O. D. Wilcox.

Artificial Leg.

No. 15,831. Patented Sep. 30, 1856.

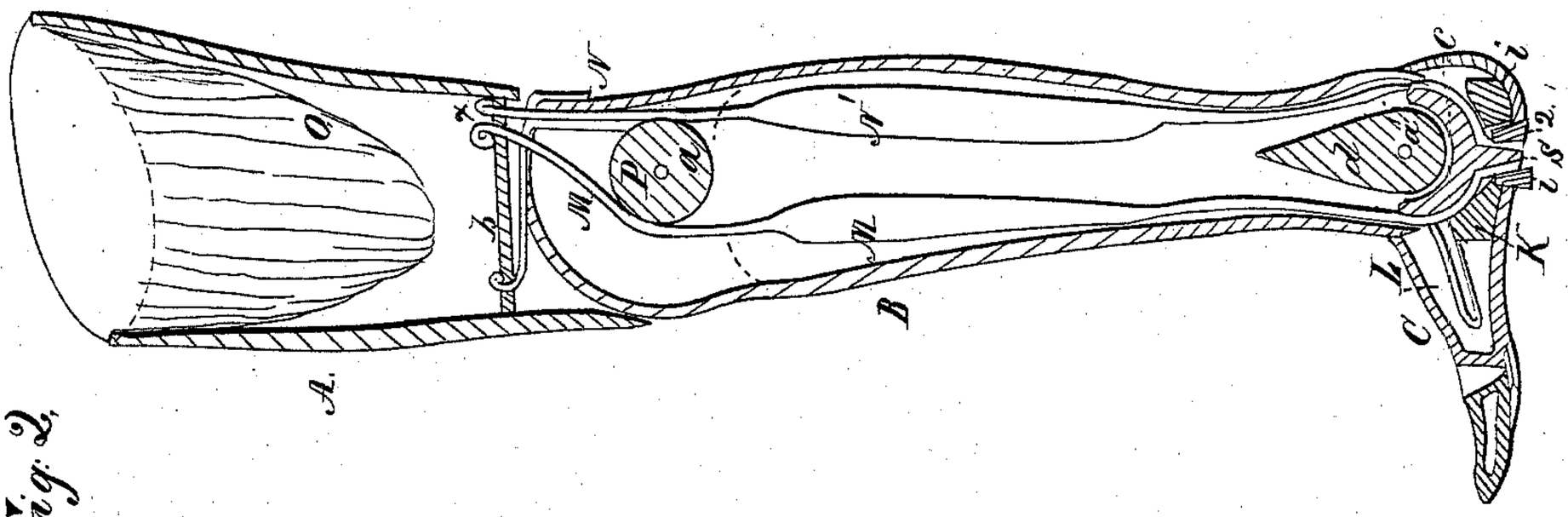

Fig. 2.

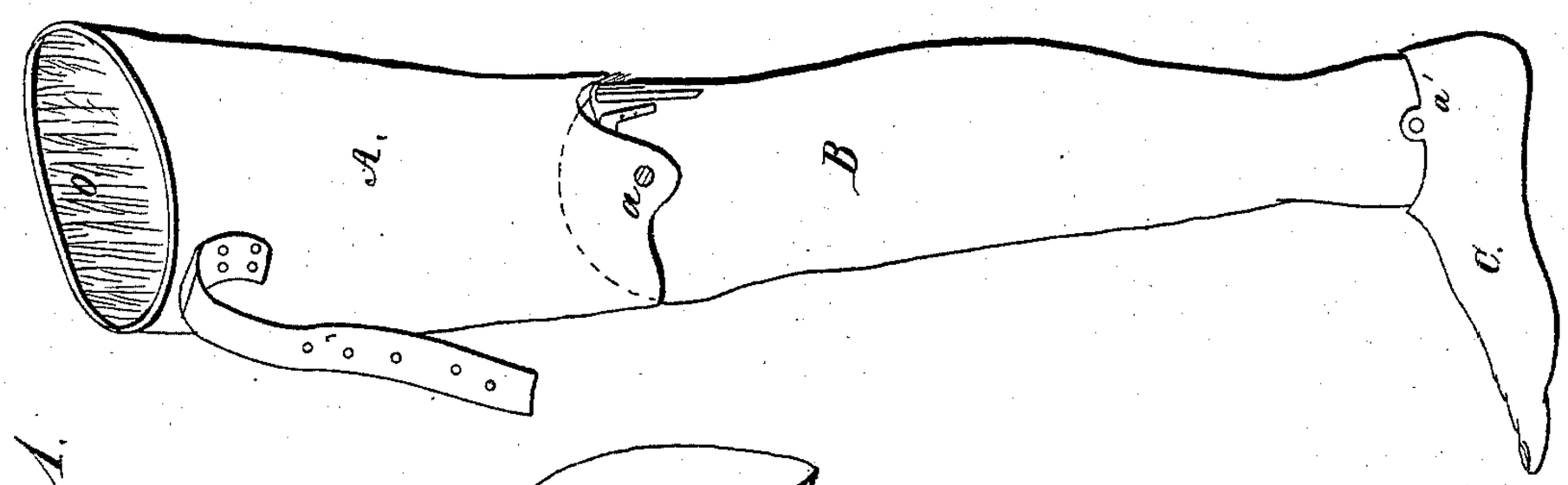

Fig. 1.

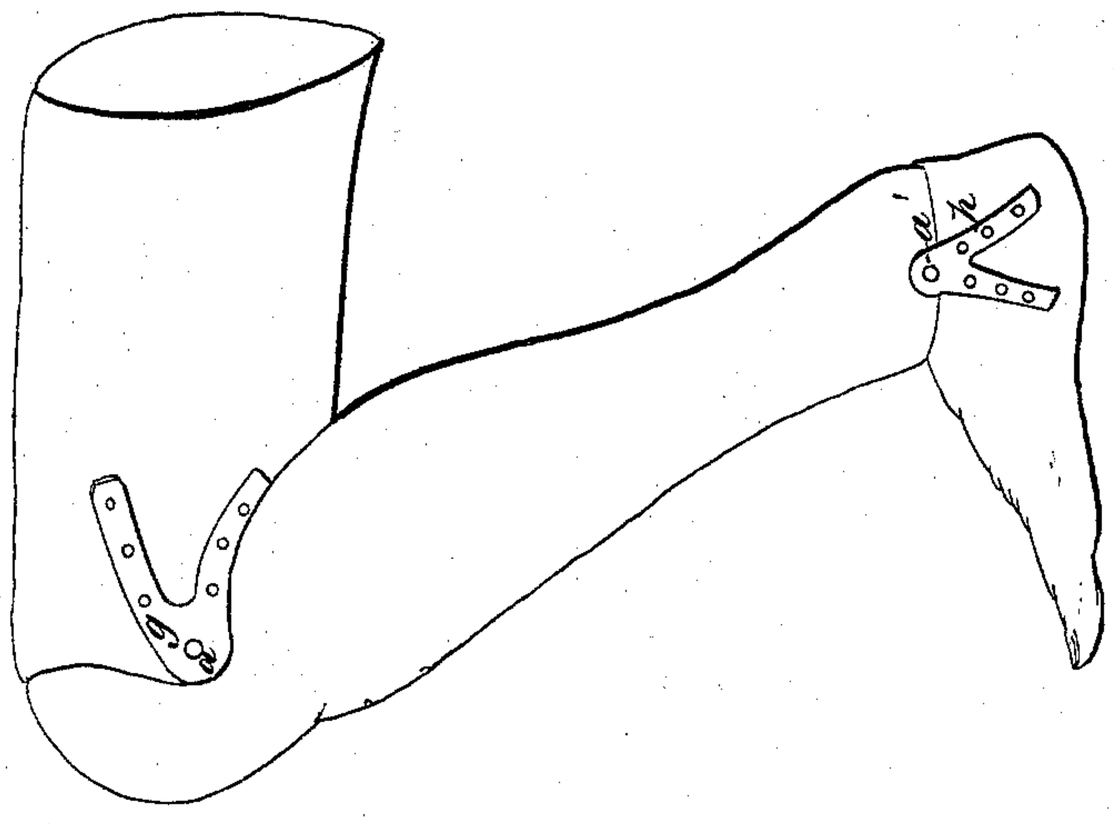

Fig. 3.

UNITED STATES PATENT OFFICE.

O. D. WILCOX, OF EASTON, PENNSYLVANIA.

ARTIFICIAL LEG.

Specification of Letters Patent No. 15,831, dated September 30, 1856.

To all whom it may concern:

Be it known that I, O. D. WILCOX, M. D., of Easton, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in the Construction of Artificial Limbs; and I do hereby declare that the following is a full, clear, and exact description of the same and its mode of operation, reference being had to the accompanying drawings, making a part of this specification.

The limb is best made of light wood such as willow, covered with white paint or varnish. The drawings exhibit it partly in section the better to enable others skilled in the art to construct the same.

The nature of the invention consists, first, in making use of a pair of elastic muscles with their tendons, by which the motion of the leg and foot are effected and controlled.

Second, in the form and construction of the knee and ankle and their joints, by which greater flexion of those joints is obtained, such as required in bending the knee in the act of kneeling, squatting or sitting, in a carriage; also in giving the requisite movement of the foot in ascending a hill or stepping on any inequality.

Third, in providing a support for the stump by the employment of a sack suspended from the upper edge of the artificial thigh, by which an equal pressure on all parts of the stump is obtained and an equality of circulation of the blood maintained thereby overcoming a difficulty experienced in other artificial limbs wherein the stump being forced into a conical socket to support the weight of the patient and not properly supported or pressed upon its lower end, strangulation of the blood ensues. An attempt has been made, by a pad and spiral springs to obviate this evil, but not successfully.

Fourth, by the employment of check stops at the knee joint I get rid of the unpleasant noise, on the motion of the limb.

The advantages of my mode of construction gives me a limb, that is light and yet strong and by the leg entering the thigh it affords substance of wood for sustaining the bolt at the knee, while by the employment of the elastic cord and pulley, the motions of the limb are more naturally produced and the sole of the foot brought more "flat" or level with the earth irrespective of the inclination thereof.

To enable others skilled in the art to construct the limb I would describe it as follows.

A represents the thigh. It is made cylindrical of light wood and fits the stump of the limb, it is provided with a bottom *b* near its lower edge to which the tendon, and check straps are secured.

In Figure 1, is shown the exterior of the limb exhibiting by a line the shape of the lower edge of the thigh.

In Fig. 3, is shown the metal straps or hinge plate of the knee and ankle.

B, is the leg, formed partially hollow. At the knee it is left solid as shown in the shade lines so as to give firmness to the screw bolt (*a*) passing through it, and support to the pulley. The bolt and plates on the thigh form the knee joint. At its lower end it is also formed solid as shown at (*d*) except perforations for passing the tendon, or cord.

c, is the foot containing within its hollow a solid portion (*e*) forming a half pulley around which the tendons giving motion to the foot, partially wind and unwind: The toe piece is secured by simply fastening a thick piece of leather as a hinge on the sole, and a spiral spring is placed in the wedged shaped opening.

The supports to the joints of the knee and ankle are formed of thin metal plates *g* and *l* riveted one to the thigh and the other to the foot. The bolts (*a* and *a'*) pass through those plates and form the joints. The holes in the leg should be bushed with metal.

I is a stop block at the rear of the joint and K a similar block in front of the ankle joint of the foot. (L, is a spring secured on the latter block whose office will be presently explained.) These blocks I and K control the motions of the foot by coming in contact with the front or rear end of the leg, as the foot is moved.

P, is a pulley working in a slot formed in the solid portion of the leg at the knee. Over it the tendons pass or roll.

M is one of the tendons and M', its muscle, corresponding to the extension; and N and N' the second muscle and tendon, corresponding the achilles. The upper end of M and N are secured firmly to the thigh by being passed through the bottom *b* thereof. They extend over the pulley P, the one in front, the other in the rear of it, down through the leg, then over the half pulley *e*,

being secured to a stem S, of said pulley by suitable wedges 1 and 2. By adjusting the degree of strain on the muscles previous to the insertion of the wedges the pointing the toe or position of the foot is accomplished.

The tendons and muscles are best made by braiding leather strips over portions of large elastic gum cords or threads, so that a requisite elasticity thereof is produced. Spiral springs of metal might be used but in practice I have found the gum the best.

R, R are check straps of leather, having one end secured in the bottom of the thigh, and the other passing loosely over the rounded end of the leg (see Fig. 2) and secured by small screws to the back thereof. Those straps check or control the movement of the leg when straightened.

The spring L in the foot is introduced, to prevent too free a movement thereof, under the influence of the muscle, and when the limb is used in ascending a hill for instance when the knee is thrown far forward, or when the front of the foot is accidentally placed on a stone, then this spring is beautifully brought into use. Under ordinary circumstances of walking on a level, it is not usually brought into play more than as an easy check.

In joining the leg to the thigh it will be noticed that the leg is inserted in the thigh, by which its strength is maintained, its movement more in conformity with the natural limb, and freedom from catching the clothes of the wearer. The lower end of the leg is inserted into the foot with the same advantages.

The sack O is made of any suitable material its size so as to freely embrace the natural stump and of just sufficient depth that the end of the stump may be pressed thereby being fastened, stitches or otherwise, to the upper edge of the thigh piece A. The weight of the body is as it were suspended in the sack. By the employment of this sack, it has been found that ventilation of the limb is not required as the circulation of blood through the stump is very slightly affected.

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

1. The employment of the pulley P at the knee joint as a common center of motion, of the elastic cords M M′ and N N as described for the purpose of producing a natural movement of the artificial limb in the manner set forth.

2. I also claim the employment of the sack O, whether used in this limb or any other.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

O. D. WILCOX.

Witnesses:
JOHN F. CLARK,
JOHN S. HOLLINGSHEAD.