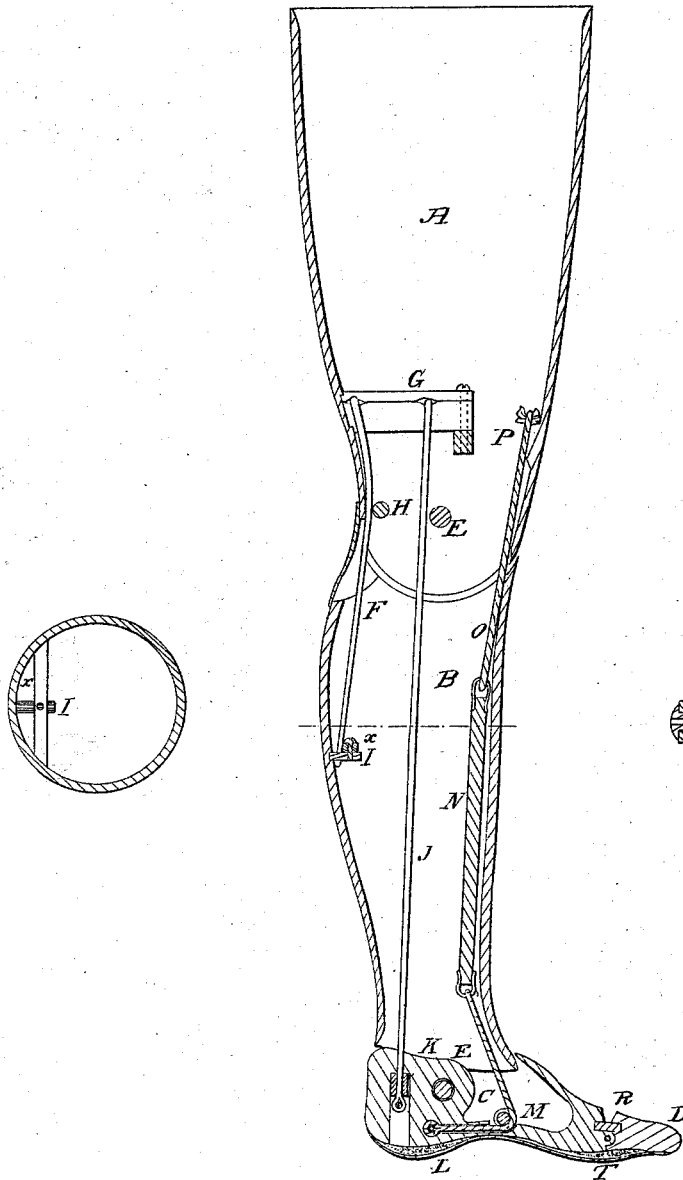


*R. Clement,  
Artificial Leg.*

*N<sup>o</sup> 47,281.*

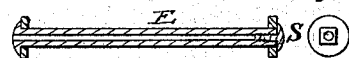
*Patented Apr. 18, 1865.*

*Fig 1*



*Fig 2.*

*Fig 3*



*Witnesses  
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# UNITED STATES PATENT OFFICE.

RICHARD CLEMENT, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN ARTIFICIAL LEGS.

Specification forming part of Letters Patent No. 47,281, dated April 18, 1865.

*To all whom it may concern:*

Be it known that I, RICHARD CLEMENT, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Artificial Legs and Feet; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a representation of a vertical section of the leg and foot, and the letters marked thereon represent the parts and uses hereinafter designated. Fig. 2 is a representation of a hollow polished steel bolt that serves as an axle or pivot for the knee-joint and forms a portion of the same. It is also represented on the drawings by the letter E.

A is the socket or thigh portion of the leg.

B is the portion of the leg between the knee and the foot. I construct these parts of any suitable material that is light and strong, and I make them hollow to receive the stump of the living leg, to contribute to their lightness and make room for the internal mechanism hereinafter described.

C is the heel and instep portions of the foot, and D is the toe portion thereof. These parts are also made of any suitable light and strong material, and C is likewise hollow from a point immediately forward of the heel to the center of the ball of the foot. The whole may be covered with leather or other suitable and lasting material, or it may remain uncovered. I prefer to have it covered.

Passing through the knee joint, and forming the axle or pivot thereof, is a hollow polished steel bolt. (Marked E.) It is also represented on the drawings by Fig. 2. This bolt has a button-head fitted in the outside of the leg, and passes through iron or steel plates on either side of the inside of the leg. The opposite end of this bolt is made in a square form, and fits closely in a square mortise in the plate in which it rests. I fasten it in this square mortise by means of a button-headed screw, which enters its point from the outside of the leg and holds it securely in its place.

This screw is represented on the drawings by the letter S, and the square end of the bolt resting in its mortise in the plates is shown by Fig. 3. The point at which the

said screw enters the bolt is also represented on said Fig. 3 by the circle in the center thereof.

Passing through the ankle-joint is another bolt, also marked E on the drawings, and which in its construction, operation, and mode of fastening is in all respects like the one above described, except that it is made less in length to correspond with the diminished size of the leg at that point.

I connect the toe part of the foot with the instep part thereof by means of a tongue-and-groove joint working on a steel pin that extends through the same and from side to side of the foot. The forward end of the instep part of the foot and the rear end of the toe part thereof from the said joint upward are cut at an angle of about twenty degrees, so as to allow them to separate at the top about half an inch asunder. This is done in order to give room for the toe part to move sufficiently upward when walking, and also when the toes have reached the desired angle to shut closely together and prevent them from raising too far upward, and forming a firm rest for the same while moving the other foot. In the middle of this opening above the joint and in mortises cut for the same, one in the toe part and one in the instep part of the foot, I secure a piece of vulcanized india-rubber about one inch in length, one inch in breadth, and half an inch in thickness. This india-rubber serves to keep the toe part down in its proper position when the leg is at rest, and when the leg is in use it aids locomotion by imparting an elastic spring to the toe part of the same. This india-rubber spring is represented on the drawings by the letter R.

Below the last-mentioned joint I allow the two parts of the foot above described to join closely together, as represented on the drawings by the letter T. I call this point of junction a stop. Its office is to give strength and stability to the joint and effectually prevent the toe part of the foot from falling below its proper position. It opens when the weight of the body falls on the toes, but by the action of the spring R it closes again when that weight is removed, and, as the two parts abut closely against each other, the toes are es- topped from falling below their proper line.

F is a firm linen cord extending from the transverse beam G, above the knee-joint, passing the wooden bolt H, and fastened to the removable pin I at a point immediately below the calf of the leg.

On the back side of the lower part of the leg, immediately below the calf thereof, and on the inside, I secure the removable pin I. This is done by placing one end thereof in a mortise or groove in the side of the leg and resting the other against the lower side of a wooden bolt, *x*, which is placed for that purpose across the leg at right-angles with said pin. I also fasten said pin in its place by means of a screw that passes through said wooden bolt into said pin and holds it securely. The method of removing this pin is as follows: I first draw the screw from the knee-bolt E and remove said bolt. This act leaves the socket free to be swung to one side and enables me to reach the screw that enters and holds the pin. I then draw that screw also and the pin is loose. The removal of this pin enables me to duplicate the cord F whenever it may be necessary without any injury whatever to the leg. Now, inasmuch as the cord F is the principal one that supports the knee-joint, and upon which greater wear and strain are made than upon any other, the removal of said pin is frequently required, and its value becomes apparent.

G is a transverse beam fastened at one end only in the inside of the socket, and serves as a fastening-bar for the cords F and J and a fulcrum upon which they may be tightened.

H is wooden bolt extending across the leg parallel with the steel knee-joint bolt E, and serves as a guide and stay to the cord F.

J is a firm linen cord extending from the transverse beam G to the center of the heel of the foot. In the upper end of the heel it passes through a small opening only large enough to receive it and allow it suitable motion, but near the middle of the heel it passes into a mortise cut for that purpose in the lower side of the heel, and is made fast therein by a knot or by being tied around a suitable pin.

K is an india rubber ring that encircles the cord J between the knot or pin, by which it is fastened in the heel and the upper end of the said mortise. The upper side of this india-rubber ring rests against the upper end of said mortise in the heel, and the lower side thereof rests upon the knot or pin, by which said cord is fastened in the mortise. The office of this india-rubber ring is to act as an elastic spring in the heel of the foot. This it

accomplishes by being compressed when the cord is drawn taut, and expanding again when the strain is taken off. Thus when the heel is lowered, the strain on the cord forces the rubber ring up against the top of the mortise and compresses it there; but when the toes are lowered the cord is slackened and the ring expands again to its usual proportions. I call this ring the "spring" K.

L is a firm gut cord, which is fastened at its lower end in a mortise cut for that purpose near the lower end of the heel, and, passing around the pulley M, just forward of the hollow of the foot, and on which said pulley it works, is united with the elastic spring N at a point about three inches above the ankle-joint.

The elastic spring N is an india-rubber cord, or I may make it of steel wire in a spiral form, or of any other suitable and elastic material. It is usually about six inches in length. Its lower end is connected with the gut cord L and its upper end with the gut cord O.

O is a gut cord extending from the elastic spring N to the triangular holder P above the knee-joint.

The triangular holder P is a projection in the inside of the front part of the socket for the purpose of forming a means of fastening for the cord O, and also it is used as a fulcrum upon which the tension of the cord may be lessened or increased.

The advantages gained by my method of fastening the bolts E E in the square mortises are that they are more easily adjusted and taken apart than by any means heretofore devised for those purposes, and that by the use of a screw-driver only said bolts may be kept firmly in their places, so as to prevent wearing in the plates or the wood and free from noise. It is also apparent that the button-heads to the bolts and screws are much more neat in appearance than the square nuts commonly used for such purposes.

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

1. The removable pin I, when used in the manner and for the purposes specified, substantially as described.

2. The cord L, in combination with the pulley M and spring N, when constructed in the manner and for the purpose specified, substantially as described.

RICHARD CLEMENT.

Witnesses:

J. C. SMITH,  
FRED. B. GINN.