

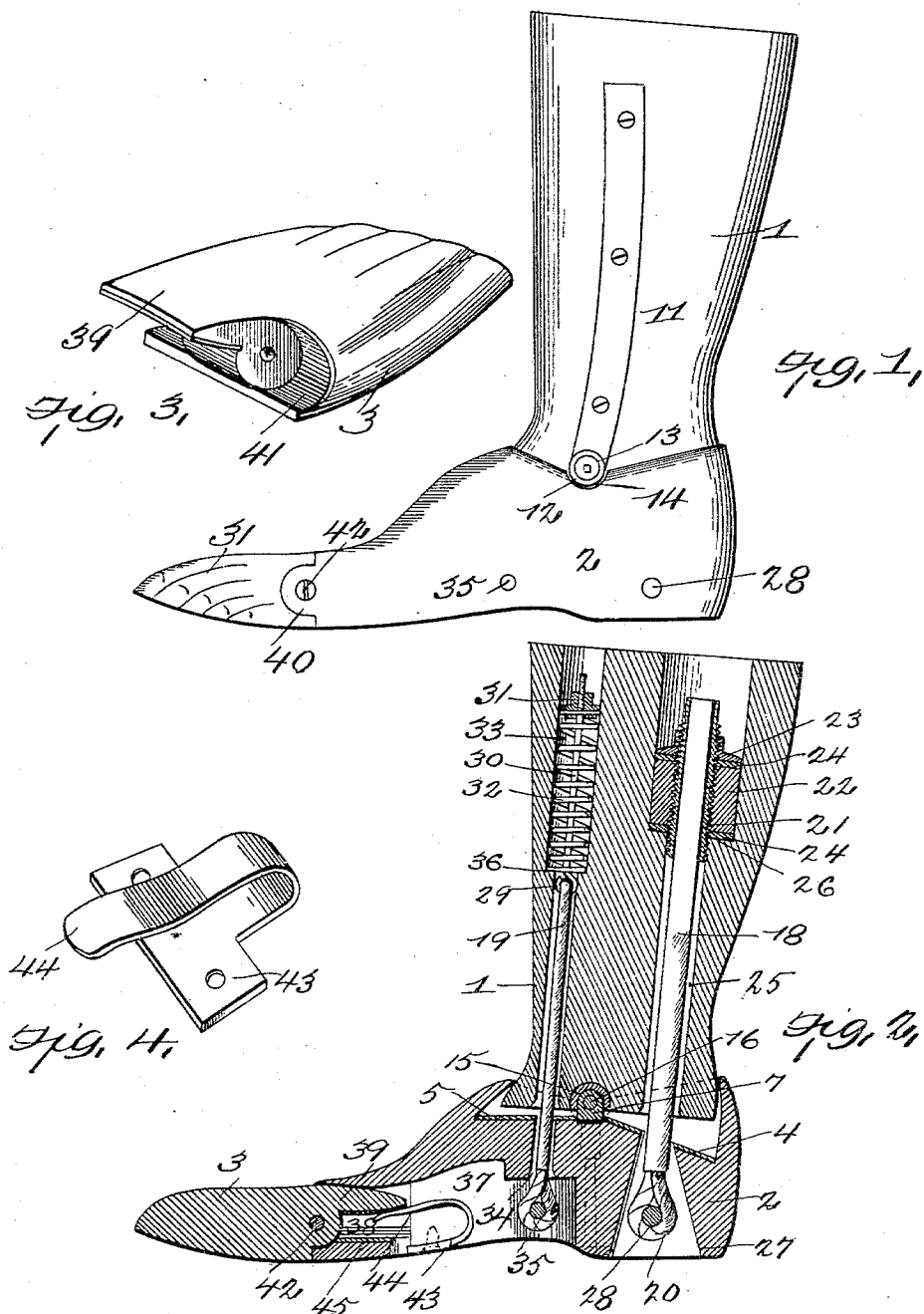
(No Model.)

2 Sheets—Sheet 1.

F. HONEGGER.
ARTIFICIAL LIMB.

No. 566,684.

Patented Aug. 25, 1896.



WITNESSES-

W. H. Brown
C. A. Brown

INVENTOR

Frederick Honegger
By *J. R. Nottingham* atty.

(No Model.)

2 Sheets—Sheet 2.

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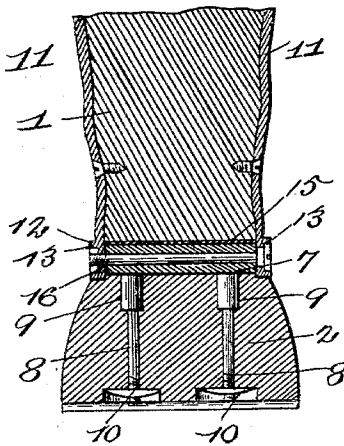
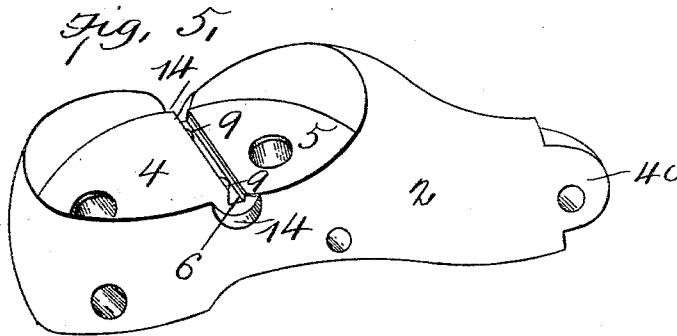


Fig. 7,

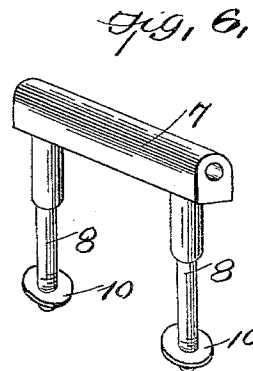


Fig. 8,

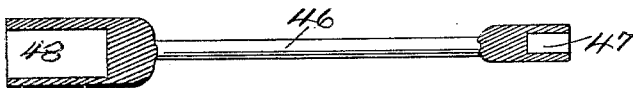
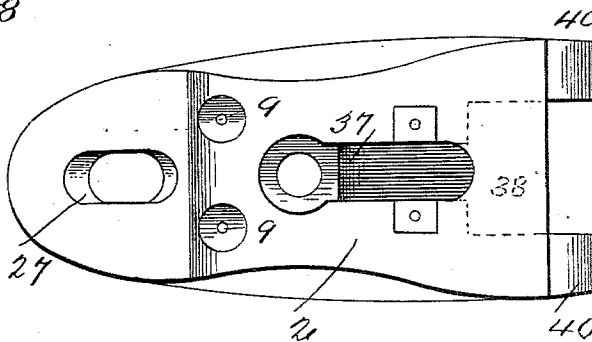
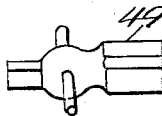


Fig. 9,



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UNITED STATES PATENT OFFICE.

FREDERICK HONEGGER, OF BALTIMORE, MARYLAND.

ARTIFICIAL LIMB.

SPECIFICATION forming part of Letters Patent No. 566,684, dated August 25, 1896.

Application filed January 21, 1896. Serial No. 576,280. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK HONEGGER, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Artificial Limbs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to certain new and novel improvements in artificial limbs, and is particularly designed to improve the ankle and toe joints of the foot. It is well known to all users of artificial legs that the ankle-joint is generally the first part to wear out, as the greatest amount of friction and strain caused by the constant movement of the leg necessarily occurs at that particular point, and, as the expense of repair is quite an item, it is one of the objects of this invention to reduce the cost of repair to a minimum.

Another object of the invention is to so construct the various parts that they may be readily taken apart, lubricated, and put together again without the aid of a skilled person.

Still another object of the invention is to so construct the parts that when they become worn out or damaged in any way they may be readily replaced by new ones.

The invention consists, generally, in the combination and arrangement of the various parts, as will be hereinafter more fully explained, and specifically set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation of the foot-section and the lower-limb section, showing the ankle and toe joints; Fig. 2, a vertical longitudinal sectional view of the same; Fig. 3, a perspective view of the toe-piece of the foot-section; Fig. 4, a similar view of the toe-spring detached; Fig. 5, a similar view of the heel and instep portions of the foot; Fig. 6, a similar view of the journal-bar detached; Fig. 7, a transverse vertical section taken through the ankle-joint; Fig. 8, a plan view of the bottom of the foot with the toe-piece removed, and Fig. 9 views partly in section of implements for tensioning the cords or tendons.

Referring specifically to the several views,

the numeral 1 indicates the lower section of the limb, 2 the main portion of the foot-section, and 3 the toe-piece of the same, said parts being constructed preferably of light wood or other suitable material.

The upper portion of the foot-section is suitably recessed to receive the ankle portion of the lower-limb section, the rear portion of the recess being provided with an inclined bottom 4, to allow for the free rearward movement of the leg, and the forward portion with a horizontal bottom 5, which limits the forward movement of the leg. The horizontal bottom portion of the recess is provided with a transverse depression 6, into which is seated a journal-bar 7, having a rounded top surface. This bar is provided with two legs 8, which pass downward through perforations 9 in the foot-section, and is firmly secured in its seat by screw-threaded nuts 10.

The numeral 11 indicates two straps or plates which are secured one on each side of the lower-limb section. The lower end of each strap is formed with a knuckle 12, which has its outer face provided with an annular recess 13, the purpose of which will be hereinafter explained. One of the knuckles of the straps, preferably the outer one, is provided with a square hole, while the other one is provided with a round hole. Each side wall of the recess, at the upper part of the foot-section, is formed with a semicircular recess 14, which is adapted to receive the knuckle when the lower-limb and foot sections are joined together. The end of the ankle portion of the lower-limb section, between the two knuckles of the straps, is grooved to coincide with the upper half of the round hole in the knuckle and is lined with buckskin, which is coated on one side with cement or glue and forced in said groove under a heavy pressure. The groove thus lined forms a bearing 15 for the journal-bar 7, which is bored to receive a bolt or pintle 16, which passes through the knuckles of the straps 11 and unites the lower-limb and foot sections, thus forming the ankle-joint. A portion of the body of the bolt is squared to fit the square hole in one of the knuckles to prevent turning, and its head is circular to fit into the annular recess 13 of said knuckle. The end of the bolt is screw-threaded to re-

ceive a circular nut 17, which fits into the annular recess 13 of the other knuckle. By this construction it will be seen that a double joint is formed, one by the bearing and bar and the other by means of the circular head and nut of the bolt fitted in the respective annular recesses of the knuckles, but in either case the body of the bolt is relieved of all strain.

The numeral 18 indicates the rear cord or tendon, and 19 the front cord or tendon. These may be composed of any suitable material, preferably of a multiplicity of threads, and the cord 18 is formed with a loop 20 at its lower end, and its upper end is received within a thimble or tube 21, which is internally screw-threaded so as to firmly secure said end. The thimble is also screw-threaded externally for a portion of its length to receive a perforated rubber cushion 22 and a flanged nut 23, by means of which the tension of the cord may be regulated. Leather washers 24 are placed on the thimble, one between the rubber cushion and flanged nut and the other at the bottom of the cushion. The rear of the lower-limb section is provided longitudinally with a hole 25 to receive the cord, the upper portion of said hole being counter-bored to receive the rubber cushion, which is seated on a shoulder 26, which forms the bottom of said counterbore. The heel of the foot-section is provided with a hole 27, through which the looped end of the cord passes, and a pin 28, passing through the side of the foot and through the loop, secures it firmly in place. The other cord 19 is formed with a loop at each end, the upper loop being received in a hook 29 of a screw-threaded rod 30, which is provided with a flanged nut 31, which is designed to regulate the tension of a coiled spring 32 surrounding said rod. The front of the lower-limb section is provided longitudinally with a hole 33, to receive the cord 19, the lower end of which is confined in a hole 34, passing vertically through the foot, by means of a pin 35, which passes transversely through the foot and the loop. The upper portion of the hole 33 is also counterbored to receive the coiled spring, the lower end of which rests upon the shoulder 36 formed by said counterbore. Each of the pins 28 and 35 are prevented from displacement by screws.

The bottom of the foot-section is provided with a vertical recess 37, which intersects the hole 34, and said recess opens into a longitudinal recess or cavity 38, which receives a tongue 39 of the toe-piece of the foot. At each side of the forward portion of the recess 38 is formed a knuckle 40, which fits into a similarly-shaped recess 41 at each side of the tongue on the toe-piece. The knuckles and tongue are bored to receive a bolt or pintle 42, by means of which the toe-piece is hinged to the main or body portion of the foot-section. The bolt-hole through the tongue is lined with buckskin to prevent creaking, and the

various surfaces of the joint are also lined with the same or similar material to afford an easy and noiselessly-working joint. A plate 43, secured transversely over a portion of the recess 37, is provided with a spring 44, which is bent downward and forward with its free end resting against the under side of the tongue. This spring serves normally to maintain the toe-piece in proper position, but when the heel of the foot-section is raised the tension of the spring will be overcome and the toe-piece can assume the natural bend in walking, the extent of bend being limited by the tongue coming into contact with shoulders 45 in the recess 38.

The several parts are of simple and durable construction, and when assembled in proper position an easy and noiselessly-operating limb is produced.

When it is desired to take the limb apart for lubricating or for any other purpose, a stem 46, having a small square socket 47 at one end and a similar larger socket 48 at the other end, is employed in connection with a key 49, which has two square posts adapted to fit the respective sockets. The socket 48 is adapted to fit the nut 23 of the cord 18 and the socket 47 is adapted to fit the nut 31 of the cord 19. By fitting socket 48 to nut 23, and inserting the smaller of the two posts of the key into the socket 47, the nut may be unscrewed to loosen the tension of the cord, after which the socket 47 is fitted to nut 31, and the larger post of the key is inserted in socket 48 and the nut unscrewed to loosen the tension of the cord 19. Pins 28 and 35 are then removed and both cords pulled out. The nut 17 is unscrewed and the bolt 16 forced out, and by tilting the lower-limb section to the rear the same can be separated or disconnected from the foot-section. The toe-piece is disconnected from the foot-section by partially unscrewing the screws which secure the toe-spring plate to the bottom of the foot and removing the bolt 42. By reversing the operation of taking apart the limb the parts may be readily put together.

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

1. In an artificial limb, the combination of the lower-limb and foot sections, said lower-limb section having a grooved bearing extending transversely across the same at its lower end, a hollow journal-bar secured to the foot-section, said bar extending transversely across the foot-section and adapted to be seated in said bearing and sustain the weight of the wearer and the wear at the ankle-joint, and a connecting-bolt passing through the hollow journal and connecting it at suitable points to the lower-limb section, substantially as specified.

2. In an artificial limb, the combination with the lower-limb and foot sections, of an ankle-joint connecting said sections together, the same consisting of a hollow journal-bar

secured transversely across the foot-section,
a corresponding bearing in the end of the
lower-limb section, an annularly-recessed
knuckle at each side of the bearing, and a
5 connecting-bolt passing through the journal-
bar and having a circular head and carrying
a circular securing-nut, said head and nut
adapted to fit into the annular recess of the

knuckles to form a hinge-joint, substantially
as specified. 10

In testimony whereof I affix my signature
in the presence of two witnesses.

FREDERICK HONEGGER.

Witnesses:

HENRY J. LAWSON,
GEORGE W. PROFF.