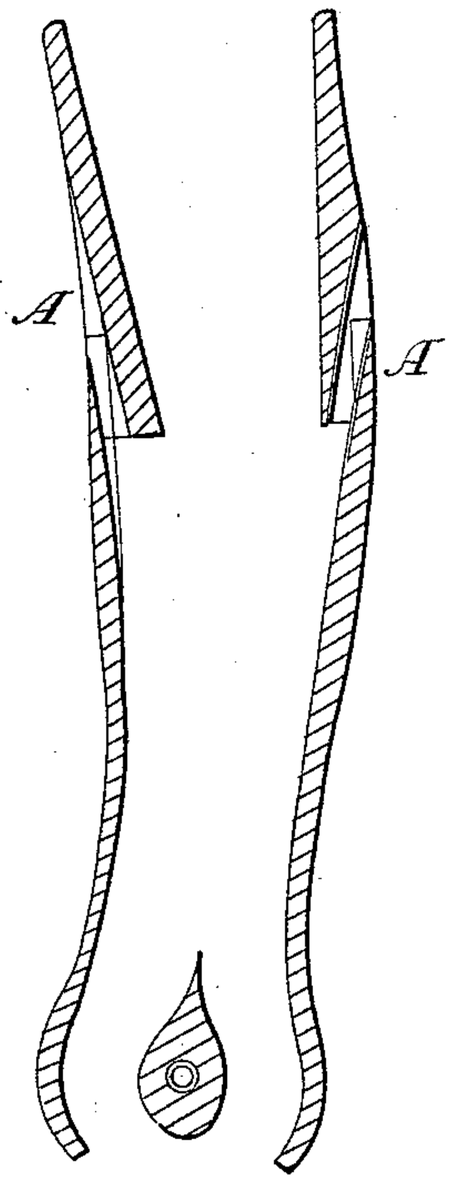
O. D. Wilcox.

Artificial Leg,

No. 16,420, Patented Jan. 13, 1857.

Fig. 1.



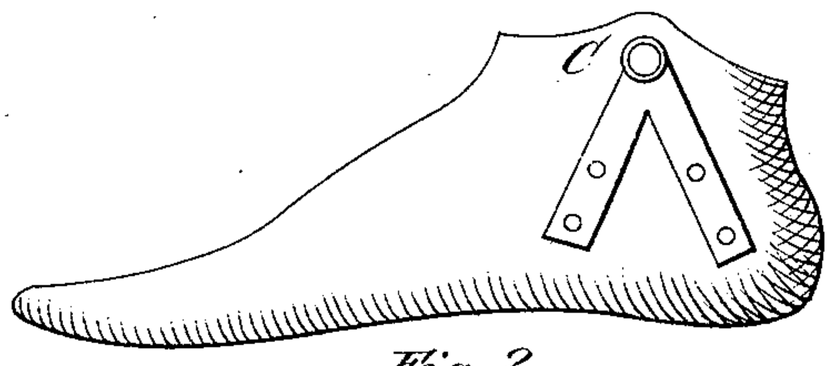
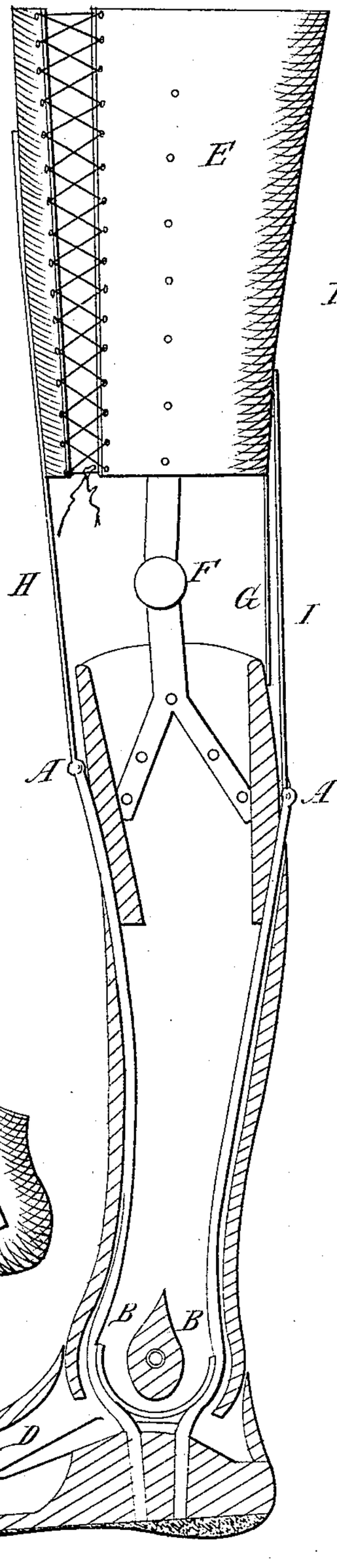


Fig. 2.

Fig. 3.



UNITED STATES PATENT OFFICE.

O. D. WILCOX, OF EASTON, PENNSYLVANIA.

ARTIFICIAL LEG.

Specification of Letters Patent No. 16,420, dated January 13, 1857.

To all whom it may concern:

Be it known that I, O. D. WILCOX, M. D., of Easton, in the county of Northampton, in the State of Pennsylvania, have invented a new and useful Improvement on Artificial Limbs to be Applied in Cases of Amputation at the Knee and Below It; 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.

The nature of this invention consists in the peculiar introduction of elastic cords or muscles, with their conjoined tendons, extending from the sound part of the limb by which the motions of the leg and foot may be effected and controlled.

To enable others skilled in the art to construct and apply this invention I will proceed to describe its construction and operation.

The limb is made of willow, covered with leather and coated with varnish, which is shaded with the flake white, and Spanish vermilion.

Figure 1 is a section of the leg. If the leg is not cut off close below the knee so that there is no stump to be fitted to, below the knee; then in the first place a socket of sufficient length should be made to fit it. Then the lower portion may be made and halved on around it, as shown at *a*, *a;* and at those places, as is also shown, oblique openings may be made for the passage of the flexor and extensor tendons. At the ankle it may be left as nearly solid as it can be to make the ankle strong; but openings in the forward and back portions of it must be made sufficient for the tendons to work through, and for each end of the half circle of the foot to work in, as shown at *b*, *b*, Fig. 3. This portion of the joint is made by simply boring a hole through the ankle, which must be firmly bushed with brass.

Fig. 2, is the foot. This portion of the joint is made by a steel flange upon each side, which run down and are firmly riveted to the foot, as in this figure exhibited at *c*.

The bottom portion of the heel is left solid as is shown in Fig. 3, sufficiently high to produce the stop motion, when the foot is bent too far forward or back, instead of putting in those blocks as in my previous patent limb, and then the half circle terminating at *b b*, is made of brass with flanges turning out from each side of the bottom of it, which are firmly fastened with screws to the foot.

D, is a spring to give elasticity to the foot when the leg is thrown forward as in walking.

E is a leather socket two thicknesses thick, made to fit the thigh, and laced to it, the same as has been previously done; F, knee joints, portions of which run down onto the leg, under its covering, spreading out as shown, and firmly riveted to the leg. A part of this joint also runs up between the two thicknesses of the thigh socket, and is fastened to it with rivets. One such joint is put upon each side of the knee so as to act just with its center of motion. These joints are the same as have been used for many years, and they may be halved together, or put together like a rule joint, with knuckles to produce the stop motion when properly extended. G is a leather strap nailed, screwed or riveted to the leg, and laced to the bottom of the thigh socket, to assist in producing the stop motion when the limb is properly extended.

H is a piece of gumelastic web which is stitched to the fore part of the thigh socket and runs down over the knee to the leg where it terminates by being bound around the straight portions of a piece of wire shaped thus, ⊐, and a strong cord or tendon made of raw hide, is fastened to its loop. This tendon runs into the leg at the opening *a* and then down forward of the half circle at the ankle, and then through the bottom of the foot where it is fastened with a wedge. I is another elastic strap and tendon of the same kind which is stitched to the back of the thigh socket, and runs down back of the knee into the leg at *a*, and down back of the half circle through the bottom of the foot, where it is also fastened like the first. The back one needs to be stronger than the forward one, though it need not be as long, because it does not have to extend so far. The openings in the leg for the passage of those tendons may be made just at the bottom of the stump, and if there is no stump below the knee to be fitted to, then the leg may be made in one piece, and the elastic straps may pass in at the top of the leg.

Operation: These elastic straps operate very much like the muscles of the natural limb; and they also terminate in tendons as the natural muscles do; consequently muscles

and tendons will properly be the most appropriate name for them. When the knee is thrown forward, as in walking, that extends the forward muscle over the knee, which through its tendon raises the foot, so that it will clear foot mats, carpets, the dirt or whatever chances to be in the way, and at the same time throws the leg and foot forward; but before it comes forward to its place, the back muscle is put upon the stretch, and as this is stronger than the forward one it gradually checks and firmly stops its motion, and at the same time raises the heel bringing the foot down right to fit an ordinary surface; so that all is made most gracefully and naturally to imitate nature in all of its motions.

If there is a sufficient stump below the knee to adjust the artificial leg to it, then that will control the action of the leg, though the artificial elastic muscles are then needed to control the action of the foot. But in cases where the leg is amputated close below the knee as it comparatively often is, then as may be at once realized, it is as necessary to have something to control the motions of the leg and foot, as it is when the limb is amputated at the thigh.

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

The artificial elastic muscles with their conjoined tendons, running from the thigh to the foot as herein described to effect and to control the motions of the leg and foot, in cases of amputation at the knee and below it.

O. D. WILCOX.

Witnesses:
IMMANUEL THUME,
HENRY S. TROXELL.