May 11, 1937. E. BLEVENS 2,080,003

SUPPORT FOR ARTIFICIAL LOWER LEGS

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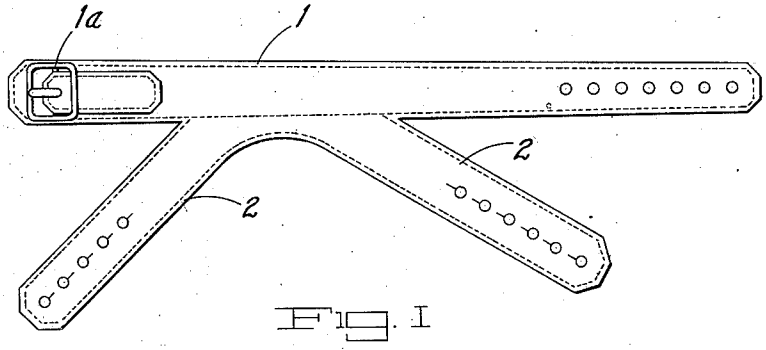


Fig. I

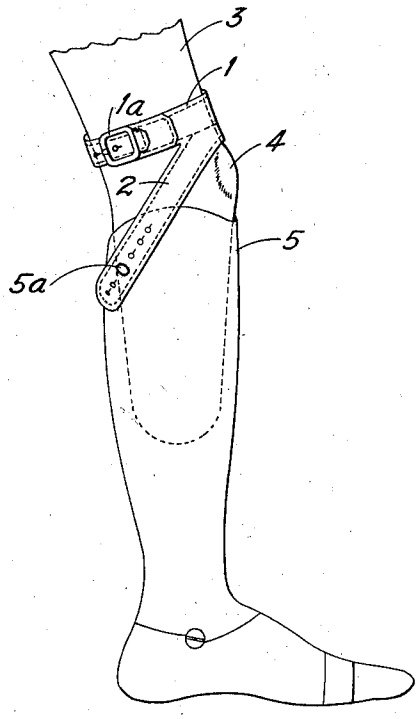


Fig. II

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SUPPORT FOR ARTIFICIAL LOWER LEGS

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1 Claim. (Cl. 3—11)

My invention relates to the ways and means of attachment and support of artificial limbs adapted for use in cases of amputations below the knee. And some of the objects of my invention are: (1) to provide comfortable means of attachment and support for said artificial limbs, from the upper leg, such as will allow natural freedom in the voluntary rotation of the lower limb and its foot, by the coordinate action of the muscles of the natural knee, which heretofore has been prevented by the cumbersome thigh-harness and the jointed, metal supports that extend from said thigh-harness down the sides of the leg past the knee to the artificial limb to which said supports are attached; (2) to devise a light-weight, secure and comfortable attachment-belt adapted to be fastened around the upper leg just above the patella and provided with soft and pliable supports designed to extend down past the knee on each side thereof, to the back of the artificial limb, to be attached thereto near the top thereof by means of headed lugs, or other fastenings; (3) to design and develop a light-weight, new and serviceable device for the secure attachment and the comfortable and efficient carriage of an artificial limb adapted to be worn in case of an amputation below the knee, and designed to allow the natural bending of the knee in walking or sitting, while firmly holding the artificial limb close-fitting in its normal service position and efficiently taking the place of the corresponding functions in the natural co-ordinating movements of the voluntary muscles and ligaments of the normal knee; (4) to develop a light-weight, pliant and comfortable device designed to be unnoticeable when worn on the leg under ordinary trousers and attached to the back part of an artificial limb which the device is adapted, both to support and hold firmly in its service position, when the wearer is engaged in ordinary vocations while standing or walking and to relax automatically with ease and comfort to the wearer when he is in the position of sitting or reclining.

With the foregoing and other objects which will appear in the process of the description, I will explain that my invention, the new and useful combination leg-belt with retaining straps and back-fastenings for artificial lower legs, illustrated in the accompanying drawing which forms part of this specification, is a practical device embodying the said novel means and other new and useful details of construction, arrangement and combination of parts, all of which, together with their functions will be described in detail with reference to said drawing and will be definitely pointed out in the claim that follows this description, so that any person familiar with the art, may understand how to construct and use this said device.

In said drawing, Figure I is a plan view of my new combination leg-belt with its retaining straps for artificial lower legs, showing the angles of fabrication.

Figure II is a side elevation of an artificial lower leg normally installed and retained on the fragment of a natural leg by means of my new combination leg-belt with its retaining straps here shown in their normal service position fixed upon the natural and artificial limbs.

This invention has been designed and developed in its various phases for the desirable purpose of producing a simple, efficient and economical combination leg-belt and supporting straps cooperative with headed back-lugs or other desirable fastenings on an artificial lower leg to take the place of the conventional, cumbersome thigh-harness and its awkward, heavy, jointed metal side supports heretofore used in cases of amputations below the knee. And with this purpose and the special objects aforesaid in view, I will now describe my invention in detail, pointing out the new and serviceable features and the functions of the individual parts and the combinations thereof, as illustrated in the drawing hereinabove described, in which similar letters and characters refer to similar parts throughout the several views.

In the design and the construction of my new combination leg-belt, indicated by the numeral 1, and its supporting straps, 2, 2, I have provided a buckle 1*a* or other suitable fastening on one end of said belt and several buckle-holes at predetermined spaces along the other end of the belt 1, adapted for the comfortable adjustment of the belt 1 to the natural leg 3 just above the knee-cap 4, as shown in Fig. II.

The retaining straps, 2, 2, may be integral with the thigh-belt 1 or may be cut separate and securely attached thereto; but in either case, the straps, 2, 2, should extend out from the leg-belt 1 at certain predetermined angles, depending on the size and shape of the leg of each individual wearer; and these supporting straps, 2, 2, must, also, extend out from the leg-belt 1 at predetermined places, so that, with respect to the size and shape of the leg, said straps may reach downward without wrinkles, on either side of the natural leg 3 and the artificial leg 5 to be attached to the headed lugs, 5*a*, 5*a*, or other fastenings, near the

back of the artificial lower limb **5**, as shown in Fig. II.

I should now explain fully that a reason why I have selected these back-contact points on the artificial leg for attaching the lower ends of said retaining straps, **2**, **2**, is that the distance between the two points of attachment in each supporting strap,—the one point in the leg-belt and the other, in the back of the artificial leg near the top thereof, is slightly less when the wearer of my new device for supporting an artificial limb, is sitting at rest, than when he is standing or walking. Now, as the supporting straps are originally adjusted in tension to hold the artificial limb firmly to the stump of the natural leg, while the wearer is in a standing position, we can readily see that when the wearer is resting in a sitting position, there is ample relaxation in both the straps, **2**, **2**, thereby affording ease and comfort for the wearer, regardless of the length of time he remains in his sitting position. But when the natural knee-joint is straightened, as when the wearer arises to a standing or walking position, the slack in said retaining straps is automatically taken up sufficiently to hold the artificial leg in its normal service position firmly up to the natural leg **3**, so that the wearer may walk naturally with a firm and even step. So, also, I have selected these efficiently-coordinate attachment-points for my newly-designed retaining straps and leg-belt in which the upper ends of the straps are attached to the lower-front part of the leg-belt and the lower ends of said straps are attached to the back-fastenings on the upper back part of said artificial leg, not only for the purpose, of holding the artificial leg up against the stump of the natural leg, but, also, for the necessary purpose of securely holding the artificial leg from turning unduly on the stump of the natural leg in service. For these reasons my novel combination leg-belt with retaining straps and back-fastenings for artificial lower legs, have been designed to be used alone, without the help of auxiliary attachments, for holding the artificial leg securely and efficiently in its normal service position on the stump of the lower natural leg, while the wearer is engaged in the ordinary pursuits of life, sitting or walking. It can now be readily seen that my new combination leg-belt with retaining straps for holding artificial lower legs firmly in their normal service position is comparatively light in weight, being from two to three pounds lighter than the conventional leg-supporting mechanism with its cumbersome thigh-harness and steel, jointed retaining side-pieces, heretofore used; and my new device is more comfortable and efficient to wear and never causes the cramping sensation in the leg muscles, which the wearer often feels when wearing the jointed steel side supports. However, it should be understood that the specific detail of the parts of my invention, as I have herein illustrated in the drawing and described, are not to be considered as limitations in the construction of my new artificial leg-supporting device; and that while keeping within the scope of my invention and claim, I may make desirable modifications of these details to facilitate production or to economize in fabrication, provided I keep within the spirit of said invention. Now, having thus described the various features of my invention, the detail construction, arrangement and combination of its parts as well as its functions and ways and means of operation; those features and combinations of my invention that I consider new and useful and representative of economy and efficiency, on which I desire Letters Patent granted to me, I have hereinbelow set forth and specifically described in the following claim.

I claim:—

In the adjustment and retention of an artificial lower leg to the stump of a natural leg,—the combination with an artificial lower leg having a socket in its upper end adapted to receive the stump of a leg-amputation and provided with means at its upper back part for the attachment of retaining straps on either side thereof; of a leg-belt adapted to fasten securely around the natural leg just above the knee-joint thereof and provided with two retaining straps designed to be attached to the front part of said belt and to pass downward and backward, fitting smoothly over either side of the natural knee-joint to be fastened to the upper back part of said artificial leg, as described, to prevent it from turning on the stump of the natural leg and to hold the artificial leg otherwise securely in its normal service position to the exclusion of auxiliary attachments.

EMMETT BLEVENS.