

Dec. 31, 1935.

R. TRAUTMAN
ARTIFICIAL LEG
Filed April 30, 1934

2,025,835

2 Sheets-Sheet 1

Fig. 1

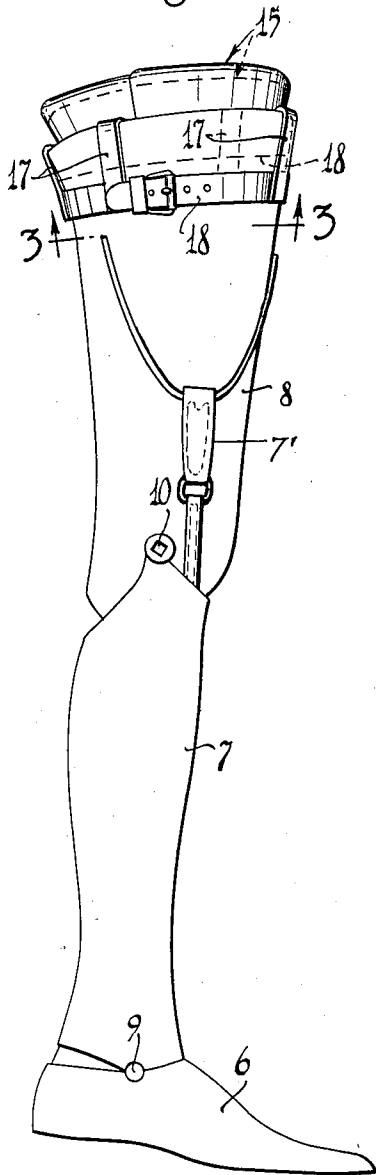
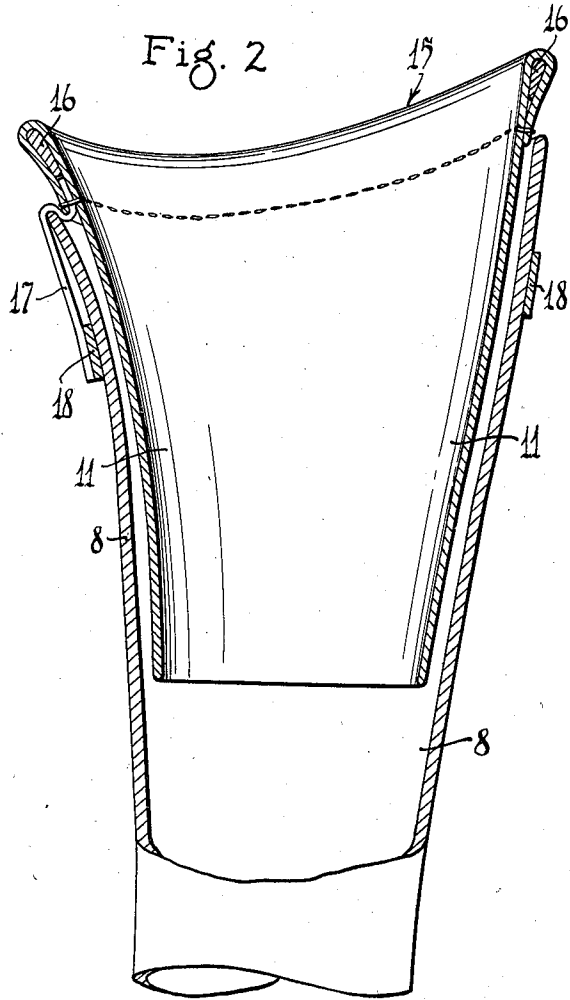


Fig. 2



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Fig. 3

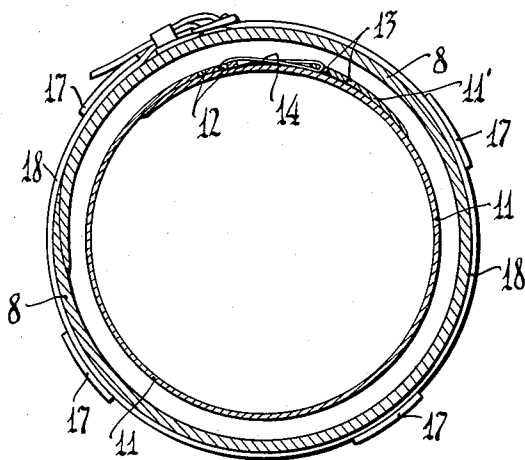


Fig. 4

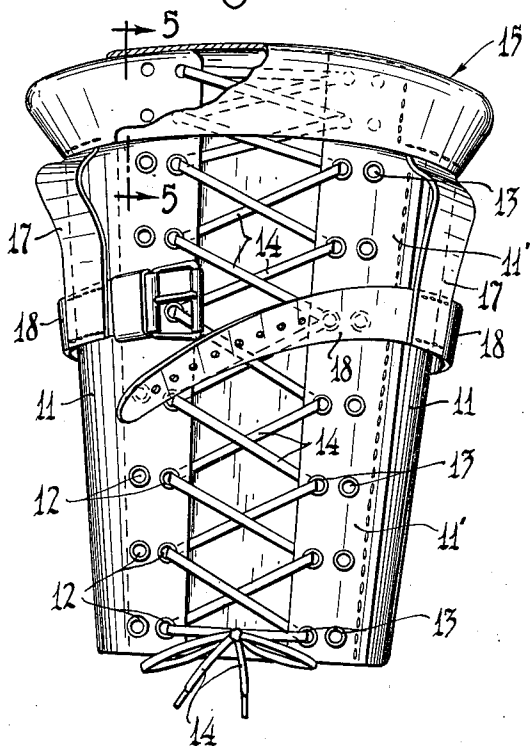
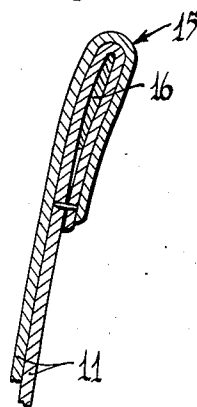


Fig. 5



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UNITED STATES PATENT OFFICE

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ARTIFICIAL LEG

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6 Claims. (Cl. 3—3)

My present invention relates to artificial legs and has for its object the provision of a highly efficient soft socket therefor and novel means for mounting the same.

To the above end, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is an outside elevation of a left artificial leg for an amputation above the knee and having the invention embodied therein;

Fig. 2 is a view principally in section taken centrally through the upper leg section and the socket from the front to the rear of the leg, on an enlarged scale;

Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1, on an enlarged scale;

Fig. 4 is a hip side elevation of the improved socket removed from the leg; and

Fig. 5 is a fragmentary detail view in section taken on the line 5—5 of Fig. 4, on an enlarged scale.

Of the parts of the artificial leg shown, it is important to note the foot section 6, the lower leg section or shell 7, the upper leg section or shell 8, the ankle joint 9, and the knee joint 10. The artificial leg is supported from the shoulders of the wearer by the customary suspenders 7' fragmentarily illustrated. Both leg sections 7 and 8 are hollow and made from fibre. It is important to note, as will hereinafter appear, that the upper end portion of the upper leg section 8 flares outwardly and upwardly.

The shell of the improved soft socket 11 is made from leather and is longitudinally divided at its hip side and the edge portions thereof overlap, whereby said socket may be circumferentially expanded or contracted. Two rows of eyelets 12 are applied to the outer or rear longitudinal edge portion of the socket 11 and a like two rows of eyelets 13 are applied to a leather strip 11' stitched to said socket considerably forward of its inner longitudinal edge portion and edgewise spaced from the outer or rear edge portion of said socket. A lace 14, laced through the two inner rows of eyelets 12—13, adjustably connects the longitudinal edge portions of the socket 11.

On the top of the socket 11 is a saddle 15 formed by folding the leather of said socket outwardly and downwardly upon itself and around a shaped piece of rock hard felt 16 which gives said saddle its proper shape. The two plies of leather at the

bottom of the saddle 15 are stitched together except where one end portion of the saddle 15 is telescoped over the other for sliding movement thereon during contracting or expanding movements of the shell of the socket 11 (see Fig. 4.)

The socket 11 is held suspended in the upper leg section 8, with the saddle just above the top of the socket 11, by four upright circumferentially spaced straps 17. These straps 17 have one of their ends inserted between the inner and outer plies of the saddle 15 and are permanently secured thereto by stitches. The straps 17, at their other or lower ends, are stitched or otherwise secured to a girdle or buckle-equipped strap 18 which encircles the upper leg section 8 at its upper end portion. By reference to Fig. 2 it will be noted that the upper end portions of the straps 17, upwardly between the socket 11 and upper leg section 8, are folded outwardly and downwardly over the upper edge of said leg section. These straps 17, where they pass between the socket 11 and the upper leg section 8, act as spacers that hold said socket and hence the saddle 15 spaced from the upper leg section 8 so that there is a free air space therebetween that extends completely around said leg section except where interrupted by the straps 17.

The straps 17 hold the socket 11 suspended in the upper leg section 8 so that the same is self-aligning therewith and also free for universal angular movement therein. Obviously, the flaring upper end portion of the upper leg section 8 holds the strap 18, which is tightly buckled around said leg section, from moving upwardly on said leg section under the pulling strain of the straps 17 thereon when weight is placed upon the socket 11. By loosening the strap 18 and moving the same upwardly on the upper leg section 8, the socket 11 may be lowered in said leg section and thereby shorten the operative length of the leg. On the other hand, the strap may be pulled downwardly on the upper leg section 8 and tightened to lift the socket 11 in the upper leg section 8 and thereby increase the operative length of the leg.

In case the foot section 6 steps on a pebble or an uneven surface that will throw said section laterally, the whole leg is given a lateral movement for the reason that the ankle joint 9 will not permit lateral movement of the foot section 6 relative to the leg. It may be here stated that ankle joints that permit lateral movement of foot sections are not a commercial success for the reason that they are comparatively complicated and soon get out of order.

In view of the fact that artificial legs are subject to such lateral movement, the suspension of the socket 11 from an upper end thereof with freedom for angular movement in the leg section 8 is highly important for the reason that said leg section may be thrown out of alignment with the socket 11 without placing any strain whatsoever upon the stump in the socket 11.

When buckling the strap 18 around the upper leg section 8, said section may be circumferentially adjusted relative to the socket 11 so that the leg will toe in the desired direction or exactly the same as the natural foot. The weight of the body, when placed on the leg at the saddle 15, is taken on the buttock and completely around the leg at said saddle, thus leaving the lower portion of the stump without any load strain. It is well known that a stump swells more at its lower end portion than at any other part thereof, and hence, as all of the body weight is taken on the saddle 15 the socket 11 may be laced to fit the stump without placing undue pressure thereon.

From what has been said, it will be understood that the artificial leg described is capable of modifications as to details of construction and arrangement within the scope of the invention herein disclosed and claimed.

While the invention is shown as embodied in an artificial leg for an amputation above the knee it is equally well adapted for embodiment in an artificial leg for an amputation below the knee.

What I claim is:

1. The combination with a hollow artificial leg section having an upwardly and outwardly flaring upper end portion, of a socket, an adjustable girdle loosely and completely encircling the leg section with freedom for circumferential adjustment thereabout, said girdle being held by friction from sliding upwardly on the flaring end portion of the leg section, and a plurality of straps loosely folded over the upper edge portion of the leg section, which straps connect the socket to the girdle and hold the socket loosely suspended in the leg section, said straps being free for edgewise shifting movement on the upper edge of the leg section, whereby circumferential movement of the girdle about the leg section and edgewise shifting movement of the straps on the upper edge of the leg section will turn the socket in the leg section.

2. The combination with the shell of an artificial leg, said shell having a foot section, of a socket in the shell, and means attached to the socket and extending over and loosely resting on the upper edge of the shell for holding the same suspended in the shell, said means being free for edgewise shifting movement on the up-

per edge of the shell to permit relative movement of the shell and the socket to change the toeing of the foot section.

3. The combination with a hollow artificial leg section, the diameter thereof increasing progressively upward, of a socket adapted to be disposed within the upper portion of said leg section with free space intervening between said socket and said leg section, a girdle of flexible material encircling the upper portion of the leg section, said girdle being of lesser diameter than the greatest diameter of said leg section and thereby frictionally confined against upward dislodgment therefrom, a plurality of spaced flexible straps looped over the upper edge of the leg section, the outer ends of said straps being connected with said girdle at intervals about the same, the inner ends of said straps being connected with said socket to suspend the same freely within the leg section, said girdle and straps cooperating to support the socket on the leg section with cushioning effect.

4. The combination with the shell of an artificial leg, said shell having a foot section, of a socket in the shell that is free for relative turning movement, and a plurality of flexible straps attached to the socket and loosely looped over the upper edge of the shell and resting thereon for holding the socket suspended in the shell, said straps being free for edgewise shifting movement circumferentially on the upper edge of the shell to permit relative turning movement of the shell and the socket to change the toeing of the foot section.

5. The combination with the shell of an artificial leg, said shell having a foot section, of a socket in the shell that is free for relative compound circumferential and endwise movements, a girdle of flexible material encircling the shell with freedom for relative circumferential adjustment, and a plurality of flexible straps having one of their ends anchored to the girdle and their other ends attached to the socket, said straps being loosely looped over the upper edge of the shell and resting thereon for holding the socket loosely suspended in the shell, said straps being free for edgewise shifting movement circumferentially on the upper edge of the shell during circumferential adjustment of the girdle on the shell to permit relative turning movement of the shell and the socket to change the toeing of the foot section.

6. The structure defined in claim 5 in which the girdle is also bodily adjustable longitudinally on the shell to move the straps endwise on the upper edge of the shell and raise or lower the socket in the shell.

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