S. SAVASTANO.

ARTIFICIAL LEG.

APPLICATION FILED FEB. 5, 1920.

1,366,027.

Patented Jan. 18, 1921.

2 SHEETS—SHEET 1.

Fig. 1

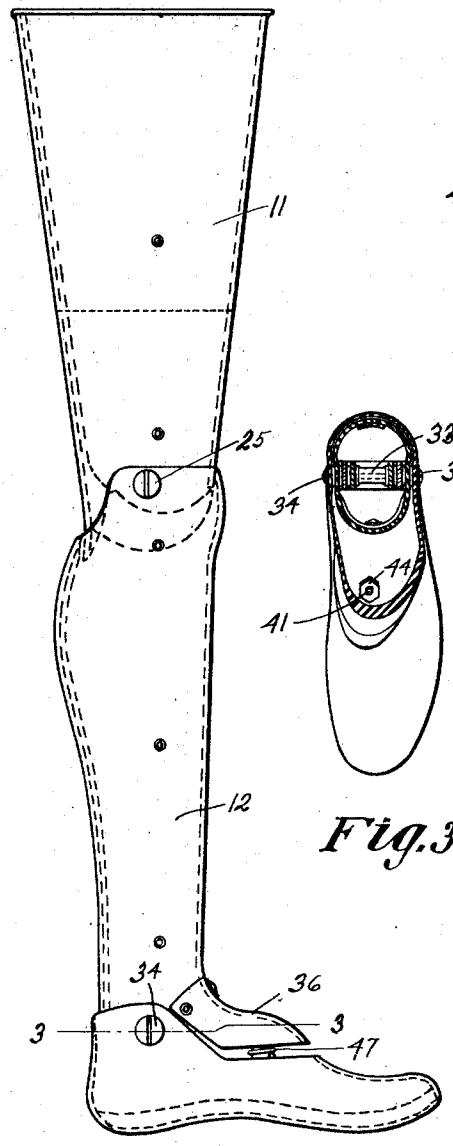

Fig. 3

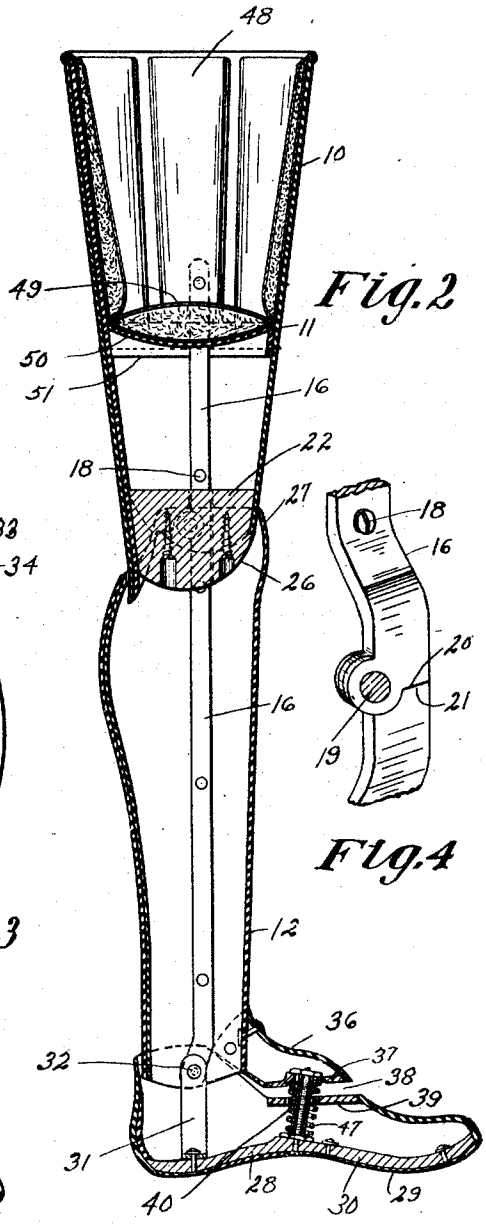

Fig. 2

Fig. 4

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2 SHEETS—SHEET 2.

Fig. 5

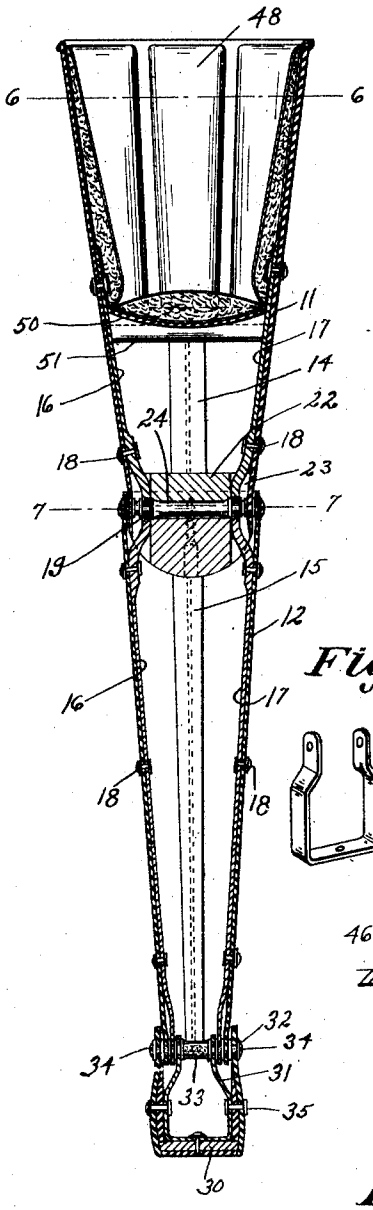

Fig. 6

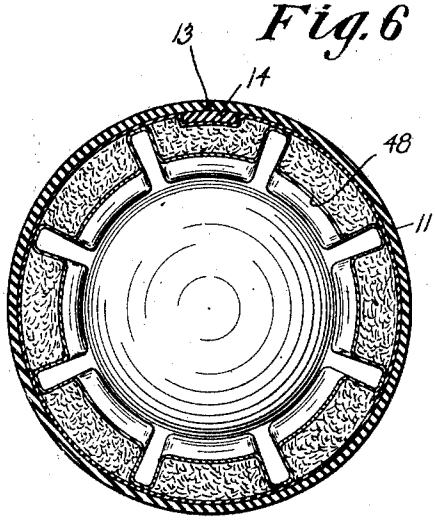

Fig. 9

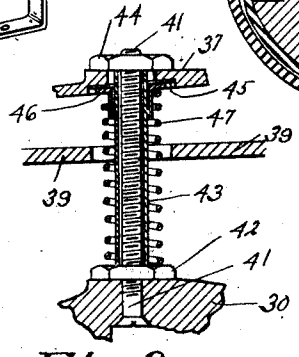

Fig. 8

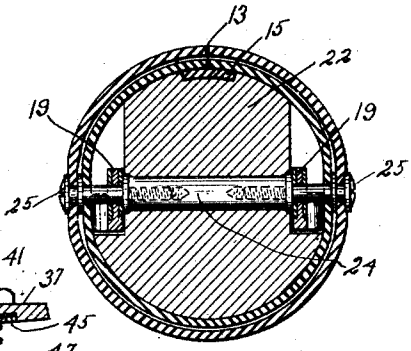

Fig. 7

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UNITED STATES PATENT OFFICE.

SAMUEL SAVASTANO, OF PROVIDENCE, RHODE ISLAND.

ARTIFICIAL LEG.

1,366,027. Specification of Letters Patent. Patented Jan. 18, 1921.

Application filed February 5, 1920. Serial No. 356,512.

To all whom it may concern:

Be it known that I, SAMUEL SAVASTANO, a subject of the King of Italy, and resident of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Artificial Legs, of which the following is a specification.

This invention relates to artificial legs, and has for its object to provide such a leg which comprises essentially a hollow casing or outer wall formed of leather or other similar suitable material, in the desired shape, the same containing stiffening and supporting side frame bars hinged at the knee.

A further object of the invention is to provide a foot frame member hinged to the leg frame bars whereby the foot may yield and bend as is natural to the human foot when walking.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1— is a side elevation of my improved form of artificial leg.

Fig. 2— is a sectional elevation of the leg.

Fig. 3— is a plan view sectioned on line 3—3 of Fig. 1.

Fig. 4— is a detail illustrating the joint portion of the side supporting frame bars.

Fig. 5— is a section through the leg at right angles to that shown in Fig. 2, illustrating the construction of the knee and ankle.

Fig. 6— is an enlarged section on line 6—6 of Fig. 5, illustrating the cushion for receiving the stump of the leg.

Fig. 7— is a section through the knee-joint on line 7—7 of Fig. 5.

Fig. 8— is an enlarged view of the spring element which permits the foot to yield in walking.

Fig. 9— is a detail in perspective showing the foot brace or frame which hinges the foot portion to the leg portion at the ankle.

With reference to the drawings, 10 designates the casing or tubular upper and lower portions of the leg, which are preferably formed hollow and of leather but which may be constructed of any other suitable material shaped to conform to the contour of the human leg.

One of the objects of the invention is to form a leg which is strong and durable and yet which is very light in weight and which will act similarly to and serve the purpose of the human leg in walking.

To accomplish this I have preferably shaped the upper and lower leg portions 11 and 12 in tubular form, of heavy sheets of leather, the abutting edges 13 of the leather being secured together by being sewed to the inner longitudinally-disposed leather strips 14 and 15.

In order to form this structure very light and at the same time stiff and strong enough to support the weight of the human body I provide a pair of longitudinally-disposed steel brace bars 16 and 17 which are arranged on diametrically opposite sides and are secured by rivets 18, or otherwise to the inside of the casing.

The upper and lower portions of these bars are offset inwardly and jointed together at 19 at the knee.

These bars are preferably set slightly forward of the center-supporting vertical axis of the leg and the joint 19 or pivot is offset rearwardly from the center line through the bar, and on the center supporting line through the leg, whereby two leg members are hinged to receive relative motion at the knee.

By offsetting this pivot at the hinge portion 19 I provide forwardly extending lips 20 and 21 on the upper and lower leg portions which when these leg portions are in vertical alinement they meet and provide a positive stop to limit the forward swinging of the lower leg when it reaches such vertical alinement.

At this knee joint I have provided a knee block 22 which may be formed of wood or other suitable material and which is cut out at its sides at 23 to receive the joint portion of the frame bars. This block is also bored to receive the center joint bar 24 into which the joint screws 25 are threaded, as best illustrated in Fig. 7. These joint screws pass through the leather casing in both the upper and lower leg portions. The block 22 being fixed to the upper leg casing to move therewith. The lower portion of this block is formed on the arc of a circle as at 26 to permit the knee-cap portion 27 to fol-

low around its surface in bending the knee so as not to permit the space in the hollow, lower leg to be opened in bending the knee.

The foot portion 28 is formed with an outer casing of leather with an inner, stiffening sole-member 30 of wood and in the hollow portion of this foot I have formed a U-shaped brace-bar 31, see Fig. 9, which extends up to the ankle joint 32 where it is pivoted to the lower ends of the brace bars 16 and 17. This ankle joint is constructed similarly to the knee joint having a center joint bar or tubular spacing block 33 into which screws 34 are threaded.

The brace-bar is secured by rivets 35 or otherwise to the heel-portion of the foot.

In order to provide suitable bending action to the foot I have provided an instep-portion 36 which is secured to the lower leg portion 12 which is, like the rest of the leg, formed hollow and preferably of leather having a leather bridge member 37 on its under side which is spaced at 38 from the bridge-member 39 in the foot portion proper.

The yielding action of this foot portion is controlled by a spring-pressed member 40 acting between the foot portion and the instep portion which spring-pressed member is constructed essentially as illustrated in Fig. 8, in which is shown a center screw bolt member 41 passing through the sole portion 30 up and through the instep bridge portion 37, which bolt member is secured in position in the lower sole member by means of a nut 42. This bolt member is provided with a tubular member 43, one end of which rests on the nut 42 and the other end is bound in position by means of the binding nut 44 at the upper end of the bolt 41. I next place a washer 45 on the under side of the bridge 37 and a collar member 46 rests against said washer 45: I then position a coil spring 47 to act between this collar on the under side of the bridge 37 and against the upper side of the nut 42 whereby the action of this spring normally serves to hold the foot down relative to the fixed position of the instep member whereby upon walking the toe-member is adapted to swing upward against the action of the spring 47 as the body is swung forward in taking the next step.

By this construction it will be seen that this artificial foot is permitted to act like the natural foot by yielding at the instep and at the ankle joint 32.

The upper portion of the upper leg is provided with a canvas lined cushioned member 48 to receive the stump of the leg, the end of the stump being designed to rest upon the lower cushion 49 which is supported on a leather plate 50 sewed to the edge of the leather collar 51, which in turn is sewed to the outer casing 11. The leg may be connected to the body by any suitable means but I preferably employ straps passing over the shoulders of the wearer.

By my improved construction of artificial leg, it will be seen that the same is extremely light in weight, is provided with a stiffening frame which is adapted to support the weight of the body, and is provided with a joint both at the knee and the ankle and permits the parts to swing with ease and certainty when walking, the weight of the foot being sufficient to always bring the lower leg back to vertical or normal position after being bent at the knee in walking or sitting.

The foregoing description is directed solely toward the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. An artificial leg comprising a calf and thigh sections, each section including a pair of longitudinal oppositely arranged side bars having their adjacent ends bowed inwardly, a knee block secured at the lower end of said thigh section between the bowed ends of its bars, and fastening means pivotally connecting the adjacent ends of the bars of each section and secured in said knee block.

2. An artificial leg comprising a calf and thigh section, each including a pair of longitudinal oppositely arranged bars having their adjacent ends curved inwardly, a knee block secured at the lower end of the thigh section and arranged between the adjacent ends of said bars of said sections, the casing secured to the bars of said sections representing the leg in contour and axially alined fastening bolts extending through the adjacent ends of said casing sections and said bars and detachably secured in the knee block for pivotally connecting the ends together.

3. An artificial leg comprising a calf section and a foot section, each section including a pair of longitudinal oppositely arranged side bars having their adjacent ends curved inwardly and slightly overlapping, a spacing element consisting of a tubular member disposed between the curved ends of the bars of said sections and having its ends opposing said ends of said sections, and means extending through the extremities of said curved and overlapping end and removably secured in said block for pivotally connecting the sections together.

4. An artificial leg comprising a leg section and a foot section pivotally connected at the ankle of the leg section for free back and forth oscillating movement, an instep element for the foot rigidly secured to the lower forward end of the leg section, a rod

secured to the forward portion of the foot and loosely extending through an opening in said instep element, an adjustable stop on the free end of said rod to abut with the instep element to limit back swing thereof, and a compression spring surrounding said rod and interposed between said foot section and instep element for cushioning the forward pivotal movement of the foot and to return it to normal position.

5. An artificial leg comprising a leg section and a foot section pivotally connected at the ankle of the leg section for free back and forth oscillating movement, said leg having an extension on its forward lower portion, a rod secured to the foot section and loosely extending through an opening in the extension of the leg section, an adjustable stop on the free end of the block to abut the leg section at said opening to limit the movement of the foot section in one direction, and a compression spring interposed between said foot section for cushioning the pivotal movement of the foot and returning it to formal position.

6. An artificial leg as described in claim 5 further characterized by the foot section having a surface overlying the instep element and engageable with a corresponding surface of the instep for limiting the forward pivotal movement of the foot section.

In testimony whereof I affix my signature.

SAMUEL SAVASTANO.