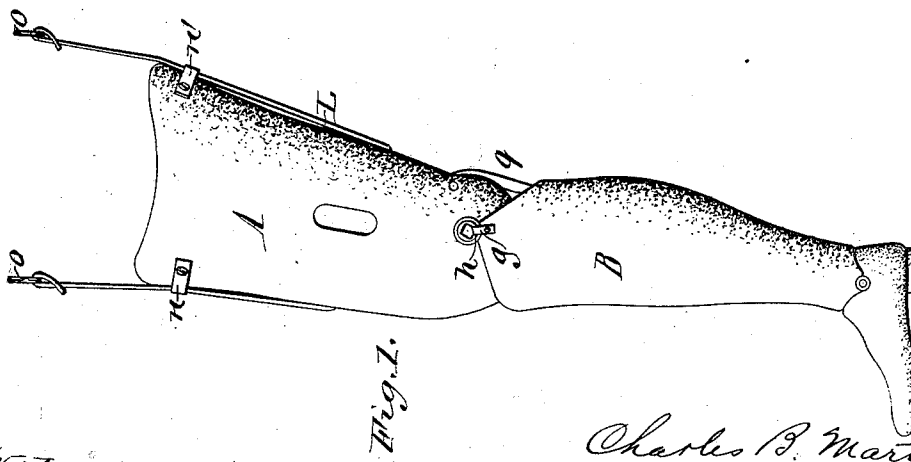
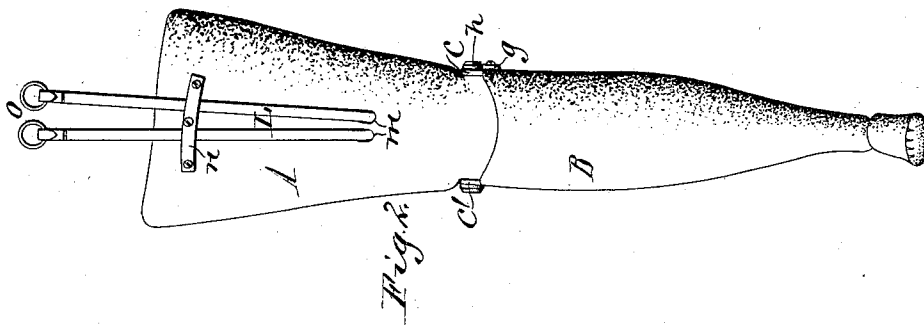
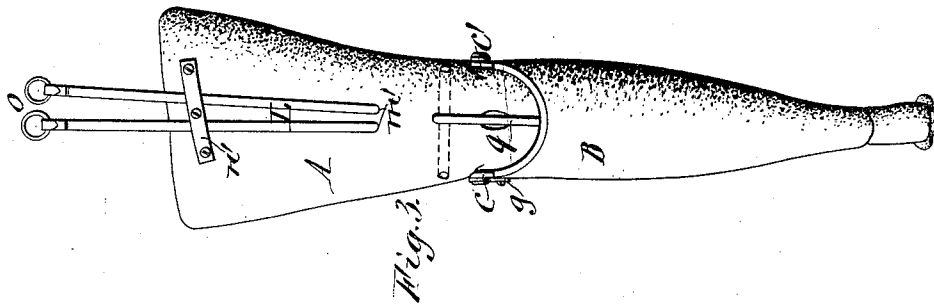


C. B. MARTIN.
ARTIFICIAL LEG.
APPLICATION FILED MAR. 15, 1911.

1,009,079.

Patented Nov. 21, 1911.

2 SHEETS—SHEET 1.



Witnesses:—

Richard Brunner
Alfred Borkenhagen.

Charles B. Martin,
Inventor

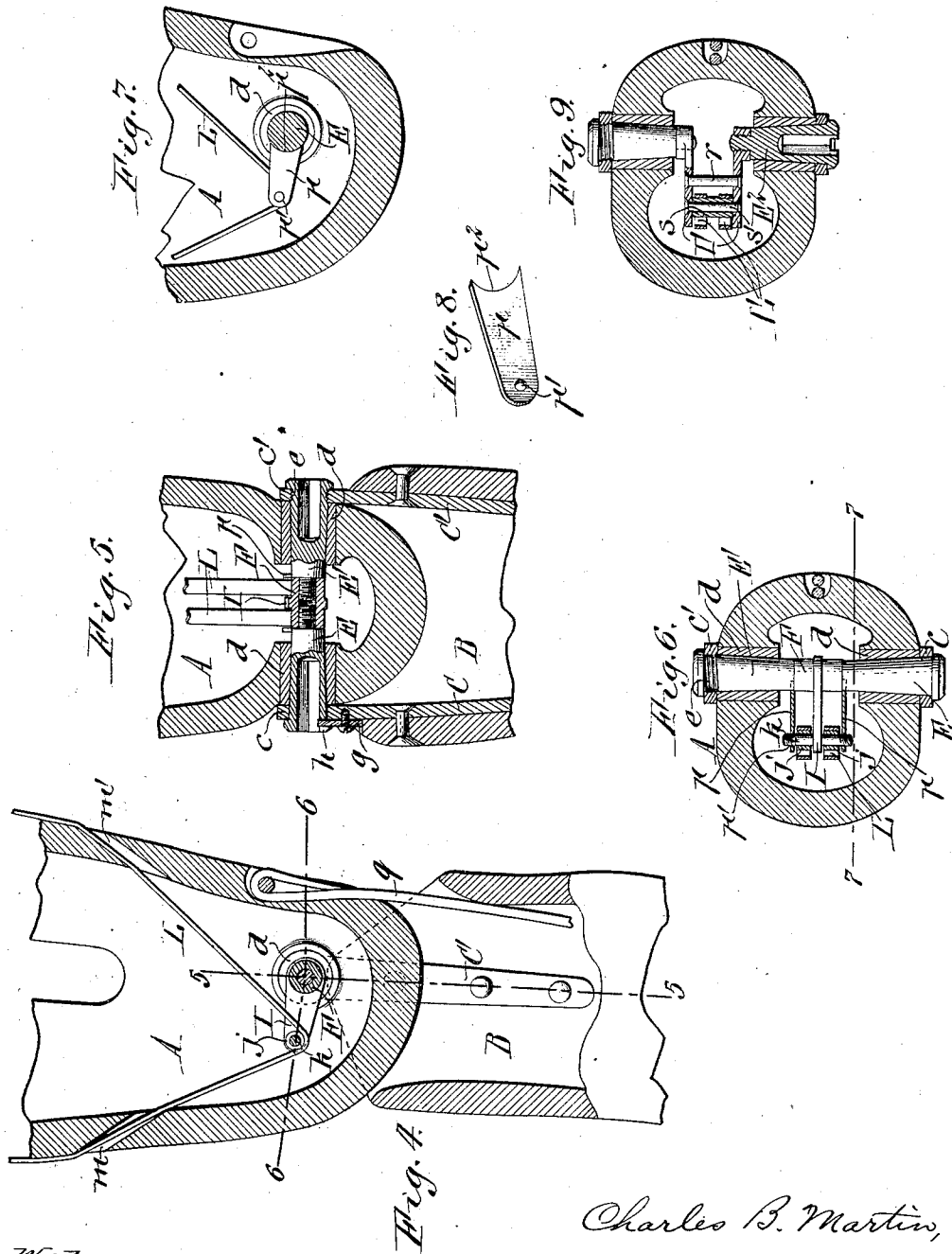
by *Leyer Popp*
Attorneys.

C. B. MARTIN.
ARTIFICIAL LEG.
APPLICATION FILED MAR. 15, 1911.

1,009,079.

Patented Nov. 21, 1911.

2 SHEETS—SHEET 2.



Witnesses:—

Richard Sommer
Alfred Bokenhagen.

Charles B. Martin,
Inventor
by Leyer Popp
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES B. MARTIN, OF DETROIT, MICHIGAN.

ARTIFICIAL LEG.

1,009,079.

Specification of Letters Patent.

Patented Nov. 21, 1911.

Application filed March 15, 1911. Serial No. 614,598.

To all whom it may concern:

Be it known that I, CHARLES B. MARTIN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Artificial Legs, of which the following is a specification.

This invention relates to artificial legs of the class which are provided with a suspender passing over the shoulders of the wearer and connected with the pivoted lower section of the leg in such manner that the same is swung forward when the wearer straightens his body or raises his shoulders, while being allowed to swing backward when he bends forward slightly or lowers his shoulders, as in the act of walking.

The invention has more particular reference to artificial legs designed for cases where the amputation is above the knee. In artificial limbs of this kind, the knee-bolt or pivotal connection between the upper or thigh-section and the lower or leg-section has heretofore been continuous or undivided from end to end and tapered more or less throughout its length. This construction is, however, objectionable, in that it allows the thigh-section to "drift" or shift toward the small end of the tapered knee-bolt, permitting the knee or lower portion of the thigh-section to come in contact with and rub against the inner top wall of the lower section. This causes squeaking and uneven wear of such contacting surfaces, rendering this construction annoying to the wearer and destructive to the leg.

One of the objects of my invention is to overcome this objection and to so construct the knee-joint that it constantly tends to center the upper and lower leg-sections on each other.

A further object is to increase the strength and durability of the connection between the suspender and the lower leg-section and render the same easy and reliable in action.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a side elevation of an artificial leg embodying the invention. Fig. 2 is a front view and Fig. 3—a rear view of the same. Fig. 4 is a fragmentary longitudinal section of the leg at right angles to the knee-bolt, on an enlarged scale. Fig. 5 is a fragmentary vertical section on line 5—5, Fig. 4. Fig. 6 is a horizontal section on line 6—6, Fig. 4. Fig. 7 is a longitudinal section of the thigh-section of the

leg on line 7—7, Fig. 6. Fig. 8 is a perspective view of one of the retainers of the anti-friction rollers. Fig. 9 is a horizontal section corresponding to Fig. 6, showing a modified construction of the sectional knee-bolt and its operating arm.

Similar letters of reference indicate corresponding parts throughout the several views.

A indicates the upper or thigh-section of the artificial leg and B the lower or leg-section. The latter is provided with the customary internal straps C, C¹, riveted or otherwise secured thereto and provided at their upper ends with the usual eyes c, c¹, extending above the top of the lower section. The thigh-section is provided in line with these eyes with the usual openings containing bushings d of leather or other suitable material in which the knee-bolt is journaled. This bolt instead of being continuous, is of divided or duplex construction.

In the embodiment shown in Figs. 1-8, the bolt consists of two sections E, E¹ which are rigidly united at their inner ends by a coupling or sleeve F. In its preferred form, this sleeve is internally screw threaded and receives the reduced inner portions or threaded stems of the bolt-sections, as shown in Fig. 5. Both of these bolt-sections are provided at their outer ends with heads which bear against the outer side of the strap-eyes c, c¹, and one of the sections, say the section E¹, is provided adjacent to its head with a screw thread e which engages the correspondingly-threaded eye c¹, while the other bolt-section and its corresponding eye are unthreaded. A suitable locking device is employed to reliably hold the knee-bolt against turning in the straps and compel the latter and the lower leg-section to turn with the bolt relatively to the thigh-section. As shown in the drawings, this lock preferably consists of a plate g removably secured to the strap C and interlocking with a notch h in the head of the knee-bolt section E, as shown in Figs. 1 and 5.

As illustrated in Figs. 5 and 6, the two knee-bolt sections are tapered toward the center of the bolt and the bushings or bearings d have corresponding bores. By this construction, not only is a strong and tight joint secured, but the inwardly and oppositely tapering surfaces of the bolt-sections and the bushings insure the centering of the thigh-section upon the lower or leg-

section at all times, preventing the thigh-section from drifting laterally and rubbing against the walls of the lower-section and obviating the squeaking and objectionable wear of the parts incident to a construction in which the knee-bolt is undivided and tapered from end to end. The joint is thus rendered more durable as well as practically noiseless.

I indicates an operating arm formed on or secured to the coupling sleeve F and extending forwardly therefrom. At its free front end this arm preferably carries one or more anti-friction rollers *j* mounted upon a cross pin *k* of the arm. Looped around these rollers is a pair of straps or cords L which pass through openings *m*, *m*¹ in the front and rear sides of the thigh-sections and through corresponding guides *n*, *n*¹ secured to the upper portion thereof. The upper ends of these straps terminate in rings *o* or other suitable attachments which in practice are connected with the front and rear members of the usual suspender which forms no part of the present invention and is therefore not shown in the drawings.

The rollers *j* are held upon the end portions of the cross pin *k* by retainers or plates *p* provided near their outer ends with screw threaded openings *p*¹ which engage threads on the end-portions of said pin, holding said plates against lateral displacement on the pin and confining the rollers between the plates and the operating arm I. The inner ends of the retaining plates *p* interlock with the adjacent sides of the knee-bolt sections E, E¹, the same being preferably provided for this purpose with curved notches or recesses *p*² conforming to said sections. By this construction, the retaining plates are held against turning on the screw threaded ends of the cross pin *k*. In assembling the parts just described, the rollers are first placed upon the cross pin, the retaining plates are next screwed upon said pin and the knee-bolt sections are finally screwed into the coupling sleeve F.

q indicates a back check of any suitable construction for limiting the forward swing of the lower leg-section.

In the use of the leg, when the wearer straightens his body and strains the suspender, the cords L pull the operating arm I forwardly and upwardly, thereby turning the knee-bolt in the same direction and swinging the lower leg-section from its rear or deflected position to its straightened position shown in the drawings. When the wearer bends forward slightly or lowers his shoulders, the suspender is relaxed, permitting the operating arm I and the lower leg-section connected therewith through the knee-bolt to swing backward to its deflected position. This improvement thus gives the wearer practically complete control over the

lower leg-section, enabling him to walk naturally either slow or fast, and preventing his tripping when walking in snow or grass or upon uneven surfaces.

If desired, the construction of the duplex or double-taper knee-bolt may be changed or modified without departing from the scope of the invention. For example, as shown in Fig. 9, the coupling sleeve F of the first described construction may be omitted and the operating device of the sectional knee-bolt E² may consist of a double or bifurcated arm I¹, the members of which are respectively secured to the inner ends of said bolt-sections. In this modification, the members of said operating arm are tied together by a cross pin or rivet *r*, and a single anti-friction roller *s* mounted on a second rivet *s*¹ is employed, both of the cords or straps L¹ passing around this roller.

I claim as my invention:

1. The combination of a thigh-section, a leg-section, and a knee-bolt pivotally connecting said sections and tapered from both ends toward its center.

2. The combination of a thigh-section, a leg-section, a knee-bolt pivotally connecting said sections, said bolt consisting of separate sections tapered toward the center of the bolt and means connecting said bolt sections.

3. The combination of a thigh-section, a leg-section, a knee-bolt pivotally connecting said sections, said bolt comprising inwardly-tapering sections, and an operating arm connected to the inner portions of said bolt-sections.

4. The combination of a thigh-section, a leg-section, a knee-bolt pivotally connecting said sections, said bolt comprising inwardly-tapering sections provided at their inner ends with screw threads, and a screw-threaded coupling-sleeve engaging both of said bolt-sections and carrying an operating arm.

5. The combination of a thigh-section, a leg-section, a knee-bolt pivotally connecting said sections and comprising a pair of sections journaled in bearings in the thigh-section and rigidly secured to the leg-section, said bolt-sections and bearings being tapered toward the center of the bolt, and an operating arm connected with said bolt-sections.

6. The combination of a thigh-section having bearings, a lower or leg-section provided at its upper end with eyes coinciding with said bearings, a centrally-divided knee-bolt pivotally connecting said sections, the sections of said bolt being tapered toward the center thereof, one of the bolt-sections having a screw threaded connection with the adjacent eye, means on the lower leg-section for locking the other bolt-section against turning, and an operating arm connected with said bolt-sections.

7. The combination of a thigh-section, a leg-section, a knee-bolt pivotally connecting said sections, an operating arm connected with said knee-bolt and provided with a screw threaded cross pin, an anti-friction roller mounted on said pin, and a retaining member provided near its outer end with a screw threaded opening engaging said retaining pin and interlocking at its inner end with the knee-bolt.

8. The combination of a thigh-section, a leg-section, a knee-bolt pivotally connecting said sections, an operating arm connected

with said knee-bolt and provided with a screw threaded cross pin, an antifriction roller mounted on said pin, and a retaining plate provided at its inner end with a notch interlocking with the side of the knee-bolt and near its outer end with a screw-threaded opening engaging said cross pin.

Witness my hand this 11th day of March, 1911.

CHARLES B. MARTIN.

Witnesses:

JOHN H. STEIN,
FRED. D. LORIMER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."