

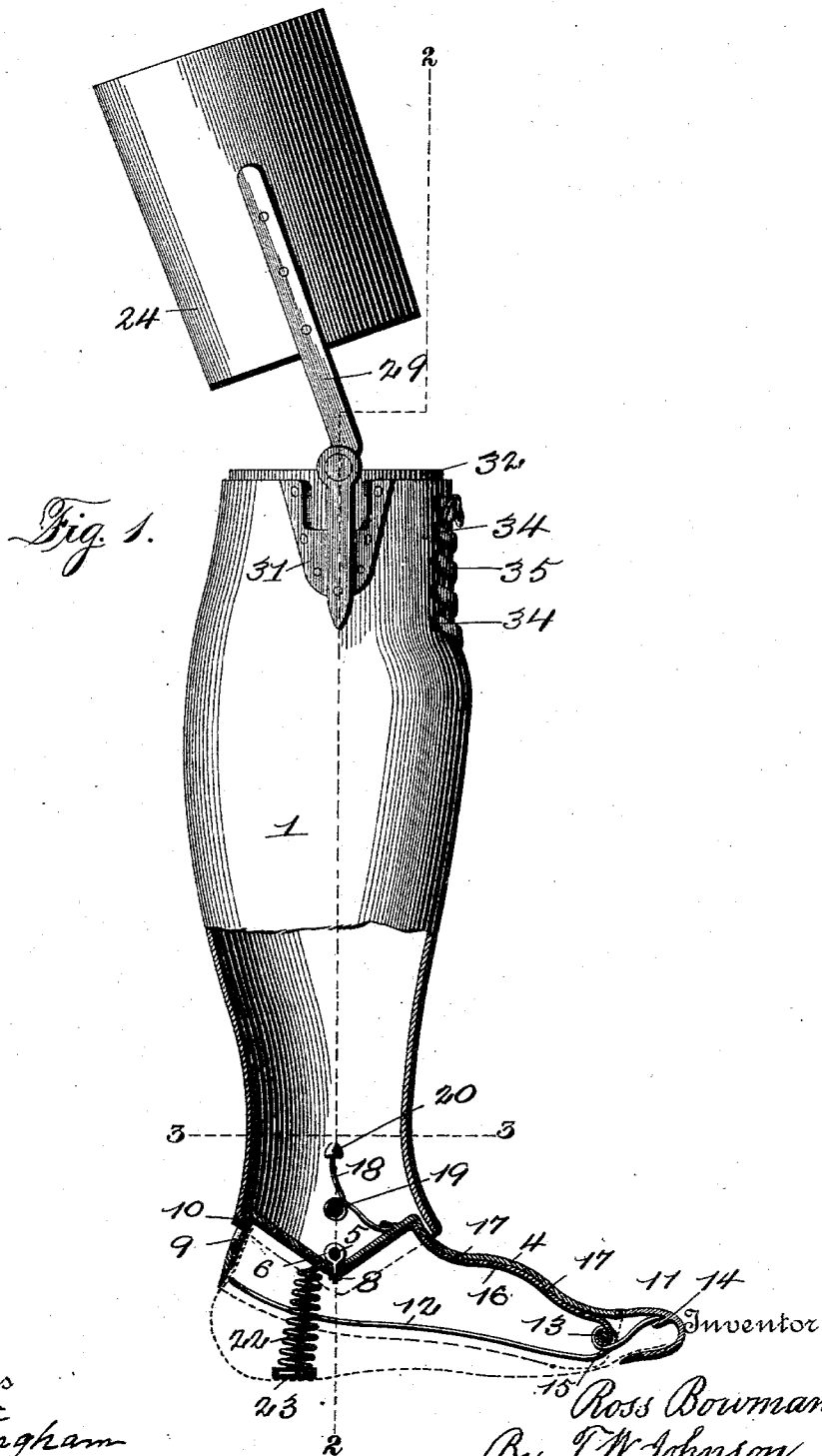
(No Model.)

3 Sheets—Sheet 1.

R. BOWMAN.
ARTIFICIAL LIMB.

No. 563,706.

Patented July 7, 1896.



Witnesses
J. R. Nottingham
Morris Price

By *T. W. Johnson*
Attorney

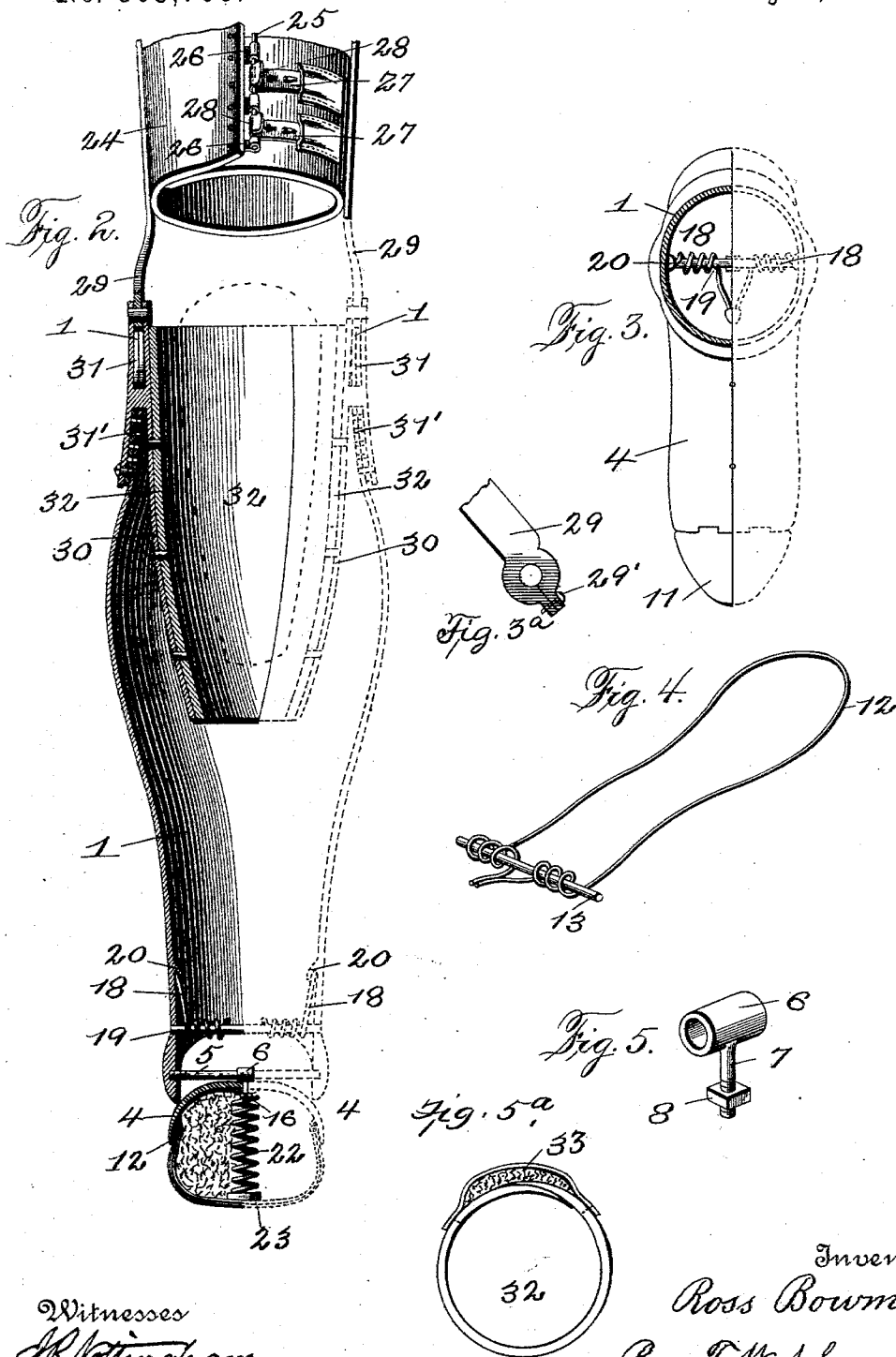
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Inventor

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Attorney

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3 Sheets—Sheet 3.

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Fig. 7.

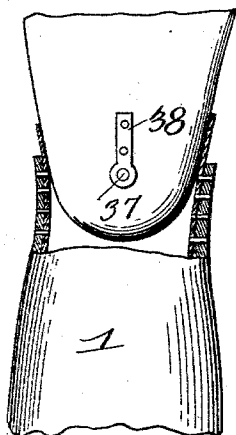


Fig. 8.

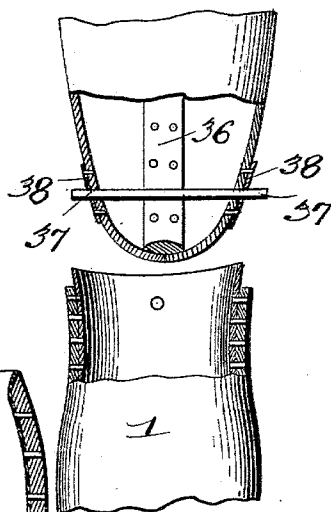


Fig. 6.

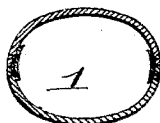
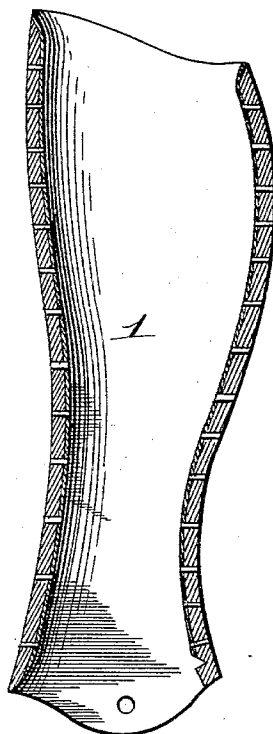


Fig. 9.



WITNESSES:

James B. Jester.
Charles K. Davies.

INVENTOR

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BY
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UNITED STATES PATENT OFFICE.

ROSS BOWMAN, OF STOYESTOWN, PENNSYLVANIA, ASSIGNOR OF ONE-HALF
TO J. H. GARDNER, OF SAME PLACE.

ARTIFICIAL LIMB.

SPECIFICATION forming part of Letters Patent No. 563,706, dated July 7, 1896.

Application filed February 10, 1896. Serial No. 578,656. (No model.)

To all whom it may concern:

Be it known that I, ROSS BOWMAN, a citizen of the United States, residing at Stoyestown, in the county of Somerset and State of Pennsylvania, have invented certain new and useful Improvements in Artificial Limbs; and I do hereby 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.

This invention relates to certain improvements in artificial limbs, and it is especially designed to furnish an artificial leg of improved construction for growing persons, as well as those who have reached maturity.

The object of my invention is to provide an adjustable limb which will possess a maximum of strength with a minimum of weight, so that while it may be perfectly reliable it will not unduly burden the wearer.

Another object of my invention is to provide a limb which may be adjusted, from time to time, to compensate for the growth of persons who have not attained maturity and to the shrinkage of the stump, which occurs in persons of mature and advancing age.

My invention further has for its object to provide a limb which will cause no irritation of the stump or injury to the health of the wearer, and which may be accurately fitted to the stump without discomfort, and which may be readily applied and removed.

A further object of my invention is to provide a "glove-fitting" socket for the stump, which is constructed so as to protect the tender parts of the stump, and while there will be a perfect fit the tender parts will not be caused to become fetid or unhealthy from the natural emanations of the body, and, finally, the invention has for its object to cushion the weight of the body in walking, avoiding jar and rendering stepping easy and comfortable.

The above-mentioned objects are attained by the means illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of an artificial leg and foot constructed according to my invention, with a portion of the lower part of the leg broken away and the foot shown in section. Fig. 2 represents a view, partly in perspective and partly in section, of my im-

proved leg and foot. Fig. 3 represents a cross-section taken on line 3 3 of Fig. 1. Fig. 3^a represents a detail view of the thigh-strip. Fig. 4 represents a perspective of a spring, detached, which forms part of the foot when complete. Fig. 5 represents a perspective view of a sleeve, a connected arm, and a nut, which form part of the pivotal attachment of the foot and leg. Fig. 5^a represents a top-edge view of stump-socket, showing overlapping edges and tongue. Fig. 6 represents a cross-section showing a means which I employ for putting the leg together. Fig. 7 represents a side elevation of a modification of the knee-joint connection. Fig. 8 represents sectional views of the leg and knee-joint connections, and Fig. 9 is a sectional view showing the construction of the shell of the leg.

Referring to the drawings, the numeral 1 indicates the shell of the lower portion of the leg. This is constructed of thin metal, preferably of aluminium on account of its lightness and strength. The said shell is constructed of two lateral halves, which are properly cast and united at their edges by riveting or in any other convenient manner. The said shell approximates the shape of the natural leg, and at the ankle the metal is turned outwardly at the front and rear, so as to set neatly over the ankle of the foot-section.

The foot-section consists of a metallic shell 4, which is shaped to conform to the instep and upper part of the foot of a natural leg. The said shell at the portion constituting the ankle of the foot is depressed or bent so as to form an angular recess, as shown in Fig. 1 of the drawings. The shell of the leg at its lower end or ankle, on opposite sides, is extended downwardly, at an angle corresponding to the angle of the angular recess above mentioned.

The apices of the angular extensions of the leg-section are provided with internally-screw-threaded recesses for the reception of a pin or bolt 5, for the attachment of the upper part of the foot. The said upper part of the foot at the apex of its angle has fitted to it an eyebolt consisting of a sleeve 6, and a threaded shank 7, which is provided with a screw-nut 8, by means of which it may be fastened to the said upper portion of the foot,

as shown in Figs. 1 and 2 of the drawings. The sleeve sets over the pin and is adapted to oscillate thereon, lateral movement of the foot being prevented by the downwardly-projecting angular extension of the ankle of the leg-section. The upper portion of the foot extends downwardly at its rear, and is provided with a slot 9, into which sets an inwardly-turned lug 10, located at the lower rear edge of the ankle of the leg-section. This lug limits the movement of the foot upon the pin 5.

At the base of the instep, in approximately the position of the joint of the great toe of the natural foot, the upper portion of the foot-section before mentioned has hinged or pivoted to it the toe-section 11, which consists of a shell, conforming in shape to the toes of the natural foot. The lower portion of the foot is constructed of leather shaped to conform to the general contour of the lower part and sole of the foot, and is stitched or otherwise fastened to the edges of the metallic portion of the foot-section.

The numeral 12 indicates a spring which passes around the pin 13, and its forward ends are seated in a recess in a lug 14 on the interior of the toe-section. This spring keeps the toe-section in a normal position, but allows it to move properly in walking. The said spring is of a shape shown in detail in Fig. 4 of the drawings, and extends around the lower part of the metal portion of the foot, as shown in Fig. 1, and may be stitched or otherwise firmly secured within the parts forming the lower part of the foot-section. The pin 13 passes through a loop formed at the forward end of a metallic strip 16, which is bent to conform to the interior configuration of the upper or metallic part of the foot-section, as shown plainly in Fig. 1 of the drawings, being attached to the same by means of rivets 17, the said strip extending downward at the heel so as to cover the slot 9 on the inside. The pin or rod 13 passes from side to side of the upper or metallic foot-section and is fastened therein, so as to form a support for the coils of spring 12.

The numeral 18 indicates two bent springs, which are partly coiled around a pin 19, passing through the sides of the leg-section above the pivotal pin by which the foot is pivoted to the said section. One end of each of these springs sets in a recess in a lug 20, formed on the inside of the leg-section. The other ends of the springs set in a recess in lugs 21 on the upper or metallic portion of the foot. The said springs keep the foot in normal position, but permit it to move properly in walking. Within the rear portion of the foot is located a spiral spring 22, which bears at its lower end in a cup-like disk 23, secured to the sole of the foot, and at its upper end bears against the upper portion of the foot. This permits the lower portion of the foot to be compressed and relieves the jar to the wearer in stepping. For amputations below the knee-

joint I provide for the wearer a socket 24, which is constructed of a single piece of leather, shaped to fit the thigh and provided with overlapping edges. One of these edges is provided with a rod 25, which is looped in a series of strips 26, which are riveted or otherwise suitably fastened to the overlapping edge of the socket. The said socket has attached to its opposite sides two metallic strips 27, which are provided with eyelets to be fastened about suitable catches riveted to the body of the leather. One end of each of the strips is secured in a pocket stitched on the leather, the other ends being bent so as to form hooks 28 to catch over the exposed portions of the rod 25 and fasten the socket to the thigh.

The numeral 29 indicates two metallic strips riveted on the outside of the thigh-socket. The said strips are pivotally secured between the upper bifurcated ends of strips 30 of the stump-socket, as shown in Fig. 2. The leg and reinforcing plates 31 are provided with a series of perforations 31' for the insertion of screws, by means of which the parts may be adjusted to compensate for the growth of the wearer. The said strips 29, at their lower ends, are provided with lugs or projections, through which pass screws 29' for the purpose of compensating for wear of the joint.

The numeral 32 indicates a socket for the stump, which is provided in amputations below the knee. This socket is formed of a single piece of leather with overlapping edges. (Shown clearly in Fig. 5^a of the drawings.) Near the top of this socket I provide a tongue of more pliable material than the socket proper, which is stitched to said socket on either side of the lap-joint in such a manner as to form a pocket 33 for the reception of cotton or other yielding material, which is stuffed into the said pocket from the top, and serves to compress the socket yieldingly to the stump, so that the shrinkage thereof may be compensated for and a comfortable fit provided. This pocket, when the socket is in place in the leg-section, comes next a V-shaped opening in said section, which is provided on either side with a series of perforations 34, into which is laced a cord 35, by means of which the stump is yieldingly held in the stump-socket.

As shown in Figs. 10 and 11, the limb is designed for amputations above the knee-joint. In this case the socket approximates the shape of a sugar-loaf, and is made in two parts, which are united at their edges by the internal riveted strips 36. The socket in this instance is pivoted to the leg-section by means of a pivot-pin 37, passing through the sides of the leg-section and journaled in metallic bearing-plates 38, secured to the outside of said stump-section.

The rivets of the respective parts are countersunk in the material which they unite, so that the ends will be flush with the inner and outer surfaces thereof, so as to give smooth

joints, which will not interfere with the comfort of the wearer.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an artificial limb, the combination with the leg-section having angular downward projections at opposite sides of the ankle-joint, of a foot-section having a depressed transverse angular recess extending entirely across the foot-section, corresponding to the angular projections of the leg-section, and the eyebolt seated in the apex of the transverse recess and secured therein by means of a screw-nut, and a pivot-pin extending into the angular extensions or projections of the leg-section and through the eyebolt, to form the ankle-joint, said pin having a bearing in the apex of the recess in the foot-section, substantially as described.

2. The combination with the leg-section, provided with an inwardly-extending lug at the lower rear edge of the ankle, and the foot-section provided with a slot at the rear, into which the lug extends to limit the movement of the foot, substantially as specified.

3. In an artificial limb the combination with the upper part of the foot-section, having a suitable strip riveted therein and provided with an eye at its forward end, of a transverse pin passing through the upper part of the foot-section, the spring partly coiled around said pin, and the toe-section having a lug furnishing a bearing for the forward ends of the spring, whereby the toe-section is held in normal position, substantially as specified.

4. In an artificial limb, the combination with the leg-section and the foot-section pivotally secured to the ankle thereof, of the pin or rod passing through the leg-section, above the pivotal connection of the foot-section, and the springs, partly coiled around the rod and having bearings at their respective ends in

recessed lugs in the leg-section and the upper part of the foot-section whereby the foot-section is held normally in a yielding position, substantially as specified.

5. The combination with the upper and lower parts of the foot-section, of the toe-operating spring confined between the folds of the lower portion of the foot-section by stitches, substantially as specified.

6. The combination with the upper and lower parts of the foot-section, of the recessed disk secured to the lower part of the foot-section, and the spiral spring seated therein at its lower end and bearing against the upper part of the foot-section at its upper end, substantially as described.

7. The combination with the thigh-socket and the leg-section, of the strips secured to said socket, the bifurcated strips adjustably secured to the leg-section, the reinforcing-plates having apertures registering with similar apertures in the leg-section, for the reception of screws to adjust the strips, the thigh-strip being pivoted between the members of the bifurcated strip to form the knee-joint of the limb, and lugs and binding-screws for taking wear at the knee-joint, substantially as specified.

8. The combination with the leg-section, of the conical stump-socket, constructed in two parts, the strips overlapping the joints of the socket, on the inside, and riveted to the parts of the socket to unite them, and the pivotal pin passing through the sides of the leg-socket, and through the stump-socket to form the knee-joint of the limb, substantially as specified.

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

ROSS BOWMAN.

Witnesses:

JOHN H. SNYDER,
PAUL B. SCHLAG.