F. BUCHSTEIN.

ARTIFICIAL LEG.

APPLICATION FILED MAY 12, 1913.

1,066,882. Patented July 8, 1913.

Fig. 2

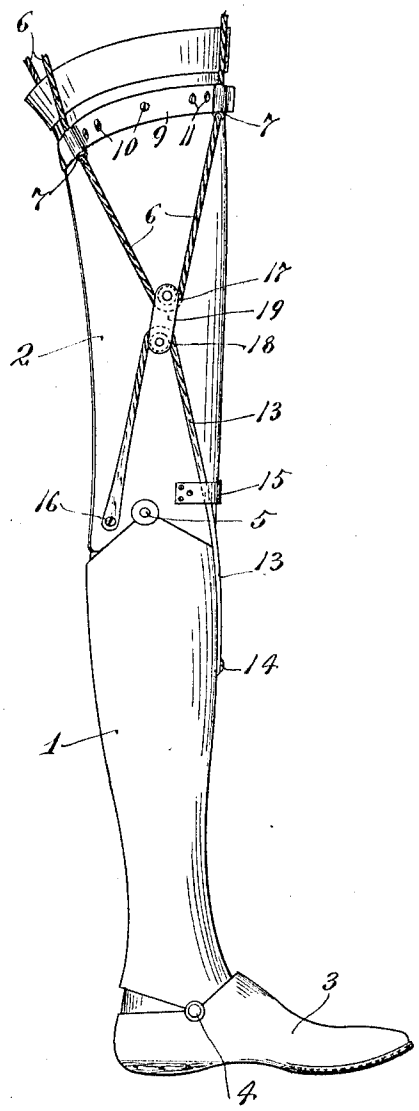
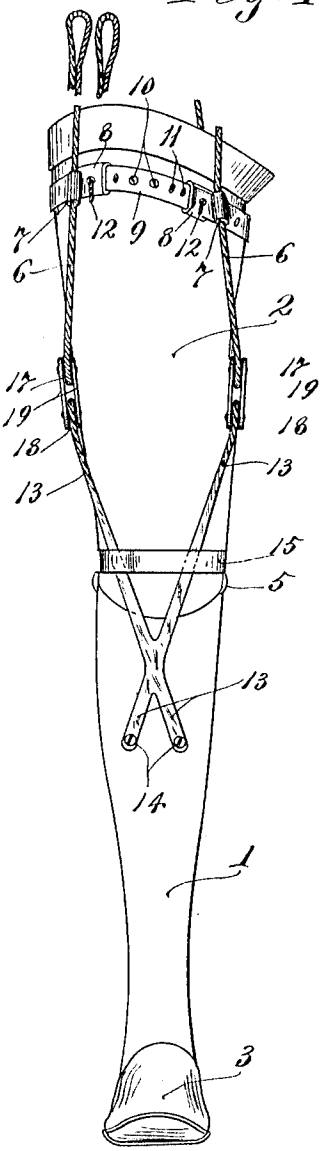


Fig. 1



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ARTIFICIAL LEG.

1,066,882. Specification of Letters Patent. Patented July 8, 1913.

Application filed May 12, 1913. Serial No. 767,003.

To all whom it may concern:

Be it known that I, FERDINAND BUCHSTEIN, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Artificial Legs; 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.

My present invention relates to artificial legs and is in the nature of an improvement on the leg disclosed and claimed in my copending application of the same title, filed Dec. 10, 1912, under Serial Number 715,367, and has for its object to improve the same in several important particulars hereinafter noted.

Particularly, the invention is directed to the connections for producing a natural forward swinging movement of the lower section of an artificial leg constructed for application to upper leg amputations.

The invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

The improved leg is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings: Figure 1 shows the improved artificial leg in front elevation, some parts being broken away; and Fig. 2 is a side elevation of the improved artificial leg, some parts being broken away.

The numerals 1 and 2 indicate the lower and upper leg sections, respectively, and the numeral 3 indicates the foot of the artificial leg, which parts may be of the usual or any suitable construction. The foot 3 is connected to the lower leg section 1 by an ankle joint 4, and the upper and lower leg sections are connected by a suitable knee joint 5.

The numeral 6 indicates the shoulder strap cords passed through suitable cord guides. These cord guides, as shown, are each made up of a tubular guide sheave 7, connected to a rectangular guide loop 8. Preferably, said parts 7 and 8 are made from leather. The shoulder strap cords 6 are passed through the guide sheaves 7, and an anchoring strap 9, preferably of leather, is passed through the guide loop 8. This anchor strap 9 surrounds the upper portion of the upper leg section 2, and is anchored thereto, at several points, by screws 10. Between the screws 10, the anchor strap 9 is loose, and has perforations 11, through which and the guide loops 8 tie cords 12 are adapted to be passed, to anchor the cord guides 7, with freedom for adjustments circumferentially of the leg. This adjustment is important because it permits the leg to be adjusted and suspended from the shoulder straps with the foot of the artificial leg set at a desired angle of divergence, and is a feature claimed broadly in my prior application above identified. The upper ends of the cords 6 are formed with loops through which the shoulder straps, not shown, may be conveniently attached.

A pair of lower leg straps 13 are crossed, at their lower ends, and secured to the front of the lower leg section, by screws 14. The intermediate portions of the lower leg straps 13 are passed through a guide on the front portion of the upper leg section, as shown, afforded by a strap 15 having its ends secured to the sides of the lower portion of the upper leg section 2. The upper ends of the lower leg straps 13 are secured to the back portion of the upper leg section 2 by screws 16, at points back of the knee joint 5. The intermediate portions of the shoulder strap cords 6 run under antifriction rollers 17, and the intermediate portions of the lower leg straps 13 are passed over rollers 18 of floating couplings which, as shown, are made up of short laterally spaced metallic straps 19. The said parts 17, 18 and 19 constitute sort of tackle blocks connecting the lower leg straps and shoulder strap cords and permitting free movements of the lower leg section.

When the foot of the artificial leg is lifted from the ground while the knee joint is bent, the lower leg section is in a position to be given a natural forward swinging movement in straight alinement with the upper leg section. During this forward swinging movement of the lower leg section, the intermediate portions of the lower leg straps 13 will slip over the lower sheaves 18 of the couplings 17.

When the leg is straight or nearly straight, the straps 13 have their minimum divergence at their lower portions and bear against the front of the knee portion of the

upper leg section 2, so that pull thereon from the shoulder straps will then hold the leg stiff. As the leg is bent at the knee joint, the diverging lower portions of the straps 13 spread out and slip laterally over the rounded knee portion of the upper leg section, so that an upward pull on the straps 13 has a decreasing tendency to straighten the leg as the leg is bent at the knee joint.

By the arrangement described, wherein the lower leg straps 13 are attached both to the lower leg section and to the upper leg section, upward pull on the shoulder straps not only serves to swing the lower leg section forward and to hold the leg stiff when straightened, but it also keeps the upper leg socket pulled up on the leg stump, which is inserted therein, and thus prevents chafing of the leg stump. When the leg is bent approximately at an angle of ninety degrees, upward pull on the lower leg straps through the shoulder strap cords and shoulder strap will not tend to straighten the leg, but the upward pull will, nevertheless, keep the upper leg section seated on the leg stump. When the leg is bent to an extreme position or approximately at a right angle, a slight release in the pressure on the lower leg strap is required to move the lower leg section into a position in which the pull on the said strap will swing the same forward. In the walking movement, the lower leg section is naturally given a forward swing. This arrangement, therefore, makes unnecessary the use of elastic straps connecting the upper leg section to the shoulder strap cords. In fact, it will be noted that in this improved leg all of the elastic straps or spring connections have been eliminated.

The lower ends of the straps 13 are shown as formed integral but, obviously, they might be independently constructed and crossed, or they might simply be brought together at their lower ends and otherwise secured to the lower leg section. The gist of the thing is that the said straps have such divergence at their lower front ends that when the leg is straight, or nearly straight, they will bear against the front knee portion of the upper leg section and, as the leg is bent, will spread out with a tendency to straddle the said knee portion of the said upper leg section.

The elements 6 herein designated as "shoulder strap cords" are usually made round but it will, of course, be understood that they might be made flat or in the form of ordinary straps and hence, the expression "cords" is herein used in a broad enough sense to include such straps.

What I claim is:

1. In an artificial leg, the combination with the upper and lower leg sections thereof connected by a knee joint, of shoulder strap cords, lower leg straps attached at their lower ends to the lower leg sections and connected at their upper ends to the upper leg sections, and floating couplings connecting the intermediate portions of said shoulder strap cords and said lower leg straps, substantially as described.

2. In an artificial leg, the combination with the upper and lower leg sections thereof connected by a knee joint, of shoulder strap cords, lower leg straps crossed at their lower ends and attached to the front portion of the lower leg section, the upper ends of said straps extending on opposite sides of the upper leg section and attached to the back portion thereof, and a floating coupling movable on and connecting the intermediate portions of said shoulder straps and said lower leg straps, substantially as described.

3. In an artificial leg, the combination with the upper and lower leg sections thereof connected by a knee joint, of upper and lower guides secured to the upper leg section, shoulder strap cords extended through said upper guides, lower leg straps extended through said lower guides and attached, at their lower ends, to the lower leg section and connected, at their upper ends, to the upper leg section, and sheave-equipped floating couplings movable on and connecting the intermediate portions of said shoulder strap cords and said lower leg straps, substantially as described.

4. In an artificial leg, the combination with the upper and lower leg sections thereof connected by a knee joint, of upper and lower guides secured to the upper leg sections, said upper guide being circumferentially adjustable, shoulder strap cords extended through said upper guides, lower leg straps crossed at their lower ends and attached to the front portion of the lower leg section, the upper ends of said straps extending through said lower guide and attached, at their upper ends, to the back portion of said upper leg section, and sheave-equipped floating couplings movable on and connecting the intermediate portions of said shoulder straps and said lower leg straps, substantially as described.

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

FERDINAND BUCHSTEIN.

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