(No Model.)

W. LOCKWOOD.

ARTIFICIAL LIMB.

No. 315,519. Patented Apr. 14, 1885.

Fig. 1.

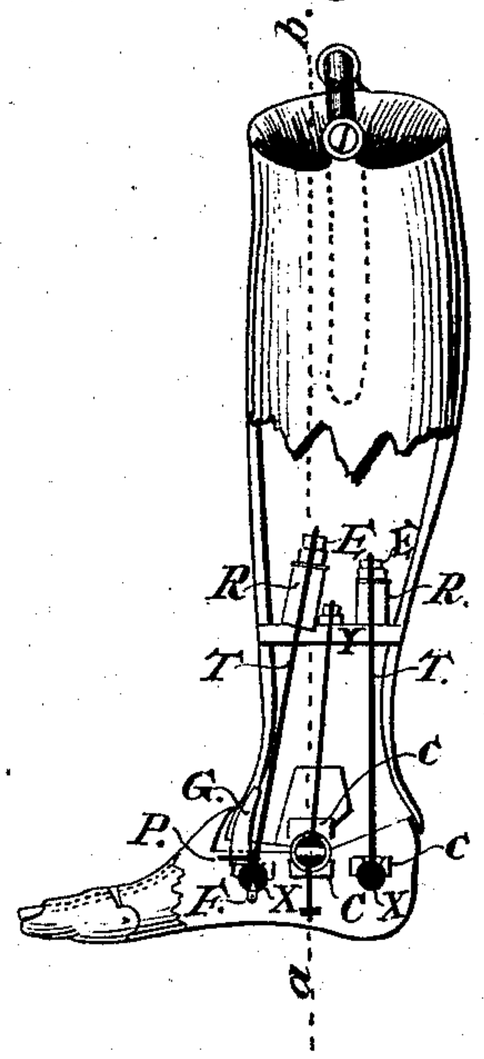


Fig. 2.

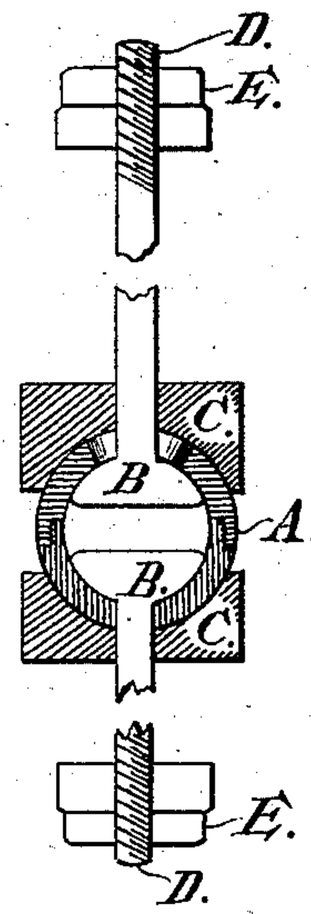


Fig. 3.

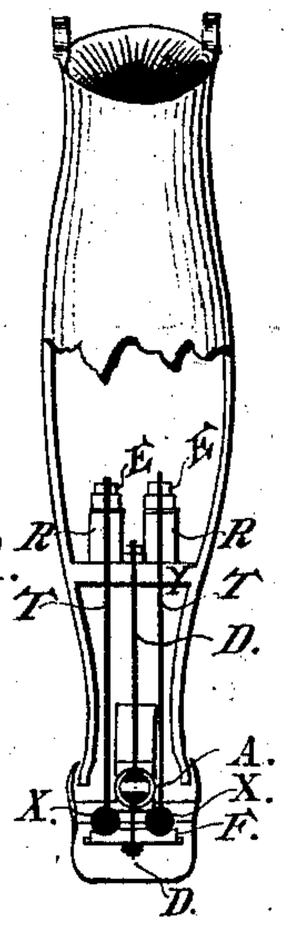
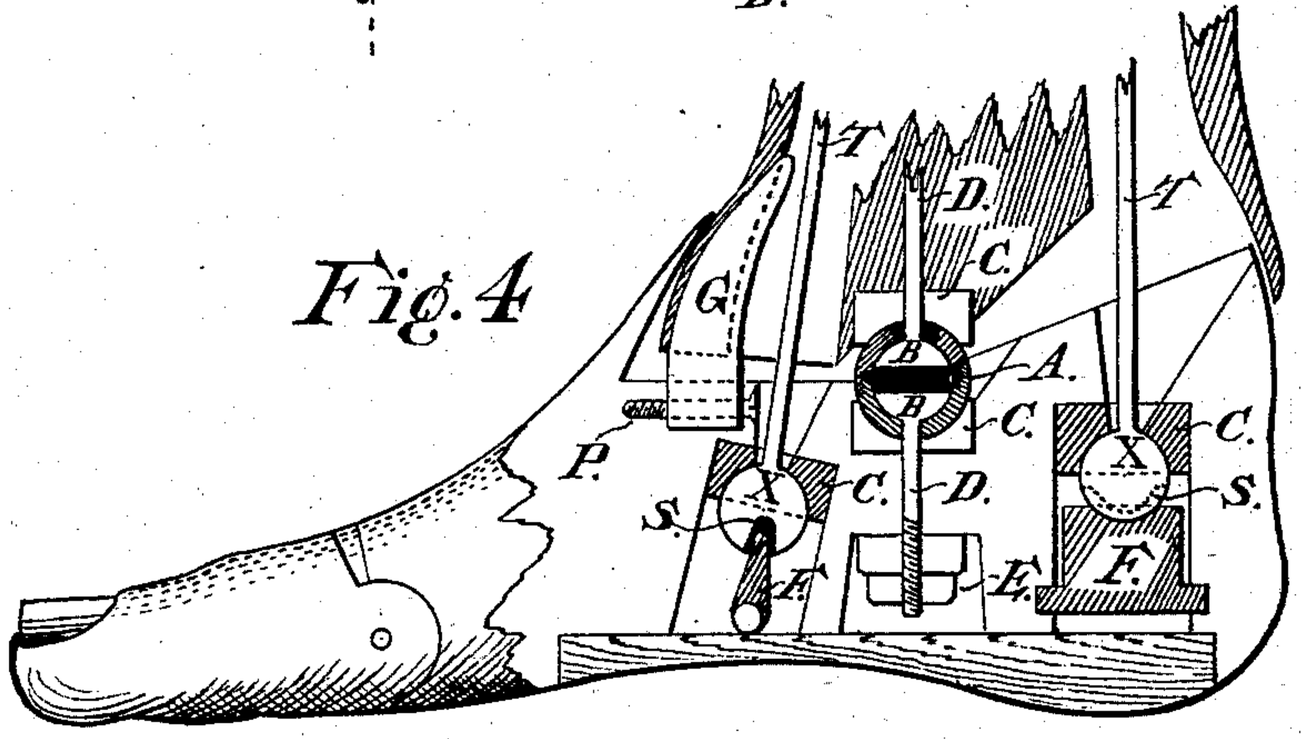


Fig. 4



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLSHIRE LOCKWOOD, OF ST. LOUIS, MISSOURI.

ARTIFICIAL LIMB.

SPECIFICATION forming part of Letters Patent No. 315,519, dated April 14, 1885.

Application filed January 3, 1885. (No model.)

To all whom it may concern:

Be it known that I, WILLSHIRE LOCKWOOD, a citizen of the United States, residing at St. Louis and State of Missouri, have invented new and useful Improvements in Artificial Legs, of which the following is a specification.

My invention relates to improvements in the construction of an ankle-joint in an artificial leg with lateral or side motion, and which operates in conjunction with three tendons; and the objects of my improvements are, first, to reduce the number of tendons in a universal or lateral motion artificial leg, and construct the ankle and the foot in such a manner that I can use a system of three tendons—two in front and one in rear, or vice versa; second, to afford facilities for the proper adjustment of the tendons independently of each other, and to avoid all chafing or chewing off of the tendons, and allowing the same to rotate with the movement of the ankle and the foot without injury to the tendons; third, to provide an ankle-joint with universal or lateral motion, with a connecting-link between the ankle and the foot independently of the tendons, for the purpose of regulating the tension of the ankle-joint and taking up all wear or lost motion, and to construct the ankle-joint in such a manner as to give it a universal or lateral motion of a more durable character, and to make it approach as near as possible the natural limb in all its movements. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of an artificial leg, showing one of the two front tendons and the rear tendon, with the movable and mechanical device of the ankle-joint, in combination with the two semi-globular headed rods; Fig. 2, a section of the limb, showing more completely the formation of the ankle-joint. Fig. 3 represents the reverse section of the leg through the dotted lines *a b* of Fig. 1, showing the two front tendons and a sectional view of the ankle-joint, in combination with the semi-globular headed rods. Fig. 4 is a scale-section of the foot representation of Fig. 2, to afford a better illustration of the mechanical device of the same for the unhampered movement of the two front and the rear tendon in connection with the center movement, as shown in Fig. 2.

Similar letters refer to similar parts throughout the several views.

The round shell A is formed of two hemispheres screwed together, and each has an oblong slot cut transversely—one in the upper side, the other in the lower side, of shell—to admit the rods D D to pass through from inside of the shell, where the semi-globular heads B B are held, and one end of one rod D passes up into the ankle, the other through the foot, constituting the articulating mechanism of the foot and ankle, in combination with the hollow sockets C C and the three tendons T T T. The shell A is partly embedded in the hollow sockets C C of both the foot and ankle, permitting free articulation. The two semi-globular heads B B of the rods D D are in the inside cavity of the shell A, by means of which the foot and ankle are connected independently of the tendons T T T. (See Figs. 1 and 3.) The semi-globular heads B B of the rods D D inside of the shell A adjust themselves to any required position by the movement of the ankle and foot, in combination with the rods D D and the ankle and foot. The rods D D pass from the inside of the shell A through oblong slots cut transversely and opposite each other—one up into the ankle, the other through the foot—and permit the free movement of the leg in one direction and the foot in another. They are provided with screws and nuts—one in the leg, the other in the bottom of the foot—for the purpose of drawing the semi-globular heads B B close to the inside surface of the shell A, and thus holding the foot and the ankle together independently of the tendons T T T, and taking up all wear or lost motion.

T T, Fig. 1, represent one of the two front tendons and the rear tendon. T T, Fig. 3, are the two front tendons. All of these tendons are provided with rubber springs R R R, which permit the rotation of the foot and ankle by their expansion and contraction, in combination with the three tendons T T T, which are provided with spherical or rounded ends X X X, as illustrated in Figs. 1, 3, and 4, and which permit a free rotary movement in the concave sockets C C C. The sockets C C C are provided with a proper incut, in order to permit the free movement of the tendons T T T in any direction required by the use of the

leg, and thereby prevent any bending or chafing of the tendons T T T. The tongues F F F, in connection with the spherical ends X X X of the tendons T T T, work in grooves engraved in the lower sides of the spherical ends X X X of the tendons T T T, and are intended to prevent the rotation of the tendons T T T when taking up the wear and regulating the tension of the rubber springs R R R by means of the screw and nut on the upper ends of the tendons T T T.

G is a rotating stopper working on a pivot for the prevention of any rotary motion of the foot and the ankle horizontally, thereby protecting the tendons T T T from side friction, and keeping the foot and the ankle in their proper relative positions.

I am aware that solid round balls have been used for the ankle-articulation of an artificial leg, and also of the spherical hollow joint with arms attached on each side of the hollow joint, with four rods clasping the same, two passing up into ankle, holding ankle-bolt to the upper part, and two passing into foot, for which Letters Patent were granted to C. D. Leach, February 24, 1874, No. 154,689; also of the improvement of a flexible joint composed of two plates with conical sockets and a rod with double conical head resting in a base, both placed together to keep the rod in same position, for which Letters Patent were granted P. M. Wolf, September 19, 1882, No. 264,812.

I am also aware of the construction of the ankle-joint with ball and socket or cup and spring for the moderate play of same, for which Letters Patent were granted to Englebrecht, Rocklen, and Staehlen, January 6, 1863, No. 37,282.

I am also aware of the construction of an ankle-joint for an artificial leg where the halves of the hollow shell are permanently riveted together after insertion of the hemispherical heads of the uniting-rods, for which Letters Patent were granted George L. Shepard, May 17, 1864, No. 42,799.

I am also aware of the construction of the ankle and foot of an artificial leg with lateral or side motion, in combination with four and five tendons. I therefore do not claim such a combination, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in the ankle-joint of an artificial leg, of a round hollow shell, A, which is made in two parts screwed together with the two rods D D, with semi-globular heads B B, inclosed in the shell-cavity, all substantially as described, and for the purpose specified.

2. The combination, in an artificial leg, of the three tendons T T T, with spherical or rounded ends X X X, and the hollow sockets C C C, substantially as described, and for the purpose specified, as set forth.

WILLSHIRE LOCKWOOD.

Witnesses:
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