(Model.)

J. FURRER.

ARTIFICIAL LEG.

No. 277,562. Patented May 15, 1883.

Fig. 1.

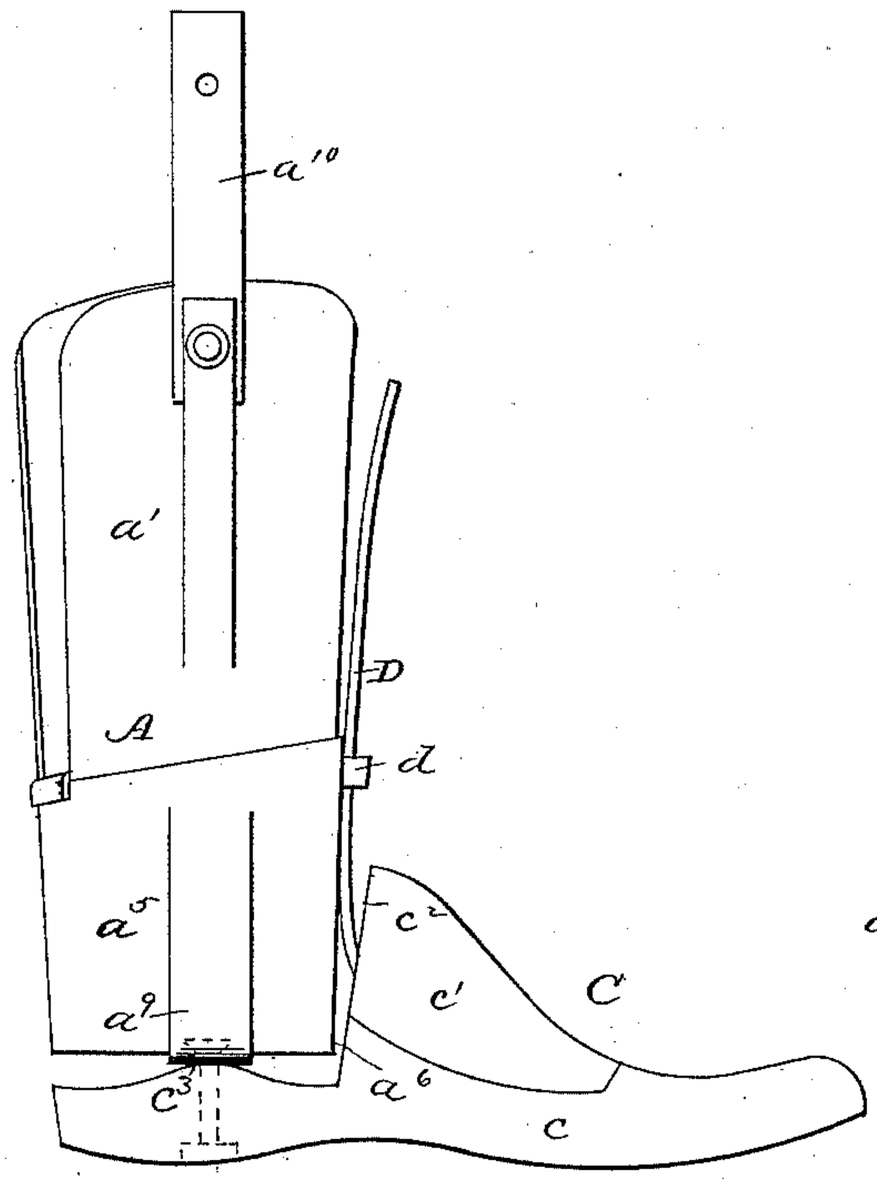


Fig. 2.

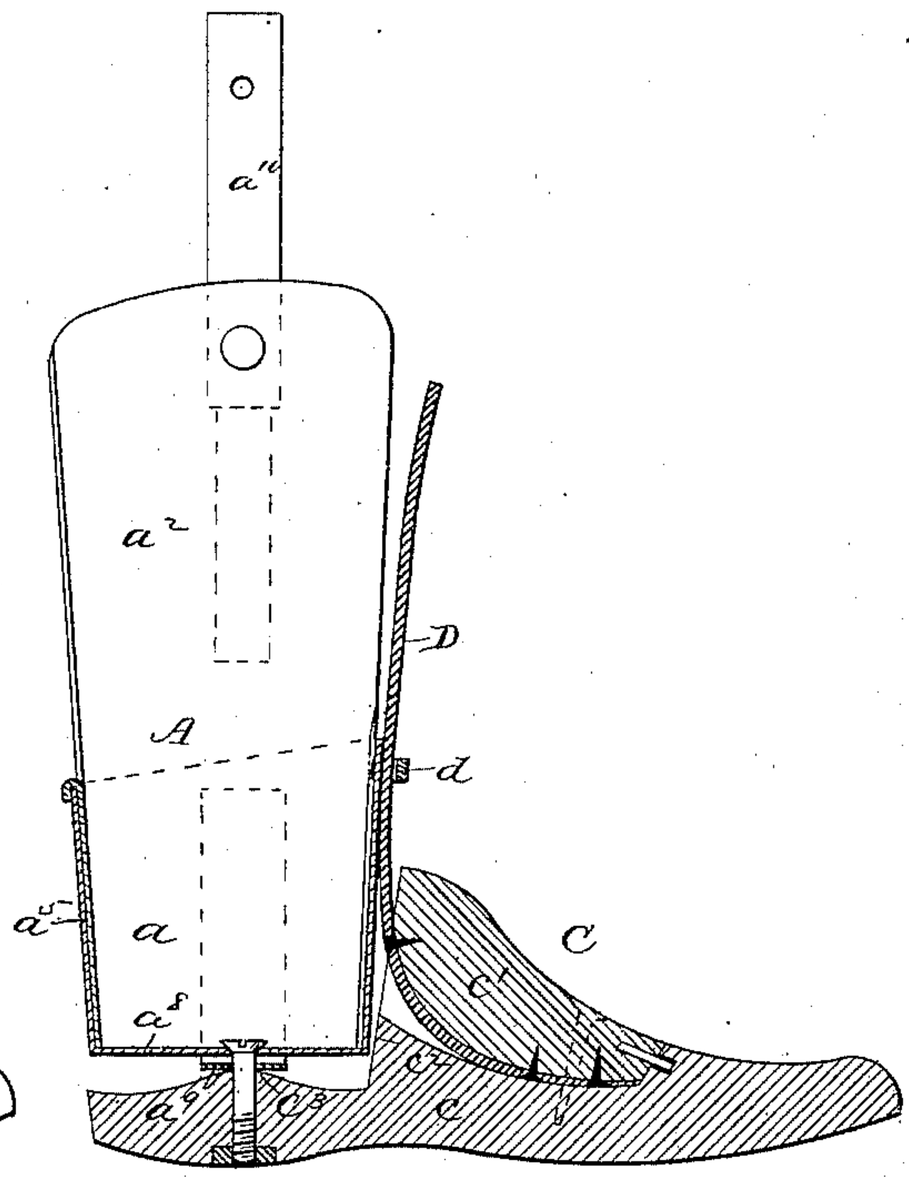


Fig. 3.

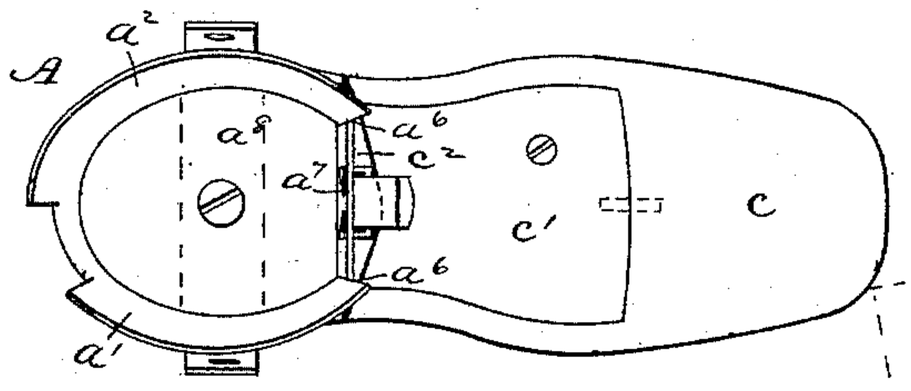
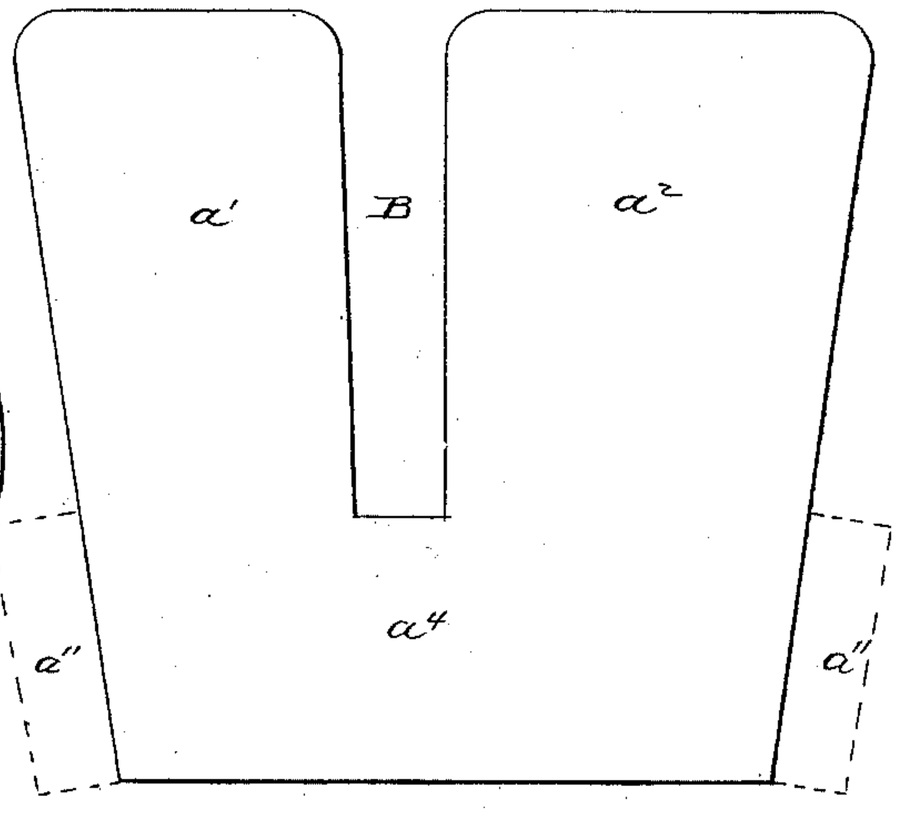


Fig. 4.



Witnesses:
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A. J. Houghton.

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atty.

UNITED STATES PATENT OFFICE.

JOSEPH FURRER, OF TOLEDO, OHIO.

ARTIFICIAL LEG.

SPECIFICATION forming part of Letters Patent No. 277,562, dated May 15, 1883.

Application filed November 28, 1882. (Model.)

To all whom it may concern:

Be it known that I, JOSEPH FURRER, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Artificial Legs; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Figure 1 is a side elevation of my improved artificial leg. Fig. 2 is a vertical longitudinal section. Fig. 3 is a plan view. Fig. 4 is a detail view, illustrating a method of constructing the socket.

A is the socket for the reception of the stump, having the cup-shaped portion *a* at the lower end and the side pieces, a' a^2, extending upwardly therefrom. These pieces do not entirely surround the leg, there being left both in front and behind a space which allows them to approach one another as much as is necessary to firmly grasp and support the stump, proper padding or suspension devices being used for the comfort of the wearer, and straps to effect the necessary degree of pressure. This socket and side pieces I have made of sheet metal, as it may easily be given the requisite shape, forms a strong and light construction, and also possesses the elasticity which the side pieces, a' a^2, should have. Other materials having the proper qualities may, however, be employed. When sheet metal is used, the socket is constructed as follows: A piece of metal is cut out in the shape shown in Fig. 4, the portions a' a^2 being intended for the side pieces, and the slit B for the space at the back of the leg. The part a^4 is then bent so as to form nearly a cylinder, a space being left between its front edges. The part a^4 is then surrounded by the band of metal a^5, the ends of which are soldered together at the back of the leg. This band a^5 is so bent as to form the shoulders a^6 at its points of contact with the front edges of the side pieces, a' a^2, the part a^7 of the said band between the shoulders a^6 being a plane surface. The bottom a^8 is then soldered on, and the socket is completed. To give additional strength to the socket, however, at its point of connection with the foot, and form an elastic supporting-spring, I pass the strip of metal a^9 transversely under its bottom and solder or otherwise secure the ends of said band to the sides of the cup portion *a*. This band is rounded upon the under surface from end to end, so as to permit a sidewise rocking of the socket upon the foot. The strips a^{10} are also attached to the tops of the pieces a' a^2, for the purpose of securing my device to the limb of the wearer. Preferably these strips are attached pivotally by the method clearly illustrated in the drawings. It is evident that when the metal is deemed strong enough it may be cut out in the shape shown in Fig. 4, with the additions a'', (indicated by dotted lines,) and these forward edges being soldered together, the band a^5 may be dispensed with.

The foot-piece C is of the ordinary shape, and consists of the bottom part, *c*, and the instep part c'. This latter is grooved upon its under side to form a seat for a spring, D, made of wood or metal, which is firmly secured in said groove, and so shaped that its upper part occupies a substantially vertical position when the parts are all in place, and touches the front surface, a^7, of the socket. A staple or keeper, *d*, fits closely around said spring, allowing only a vertical movement of it relative to the socket. This spring is preferably flat; but such shape is not necessary. The portion *c* of the foot is cut down at the heel to form a bearing-surface for the lower end of the socket not far from the ground, at about the height of the natural ankle-joint. This surface is inclined downward from the pivotal point, both toward the front and back of the foot, leaving the transverse ridge c^3, and permitting the forward and backward rocking of the socket on the leg. The foot is held to the socket by a bolt, E, which passes downward through the bottom a^8, strip a^9, and part *c* of the foot, and is secured by a nut in the bottom of the heel. This bolt is not too tight to prevent the backward and forward oscillation of the socket, and also furnishes a vertical pivot for the horizontal oscillation of the foot. The horizontal oscillation is limited by the contact of the shoulders

a^6 with the vertical surface c^2 of the foot. It will be observed that if the foot be inclined either upward or downward relative to the socket the spring D will return it to its normal position at right angles to the foot; also, if the foot be oscillated horizontally, the spring will be twisted, it being held firmly at one end by its seat in the foot and at the other end by the keeper d, and its torsional resilience will return the foot to its normal position relative to the line of progress of the wearer, which varies in different persons, and will be regulated when my device is attached. This method of connecting the socket and foot will be found to fully answer the purpose of the various complicated mechanisms heretofore used, and, moreover, leaves the interior of the socket free from such mechanism to receive a stump, which reaches even as low as the ankle-joint.

It is obvious that this advantageous construction of ankle-joint may be used with many of the knee-joints in ordinary use when the limb is amputated at or above the knee; or, by simply increasing the length of the socket, it may be used with such limb, dispensing with a knee-joint, and its strength and lightness are particularly favorable to such use. The great objections to the jointed limbs heretofore made are their complexity and expensiveness; but my device is nearly as cheap as the ordinary stiff wooden leg and lighter and far more convenient.

What I claim is—

1. In an artificial leg, the combination of the socket A, foot C, hinged vertically and horizontally thereto, and spring D, rigidly secured at one end to the foot, and having its other end loosely connected to the socket, whereby the vertical and horizontal oscillation of the foot relative to the socket is governed, substantially as set forth.

2. In an artificial leg, the sheet-metal socket A, consisting of the part $a^4\ a'\ a^2$ and surrounding band a^5 and bottom a^8, combined as described, and forming the cup-shaped portion a, having the upwardly-extending elastic side pieces, substantially as set forth.

3. In an artificial leg, the flat spring D, forming an elastic connection between the socket and foot, and secured to the latter between the detachable instep-piece c' and the body of the foot, substantially as set forth.

4. In an artificial leg, the combination, with the socket A and foot C, of the elastic spring a^9, interposed between the socket and foot for supporting the weight of the wearer, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH FURRER.

Witnesses:
JOSEPHUS RICKETTS,
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