



Inventor—
Howard R. Webb
By *Walter P. Murray*
Attorney

UNITED STATES PATENT OFFICE.

HOWARD R. WEBB, OF CINCINNATI, OHIO.

ARTIFICIAL LIMB.

1,312,599.

Specification of Letters Patent.

Patented Aug. 12, 1919.

Application filed August 16, 1918. Serial No. 250,098.

To all whom it may concern:

Be it known that I, HOWARD R. WEBB, a citizen of the United States of America, and resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Artificial Limbs; of which the following is a specification.

An object of my invention is to produce an artificial limb in which increased naturalness of action is obtained over other artificial limb constructions known to me.

A further object is to produce an artificial limb in which the wearer seats himself and arises from a seated position with greater ease and increased rapidity than when wearing limbs of other constructions known to me.

These and their objects are attained in the artificial limb described in the following specification and illustrated in the accompanying drawing, in which:—

Figure 1, is a sectional elevation of the artificial limb embodying my invention.

Fig. 2, is a sectional elevation of a detail of the operating mechanism of my improved artificial limb.

The limb to which my invention is particularly applicable is that in which the wearer has had an amputation above the knee, since the particular function of certain of the movable portions of my improved invention is to perform the knee bending and straightening operation.

In the drawing the upper portion of the leg is shown adapted to receive the leg stump within a socket —3—, constructed preferably of wood and leather, the upper end being made principally of leather, rendering it adaptable in shape to the shape of the stump it is to hold. A slit —4— in the socket —3—, permits the lacing of the socket in much the same manner as a shoe is laced. The lower end —5— of the socket is rounded to resemble in shape the knee, when the leg is straight or bent. Through this lower portion the pivot pin is passed, which has its bearing in the lugs —7— extending upwardly from the sides of the lower portion —8— of the limb. This lower portion is also preferably constructed of wood and leather, and is hollow, except a short distance from its lower end. Within the lower portion and extending from the lower end to the upper end, is a tubular strengthening brace or sup-

port member —9— through the center of which, adjacent to its upper end, passes pivot pin —6—. At its lower end the tubular member —9— is provided with plates —10— to the lower ends of which is pivoted the foot —11—. Attached to tube —9— at the bottom of the hollow —12— is the bracket —13—, which is provided with journals —14— in which the cylinder —15— rocks forwardly and backwardly of the limb. Guides —16— extend from tube —9— and serve to direct the movement of the cylinder by preventing any sidewise motion which might tend to take place. Within the cylinder —15— a piston —18— is reciprocally mounted, having a central passage —19— and connecting the upper and lower ends of the cylinder interior. The cylinder head is preferably provided with an elongated stuffing box, through which the piston rod passes. The lower end of the piston rod is provided with a valve which closes passage —19— when the rod moves downwardly, and which opens passage —19— when the rod is moved upwardly. The spider —24— is secured to the upper surface of the piston to connect the rod and the piston and permit of the valve being turned in position to close passage —19— when the piston is moved downwardly, as well as to limit the opening movement of the valve when the piston rod is moved upwardly. Connecting the upper and lower end of the cylinder is a by-pass —25—, the opening through which is controlled by the set screw —26— for regulating the discharge of fluid therethrough. The upper end of the piston rod is suitably connected as by the bracket —27— to the interior of the leg socket adjacent to the upper end of the slot —17— in which the tube —9— reciprocates in the bending and straightening action of the limb. The turnbuckle —28— forms an adjustable connection between the upper and lower ends of the friction rod. In each side of the socket —3— I have provided openings —29— through which the ends of the strap —30— pass, the central portion being secured to the upper end of the tube —9— as shown in Fig. 1. Each end is provided with a pulley —31— over which the thong —32— passes, and connects with a harness passing over the shoulder of the wearer. The pivotal action of the foot —11— is cushioned by rubber cushions —33, 34— so as to make the

action of the limb more natural and less of a shock to the wearer, whenever a step is taken.

In the use of my improved artificial limb it is placed in position on the stump of the wearer and socket tightened thereon by means of lacing which draws the slit —4— together. The thongs —32— are then attached to the harness provided for supporting the limb. The limb is then in condition for walking upon it. At each forward step the limb is swung forward the weight resting on the heel, the shock of the movement being absorbed by cushion —33—. As the body moves forward the limb occupies the natural position at the rear of the body and rests upon the toe thereof, cushion —34— absorbing the shock occasioned by the swing of the body forward. Simultaneously with this a slight bending of the limb at the knee takes place. When desired to straighten the leg and swing it forward it is necessary for the wearer to shrug his shoulder to tighten thongs —32— and strap —30—, thereby straightening the lower portion of the limb with relation to the socket while simultaneously lifting the limb sufficiently to clear the ground. Thus successive steps may be taken and the operation and motion of walking naturally performed.

Cylinder —15— has been filled with oil. In seating himself, the wearer may do so without discomfort by lowering himself gradually into position, the action of bending the socket with relation to the lower portion of the limb closes the valve —23— by means of the downward pressure of piston rod —22— upon piston —18— causing the piston to force the oil gradually through by-pass —25— and into the top of the cylinder. This prevents any sudden dropping of the wearer to a seated position, and any unnatural jerking of the lower end of the limb. Screw —26— may be adjusted to obtain the desired resistance to the flow of the oil, to

afford the proper resistance to the movements of the piston —18. Upon arising from a seated position the wearer may do so quickly, the action opening the valve —23— and allowing the oil to pass speedily from the upper end of the cylinder to the lower end thereof, through passage —19.

Having thus described my invention what I claim is:—

1. In an artificial leg the combination of hollow upper and lower members, a tubular support member within the lower member and extending from the ankle portion thereof through the member and into the lower end of the upper member, a pivot connecting the upper member and the tubular support, a cylinder secured to the tubular support within the lower member, a piston within the cylinder, a rod within the member and secured to the piston and the upper member and means for retarding the movement of the piston in the cylinder.

2. In an artificial leg the combination of hollow upper and lower members, a tubular support member within the lower member and extending from the ankle portion thereof through the member and into the lower end of the upper member and having a slot adjacent to its upper end, a pivot connecting the upper member and the tubular support, a cylinder secured to the tubular support within the lower member, a piston within the cylinder, a rod within the cylinder passing through the slot in the tubular member and secured to the piston and the upper member and means for retarding the movement of the piston in the cylinder.

In testimony whereof, I have hereunto subscribed my name this 9th day of August, 1918.

HOWARD R. WEBB.

Witnesses:

WALTER F. MURRAY,
W. THORNTON BOGERT.