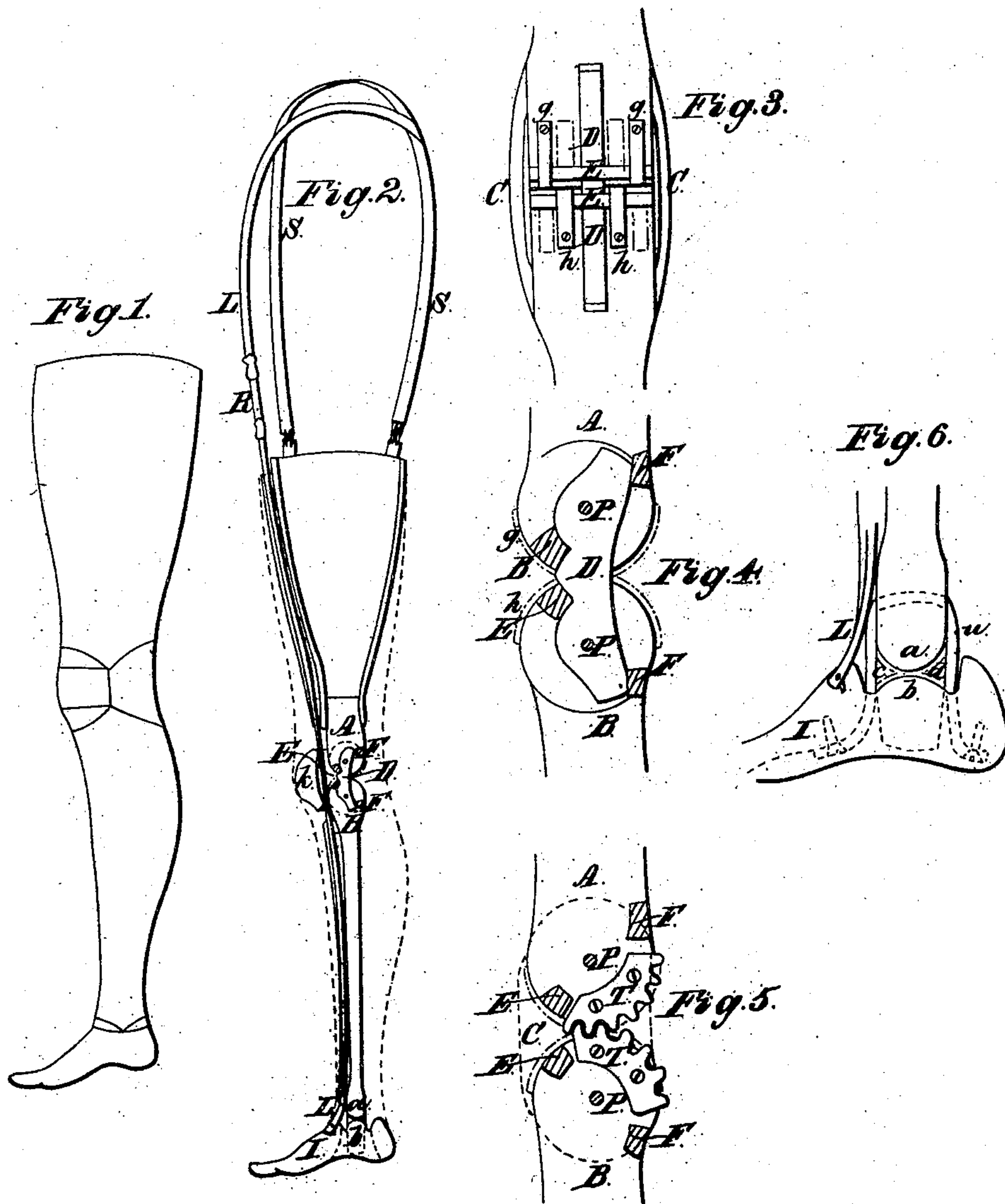


*U. Smith,  
Artificial Leg,*

*No 39,361,*

*Patented July 28, 1863.*



*Witnesses.*

*William E. Sherman  
Moses B. Russell*

*Inventor.*

*Ursah Smith*



# UNITED STATES PATENT OFFICE.

URIAH SMITH, OF BATTLE CREEK, MICHIGAN.

## IMPROVEMENT IN ARTIFICIAL LEGS.

Specification forming part of Letters Patent No. 39,361, dated July 28, 1863.

*To all whom it may concern:*

Be it known that I, URIAH SMITH, of Battle Creek, in the county of Calhoun and State of Michigan, have invented a new and Improved Artificial Leg; 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 an external view of the leg, stuffed and covered for wearing. Fig. 2 is a sectional profile view. Fig. 3 is an enlarged front view of the knee-joint with the patella removed. Fig. 4 is an enlarged profile sectional view of the knee-joint. Fig. 5 is a profile view of the knee-joint with one of the side pieces, C, removed. Fig. 6 is an enlarged view of the ankle-joint.

In all the figures the same letters refer to the same parts.

The construction of this leg is as follows: The lower end of the femur or thigh-bone A and the upper end of the tibia B are rounded laterally to a true circle and brought together so as to take bearings end to end against each other, thus dispensing with a bolt at the knee-joint. These parts are held in place by the straps *g g h h*, the side pieces, C C, Fig. 3, and the pins P P. The central perpendicular bar, D, is held in its place by the pins P P. Cross-bars E E F F are screwed fast to the upper and lower leg-pieces, A B, in such a manner as to arrest the motion of the upright bar D when the leg is straightened, two of them, E E, near the center, the others, F F, at each of its extremities, thus forming an efficient and substantial knee-stop, without bringing any strain upon the pins P P or the straps *g g h h*. The knee-joint is further strengthened by the toothed segments T T on each side of the knee-joint, (two only of which are shown at Fig. 5,) to enable it to sustain any twisting strain or any weight borne in the lap of the wearer while in a sitting posture.

The ankle-joint is formed by projections *a* upon the tibia, (one of which is seen at Fig. 6,) resting upon corresponding shoulders, *b b*, on the foot-piece I, held in place by straps *c d*, applied as in the knee-joint, thus forming a solid bearing at this point without the use of a bolt.

The motion of the foot is limited by the tenon of the tibia striking at diagonal points in the mortise of the foot-piece, thus forming an efficient stop for the ankle-joint, yet bringing no strain upon the straps *c d*.

The foot is held to the leg by the cord *u*, which, though loose enough to allow an easy motion to the foot without friction, is yet tight enough to hold it firmly to its place.

I operate both the knee and ankle-joints by one cord, L, attached to the instep of the foot, passing up through the leg, over the knee-joint under the patella, and attaching at some point above the leg to the supporting-strap S. It will be seen that as the knee is flexed in the act of walking a strain immediately comes upon the cord L, which being attached to the foot lifts the toes, and being drawn over the knee-joint, acts as a most effective knee-spring in the forward movement of the leg. Thus the living body is made to impart of its vigor and elasticity to the artificial appendage.

To save any unpleasant sensation from the sudden strain upon the cord L, a piece of elastic is inserted in that cord at R.

The advantages which I claim for this leg are—

First. The knee-joint admits of being bent back to the full extent of the natural limb, thus relieving the wearer from the many cramped and uncomfortable positions in which he is continually finding himself with a knee-joint that will bend only to an angle of ninety degrees; and, further, enabling him to assume any position that he could with the natural limb:

Second. A solid and continuous support of wood is obtained from the body to the ground without the use of bolts, which usually add greatly to the weight of the limb.

Third. All springs in the leg are dispensed with, thus avoiding the necessity of frequent repairs.

Fourth. Legs, which have a spring attached near the ankle-joint, to operate that joint, keep the toes elevated when the wearer is sitting, and the foot is relieved from pressure, which is an awkward position. With this leg, when a person is sitting, the cord L is relaxed, allowing the toes to drop into their natural position.

Fifth. Legs that have a spring in the knee-joint tax that spring to its utmost when the



leg is flexed in the sitting posture, and being in this position so large a proportion of the time, as it must necessarily be, the spring will eventually lose its elasticity and become inoperative. With this leg, when a person is in the sitting posture, the cord L is relaxed and the elastic R is relieved from all tension whatever, no strain being put upon it, except in the act of walking, which is the only time when its action is required.

Sixth. This elastic being inserted in the cord L, not in but above the leg, its tension can be regulated by the wearer with the utmost convenience without even removing the limb.

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

1. A knee-joint formed by the two parts A B, representing the femur and tibia, brought together in such a way as to take bearings end to end against each other, and held in their normal relations to each other by the straps *g g h h*, the side pieces, C C, the bar D,

and the pins P P, the ends of the said pieces A B being rounded, so as to allow the knee to be flexed to the full extent of the natural limb.

2. A knee-stop formed by the cross-bars E E F F, or their equivalents, acting upon the bar D, substantially as and for the purpose herein set forth.

3. An ankle-joint formed by the projections *a a* upon the tibia, resting upon the corresponding shoulders, *b b*, of the foot-piece I, in connection with the straps *c d*, and the cord *u*, as herein set forth and described.

4. The cord L, or its equivalent, attached to the instep of the foot, passing up under the patella, and attaching at some point above the leg to the supporting-strap S, to operate both the knee and ankle joints, substantially in the manner herein specified.

URIAH SMITH.

In presence of—

JOHN MACHEM,  
M. B. RUSSELL.