Feb. 19, 1935. C. DESOUTTER 1,991,796

JOINT FOR ARTIFICIAL LIMBS

Filed Aug. 13, 1932

Fig. 1.

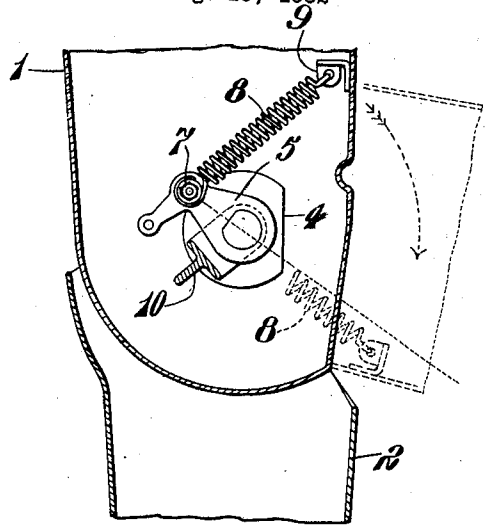


Fig. 2.

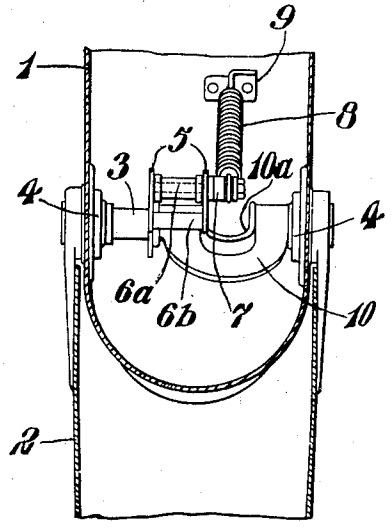
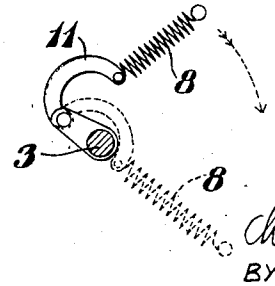


Fig. 3.



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JOINT FOR ARTIFICIAL LIMBS

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1 Claim. (Cl. 3—2)

This invention relates to improvements in joints for artificial limbs and is particularly applicable to knee joints for artificial legs.

In connection with artificial limbs and in particular with artificial legs, it is desirable that the lower portion shall have a certain amount of free play. It is also necessary, however, that means be provided to prevent unrestrained swinging motion of this lower portion and to this end it has been proposed to utilize spring means mounted exteriorly of the upper portion, which spring means tended to bring the lower portion to its extended position.

The present invention relates to an arrangement for controlling the movement of the lower portion of the limb and it has for its object to provide a particularly simple and easily constructed arrangement whereby this end can be attained.

In accordance with the present invention, a joint for an artificial limb embodies upper and lower portions which are pivoted together, the joint embodying a spring or the like located wholly within the upper portion and being connected at one end to said portion and at its other end to a member connected to rotate with the lower portion. Consequently, as the lower portion of the limb is moved pivotally around the upper portion, said spring becomes progressively more tensioned and the necessary returning force is thus applied to the lower portion of the limb.

The invention also includes means whereby the said spring can be caused to pass over a dead centre during the period of motion of the lower portion of the limb, whereby when said dead centre is passed, said spring is effective to bring the lower portion of the limb to a folded position relatively to the upper portion. By virtue of this construction as applied to a knee joint for a leg, it will be appreciated that when the person wearing the leg sits down, the spring becomes operative to hold the lower portion of the limb in the folded position, that is making an angle of 90° or less with the upper portion of said limb.

In one construction in accordance with the present invention, a spindle or axle is provided rigidly attached to the lower portion of the limb around which the upper portion pivots. Said spindle or axle embodies an eccentrically mounted pin to which one end of the spring or the like is connected and in order to enable said spring to pass over a dead centre in the manner described above, the spindle may be suitably cranked, or alternatively the spring may be connected to a curved or ring-shaped link, surrounding said spindle wholly or in part.

The invention will now be described with reference to the accompanying drawing which is given by way of example only, in which:—

Figs. 1 and 2 are two cross-sectional views of a knee joint taken on planes at 90° to one another, and

Fig. 3 is a detail view indicating a slight modification.

In the knee joint shown in Figs. 1 and 2, 1 represents the upper leg portion or bucket and 2 the lower leg portion to which the foot is attached. Rigidly connected to the lower leg portion 2 so as to rotate therewith is a cross spindle 3 upon which the portion 1 is journalled for example by means of ball bearings located in the housings 4. Two plates 5 or the like are attached fixedly to said spindle to rotate therewith and distance bars or rods 6^a, 6^b are fitted between said plates 5. A laterally projecting pin 7 is fixed to one of the plates 5 conveniently on the opposite side to the distance rods 6^a, 6^b.

A spring of helical form 8 is connected to said pin 7 and to a bracket 9 fixed to the upper leg portion 1. In the position shown in full lines in Fig. 1 it will be readily understood that the tendency of the spring is to tend to cause the lower leg portion to rotate in the clockwise direction but such movement is restricted by a check cord or stop fixed to the upper and lower portions 1, 2 in the usual manner.

Upon the distance piece 6^a there may be rotatably mounted a roller of fibre or any other suitable material over which the control cord passes in the usual way, the distance piece 6^b serving to retain said cord and prevent it from coming out of contact with the roller carried on the distance piece 6^a. It will be understood that in the normal functioning of the leg joint the lower portion 2 can swing relatively to the upper portion 1, the spring 8 tending to exert a returning force which brings the lower portion of the limb to the extended or straight position.

In connection with knee joints for artificial legs, it is desirable that the lower portion of the limb can, at certain times, be caused to move to a considerable extent relatively to the upper leg portion, for example when the user sits down. In order to prevent such a movement producing an undue reaction from the spring 8 in the circumstances, this spring may be caused to approach or even to pass over a dead centre during its move-

ment towards the folded position. By arranging for this spring actually to pass over a dead centre, same becomes operative when the leg is folded past said dead centre, actually to hold the lower portion of the limb in the folded position.

In order to enable the spring 8 to have the necessary degree of movement in this case, Figs. 1 and 2 show the spindle 3 as being cranked, for example said spindle may be formed of cast or forged material and the cranked portion 10 thereof may be T-shaped in section. Fig. 1 clearly shows in dotted lines how, when the two portions of the limb are rotated relatively so that they make an angle with one another of 90° or less, the spring 8 is accommodated within the cranked portion 10^a of said spindle.

In the modified construction shown diagrammatically in Fig. 3, instead of the spindle 3 being cranked as in the embodiment previously mentioned, the spring 8 is connected to a curved link 11 conveniently of the shape shown, or alternatively it may be in the form of a closed ring surrounding the said spindle. It will readily be appreciated that the action obtained in Fig. 3 is precisely similar to that obtained in Figs. 1 and 2.

The invention is not limited to the precise forms or details of construction described, as these may be varied to suit particular cases.

What I claim and desire to secure by Letters Patent of the United States of America is:—

An artificial limb having a knee joint comprising an upper, bucket portion and a lower leg portion, the lower end of the upper bucket portion fitting partially within the upper end of the leg portion and being adapted to be rotated relatively thereto to give either a walking or a sitting position, a spindle fixed to the leg portion, means for freely pivoting the bucket portion on said spindle, a radially extending plate fixed to said spindle within the bucket portion, a projecting pin on said plate, said spindle embodying a deeply recessed portion by the side of said plate and near said pin, a bracket fixed within said bucket portion and a helical tension spring connected to said projecting pin and to said bracket so as to tend to maintain the leg in the extended position until the user sits, whereupon the spring enters said recessed portion of the spindle and becomes operative to maintain the leg approximately at right angles to the bucket portion.

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