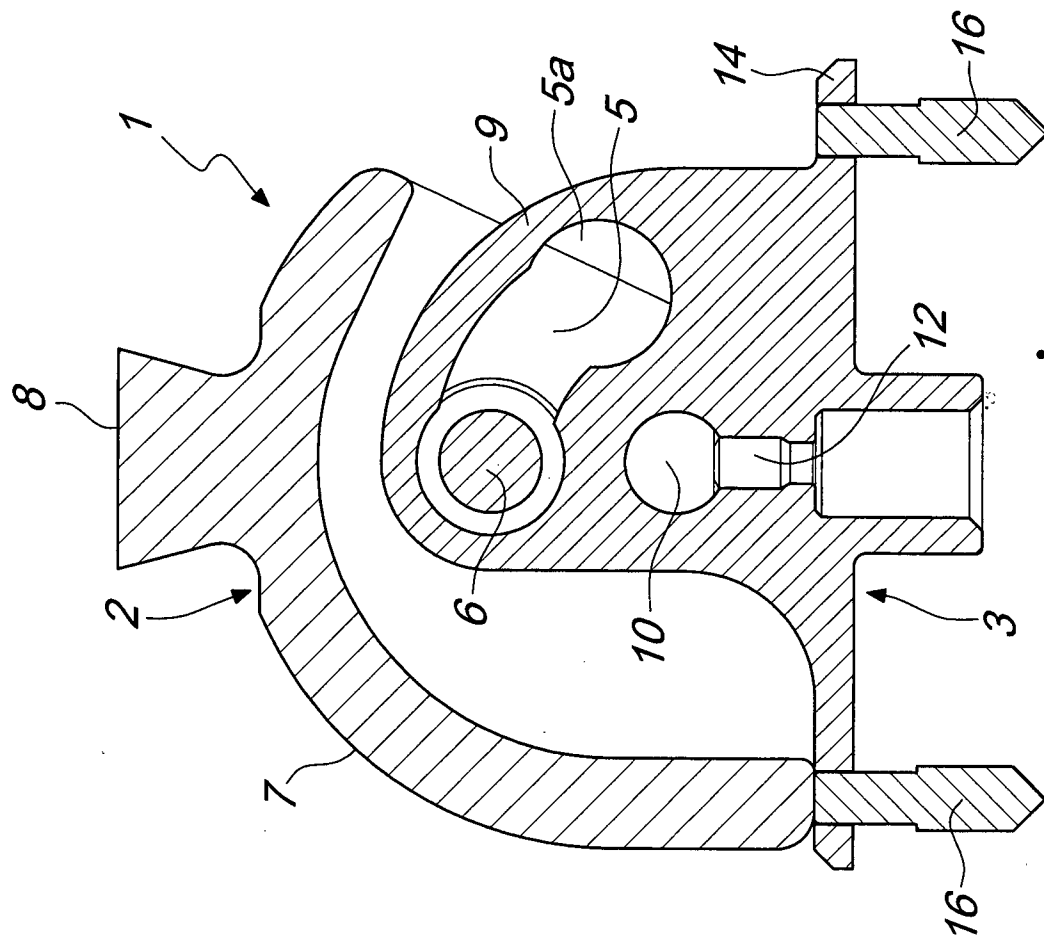


Fig. 5

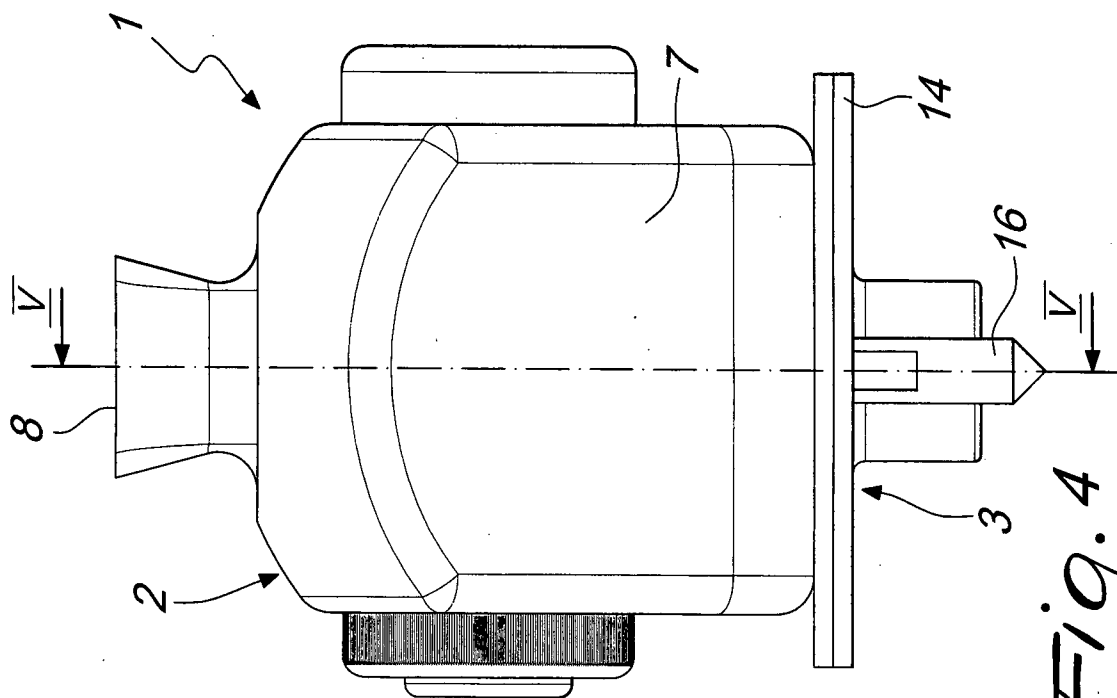


Fig. 4

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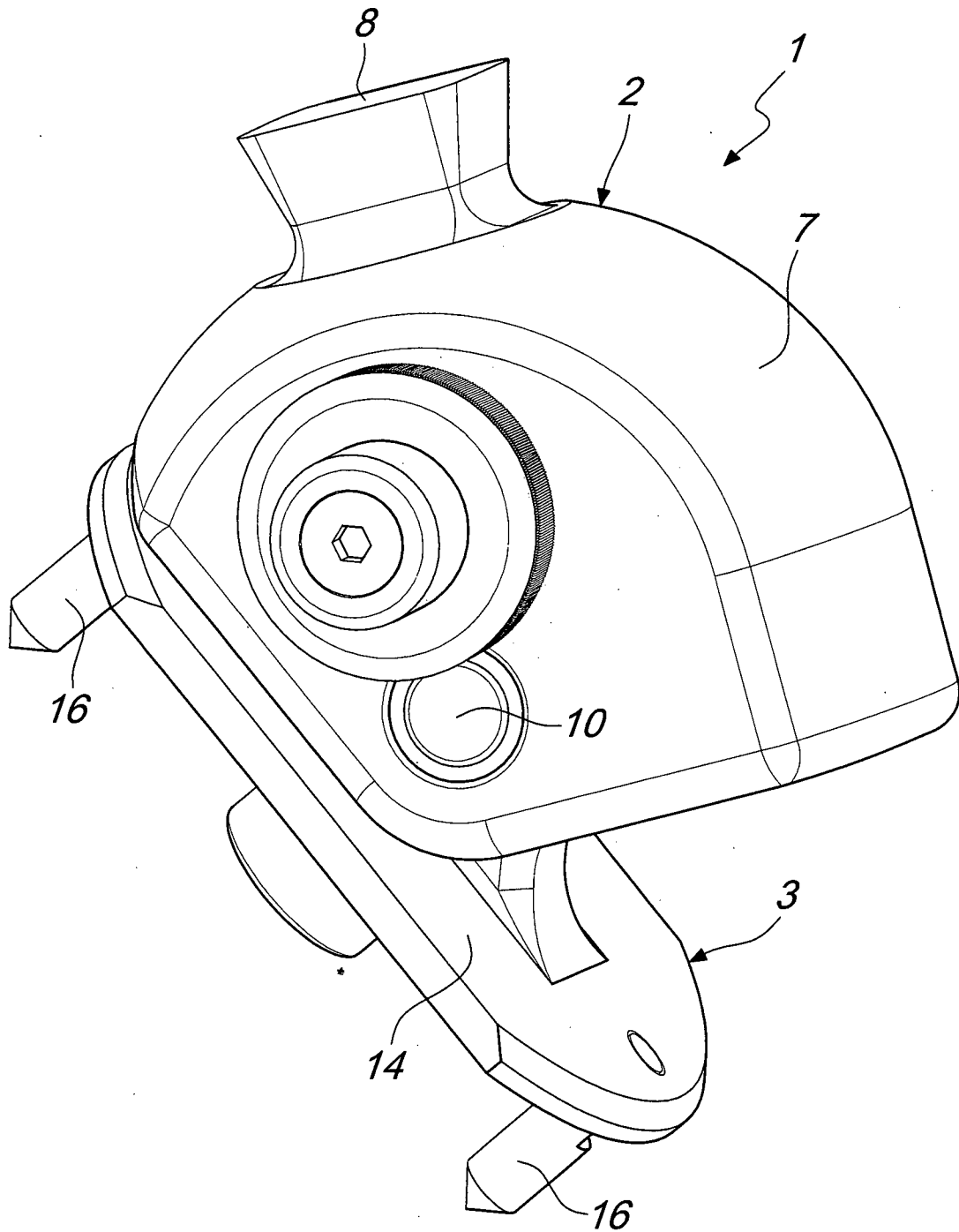


Fig. 6

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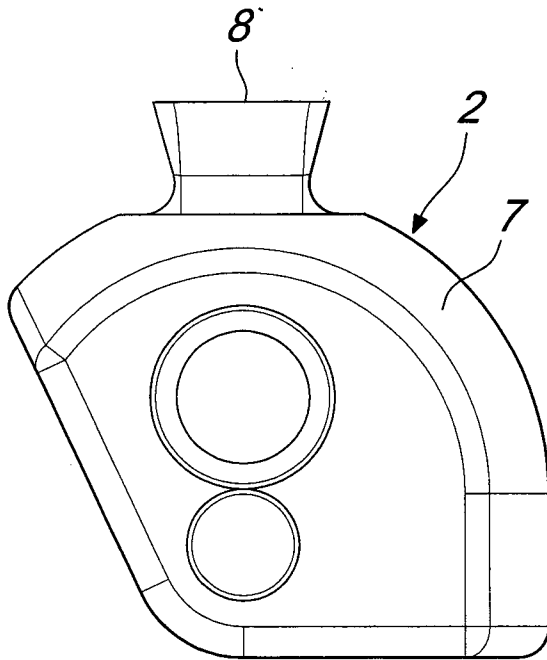


Fig. 7

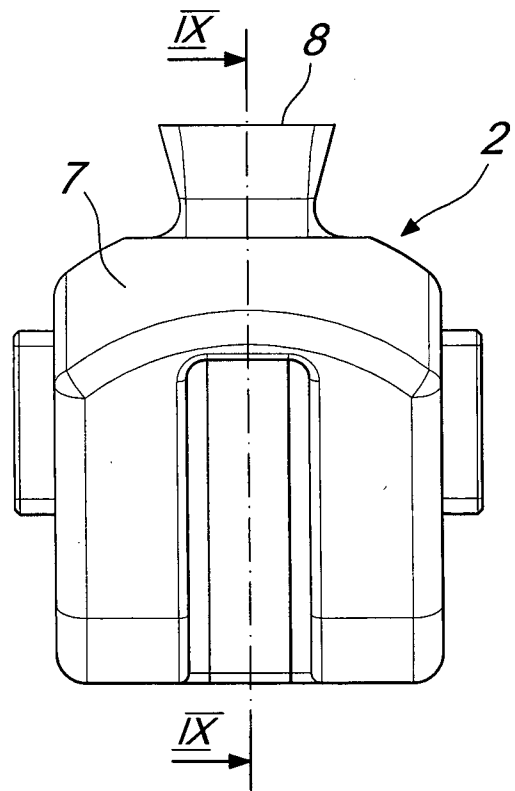


Fig. 8

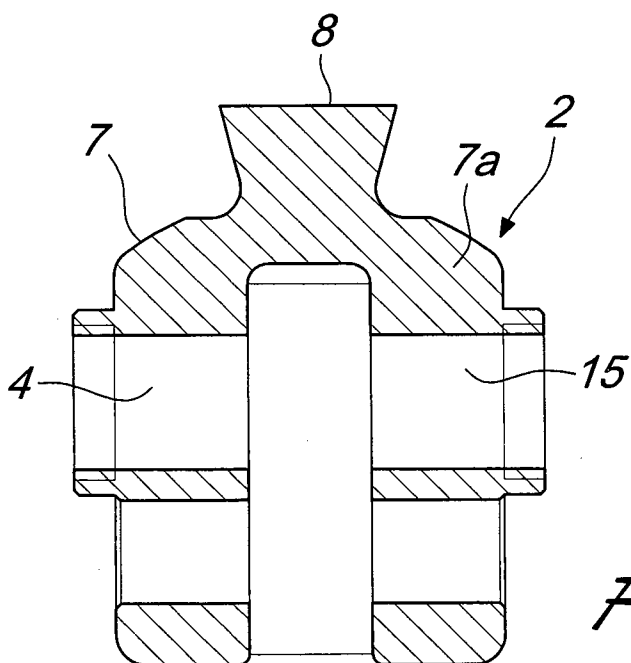


Fig. 9

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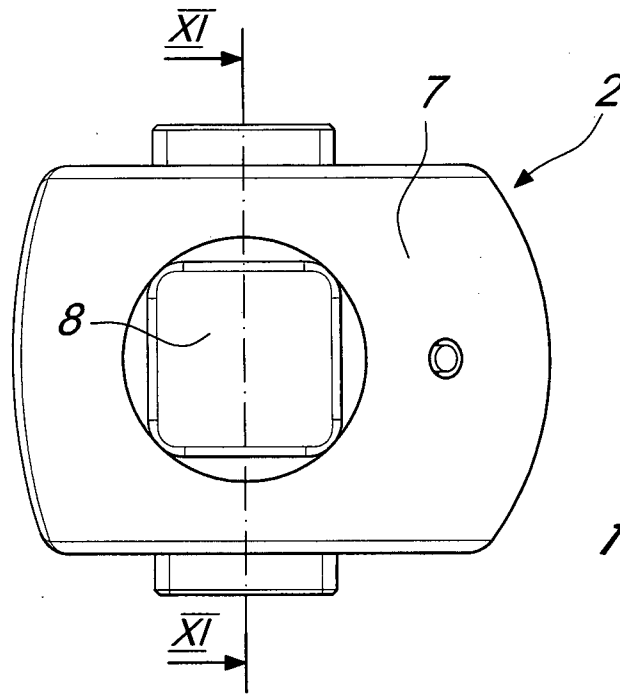


Fig. 10

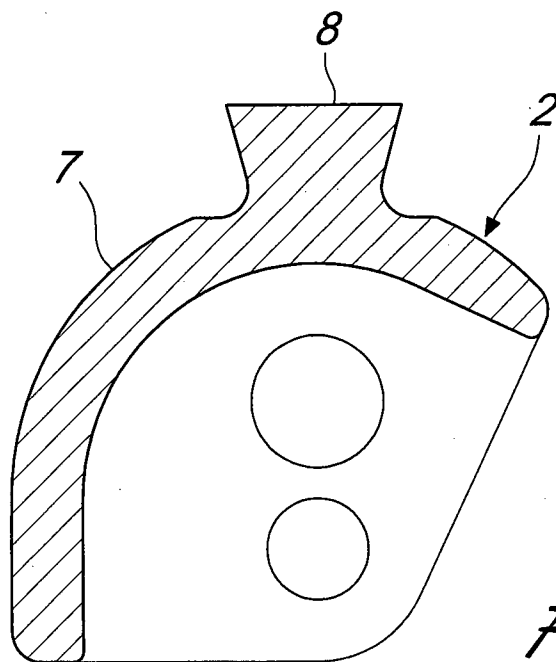


Fig. 11

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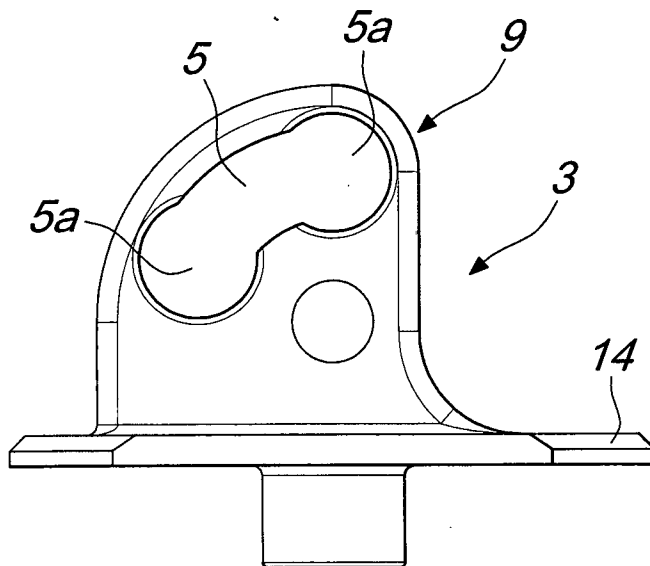


Fig. 12

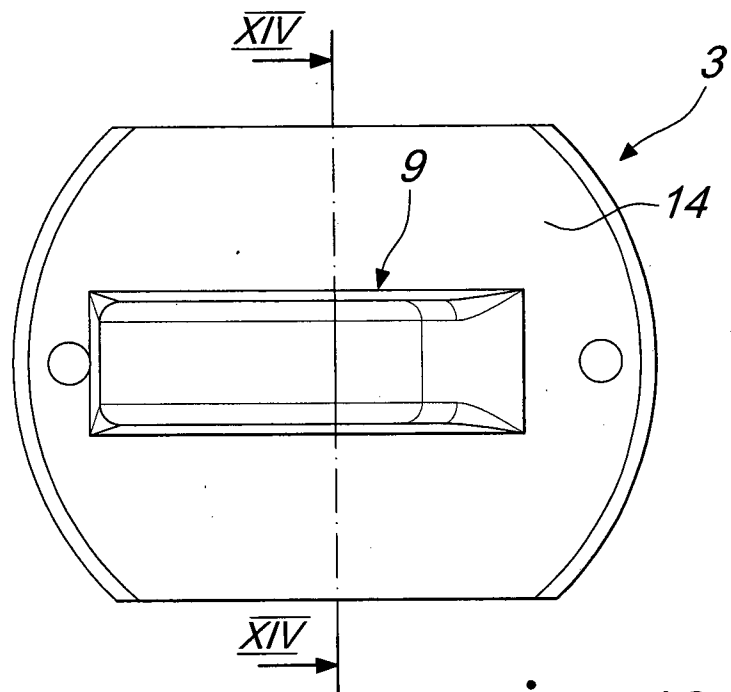


Fig. 13

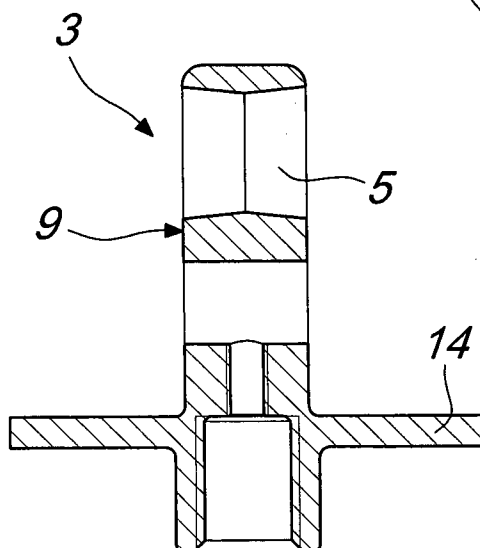


Fig. 14

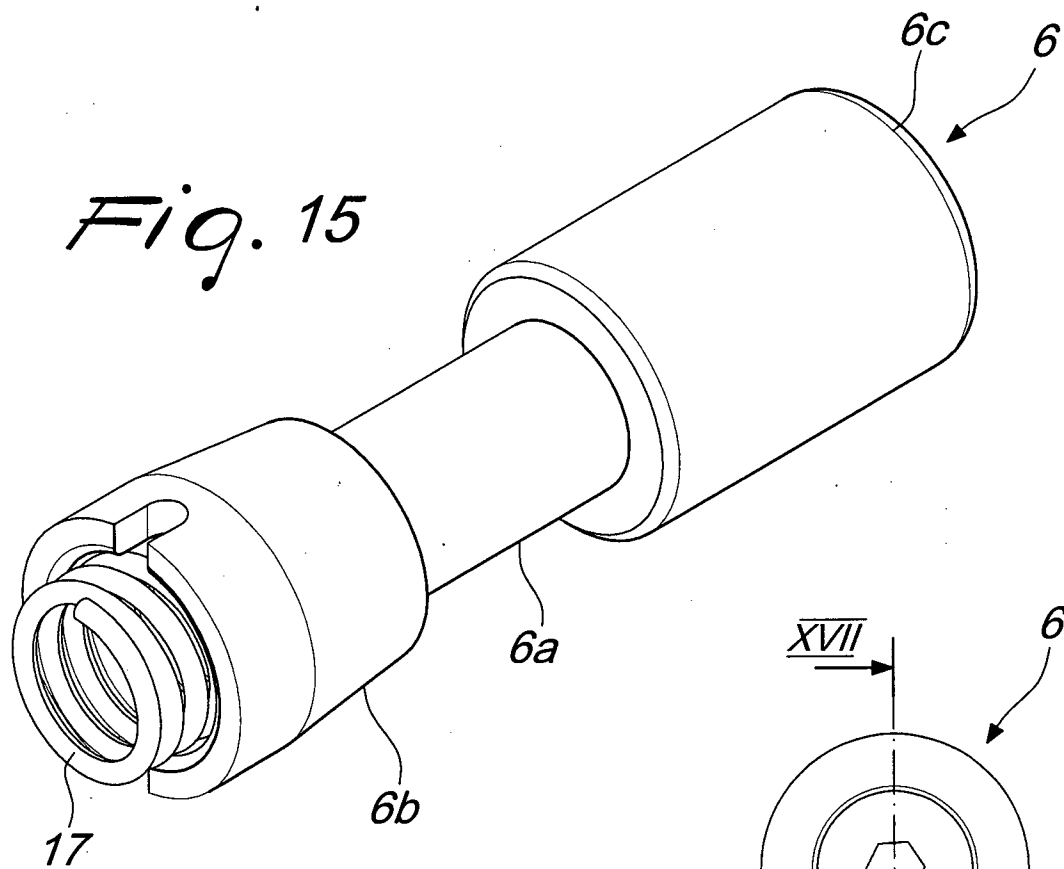


Fig. 16

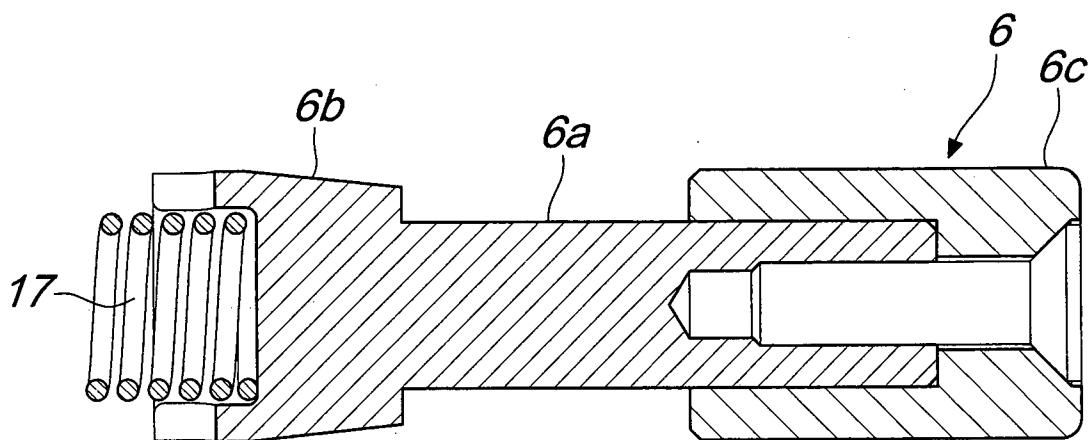
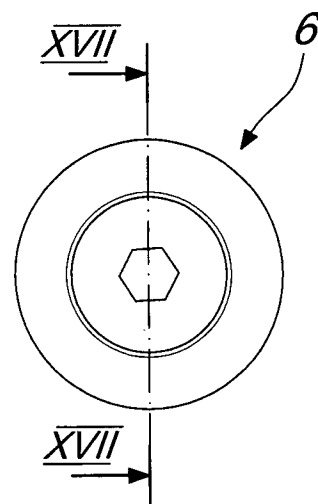


Fig. 17

INTERNATIONAL SEARCH REPORT

International application No

PCT/IT2010/000489

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61F2/66

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)

A61F

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)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/085926 A1 (CHRISTENSEN ROLAND J [US]) 21 April 2005 (2005-04-21)	1,3-5, 7-10
Y	paragraph [0028] - paragraph [0029] paragraph [0031] - paragraph [0042] figures 1-6	2
Y	----- WO 96/29032 A1 (BYRNE MICHAEL O [GB]; DIX COLIN [GB]; PARSONS ANTHONY JAMES [GB]; STUR) 26 September 1996 (1996-09-26) page 2, line 23 - page 4, line 16 figures 1,2,6,7	2
A	----- US 5 913 901 A (LACROIX BARRY [CA]) 22 June 1999 (1999-06-22) abstract figures ----- -/--	1



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

11 May 2011

Date of mailing of the international search report

14/06/2011

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Storer, John

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2010/000489

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 5 156 630 A (RAPPOPORT ALBERT F [US] ET AL) 20 October 1992 (1992-10-20) abstract column 6, line 21 - column 7, line 5 figures</p> <p>-----</p>	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IT2010/000489

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005085926	A1	21-04-2005	NONE
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WO 9629032	A1	26-09-1996	EP 0764009 A1 26-03-1997
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US 5156630	A	20-10-1992	NONE
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