E. SAUZE.

ARTIFICIAL LEG.

APPLICATION FILED SEPT. 5, 1918.

1,376,292.

Patented Apr. 26, 1921.

Fig. 1.

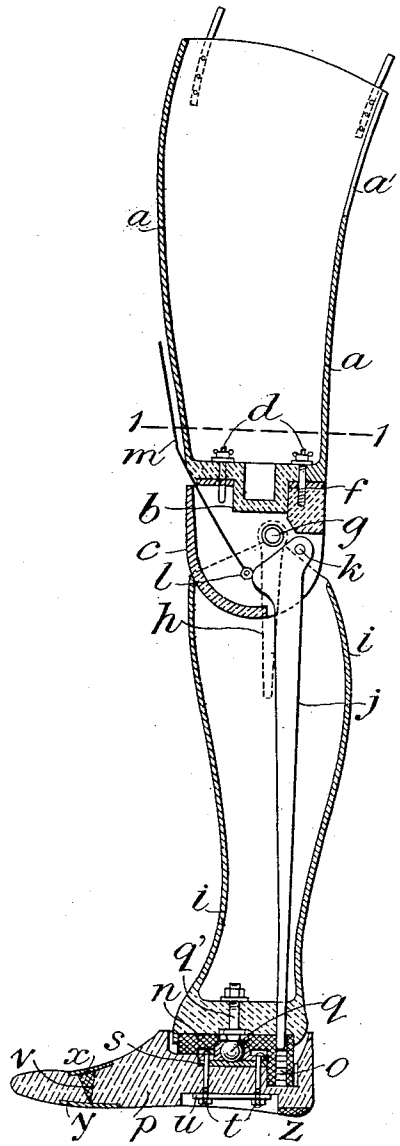


Fig. 2.

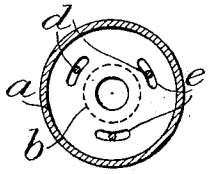


Fig. 3.

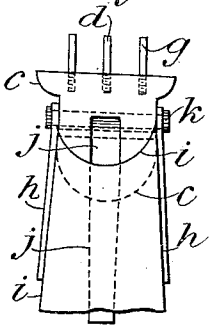


Fig. 4.

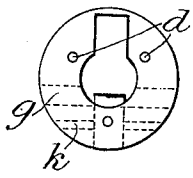


Fig. 5.

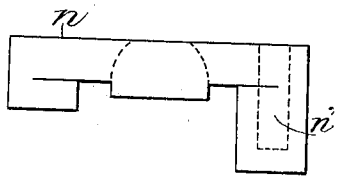


Fig. 6.

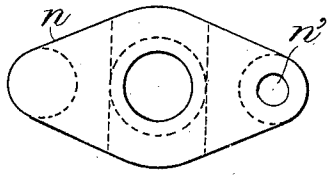


Fig. 7.

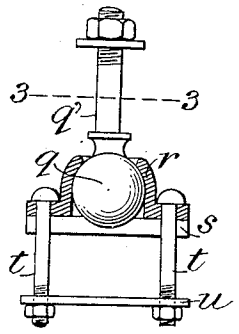
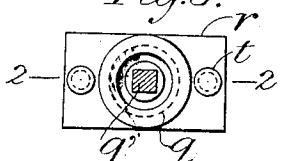


Fig. 8.



Witnesses.

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ARTIFICIAL LEG.

1,376,292. Specification of Letters Patent. Patented Apr. 26, 1921.

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To all whom it may concern:

Be it known that I, EUGÈNE SAUZE, a citizen of the French Republic, residing in St. Etienne, France, have invented certain new and useful Improvements in Artificial Legs, of which the following is a specification.

This invention relates to an artificial leg, the construction of which permits—

1. Easy adjustment of its length.

2. Easy adjustment of the distance between the artificial foot and the knee to obtain perfect symmetry in relation to the healthy foot.

3. Automatic braking whereby bending of the leg is prevented when the cripple brings the weight of his body to bear upon it.

4. Automatic straightening of the leg by means of the braking apparatus.

Other objects of the invention will be gathered from the following description with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the leg.

Fig. 2 is a cross section through the casing for the stump on line 1—1 of Fig. 1.

Fig. 3 is a part elevation showing the connection of the knee with the leg.

Fig. 4 is a plan of the knee.

Figs. 5–8 are drawn to an enlarged scale. Fig. 5 is an elevation of a damping pad. Fig. 6 is a plan of the same pad. Fig. 7 is an elevation of the ball and socket joint in section on line 2—2 of Fig. 8. Fig. 8 is a sectional plan on line 3—3 of Fig. 7.

The stump casing *a* has at its lower part a pivot *b* which fits into the knee *c*. The casing and the knee are connected by screw bolts *d* which extend through arc-shaped slots *e* (Fig. 2) in the end of the casing *a*. This mode of connecting the casing with the leg permits adjustment of the latter relatively to the former in angular direction. For adjusting the length of the limb there may be interposed between the casing and the knee one or more plates *f* of any suitable material. At the upper part of the casing there is an opening *a'* for accommodating a pneumatic cushion, if necessary.

The knee thus connected with the casing is connected with the leg *i* by means of a pivot *g* on which can turn straps *h* fixed to the leg.

A brake rod *j* hidden in the leg is pivoted at its upper part on a pin *k* mounted in the knee. The axis of the pin is eccentric to that of the pivot *g*. At its upper end the brake rod has a forward projection at the end of which is mounted an eye receiving the end of a strap *m* which extends through the knee and is connected with a strap resting on the shoulders of the cripple.

The rubber damping pad *n* interposed between the leg and the foot as shown in Figs. 1, 5 and 6, has in its rear part a bore *n'* to receive a variable number of washers *o* made of rubber, leather, wood or the like. These washers support the lower end of the brake rod *j*. When the cripple places the heel on the ground and leans the weight of this body on this heel the damping pad is compressed and the rod *j* suffers an upward thrust upon the pin *k*. While this pressure is maintained, the pin *k* cannot move around the pivot *g* so that the leg cannot bend and the cripple does not run the risk of falling every time that he rests his body on the artificial limb; the degree of braking may be adjusted by varying the number of the washers *o*.

The brake rod *j* fulfils another function, namely the automatic straightening of the leg as soon as the latter has been bent for imitating natural walking. When in relation to the leg the casing *a* turns around the pivot *g*, the pin *k* moves around this pivot in the downward direction and thus compresses through the brake rod that part of the damping pad *n* which is in the heel.

The effect of this compression is on the one hand to lower the heel and in consequence to raise the point of the foot by rotating the whole about the ball and socket joint, in this manner stumbling against the roughnesses of the ground is avoided; and on the other hand, and this is the more important point, the compressed rubber reacts and thrusts the rod upward, thus straightening the leg automatically.

As an aid to this automatic straightening of the leg movement of the shoulders may exert tension on the strap *m*, thus pulling upward the eye *l*.

A more energetic lifting of the shoulders may effect braking which may be distinct from that produced by the heel or may add itself to the latter.

It is to be noted that in whichever manner the braking is effected it is always through the brake rod and requires the least possible effort. It will be seen that the rod constitutes the long arm of a lever and thus diminishes the fatigue of the

shoulders and the stump. It is also to be noted that the braking by the heel utilizes the whole weight of the body of the cripple which otherwise he would use in useless compression, thus fatiguing himself without any compensating advantage.

The foot *p* is connected with the leg by a ball and socket joint *q*. The ball is fixed to the end of a rod *q'*, of square section, extending through the bottom of the leg where it is firmly held by a nut. The socket is constituted by a cap *r* held to the seat *s* by bolts *t* which extend through the body of the foot where they are connected by a plate *u* to receive the pressure of their nuts.

It will be seen that the ball and socket joint permits movement of the foot in any direction, this movement being damped by the pad *n*. Between the front end and the body of the foot is interposed a pad of rubber *v* hidden by a leather cover *x* which encircles the foot except the tread thereof where there is a band of leather or rubber *y*, fulfilling the function of a hinge. A rubber pad *z* may be fixed beneath the heel.

This leg may also be used for cripples amputated below the knee, in which case only the leg and foot are necessary and are attached to a stump by means of a suitable casing.

Having thus fully described my invention and the best means I know of carrying the same into practical effect, I claim:

1. An artificial leg comprising a casing, a knee attached to the said casing, a leg adapted to turn on a horizontal axis in the knee, a rod within the said leg adapted to turn about an axis in the said knee eccentric to the axis on which the said leg turns, a cavity in the said foot and an elastic cushion of adjustable thickness within the said cavity upon which cushion the end of the said rod rests.

2. An artificial leg comprising a casing, a knee attached to the said casing, a leg adapted to turn on a horizontal axis in the said knee, a rod within the said leg adapted to turn about an axis in the said knee eccentric to the axis on which the said leg turns, a cavity in the said foot, an elastic cushion of adjustable thickness within the said cavity upon which cushion the end of the said rod rests, a forward projection at the upper part of the said rod and a strap connected with the end of the said projection and adapted to extend to the shoulders of the wearer of the artificial leg.

3. An artificial leg comprising a casing for the stump, a knee, arc-shaped slots in the lower end of the said casing, bolts extending through the said arc-shaped slots to connect the knee with the casing, and a leg adapted to turn on a horizontal axis in the said knee.

4. An artificial leg comprising a casing for the stump, a knee, arc-shaped slots in the lower end of the said casing, bolts extending through the said arc-shaped slots to connect the knee with the casing, a pivot in the said knee, straps turning about the said pivot, a leg fixed to the said straps, a rod within the said leg pivoted on an axis to the said knee which is eccentric to the axis of the said pivot, a forward projection at the upper part of the said rod, and a strap connected with the end of the said projection and adapted to extend to the shoulders of the wearer of the leg.

In testimony whereof I have signed my name to this specification.

EUGÈNE SAUZE. [L. S.]