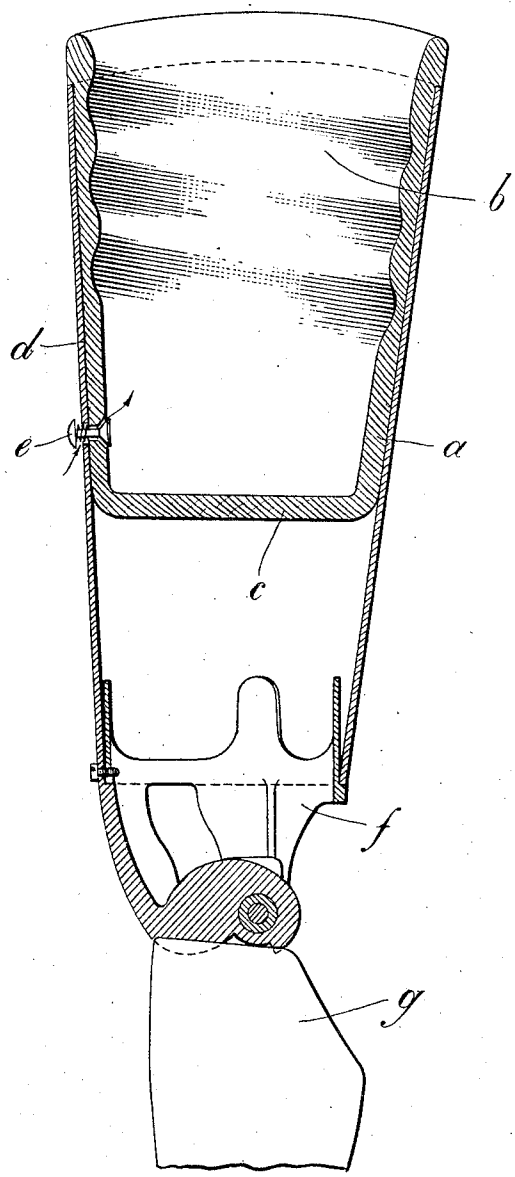
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ARTIFICIAL LIMB

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ARTIFICIAL LIMB.

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This invention relates to a new or improved artificial limb, and refers particularly to an artificial leg specially intended for use by those who have suffered the amputation of a leg above the knee joint.

Where such an amputation has taken place the greatest difficulty is experienced in fitting the artificial limb to the stump in such a manner that the wearer can walk naturally, and in preventing friction between the stump and the socket into which it fits.

Hitherto it has been common practice to provide a socket which is supported by braces and straps from the wearer's body, but in the act of walking the movement of the limb causes rubbing of the straps and braces to and fro upon the body giving rise to sores and abrasions, and the straps and braces also cut into the body when the wearer sits down. It has, therefore, been difficult and painful for a person having a leg amputated above the knee to walk for any appreciable distance or to wear an artificial limb continuously, not only on account of the discomfort caused by the supporting braces or straps, but also on account of the injury done to the stump by friction between the stump and the socket on the limb into which it fits. To avoid this difficulty I believe an attempt was made some years ago to secure the limb to the stump by the use of suction, the bucket or socket portion of the limb being smooth and arranged to form an air chamber, but I believe the attempt was unsuccessful. In any case previously it has been proposed to provide such an air chamber with a valve for admitting air into the chamber to relieve the suction and permit the withdrawal of the limb.

In my own case I have tested sockets depending on suction alone in this manner without success, and the object of my invention is to provide an artificial limb having a valved suction chamber of the character described in which accidental detachment and the risk of chafing or injuring the stump will be obviated and a healthy condition of the limb will be promoted.

Accordingly, my invention consists in a limb having a suction chamber in the socket or bucket in which a smooth helical groove or grooves, is formed in the interior of the bucket so that the limb is easily applied to the stump and is held very effectively thereon.

One form of limb suitable for a person having a leg amputation considerably above the knee joint has been illustrated by way of example in the accompanying drawing being shown in sectional side elevation.

As shown, the stump receiving part of the limb consists of a hollow wooden, papier-mâché, or other socket *a* closed at the lower end *c*, and having a shallow internal screw-thread *b* of two or more turns adapted to grip the stump. The internal dimensions and length of the socket will of course be determined by the dimensions of the stump for which it is intended. An air release valve *e* is employed in the socket to allow air to escape therefrom as the stump is inserted; and to permit air to be admitted thereto when the stump is withdrawn.

Fitting on the outer surface of the socket proper is a tubular member *d* which may conveniently be made of sheet aluminium or other light metal, the upper end of the member abutting against a lip or flange at the upper end of the socket as shown.

The lower end of the member *d*, as shown in this example, is attached to a knee part *f*, which in turn is jointed to the lower leg *g* in any known manner. I wish it to be understood, however, that these details form no part of the present invention which is in no wise limited to any particular construction of the limb.

The valve employed in the socket is preferably an ordinary spring-seated valve *e*. It has a stem or plunger projecting through the wall of the socket and a head having a resilient or other suitable sealing face for closing against an internal seating. Around the stem a light compression spring is arranged so that the valve is closed automatically by the spring, but can be opened by finger pressure applied to the plunger or stem.

The grooved socket should not be a dead-tight fit upon the stump, but should be a free fit so that the stump can find its way easily practically to the bottom of the bucket. As the grooved socket is placed over the stump, the latter finds its way into the socket if the valve is depressed to relieve the air. The muscles of the stump cause it to expand into the groove or grooves when the patient is standing or walking, but permit it to be contracted so that air may enter around the groove or grooves to ventilate the stump when the patient so desires.

By the use of the invention the stump is developed and exercised, and a healthy condition results.

What I claim is:—

1. An improved artificial limb including a hollow socket for the reception of the stump of the patient's limb, said socket being constructed of comparatively rigid material and closed at its lower end and being formed with a helical groove in the internal surface thereof.

2. An improved artificial limb including a hollow valved socket for the reception of the stump of the patient's limb, said socket being constructed of comparatively rigid material and closed at its lower end and being formed with a helical groove in the internal surface thereof.

3. An artificial limb including a wooden socket closed at its lower end and provided with a continuous groove in a portion of the internal wall.

In testimony whereof I have hereunto signed my name.

ERNEST WALTER UNDERWOOD, M. M.