(No Model.)

R. BOWMAN.

ARTIFICIAL LIMB.

No. 579,787. Patented Mar. 30, 1897.

Fig. 1.

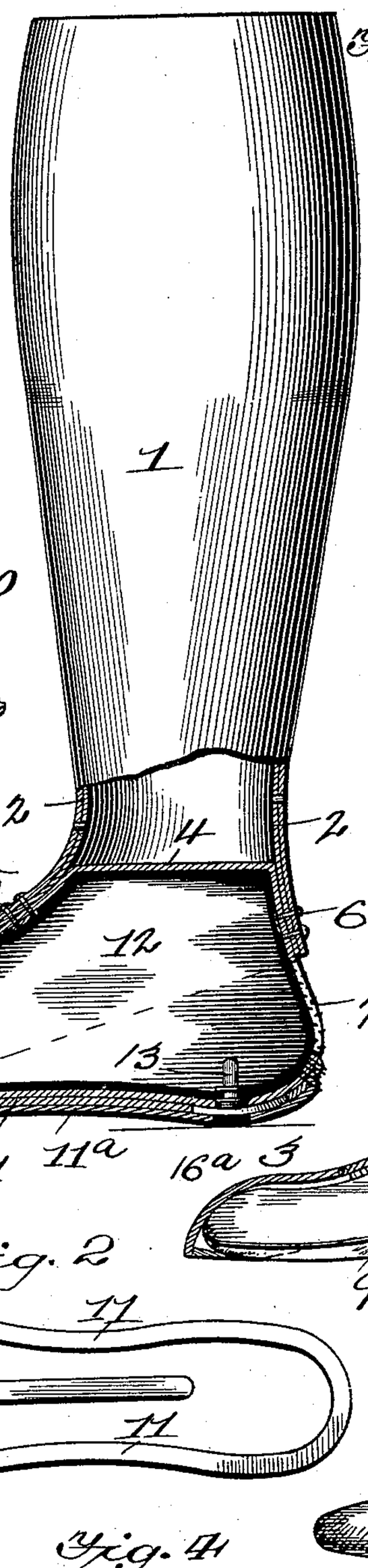

Fig. 2.

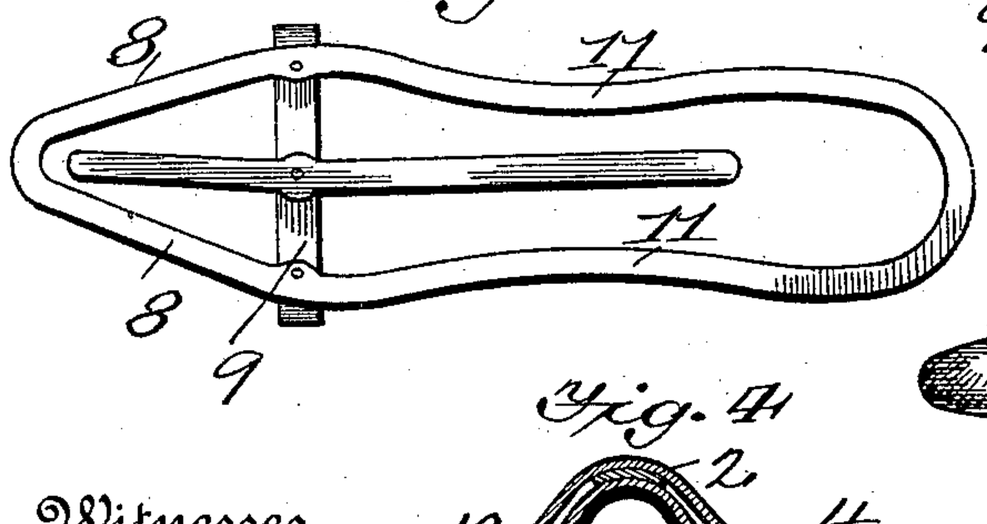

Fig. 3.

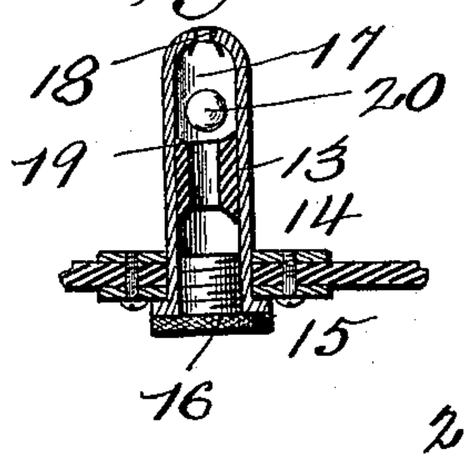

Fig. 4.

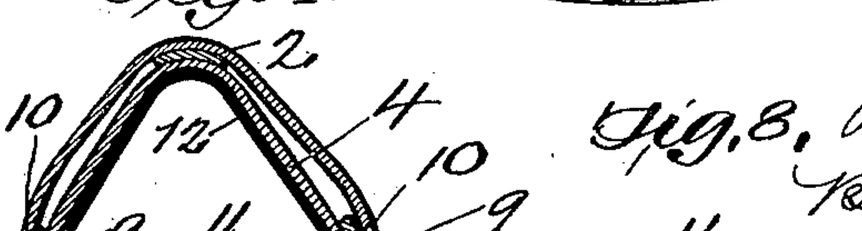

Fig. 5.

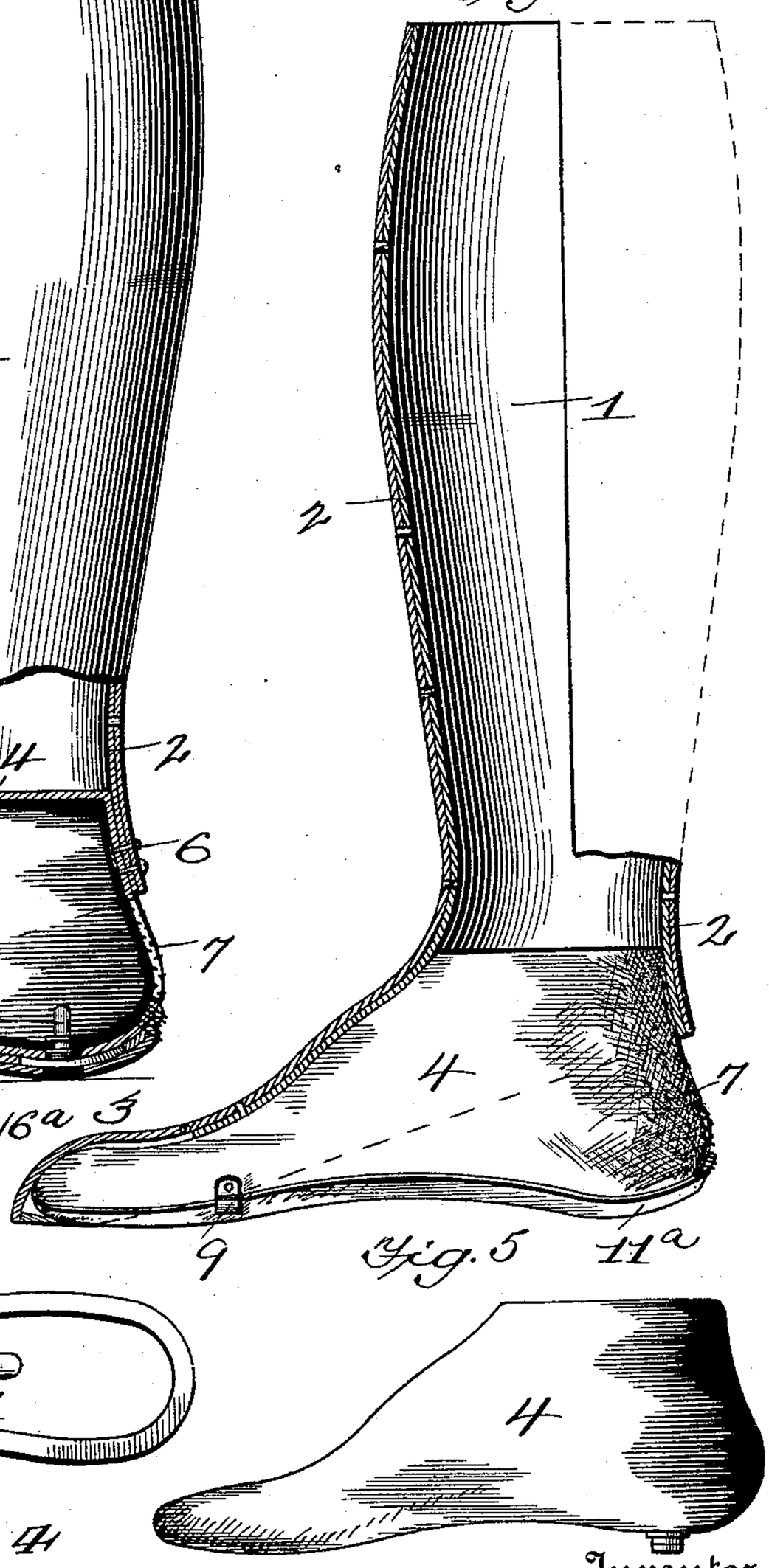

Fig. 6.

Fig. 7.

Fig. 8.

Witnesses
John Dennis
Chas. L. Coombs

Inventor
Ross Bowman
By Wright Brown & Quinby
Attorney

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. 579,787, dated March 30, 1897.

Application filed May 11, 1896. Serial No. 591,091. (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 that class of artificial limbs in which a pneumatic sac is employed in the foot-section to give the limb a yielding or elastic support in order to prevent shock or jar in walking; and the invention consists in certain improvements in the construction of the foot-section and inclosed pneumatic sac and in certain details of construction, as will be hereinafter more fully described.

My invention is intended to provide certain details of construction of the leg and foot, as will be more fully hereinafter described, and specifically pointed out in the claims.

In the accompanying drawings, in which like reference-numerals indicate like parts in the respective views, Figure 1 represents a view of the lower part of the leg in side elevation, showing the foot thereof in longitudinal section. Fig. 2 represents a view of the skeleton sole of the foot or frame. Fig. 3 represents a detached sectional view of the valve-tube, by which the pneumatic sac is inflated, showing the automatically-operated valve to permit inflation and prevent collapse of the sac after it is inflated. Fig. 4 represents a cross-section taken on the line 4 4 of Fig. 1. Fig. 5 represents a side elevation of the pneumatic sac detached. Fig. 6 represents a sectional view showing a modification of the leg and foot for special amputation. Fig. 7 represents a modification of the pneumatic sac detached from the foot, and Fig. 8 is a detached sectional view showing the method of attaching the sole-frame to the foot.

Referring to the drawings, the numeral 1 indicates the leg-section, which is constructed in two lateral halves or shells of any suitable material, preferably aluminium, united at the front and rear joints by means of the strips 2 of suitable material, preferably of aluminium, like the halves or shells of the limb, the said halves being riveted or otherwise secured to the strips which overlap the joints on the inside of the limb. At or near the base of the instep of the foot portion the said portion terminates, and it has hinged to it a toe-section 3, which is also constructed of aluminium, preferably, and which is bent backwardly abruptly or at an angle, as shown in Figs. 1 and 6, so as to form a recess or shell for the toe of the pneumatic sac and its outer covering, and to provide a seat for the toe-spring, by which the toe-section is held in normal position and returned thereto in the act of walking.

The numeral 4 indicates a casing, preferably of leather, made up into proper shape to resemble a human foot. This casing is secured to the front and rear inner portions of the foot of the limb near the instep and the heel by means of rivets or bolts 5 and 6, as shown in Fig. 1 of the drawings. The leather casing at the heel is provided with a slit or opening having suitable eyelets at the edges, by means of which the parts may be drawn together and closed by lacing-cord 7 or other suitable means. The slit or opening is for the insertion of the pneumatic or inflatable sac, to be more fully hereinafter described.

The numeral 11 indicates a skeleton sole-section which is constructed of thin sheet metal of the general contour of the sole of the foot and which extends entirely around the same, being secured to the sole or leather casing by stitching between said sole and an outer sole 11^a. The said skeleton is riveted to a stirrup 9, the upturned ends of which are riveted to the metallic portion of the foot-section at opposite sides thereof, as indicated by the numeral 10, and this stirrup has also riveted to it a longitudinally-extending spring which crosses said stirrup at right angles to the same, the forward part of the skeleton frame, the stirrup 11, and the spring forming the toe-section spring, as more fully hereinafter described.

The numeral 12 indicates a pneumatic or inflatable sac, which is constructed of rubber or other material which is impervious to air and of the general contour of the human foot. This sac is located within the leather casing of the foot of the limb, being inserted through the slit or opening at the heel, which is after-

ward closed by lacing to properly hold it, as shown particularly in Fig. 1 of the drawings.

The pneumatic sac is preferably inflated through a valve-tube 13. (Shown in detail and enlarged in Fig. 3.) This tube is provided with flanges 14 and 15, which confine it in position in the pneumatic sac by rivets, as indicated in Fig. 3, or in any other convenient manner. The said tube is provided with a screw-cap 16 at its lower or outer end, which may be removed and replacd by a screw-threaded nozzle of a tube leading from an air-forcing pump, by means of which the rubber sac may be inflated. The upper or inner end of the valve-tube is provided with a valve-chamber 17, having an opening 18 at its top for the passage of air to the interior of the sac, and provided with a valve-seat 19, against which the valve 20, located in the said chamber, automatically closes by the internal pressure of the air in the pneumatic sac to prevent the escape of air from the same after inflation. The valve-head when in position registers with an opening 16^a in the sole of the leather casing.

In the modification shown in Fig. 7 the pneumatic sac is provided with a tube at the heel, through which it may be inflated. In this instance the closure is effected by doubling the tube between its rear outer wall of the sac and the inner wall of the leather casing, and then lacing the same.

The operation of my invention is as follows: The parts being assembled as described, the pneumatic sac is inflated through the valve-tube or the tube at the rear and leather casing is closed. The pneumatic sac forms a cushion to receive the weight of the wearer and prevent shock or jar in walking.

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

1. The combination with the foot and toe sections of an artificial limb, of the leather sac, the pneumatic sac inclosed therein, the skeleton sole or frame extending entirely around the sole of the foot-section, and the stirrup having its upturned ends riveted to the metallic shell of the foot-section, and its transverse portion, and right-angularly-located spring secured to the leather casing, substantially as and for the purpose specified.

2. In an artificial limb the combination of the foot-section, consisting of a rigid shell, having the configuration of the upper part of the foot, a toe-section secured thereto and having its lower portion turned inwardly and backwardly, an inside leather sac fitting up into the foot-section and secured to the same at points above the instep and heel, and an inclosed pneumatic sac filling the casing or leather sac, the toe of the sac and inclosing casing extending into and being seated in the toe-section of the limb substantially as described.

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

ROSS BOWMAN.

Witnesses:
ORLO C. SCHLOG,
M. V. SORBER.