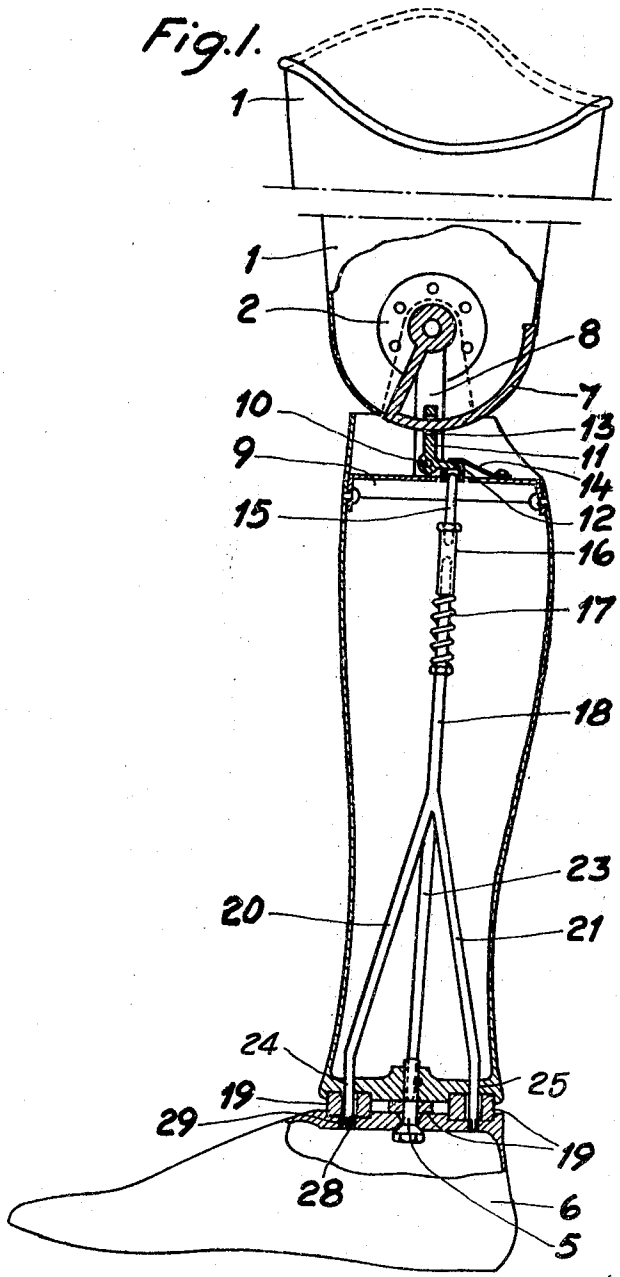
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PROSTHESIS

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Fig. 1.



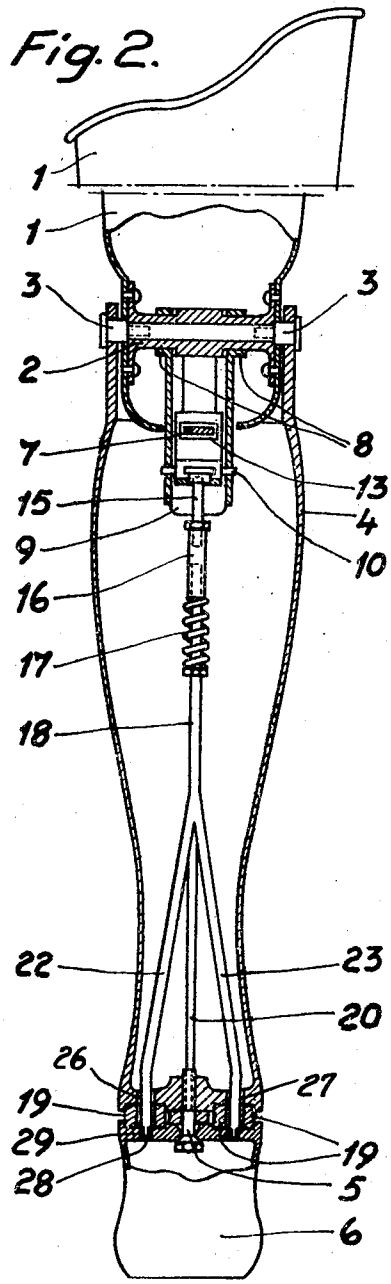
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Fig. 2.



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Fig. 3.

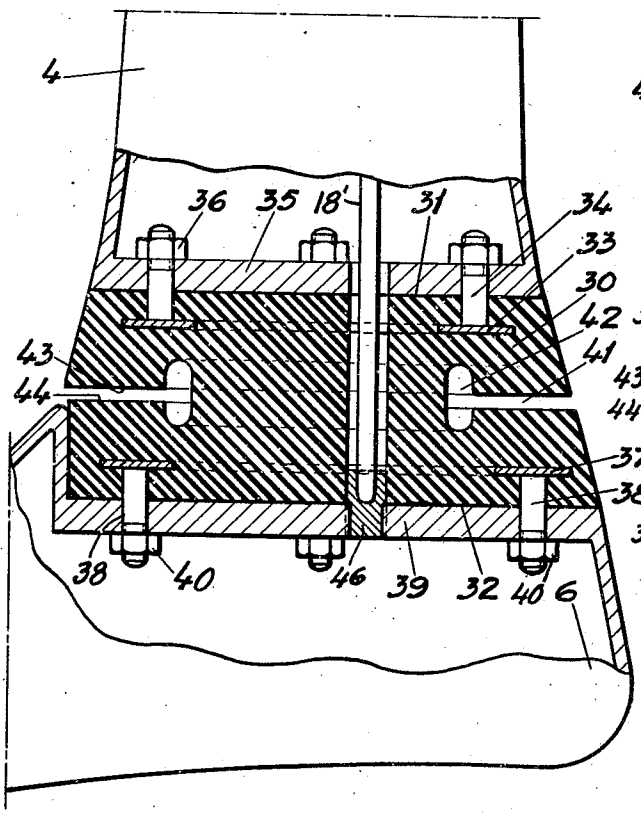
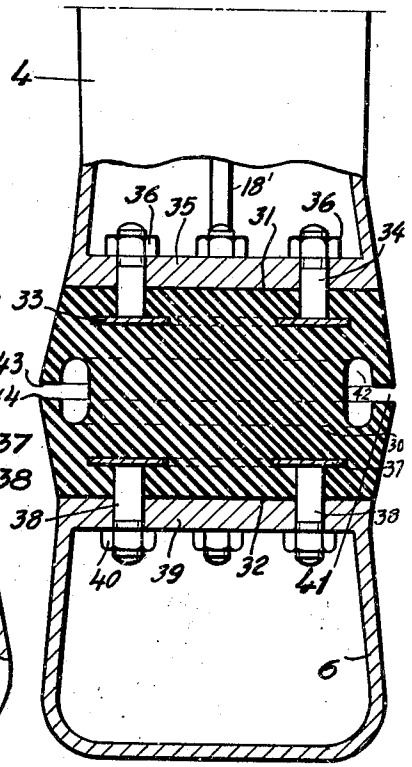


Fig. 4.



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PROSTHESIS

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9 Claims. (Cl. 3—2)

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The present invention refers to an arrangement in a prosthesis having two articulated members, such as a leg prosthesis, to render possible the locking of the articulation or joint in various angular positions solely by exerting a pressure in the longitudinal direction of the one member.

According to the invention, the one member of the prosthesis, for instance a thigh attachment, is provided with a friction bar or the like, which is adapted to cooperate with a locking member swingably or displaceably arranged on the other member of the prosthesis, such as a lower leg member, said locking member being adapted to be actuated by a force component acting in the longitudinal direction of the prosthesis member.

The invention is illustrated in the accompanying drawing, wherein Fig. 1 is an elevation, partly in section, of a leg prosthesis according to the invention. Fig. 2 is a partially sectioned rear view of the prosthesis. Figs. 3 and 4 are partly sectioned side and rear views, respectively of a prosthesis articulated in accordance with the present invention.

In the drawing, 1 designates the thigh attachment of a leg prosthesis, which is provided at the lower end thereof with a transversely extending sleeve 2 having journals 3 for a lower leg member screwed therein, onto which a foot-member is articulated in known manner by means of a threaded bolt 5.

According to the invention, a metal bar 7 is secured to the transverse sleeve 2, said metal bar 7 being shaped on a circular arc and having its center coinciding with the axis of the journals 3. Rotatably mounted on the sleeve 2 is a strap 8 or the like, which is rigidly connected to a cross stay 9 secured in the upper portion of the lower leg member. Pivotally mounted in the strap 8 by means of journals 10 is a bell crank lever 11, 12, one lever arm 11 of which is provided with a slot 13 having the metal bar 7 thrust therethrough. Bearing on the other lever arm 12, which is actuated by means of a spring 14, is a rod 15, which in the longitudinal direction is adjustably secured to a threaded sleeve 16 attached by a compression spring 17 to the upper end of a rod 18, the lower end of which is branched into four branch members 20, 21, 22, 23 extending each through bushing type buffers 19 and an aperture 24, 25, 26 and 27, respectively, in the lower portion of the lower leg, that is to say through a front hole 24, a rear hole 25 and a lateral hole 26 and 27 respectively on either side, said branch members bearing on the foot member 6 while being guided, if

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desired, by means of the pins 28 in apertures 29 provided in the foot member.

In the embodiment shown in Figs. 3 and 4, there is inserted a substantially oval piece of rubber 30 between the lower leg member 4 and the foot member 6, said rubber piece having a plane upper surface 31 and a plane lower surface 32. Molded and vulcanized into the upper portion of the rubber piece 30 is a metal ring 33 having screw bolts 34 secured thereto, which extend through the upper surface 31 of the rubber piece and serve for the attachment of the rubber piece to the lower end 35 of the lower leg member by means of nuts 36. The lower portion of the rubber piece also has a metal ring 37 molded and vulcanized into the same, said metal ring having screw bolts 38 secured thereto, which project through the lower surface 32 of the rubber piece and serve for the attachment of the rubber piece to the upper end wall 39 of the foot member 6 by means of nuts 40. Through this rubber piece, the foot member 6 will have a certain resilient mobility imparted thereto relatively to the lower leg member. To increase this mobility within certain limits, a circumferentially extending horizontal slot is provided in the rubber piece, said slot terminating at its extreme inner end by an enlarged portion 42. Preferably, the slot 41 is deeper and, perhaps, wider at the front and rear to facilitate greater mobility in a plane in the longitudinal direction of the foot member.

As will appear from the drawing, a resilient articulation of the foot member is rendered possible in all directions, which movement is damped when the opposite faces 43 and 44 of the slot 41 abut against each other. Instead of being united with common molded-in rings, the screw bolts 34 and 38 may be provided with individual anchoring pieces from sheet metal molded into the rubber.

The arrangement according to the construction shown in Figs. 1 and 2 operates as follows: When the foot member is caused to bear on the ground, it will actuate one or more of the branch members 20—23, so that the rod 18 is displaced in its longitudinal direction and the rod 15 is caused to swing the bell crank lever 11, 12, against the action of the spring 14, in a manner such that the edges of the slot 13 get jammed with the bar 7 so as to lock the lower leg member relatively to the thigh attachment, independently of the angular position of these members relatively to each other. When the leg is raised and the pressure of the foot member on the ground ceases, the lever arm 12 will be depressed by the spring 14, the edges of the slot

13 being thus caused again to release the bar 7.

The modified construction shown in Figs. 3 and 4, wherein the four branched rods 20—23 are replaced with a single main rod 18' seating in a recessed member 46 and corresponding in function to rod 18 in Figs. 1 and 2 operates in a similar manner when pressure is applied to the lower end of rod 18' as the foot member 6' is caused to bear upon the ground.

The invention is not restricted to the leg prosthesis, but may also be applied in arm prostheses or hand prostheses.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a leg prosthesis including articulated thigh, lower leg and foot members, means for locking the articulation between the thigh and lower leg members at any arbitrary angular position by an application of pressure upon the foot member, said locking means comprising, a stationary arcuate locking bar secured to the thigh member in the plane of articulation, a bellcrank locking lever pivotally secured intermediate its ends to the lower leg member, one arm of said lever being provided with a sharply edged slot receiving said locking bar, and an actuator member within and displaceable in the longitudinal direction of the lower leg member for engagement with the other arm of said lever, said actuator member being displaced upwardly in response to pressure applied thereto from the foot member to thereby rock said lever and cause the sharp edges of said slot to jam and lock against the upper and lower faces of said locking bar.

2. A leg prosthesis as defined in claim 1 wherein the articulation between the lower leg and foot members is constituted solely by a substantially oval resilient body secured at its upper and lower surfaces to the leg and foot members, respectively, said resilient body being provided with a circumferentially extending horizontal slot, the opposite faces of which abut one another upon articulation of the foot member to thereby exert a damping action on the foot member.

3. A leg prosthesis as defined in claim 1 wherein the lower end of said actuator member terminates in a plurality of spaced branches each of which abuts against the foot member.

4. A leg prosthesis as defined in claim 1 wherein the lower end of said actuator member terminates in two pairs of branches at right angles to each other each of said branches abutting against the foot member.

5. A leg prosthesis as defined in claim 1 wherein said actuator member is constituted by a rod provided with a resiliently compressible member.

6. A prosthesis having a foot member articulated to a lower leg member, the articulation being constituted solely by a substantially oval resilient body secured at its upper and lower surfaces to said leg and foot members, respectively, said resilient body being provided with a circumferentially extending horizontal slot, the opposite faces of which abut one another upon articulation of the foot member to thereby exert a damping action on the foot member.

7. A prosthesis having a foot member articulated to a lower leg member, the articulation being constituted solely by a substantially oval resilient body secured at its upper and lower surfaces to said leg and foot members, respectively, said resilient body being provided with a circumferentially extending horizontal slot which is deeper at the front and rear portions of the prosthesis than at the sides thereof, the opposite faces of said slot abutting one another upon articulation of said front member to thereby exert a damping action on the foot member.

8. A prosthesis having a foot member articulated to a lower leg member, the articulation being constituted solely by a substantially oval resilient body secured at its upper and lower surfaces to said leg and foot members, respectively, said resilient body being provided with a circumferentially extending horizontal slot which is wider at the front and rear portions of said prosthesis than at the sides thereof, the opposite faces of said slot abutting one another upon articulation of said foot member to thereby exert a damping action on the foot member.

9. In a limb prosthesis including articulated upper and lower limbs, means for locking the articulation between said limbs at any arbitrary angular position, said locking means comprising, a stationary arcuate locking bar secured to one of said limbs in the plane of articulation, a bellcrank locking lever pivotally secured intermediate its ends to the other limb, one arm of said lever being provided with a sharply edged slot receiving said locking bar, and an actuator member within and displaceable in the longitudinal direction of said other limb to engage the other arm of said lever and rock the latter thereby causing the edges of said slot to jam and lock against the opposite faces of said locking bar.

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SVEN H. DAHLBÄCK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,315,795	Johnson et al.	Apr. 6, 1943

FOREIGN PATENTS

Number	Country	Date
314,830	Germany	Oct. 15, 1919