

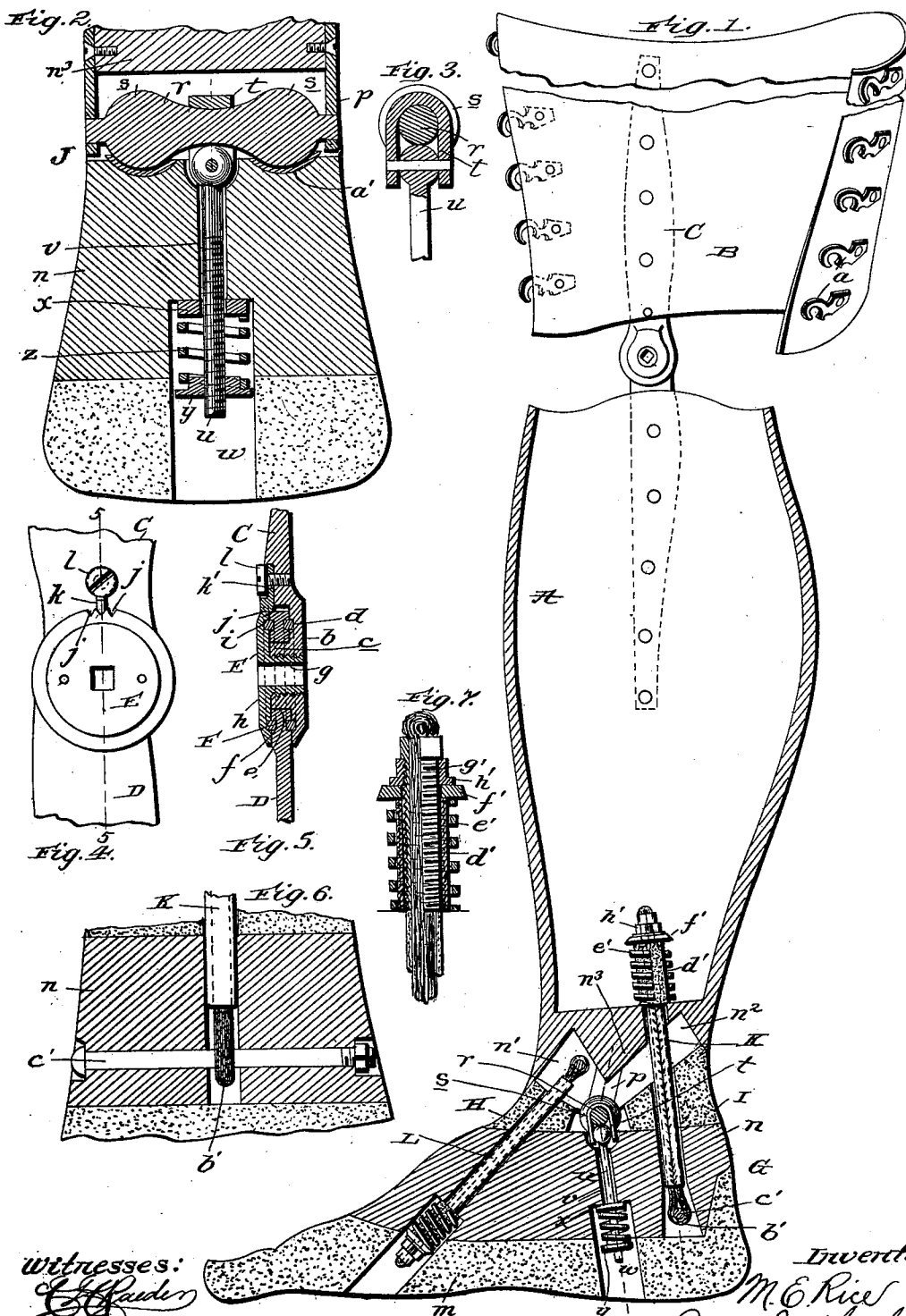
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M. E. RICE.
ARTIFICIAL LIMB.

(Application filed Jan. 23, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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ARTIFICIAL LIMB.

SPECIFICATION forming part of Letters Patent No. 630,630, dated August 8, 1899.

Application filed January 23, 1899. Serial No. 703,156. (No model.)

To all whom it may concern:

Be it known that I, MILO E. RICE, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented new and useful Improvements in Artificial Limbs, of which the following is a specification.

My invention relates to artificial legs; and it consists in the peculiar and advantageous combinations and the adaptation of parts hereinafter described, and particularly pointed out in the claims appended.

In the accompanying drawings, Figure 1 is a vertical section of an artificial leg constructed in accordance with my invention. Fig. 2 is an enlarged transverse section taken in the plane indicated by the line 2 2 of Fig. 1. Fig. 3 is a detail section taken on line 3 3 of Fig. 2. Fig. 4 is a detail side elevation illustrating the connection between the thigh-bar and leg-bar. Fig. 5 is a section taken on line 5 5 of Fig. 4. Fig. 6 is an enlarged transverse section illustrating the connection of the Achilles tendon to the wood portion of the foot. Fig. 7 is an enlarged sectional view illustrating the appurtenances of the Achilles tendon.

In the said drawings similar letters designate corresponding parts in all of the several views, referring to which—

A is the main portion of my improved artificial leg, which is of wood and made hollow, and B is a leather strip designed to be secured upon the leg of the wearer above the knee-joint and effect a connection of the artificial leg thereto. The strip B is provided adjacent to its ends with hooks *a*, which lie flat upon the same, so as not to catch into the apparel of the wearer, and are designed for the engagement of the usual securing-lace. (Not shown.)

C is a thigh-bar fixedly connected to the strip B, and D is a leg-bar fixedly connected to the main portion A of the leg. The bar C is provided at its lower end with a circular enlargement *b*, having a lateral, central, and interiorly threaded projection *c*, and also having a circular groove *d* in its inner face around the projection *c*. The bar D merges at its upper end into an annular portion *e*, having circular grooves *f* in its opposite sides.

This annular portion *e* of bar D receives the lateral projection *c* of the bar C, after the manner shown in Fig. 5, and is secured thereon by means of a screw E, which has a threaded shank *g*, arranged in the tubular projection *c*, and also has a flat head *h*, corresponding in diameter to the enlargements of the two bars. The screw E is also provided in the inner side of its head *h* with a circular groove *i*. In the grooves *f* of the annular enlargement *e* on bar D and the grooves *d* in the bar C and screw-head, respectively, are arranged rings F, of soft metal, the purpose of which is to permit of free movement of the bars C D with respect to each other and yet effectually prevent rattling and creaking. When the rings F become worn, the wear may be taken up by tightening the screw E, while when it is necessary to replace the said rings with new rings the parts may be readily disconnected for such purpose.

In order to prevent casual loosening of the screw E, the head *h* thereof is provided with three (more or less) peripheral indentations *j*. These indentations are designed for the engagement of a locking-key *k*, which is arranged in a depression *k'* and connected by a screw *l* to the bar C, so as to permit of its ready removal when it is desired to adjust the screw E or disconnect the parts of the joint, which is the knee-joint, of the leg.

G is a foot which comprises a lower portion *m*, of felt, and a superposed portion *n*, of wood. The felt is light and elastic in character and is extended in advance of the wood portion, as shown, so as to render the forward portion of the foot yielding and enable it to flex like the forward portion of the human foot. The felt is also extended beyond the rear end of the wood portion and preferably up in rear of said end, as shown, in order to render the foot yielding at the heel.

H and I are forward and rear cushion-sections of felt or other material arranged upon the wood portion *n* of the foot. These sections are arranged, as shown in Fig. 1, so that their upper portions will take slightly within recesses *n'* *n''*, disposed in front and rear of a V-shaped portion *n'''* at the lower end of the main portion A of the leg.

J is an ankle joint or connection between

the leg portion A and the wood portion *n* of the foot. This joint J comprises straps *p*, connected to the main portion A, at opposite sides thereof, and depending therefrom, a cross-bar *r*, having angular end portions let into similar apertures in the straps *p* and also having globular enlargements *s* at opposite sides of its middle, a yoke *t*, loosely straddling the reduced middle portion of the roller and adapted to rock thereon in the direction of the length of the foot, and a bolt *u*, arranged between and pivotally connected to the arms of the yoke and movable in a direction transverse of the foot. The bolt *u*, which is threaded, as shown, extends loosely through an opening *v* in the wood portion of the foot and into a recess *w* in the under side thereof, where it is equipped with a washer *x*, a nut *y*, and a coiled spring *z*, of rectangular form in cross-section, interposed between the nut and washer. The yoke *t* permits of a longitudinal rocking movement of the foot, and the globular enlargements *s* of the bar *r* bear in correspondingly-shaped leather-lined depressions *a'* in the upper side of the wood portion *n* of the foot and support the main portion A of the leg upon the wood portion of the foot without interfering with the longitudinal or transverse rocking movements of the latter, which is an important advantage. The spring *z* serves to yieldingly hold the wood portion of the foot against the felt sections II I and enable it to move and accommodate itself to the said sections as they are compressed and expand.

K is the Achilles tendon of the leg. This tendon, which is of buckskin or other flexible material, extends through registered openings in the part *n*³ of the main portion A, the felt section I, and the wood portion *n* of the foot and is provided at its lower end with a loop *b'*, which receives a bolt *c'*, passed transversely through the wood portion of the foot. Above the part *n*³ of the main portion A of the leg the tendon K is surrounded by a sleeve *d'*, of felt or other suitable material, which in turn is surrounded by a coiled spring *e'*. This spring is interposed between the part *n*³ of the leg portion A and a washer *f'*, of rawhide or other material, which surrounds a threaded metallic tube *g'*, secured on the upper portion of the tendon, and is arranged below a nut *h'* on said tube, as shown. The purpose of the spring *e'* is to yieldingly hold the rear part of the foot portion *n* against the rear interposed section I, of felt, as shown, and its tension may be readily regulated as desired by simply adjusting the nut *h'*.

L is a forward tendon, of buckskin or other suitable material, which extends through registered openings in the felt section H and the wood portion *n* of the foot. This tendon is provided below a shoulder in the wood portion *n* of the foot with a felt sleeve, a coiled spring, a metallic threaded tube, a rawhide washer, and a nut similar to those on the Achilles tendon. Said forward tendon is con-

nected by a transverse bolt *n*⁷ with the main portion A of the leg, as shown. From this it follows that while the tendons K L securely connect the foot to the main portion A of the leg they do not interfere with the foot rocking in the direction of its length and also transverse of its length within certain limits.

Having thus described my invention, what I claim is—

1. In an artificial leg, an upper main portion having depending straps at opposite sides, and a cross-bar fixed in and interposed between the straps and having globular portions at opposite sides of its middle; in combination with a foot having depressions in its upper side shaped in conformity to and receiving the globular portions of the cross-bar, a yielding connection between the middle of the cross-bar and the foot, forward and rear cushion-sections of felt or other suitable material interposed between the upper main portion and the foot, and forward and rear flexible and yielding connections between the upper main portion and the foot, substantially as specified.

2. In an artificial leg, an upper main portion having depending straps at opposite sides, and a cross-bar fixed in and interposed between the straps and having globular portions at opposite sides of its middle, in combination with a foot having depressions in its upper side shaped in conformity to and receiving the globular portions of the cross-bar, a yoke loosely mounted on the middle of the cross-bar, a threaded bolt connected in a hinged manner to the yoke and loosely extending through an opening in the foot, a nut on said bolt, a spring interposed between the nut and the foot, forward and rear cushion-sections of felt or other material interposed between the upper main portion and the foot, and forward and rear flexible and yielding connections between the upper main portion and the foot, substantially as specified.

3. In an artificial leg, an upper main portion of wood; in combination with a foot comprising a lower portion of felt and an upper portion of wood; the felt extending in advance of the wood and also up at the rear end of the same so as to cover said end, forward and rear sections of felt interposed between the main portion of the leg and the wood portion of the foot, a yielding connection between the main portion of the leg and the foot arranged between the interposed felt sections, and yielding and flexible connections between the main portion and the foot extending through said felt sections, substantially as specified.

4. In an artificial leg, an upper, main, hollow portion closed at its lower end; in combination with a foot, a cushion interposed between the main portion and the foot, a tendon of flexible material connecting the main portion and the foot and extending through the interposed cushion and the lower end of the main portion, a threaded metallic tube

secured on the tendon, a sleeve of elastic material surrounding said tube, a coiled spring surrounding the sleeve, a nut mounted on the threaded tube, and a washer interposed between said nut and the spring, substantially as specified.

In testimony whereof I have hereunto set

my hand in presence of two subscribing witnesses.

MILO E. RICE.

Witnesses:

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