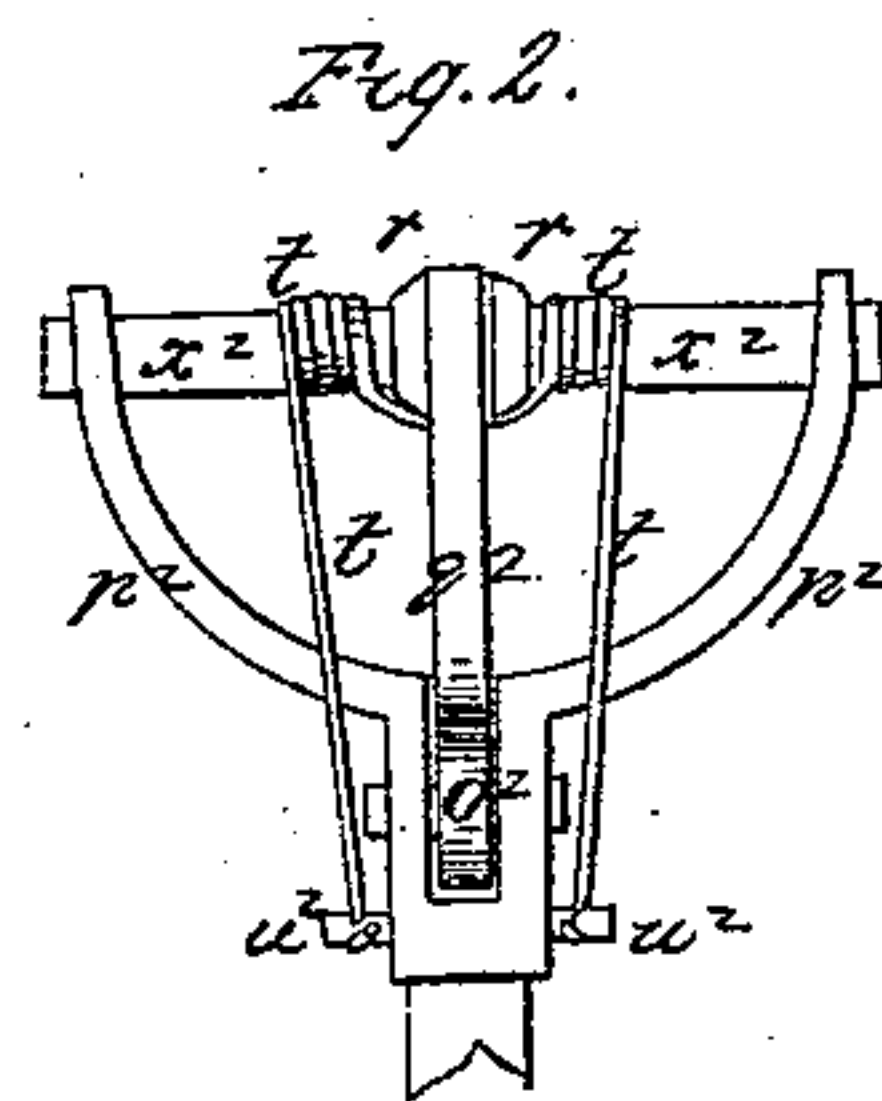
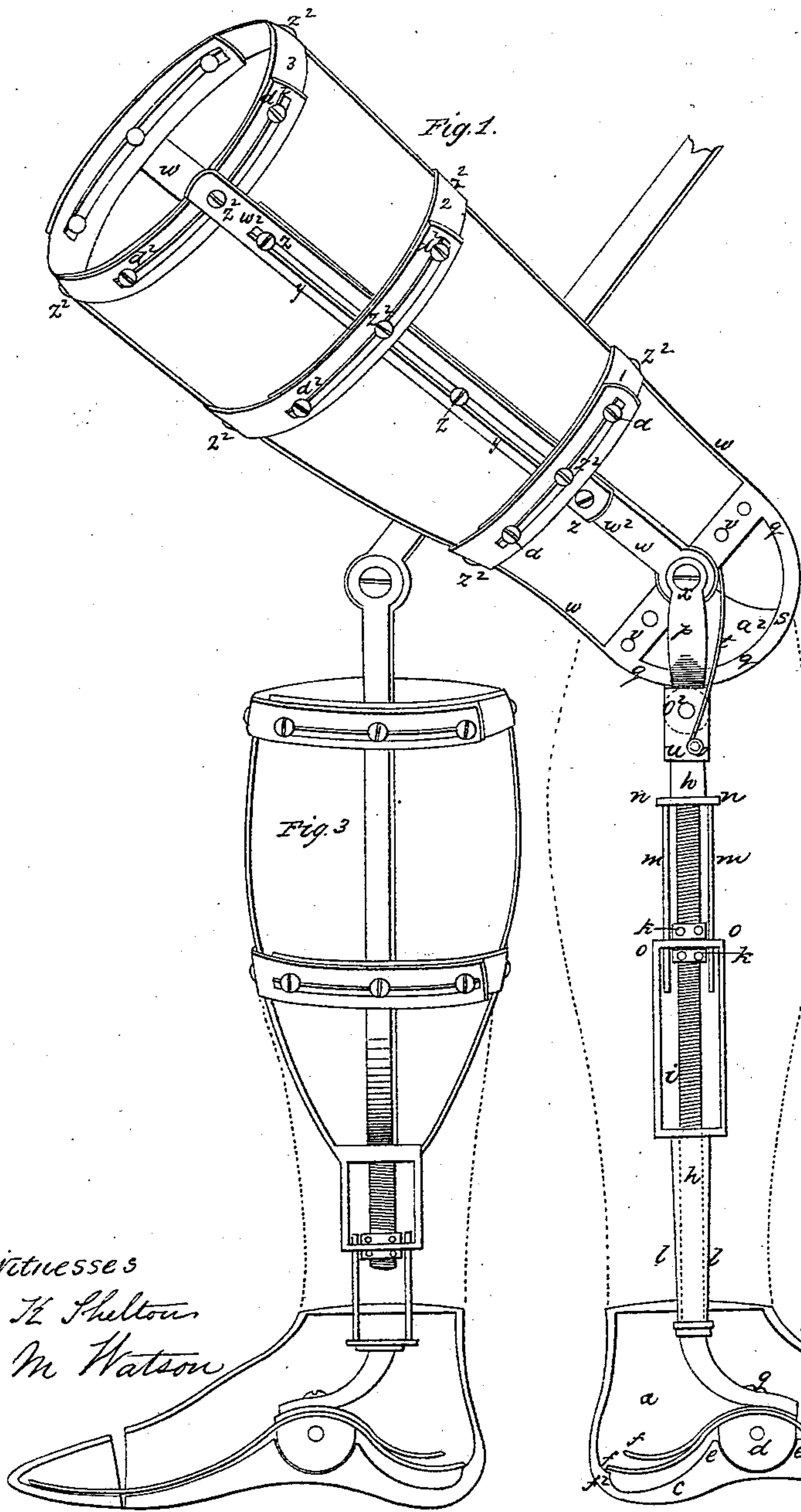


*A. T. Watson,*  
*Artificial Leg.*

*N<sup>o</sup> 61,780.*

*Patented Feb. 5, 1867.*



*Witnesses*  
*H. H. Shelton*  
*A. M. Watson*

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# United States Patent Office.

ALEXANDER T. WATSON, OF NEW YORK, N. Y.

*Letters Patent No. 61,780, dated February 5, 1867.*

## IMPROVEMENT IN ARTIFICIAL LEGS.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, ALEXANDER T. WATSON, of the city, county, and State of New York, have invented a new and useful Improvement in Artificial Legs; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, in which—

Figure I represents the artificial leg suitable for amputations at or above the knee, the means of attachment to the thigh being represented in perspective.

Figure II is a cross-section of the knee joint; and

Figure III is a view of an artificial leg partly in section, as adapted to amputations below the knee.

The object of my said invention is to produce an artificial leg, approximating to the skeleton of the human leg, but capable of being lengthened or shortened, and expanded or contracted in the direction of the circumference, at pleasure, so as to suit any ordinary-sized person, and which may be applied to any amputation of the thigh, leg, or foot, and which may be used for the right or left, as required.

In the accompanying drawings, Fig. I, *a a* represents the artificial foot, which I prefer to make of wood, in the form of a last, cut in two in a longitudinal vertical plane. The inside is partially cut out, as represented, taking care to leave sufficient thickness of wood for the required strength, at *c c*. The toe part *b* is separated and cut away from the upper part, and the two parts, so separated, are then connected by a hinge-joint, so that the toe end *b* may yield in walking, whilst, at the same time, a spring, to be presently described, tends to carry it back to a natural position. The foot, formed as before described, or in any analogous manner, is then connected with the leg by a fulcrum-bolt passing horizontally through the foot, to which it is firmly secured by a nut and screw on one end of said bolt; this bolt also passes through the bolt-hole in the metallic segment at *d*. The lower part of the periphery of said segment is fitted to turn in a socket formed in the inside of the foot at *e e*, so that the fulcrum or ankle-joint bolt need not sustain the whole weight. The hole in this metal segment *d* is slightly enlarged towards each end, to enable the fulcrum or ankle-joint bolt to vibrate in it laterally, that the foot may turn slightly. A spring, *f*, is fitted and secured to the upper part of the segment *d*, and the front end of it curves down to rest on the bottom of the inside of the foot, and extends into the cavity of the hinged toe piece *b*, and the rear end of the said spring curves down into the cavity of the heel, and rests on the bottom thereof, so that when the foot in walking is thrown forward, and the heel first strikes the ground, the spring will permit it to yield downwards, and as the foot falls back by the forward motion of the body, the front part of the spring will yield and allow the front part of the foot to yield upwards, and, finally, the toe piece will yield upwards, thus causing the foot to yield and return to the original position, as the natural foot does in walking. To give greater power of resistance to the heel, I prefer to make the spring *f* double at the rear end, as represented, or more springs may be added, if necessary, the leaves being separated at some distance, one from the other, so as to be brought into action one after the other, as pressure is made on the heel. The parts of the foot on which the spring bears, I prefer to line with leather or other substance more yielding than wood. The leg piece *h h* is in two parts, an upper and lower; the upper part having a screw, *i i*, passing through a hole in the head of the lower part in the transverse piece at *o*, and entering into a chamber drilled in the lower portion of the lower part of the leg, as represented by the dotted lines *l l*. *m m* are guide-rods descending in front and rear of the screw *i i*, and are secured to the cross-piece *n n* of the upper portion of the leg, and through holes in the cross-piece *o o* of the lower portion of the leg. The action of the guide-rods is to prevent the foot from turning. The lower end of the lower part of the leg *h* is solid, and so formed, as represented, that it can be firmly secured to the upper part of the segment *d* by the screw *g*, which, at the same time, secures the spring *f*, which is interposed as represented between the lower end of the leg and the segment *d*. Binding or jam-nuts *k k* are placed on the screw *i*, one above and the other below the cross-piece *o o*, and hold the upper and lower part of the leg firmly together when the required length has been obtained. Other and equivalent means may be substituted for adjusting the length and for holding the parts firmly when set, and to prevent the one part from turning on the other, viz, the same effect may be produced by tubes sliding one within the other, as a telescope, and having within a right and left screw to lengthen and shorten. The upper part of the upper portion of the leg is bifurcated, (Fig. I, *p*, Fig. II, *p<sup>2</sup> p<sup>2</sup>*), forming about a semicircle, and their upper ends are fitted to turn on the ends of an axle, Fig. II, *x<sup>2</sup> x<sup>2</sup>*, which forms the knee-joint. From the middle of this axle an arm



extends down, and its extreme end is attached to or makes part of a segment,  $q$ , (Fig. I,  $q^2$ , Fig. II,) the upper ends of which are secured to a loop  $r$ , Fig. II, through the diameter of which the axle  $x^2$  extends, and to which it is secured, so that the loop is between the two bifurcations  $p^2$  of the upper portion of the leg. The upper end of the upper portion of the leg, and before it bifurcates, is slotted, and within this slot is mounted a friction-roller, (Fig. II,  $o^2$ , Fig. I, dotted lines  $o$ ,) which rolls against the periphery of the segment  $q^2$ , (Fig. II,  $q$ , Fig. I,) the extent of which below the loop  $r$ , Fig. II, is a semicircle, and this segment is formed with a shoulder, (Fig. I,)  $s$ , on each side and a little forward of the middle, to act as stops to the upper part of the leg to prevent it moving forward of a vertical, or nearly vertical, line when the person is standing up. In this way the leg can move on the axle  $x^2$  as a knee-joint to the extent of about a quarter of a circle, and there are two springs  $t$ , Fig. II, attached to the axle  $x^2$ , and to the upper part of the upper portion of the leg at  $u$ , the tension of which will bring back the leg in line with the thigh, whenever it is liberated, either when walking or in rising from a seat. The lower ends of the four straps  $w$ , which I prefer to make of metal, are secured to the hoop  $v$ , and each of these straps is made of two parts,  $w^2$ , lapped and slotted longitudinally to secure flat-headed screws  $z^2$ , by which the two parts are held together, but by means of which the length can be increased or decreased to meet the length of the thigh to which they are to be applied; and there are three other flat hoops, 1 2 3, secured to the straps by means of flat-headed screw bolts  $d^2$ , and the said hoops are formed with lap-joints slotted and secured by flat-headed screw bolts, so that their circumference can be varied to suit the person to which an artificial limb is to be applied; felt, leather, or other suitable material being interposed between the stump and the metal hoops and straps to form a socket for the protection of said stump.

The modification of my invention to suit an amputation of the leg below the knee is represented in Fig. III of the accompanying drawings. In such modification, the mechanism above the knee, and as described, is not required. Hoops, such as in Fig. I, are required to be applied to the stump of the leg, and connected with four longitudinal straps; two do not extend above the hoop next below the knee, but the two side ones extend up to the knee-joint, and are there to be connected by rule joints to the side thigh straps. The thigh straps are to be secured to the thigh by adjustable hoops, as for amputation above the knee.

It will be obvious, from the foregoing, that some of my said improvements may be used without others by substituting other means, and therefore I do not wish to be understood as limiting my claim of invention to the use of all my said improvements in combination or connection.

#### *Claims.*

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

The connection of the foot with the leg by means of the joint, substantially as described, in combination with the springs extended both ways, for action at the heel and at the toes, substantially and for the purposes described.

I also claim the toe piece hinged to the front part of the foot, substantially as described, in combination with the spring which controls the movements, substantially as described.

I also claim the leg made in two parts and adjustable in length, substantially as described, or any equivalent thereof for adjusting the length of the leg.

I also claim the adjustable longitudinal straps and the adjustable hoops in combination, substantially as described, as a means of fastening the artificial leg to the thigh or to the stump of the leg, as described.

I also claim the knee-joint, substantially as described, in combination with the leg and foot or their equivalents.

ALEX. T. WATSON.

Witnesses:

N. C. TEMPLETON,

G. S. LOTT.