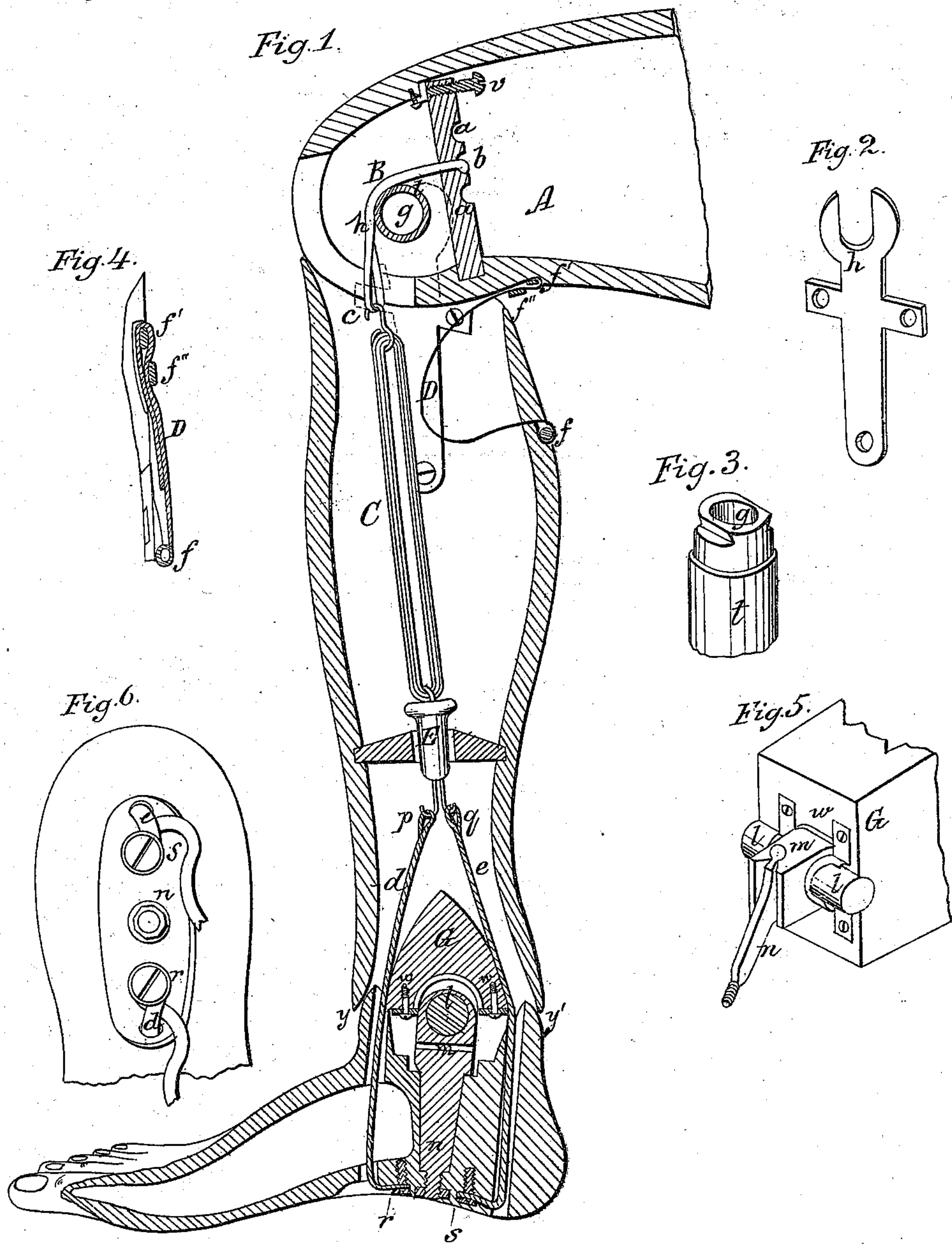


M. H. Hawkins.

Artificial Leg.

Nº 90,099.

Patented May 18, 1869.



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IMPROVEMENT IN ARTIFICIAL LEG AND FOOT.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, MOSES H. HAWKINS, of the city and county of New Haven, in the State of Connecticut, have invented a new and useful Improvement in Artificial Leg and Foot; and I do hereby declare that the following is a full, clear, and exact description of the construction, character, and operation of the same, reference being had to the accompanying drawings, which make part of this specification, in which—

Figure 1 is a section of the leg and foot, from above the knee, downward, as cut vertically through the centre, showing the general construction of the knee and ankle-joints, the main spring which is common to both, and the cords which govern both.

Figure 2 is a perspective view of one of the irons which support the journals of the pin, or arbor, on which the knee-joint vibrates, showing the dovetail-form of the bearings.

Figure 3 is a perspective view of one of the journals of the pin, or arbor, on which the joint vibrates, showing the leather case which surrounds it.

Figure 4 is a vertical section, showing the manner of connecting and adjusting the ham-string, &c.

Figure 5 is a perspective view of the joint of the ankle, showing the mechanism for giving both the vertical and transverse motions to the foot, and the means by which it is secured to the leg.

Figure 6 is a perspective view of the rear, or heel-portion of the bottom of the foot, showing the screw which secures the foot to the leg, and the two cords which govern the two ends, that is, the heel and toe of the foot, and the manner of adjusting them by the binding-screws.

My improvements consist in covering or enveloping the fulcrum-pin of the knee-joint with leather, or any other suitable material, so as to obviate the ordinary friction; and in carrying the cord by an eye-splice, or loop around a bar, fitted transversely in the leg, above the knee, with several notches in it to suit the desired strain of the knee-joint; and in fitting the ankle-joint with both a vertical and transverse motion, by means of the two joints perpendicular to each other; and in regulating the vertical motion of the foot, by the two cords, which are connected with the main spring of the two joints, knee and ankle, so that the foot may be held in the desired horizontal position for its general effect, but so that the foot may be vibrated vertically, while walking; and in making the ham-string readily adjustable by means of having, at one end, an eye-splice, or permanent loop, properly secured, and at the other end, an adjustable loop, to be secured by a suitable binding-plate, to secure the loop in any desired position, which the owner can readily do.

I make the upper part of the leg, or the part, above the knee, and containing the knee-joint, of wood, or any other suitable material, making it hollow, as represented at A, both for lightness and convenience.

Transversely across this hollow part, I fit an adjust-

able bar, with any suitable number of slots, or notches in it as represented at *a a*, fig. 1, to receive the loop, or eye-splice, at one end, *b*, of the cord B, while the other end, as at *c*, is connected with the main spring C, of the leg, which main spring is also connected with the foot-cords *d* and *e*.

I also fit the ham-string D with a suitable loop, to be secured by a suitable pin, or stay, as represented at *f*, fig. 1, and the upper loop or bight, *f'*, I pass over a bearing, or stay, in the upper part of the leg, in such a manner that a straight or flat plate, *f''*, may be applied to bind it, by being secured, by screws, in the desired position to keep the knee-joint straight.

In the knee, I support the journals of the joint-pin *g*, figs. 1 and 3, in slotted bearings, one of which is shown in fig. 2, and indicated by dots at *h*, fig. 1; and I connect the lower loop of the cord, which passes over it, with the main spring C, of the leg, so as to assist in working it, and also in working the ankle-joint, so that the action may be reciprocal.

I construct the ankle-joint substantially in the manner represented in the double-jointed device shown in fig. 5, and indicated in section in fig. 1.

I make the ankle-joint fulcrum-pin with proper journals, as represented at *l l* in fig. 5, and in section in fig. 1, to regulate the vertical motion of the foot, and with a rocker, as shown at *m*, fig. 5, to admit of a lateral motion of the foot, the bar *n* of which rocker I extend down through the solid part of the foot, and secure it by a nut, as indicated at *n*, figs. 1, 5, and 6, the bar being shown more fully in fig. 5.

I secure the fulcrum *l l*, of the ankle-joint, to the solid part G, of the ankle, by straps and screws, as represented at *w*, fig. 5, and indicated in section in fig. 1; and I fit the rocker in a proper recess, as shown at *m*, fig. 5, to roll freely, so as to allow the foot to have a sufficiently free lateral motion.

I fit the cords *d* and *e* to control the vertical motion of the foot, by attaching their upper ends to suitable hooks, as represented at *p* and *q*, fig. 1, connected with the main spring C, and extending them downward through holes in the lower portion of the ankle and foot, where I loop each of them around, and secure them firmly by binding-screws, as represented at *r* and *s*, figs. 1 and 6, so that the cords may be readily adjusted to regulate the vertical motion of the foot.

I make the main spring, C, of India rubber, or any other suitable material, substantially as shown in fig. 1, and connect its upper end with the knee-cord B, as shown at *c*, and its lower end with the two foot-cords *d* and *e*, as shown at *p* and *q*, having a solid guide to keep them in the centre, as shown at E.

The advantages of my improvement consist in that by means of the bearings, as fig. 2, and indicated at *h*, fig. 1, I secure the joint or fulcrum-pin *g*, of the knee-joint, and by holding this fulcrum-pin fixedly in its position, by means of the dovetail at *g*, fig. 3, fitting the dovetail slot, shown at *h*, fig. 2, and using a

loose leather collar, or sheath, as represented at *t*, figs. 1 and 3, I entirely avoid friction on the knee-cord B, as the leather sheath always turns with the cord; and in that I can adjust the loop, at *b*, to either of the notches in the bar *a a*, and I can also adjust the bar *a a* by means of the adjusting-screw *v*, I can give the proper tension to the knee-joint; and in that by the means which I use for adjusting the ham-string around the stay *f'*, and securing the loop in its position, by means of the metallic strap *f''*, so as to enable the wearer to adjust it at any time, as before described; and in that the knee-cord B is connected with the main spring C, the whole can be tightened from above the knee, or under the foot; and in that by my method of adjusting the cords *d* and *e*, by means of the binding-screws *r* and *s*, I can constantly keep the two joints, that is, the knee and ankle-joints, in perfect order, and in the proper condition for use; and in that the adjustment may be made by the wearer, should he find it necessary, with the aid of a screw-driver, and perhaps a pair of pliers; and in that

any dust which may accidentally penetrate into the leg, may fall out about the bottom, as at *y* and *y'*, or pass down the holes for the cords *d* and *e*, so as never to injure the ankle-joint, as has often happened.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the knee-cord B and the leather sheath *t*, with the main spring C, adjustable bar *a a*, and fulcrum-pin *g*, when constructed, arranged, and fitted substantially as herein described and set forth.

2. The combination of the cords *d* and *e* with the screws *r* and *s*, and the main spring C, substantially as herein described and set forth.

3. The combination of the devices which constitute the double-acting ankle-joint, *l l* and *m*, fig. 5, substantially as herein described and set forth.

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Witnesses:

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