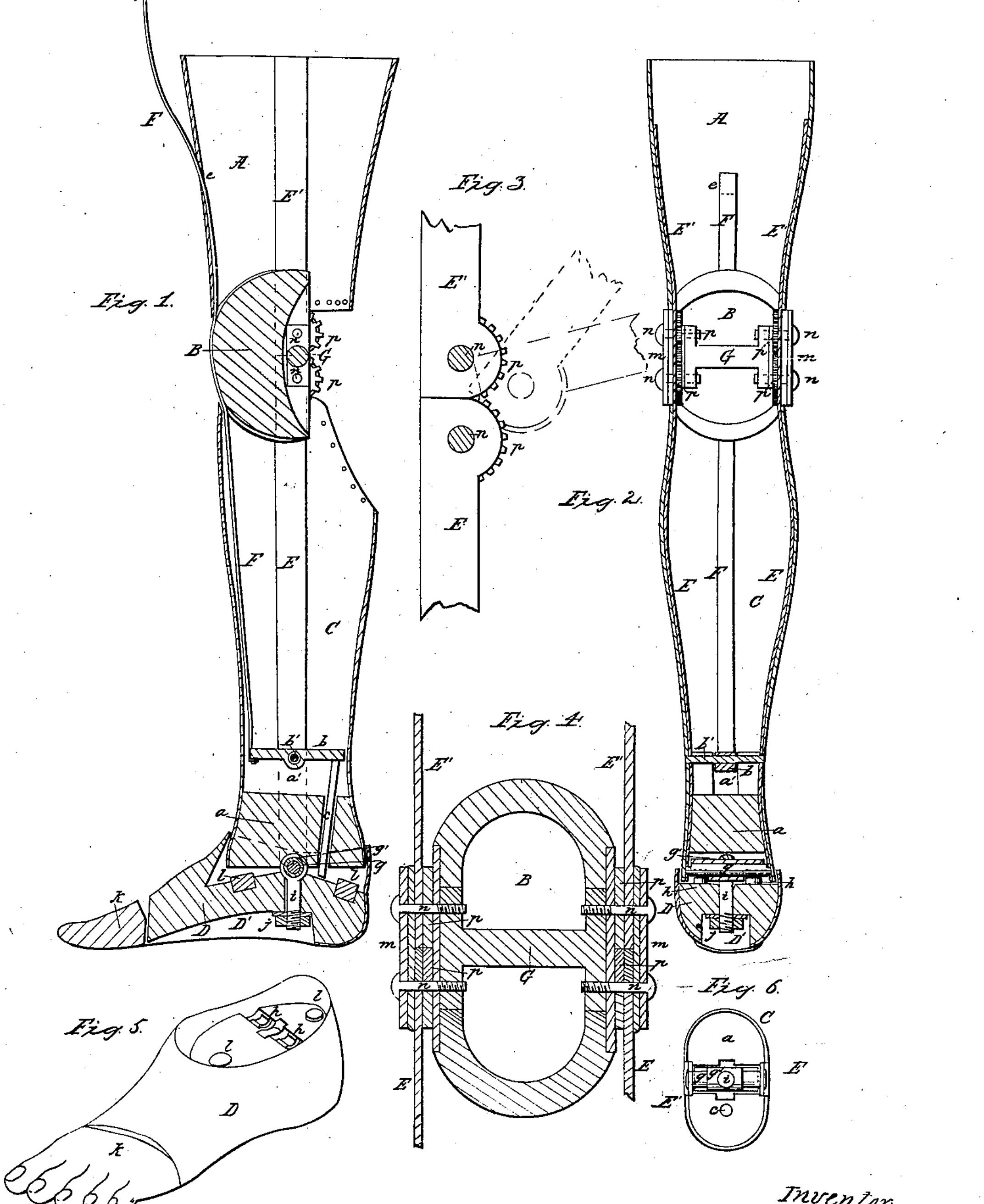
R. G. Lockwood

Artificial Leg,

No. 50,770, Patented Oct. 31, 1865.



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UNITED STATES PATENT OFFICE.

R. G. LOCKWOOD, OF BATTLE CREEK, MICHIGAN, ASSIGNOR TO HIMSELF AND O. B. JONES, OF SAME PLACE.

IMPROVEMENT IN ARTIFICIAL LEGS.

Specification forming part of Letters Patent No. **50,770**, dated October 31, 1865.

To all whom it may concern:

Be it known that I, R. G. LOCKWOOD, of Battle Creek, Calhoun county, State of Michigan, have invented a new and Improved Artificial Limb; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical section through the improved limb. Fig. 2 is a vertical section through the limb, taken in a plane at right angles to the section of Fig. 1. Fig. 3 is a view of one side of the jointed brace-straps. Fig. 4 is an enlarged view, showing the construction of the knee-joint. Fig. 5 is a perspective view of the foot detached from the ankle-joint. Fig. 6 is a view of the end of the lower portion of the leg with the foot removed.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain novel improvements on the artificial leg for which Letters Patent were granted to Theodore Burr, the object of which invention is to provide for the use of hollow shells in the manufacture of the upper and lower portions of the leg, in conjunction with stiffening and supporting straps, which constitute bearings both for the joints of the knee and the ankle; also, to employ a solid knee-cap, which is received within the upper and lower sections of the leg, and which is attached thereto by rolling joints and connecting-straps, for the purpose of affording strength and stiffness to said portions of the leg at the knee, as will be hereinafter described.

The object of my invention is also to connect the foot to the lower section of the leg by an ankle-joint of a peculiar construction, and to provide for setting up or tightening this joint when it wears loose, as will be hereinafter described.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawings, A represents the uppermost section of the leg, which receives the stump of the natural leg when dissected above the knee. B is the knee-section, and C is the lowermost section, to which the foot D is attached by a joint, as will be hereinafter described. The two sections A and C are made hollow, and the lower section, C, is made of rawhide by stretching the green hide over a block of the proper form and allowing it to dry, after which the hide should be coated with some suitable water-proof composition which will insure it against hygrometric changes. The upper section, A, may be constructed in a similar manner, or it may be made of any other substance which may be found to answer the purpose. In the lower end of the hollow section C is a solid block, *a*, having a slot, *a'*, in its upper end, adapted for receiving a lever, *b*, which is pivoted at *b'* by a pin passing through the side straps, E E, as shown in Figs. 1 and 2. This block *a* is also perforated to receive a pin, *c*, which is acted upon by one arm of the lever *b*, the other arm of this lever being acted upon by a strap, F, which extends upward and over the cap of the knee-section B, and is passed out from the upper section, A, through a slot, *e*, shown in Fig. 1. A groove is made transversely across the lower end of the block *a* for the purpose of receiving a pin, *g*, which is riveted to the lower extremities of the side straps, E E, and which receives around it a tube, *g'*. This tube is allowed to play freely upon the pin *g*, and its ends are cut away on the lower side, in order to allow the pin *g* to rest upon bearings *h h* of the foot D, as shown in Fig. 2. To this tube *g'* a screw-bolt, *i*, is securely attached, which passes down through the foot D and receives on its end a nut, *j*, by means of which the foot is attached to the lower section, C, of the leg. The foot D has a cavity, D', in its bottom, to receive the nut *j*, and also to receive some suitable elastic substance to afford an elastic tread. The toe-section *k* of the foot is attached in such manner as to admit of a free articulation while walking.

In order to make a perfect attachment of the foot to the leg, the upper portion of the foot is recessed to receive within it the lower end of the section C, and the bottom of the recess is inclined forward and backward from the bearing-points *h h*, so as to allow the foot to rock upon its bearing *g*. I introduce small blocks of rubber, *l l*, into the foot-recess to prevent the end of the block *a* from striking a solid substance and producing jar and concus-

sion in walking. Metal springs may be used nstead of india-rubber, but I prefer to use the atter. The two straps E E extend from the bearing-pin *g* to the knee-joint, at which point heir ends are rounded and abut against the corresponding rounded ends of two side straps, E′ E′, which are secured to the upper section, A, of the leg. The form of the ends of the straps E E E′ E′ is shown clearly in Fig. 3, wherein it will be seen that the rounded surfaces roll upon each other, so as to admit of the flexure of the knee. The flat surfaces of the ends of these straps abut against each other when the leg is not bent at the knee, and prevent the knee-joint from bending or articulating backward. The ends of the straps E E E′ E′ are connected together by links *m m* and pivot-pins *n n*, which latter pass through their respective straps and enter a metal frame, G, which is in the form of the letter H, and which is suitably attached to the knee-section B, as shown in Figs. 2 and 4. The rounded surfaces of the ends of the straps are concentric with the axes of their pivots *n n*, and these surfaces are prevented from slipping by means of teeth *p*, which interlock with each other on the sides of the straps. I form compound joints at the knee, for the purpose of approaching as near as possible to the natural articulation of a leg.

The forward portion of the knee-section B is rounded to conform as near as possible to the natural knee-cap, and the rear side of this section is flattened to receive the H-brace G, which is intended for strengthening the parts which constitute the knee-joint.

It will be seen from the above description that the side straps, E E and E′ E′, form a metallic skeleton, and that while they serve as supports for the leg at the knee-joint, they also stiffen the shells A and C and serve as bearings for the pin *g* of the ankle-joint. These straps enable me to employ a very thin substance for the leg-section, and thus afford lightness and strength to the entire structure.

The manner of attaching the foot to the lower section of the leg enables me to provide for any wear of the parts composing the joint by setting up the nut *j* and drawing the joint tighter when it becomes loose.

The lever *b* and pin *c*, together with the strap F, are intended for moving the foot to the proper position in walking. It will be seen that when the leg is bent in walking a strain comes upon the strap, its upper end being attached to the body, which lifts the front end of the lever *b*, and by so doing the pin *c* is forced downward and lifts the forward part of the foot. This movement of the foot takes place every time the knee is slightly bent. The strap F being passed over or in front of the knee-section B, it serves as a very efficient knee-spring to return the leg portion C to its proper position after the knee is bent.

I employ the rocking lever and pin in the ankle-joint for the purpose of enabling me to move the foot with a strap, F, without the necessity of attaching this strap to the foot. By so doing I am enabled to remove the foot from the leg at pleasure without detaching the strap from its lower fastening.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Securing the ends of the straps E E′ and connecting-plates *m m* to the knee-section B by means of a frame, G, substantially as described.

2. Attaching the strap F to a lever, *b*, which acts upon the foot D through the medium of a pin, *c*, substantially as described.

3. Connecting the strap F at its lower end to a rocking lever, *b*, applied within the hollow section of the leg, substantially as described.

4. The combination of the hollow sections A C, knee-section B, and straps E E′, constructed substantially as described.

R. G. LOCKWOOD.

Witnesses:

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