

Prosthetic Joint

Specification

- 5 The present invention relates to a prosthetic joint with the features of the preamble of claim 1.

10 A prosthetic joint for use as an artificial knee, consisting of an upper part, a lower part and a clamping member connecting said two parts, said upper part of the knee being disposed for rotation about an axis of rotation of the clamping member and the rotation occurring against the force of an elastic element disposed in the lower part of the knee, is known from EP 1 166 726 A1 or DE 201 19 049 U1 for example. This mechanism allows for braking flexion whilst extension is allowed to occur without much braking.

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It is the object of the present invention to improve such a prosthetic joint in such a manner that it may be fixed at little expense in certain positions, so for example in the flexed position. This is of great advantage to fresh amputees that are not yet very skilled in controlling a knee joint. Hitherto, in practice, two different knee joints have
20 been used one after the other, i.e., the prostheses needed to be modified. Both the use of two knee joints and the modification were cost prohibitive so that there was a desire to combine both functions in one knee joint.

This object is solved with the features of the characterizing portion of claim 1.
25 Improvements and advantageous embodiments of the invention are comprised herein after.

In accordance with the invention, there is provided a prosthetic joint for use as an artificial knee, consisting of an upper part, a lower part and a clamping member
30 connecting said two parts, said upper part of the knee being disposed for rotation about an axis of rotation of the clamping member and the rotation occurring against the force of an elastic element disposed in the lower part of the knee, characterized in that releasable fixing means for fixing at least one position of rotation are provided between the upper part of the knee and the clamping member.

According to a preferred embodiment of the invention, the fixing means is a pawl hinged to the upper part of the knee, said pawl being engageable into a recess of the clamping member. In the alternative, solutions using clamping levers, screws, detent means or the like may be used. In the embodiment shown, the pawl has means for fixing its position on the upper part of the knee. Advantageously, the pawl is biased in a locking position by an elastic element, e.g., a spring. The pawl preferably has an actuation lever. The fixable position of rotation is for example the extension position.

According to the preferred embodiment of the invention, the axis of rotation of the clamping member is eccentrically connected for rotation to at least one advance push-rod that is hinged to a spring piston of a spring carried in the lower part of the knee. The spring preferably is a mechanical compression spring, its spring path and characteristic being adjustable by a screwing device.

Between the clamping member and the lower part of the knee there is preferably provided an adjustable adjusting wedge.

The invention will be understood better upon reading the exemplary description accompanying the drawing.

Fig. 1 is a side view of a prosthetic joint in the extension position;

Fig. 2 is a back view of the prosthetic joint of Fig. 1;

Fig. 3 is a partial sectional view in elevation of the prosthetic joint of Fig. 1;

Fig. 4 shows the prosthetic joint of Fig. 1 in the flexion position.

The Figs. 1, 2 and 3 show the prosthetic joint from the outside. It consists of an upper part 1, a lower part 2 and a clamping member 8 connecting said two parts together. At its top end, the upper part 1 of the knee is provided in a known manner with a pyramid 3 for connection to a prosthetic shank (not shown). At its bottom end, the lower part 2 of the knee has a bracket with a clamping screw 9 for connection to a

prosthetic tube (not shown). The clamping member 8 is carried on a brake hinge axis 5, between two legs of the lower part 2 of the knee. The upper part 1 of the knee is carried on an axis of rotation 4 of the clamping member 8 and is pivotal between the extension position (Fig. 1) and the flexion position (Fig. 4).

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The functioning of the prosthetic joint will now be explained referring to Fig. 3. The clamping member 8 is configured to have a slot 8' and is rotatably carried on the axis of rotation 4 that is non-rotatably retained in lateral legs of the upper part 1 of the knee. In the extension position, the weight of the user pushes onto the upper part 1 of the knee and against an extension limit stop 10 retained in a recess that is open toward the top of the clamping member 8. The exerted force acts to close the slot 8' for the clamping member 8 to close harder about the axis of rotation 4 and to clampingly engage therewith. To adjust the clamping effect, the threshold of the charge and the progression of the braking effect, there are provided in a known manner a brake regulation screw 11 with spring, a fixing screw 12 for the hinge axis 5 and a wedge 18 that is adjustable by means of another screw 13. Between the axis of rotation 4 and a damping arrangement disposed in the lower part of the knee and consisting of a piston 14', a cylinder 14, a spiral spring 17 biasing said cylinder and an adjusting screw 16, there is disposed an advance push-rod 15. At its lower end, the advance push-rod 15 is connected to the cylinder 14 and is eccentrically hinged to the axis of rotation 4 at its upper end. If the prosthetic joint is brought from the extension position (Fig. 1, 2 and 3) to the flexion position (Fig. 4) (when the knee is being bent), the clamping effect of the clamping member 8 is cancelled and the upper part 1 of the knee rotates clockwise about the axis of rotation 4. This occurs against the force of the spring 17 of the damping arrangement that is compressed by the advance push-rod. If the prosthetic joint is returned to the flexion position, the damping arrangement acts as an advancing mechanism and the advance push-rod 15 pushes the axis of rotation 4 with the upper part 1 of the knee back into the flexion position.

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If the prosthetic joint is to be used as a "first" prosthesis after amputation, the upper part 1 of the knee can be fixed with respect to the clamping member 8 by a stopper device. Said stopper device consists of a pawl 7 that is carried above the clamping member 8 on the upper part 1 of the knee so as to be pivotal about a pin 20. In the

extension position, said pawl 7 can be engaged into a recess 21 of the clamping member 8 so as to stop the movement of the upper part 1 of the knee. The pawl 7 has an actuation lever 6 guided outward and is biased in the stop position by a spring 19. A locking device 7' (Fig. 1) for fixing the pawl in the engaged or disengaged position is provided.

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Claims

1. A prosthetic joint for use as an artificial knee, consisting of an upper part, a lower part and a clamping member connecting said two parts, said upper part of the knee being disposed for rotation about an axis of rotation of the clamping member and the rotation occurring against the force of an elastic element disposed in the lower part of the knee,
characterized in
that releasable fixing means for fixing at least one position of rotation are provided between the upper part of the knee and the clamping member.
2. The prosthetic joint as set forth in claim 1,
characterized in
that the fixing means is a pawl hinged to the upper part of the knee, said pawl being engageable into a recess of the clamping member.
3. The prosthetic joint as set forth in claim 2,
characterized in
that the pawl has means for fixing its position on the upper part of the knee.
4. The prosthetic joint as set forth in claim 2 or 3,
characterized in
that the pawl is biased in a locking position by an elastic element.
5. The prosthetic joint as set forth in claim 2, 3 or 4,
characterized in
that the pawl has an actuation lever.
6. The prosthetic joint as set forth in any one of the afore mentioned claims,
characterized in
that the fixable position of rotation is the extension position.
7. The prosthetic joint as set forth in any one of the afore mentioned claims,
characterized in

that the axis of rotation of the clamping member is eccentrically connected for rotation to at least one advance push-rod that is hinged to a spring piston of a spring carried in the lower part of the knee.

5 8. The prosthetic joint as set forth in claim 6,
characterized in
that the spring is an adjustable spring.

10 9. The prosthetic joint as set forth in any one of the afore mentioned claims,
characterized in
that an adjustable adjusting wedge is provided between the clamping member
and the lower part of the knee.

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