

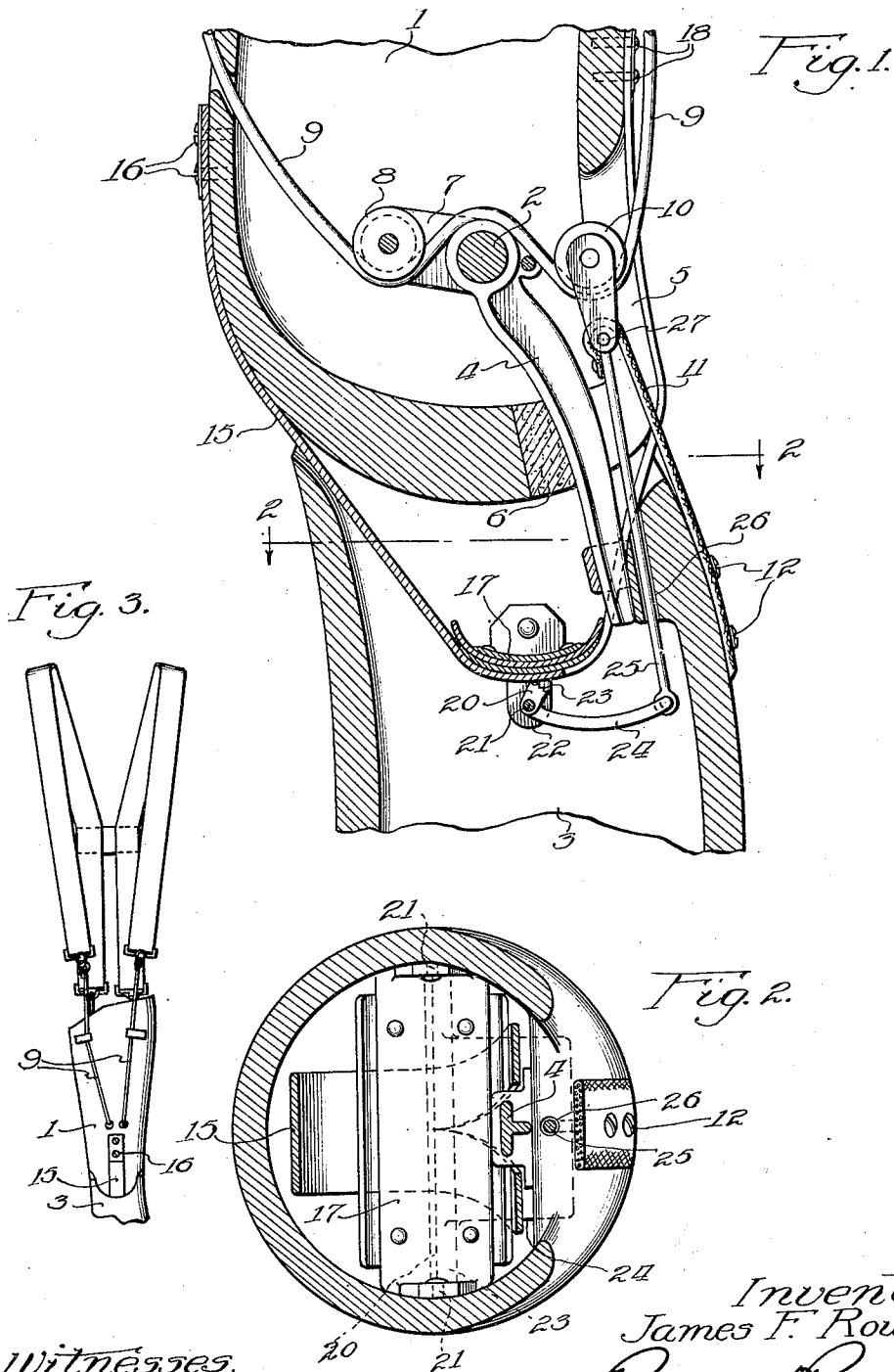
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ARTIFICIAL LIMB LOCKING MECHANISM

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ARTIFICIAL-LIMB-LOCKING MECHANISM.

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This invention relates to artificial limbs of the type operated by a suspender over the shoulder of the wearer.

The main objects of this invention are to provide an artificial limb of the two section type in which the operator can lock the two sections against relative angular movement when the said sections are in various angular relationships with respect to each other.

Heretofore various types of artificial limbs have been designed having for their main object the locking of the sections when in a flexed position. Some of these forms have been automatic in operation and others have made use of a ratchet and pawls controlled by a suspender. None of these limbs has been successful and at the present time there is no artificial limb on the market which can, at the will of the wearer, be locked against relative angular movement when in any position, whether flexed or straight.

Such an artificial limb has great utility as for instance when it is desired to take a step up an inclined grade, such as going up hill. In such an instance, it is necessary to place the weight of the body on the limb while in various flexed positions. The present invention permits the wearer of the limb to use it in this manner and thus more closely approximate the actual use of a real limb than has been heretofore accomplished.

An illustrative embodiment of this invention is shown in the accompanying drawings in which:

Figure 1 is a vertical sectional elevation of the knee joint with its necessary connections and the improved locking mechanism, with portions of the shin and thigh sections.

Fig. 2 is a section taken on the line 2—2 of Fig. 1.

Fig. 3 is a front elevation of the artificial limb showing the suspender and suspender thongs in position.

In the construction shown in the drawings, the thigh section 1 is shown pivotally hinged by a pin 2 to a shin section 3, forming the usual customary knee joint connection for an artificial limb of this type. A back-check 4 is rigidly mounted at its lower end on shin section 3 and extends upwardly through a slot 5 in the lower end of the thigh section 1. The upper end of the back-check is pivoted on the pin 2 and when the shin and thigh sections are prolonged the back-check bears against a pad 6, which limits the forward swinging movement of the leg section.

A forwardly projecting arm 7 of the back-check 4 is provided with a roller 8 for receiving a thong 9 of the shoulder suspender in the usual manner. The thong 9, after passing underneath the roller 8 then passes upwardly and over the hub part of the back-check 2 and then downwardly at the rear thereof, passing underneath a roller 10 which is attached to the upper end of an elastic web 11, the lower end of said web being rigidly secured by screws or the like 12 to the shin section 3.

The improved locking means comprises a strap-like flexible member 15 which has one end attached to the outer front surface of the thigh section near the lower end thereof by screws or the like 16. Flexible member 15 passes down from this point of attachment into the upper open end of the shin section 3, around a rigidly mounted bearing member 17, which forms part of the locking device and thence upwardly around the outer back surface of the thigh section 1 and is attached thereto by screws 18. From a point near the medial part thereof, the flexible member 15 is bifurcated as shown most clearly in Fig. 2. One-half of the flexible strap member passes upwardly on each side of the back-check 4, elastic member 11 and suspender thong 9. When the shin and thigh sections are pivotally moved relatively to each other, the flexible member 15 slides back and forth across the bearing member 17 and means are provided for gripping the member 15 at the will of the wearer at any point so as to lock the sections against relative angular movement.

This gripping means comprises a cam member 20 pivotally mounted on a pin 21 carried on depending ears 22 of the bearing member 17. The face of the cam member 20 may be roughed or corrugated as shown at 23 so as to secure a better grip on the flexible member 15. The cam 20 is operated by an arm 24, one end of which is formed integrally with the cam 20 and the other end of which is pivotally secured to the lower end of a rod 25. The rod 25 passes upwardly through an opening 26 in the shin section and has its upper end secured to a pin 27, which carries the upper end of the elastic web 11.

In the operation of this artificial limb, the wearer operates the sections as he takes a step in the usual life-like manner by the shoulder suspender which is attached to the

thong 9 and which passes around the rollers 8 and 10. As is customary in legs of this character, the arrangement is such that the wearer secures a double action of the leg, that is, on the forward movement the leg flexes as it swings to the front and is then straightened before the weight is placed upon it.

At any time that the wearer wishes to lock the sections against relative angular movement, he lifts his shoulder an abnormal amount causing the suspender thong to raise the roller 10, thus stretching the elastic web 11, and thereby lifting the rod 25, which is attached to the arm 24 of cam 20. Upward movement of the arm 24 causes the cam 20 to engage or bear against the outer surface of the elastic member 15 and pinch it or grip it against the bearing face of the rigidly mounted bearing member 17. The direction of movement of the cam 20 is such that when it once engages the flexible member 15, additional strain on the member 15 tends to cause the cam 20 to have a tighter grip. As soon as the weight has been removed from the limb and the shoulder of the wearer lowered to its normal position, the elastic web 11 will pull down on the rod 25 and thus automatically release the cam member 20 from engagement with the flexible member 15.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. An artificial limb comprising pivotally connected shin and thigh sections, a bearing member mounted on said shin section, a flexible member having its ends attached to said thigh sections with the middle portion looped around said bearing member and adapted to slide thereover when said sections are pivotally operated, a locking member for clamping said flexible member against said bearing member, thereby locking said sections against relative angular movement and means independent of said pivotal connection for actuating said locking means.

2. An artificial limb comprising pivotally connected shin and thigh sections, a bearing member mounted on said shin section, a flexible member having its ends attached to said thigh sections with the middle portion looped around said bearing member and adapted to slide thereover when said sections are pivotally operated, a locking member for clamping said flexible member against said bearing member, thereby locking said sections against relative angular movement, a means independent of said pivotal connection for actuating said locking means to engage said flexible member and automatic means for releasing said locking means.

3. An artificial limb comprising pivotally connected shin and thigh sections, a suspender for controlling knee action of said limb, a flexible member having its ends attached to one of said sections and the medial part thereof looped around a portion of said other section so as to slide thereover when said sections are pivotally operated, and locking means operatively connected to said suspender for engaging said flexible member, thereby locking said sections against relative angular movement.

4. An artificial limb comprising pivotally connected shin and thigh sections, a suspender for controlling the knee action of said limb, a bearing member mounted on one of said sections, a flexible member having its ends attached to the other of said sections, and the medial part thereof looped around said bearing member so as to slide thereover when said sections are pivotally operated, and locking means operatively connected to said suspender for clamping said flexible member against said bearing member, thereby locking said sections against relative angular movement.

5. An artificial limb comprising pivotally connected shin and thigh sections, a suspender for controlling the knee action of said limb, a bearing member mounted on said shin section, a flexible strap member having its ends attached to said thigh section, a middle portion of said strap member contacting against said bearing member, and adapted to slide thereover when said sections are pivotally operated, a locking member for clamping said flexible member against said bearing member thereby locking said sections against relative angular movement, and means operatively connecting said locking member with said suspender.

6. An artificial limb comprising pivotally connected shin and thigh sections, a suspender for controlling the knee action of said limb, a bearing member rigidly mounted on one of said sections, a flexible strap member having its ends attached to the other of said sections and the middle part thereof contacting against the face of said bearing member so as to slide thereover when said sections are pivotally operated, and a locking member operatively connected to said suspender for pinching said flexible strap member against said bearing member thereby locking said sections against relative angular movement.

7. An artificial limb comprising pivotally connected shin and thigh sections, a flexible member attached to one of said sections with a part thereof looped around a portion of said other section so as to slide thereover when said sections are pivotally operated, locking means for engaging said flexible member thereby locking said sections against relative angular movement, and a suspender for controlling said locking means.

8. An artificial limb comprising pivotally connected shin and thigh sections, a flexible member attached to one of said sections with a part thereof looped around a portion of said other section so as to slide thereover when said sections are pivotally operated, locking means for engaging said flexible member thereby locking said sections against relative angular movement, a suspender for actuating said locking means to engage said flexible member, and automatic means for releasing said locking means. 25

9. An artificial limb comprising pivotally connected shin and thigh sections, a flexible member having its ends attached to one of said sections and the medial part thereof looped around a portion of said other section so as to slide thereover when said sections are pivotally operated, locking means for engaging said flexible member thereby locking said sections against relative angular movement, and a suspender for controlling said locking means. 30

11. An artificial limb comprising upper and lower sections having a pivotal connection, means for locking said sections together so as to prevent relative movement thereof around said pivotal connection, a suspender having connections for rocking said lower section forwardly on said pivotal connection and for operating said means to cause the two sections to be locked together. 35

Signed at Chicago this 23rd day of June, 1927. 45

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