

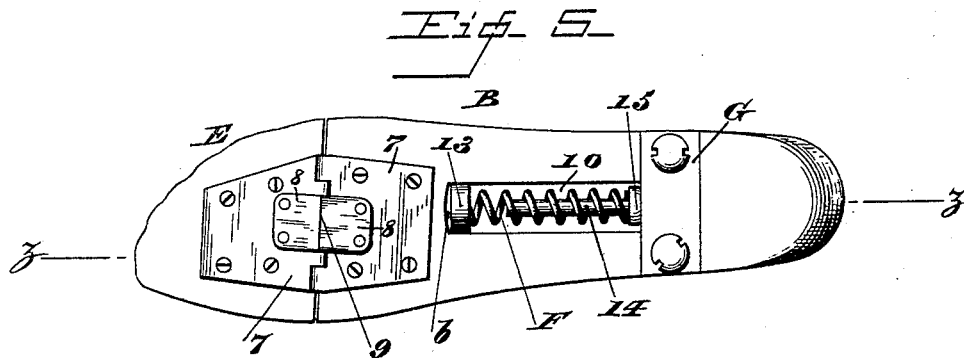
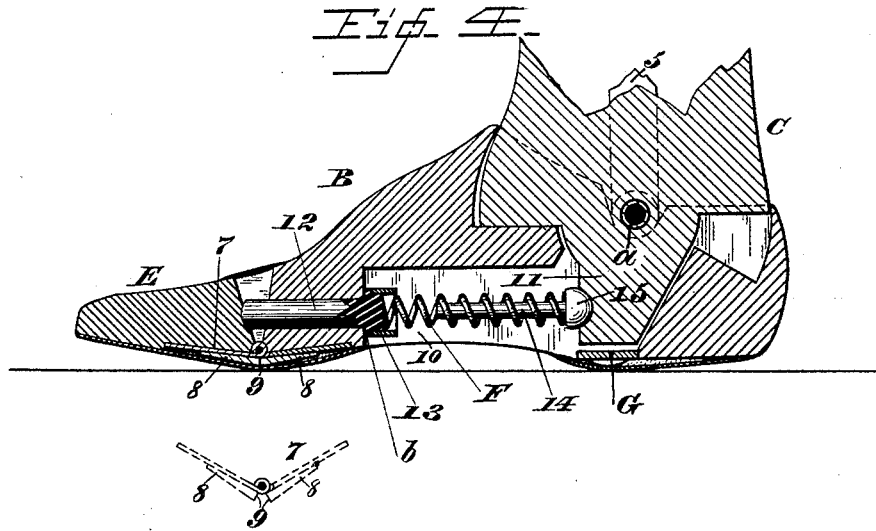
(No Model.)

2 Sheets—Sheet 2.

H. M. KOLBE.
ARTIFICIAL LIMB.

No. 419,019.

Patented Jan. 7, 1890.



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UNITED STATES PATENT OFFICE.

HEDWIG M. KOLBE, OF PHILADELPHIA, PENNSYLVANIA.

ARTIFICIAL LIMB.

SPECIFICATION forming part of Letters Patent No. 419,019, dated January 7, 1890.

Application filed November 14, 1888. Serial No. 290,835. (No model.)

To all whom it may concern:

Be it known that I, HEDWIG M. KOLBE, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Artificial Limbs, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of improvements in artificial limbs, as follows: first, in constructing the body of the leg portion of a piece of metal formed in horizontal and vertical bars integral one with the other; second, in securing the skeleton body part of the leg, formed of integral horizontal and vertical bars, to the ankle-piece by metallic straps fastened to the vertical bars.

It also consists of an artificial foot having a recess for the spring thereof and a plate connected with the side walls of said recess for bracing the same.

It also consists of the construction and combination of parts, as will be hereinafter fully set forth.

Figure 1 represents a side elevation of an artificial leg embodying my invention. Fig. 2 represents a section on line *xx*, Fig. 1. Fig. 3 represents a horizontal section on line *yy*, Fig. 1. Fig. 4 represents a vertical section of the foot on line *zz*, Fig. 5. Fig. 5 represents a bottom plan view thereof.

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

Referring to the drawings, A represents the body or frame of the lower limb of an artificial leg, and B the foot, which is connected therewith by a bolt *a*, as the ankle-joint. The body of the limb A is of skeleton form, constructed of vertical and horizontal plates 1 and 2, of metal, preferably light sheet metal—such as steel—and integral. The upper ends of the vertical plates 1 are secured to the band 3, of metal or other material, as the top of the frame.

The lower portion of the body of the limb is secured to the ankle portion C by straps 4, and furthermore connected therewith by vertical straps of metal 5, which pass along the sides of the body and are secured by rivets 6 to the horizontal plates 2 of the frame,

and also to the ankle portion C, the lower ends of said straps 5 having the bolt *a* passing through the same.

D represents rivets, each of which is passed through the straps 5 of the ankle portion C, and having its ends headed on said straps 5, thus firmly connecting said straps and ankle portion, it being seen that, owing to the construction of the body or frame of the limb, it is light, durable, and inexpensive, and has the ankle portion secured to it in a strong and reliable manner. The number of rivets may be increased or decreased, as desired.

The toes E are connected with the foot B by a hinge 7, one leaf or knuckle of which is secured to the toes and the other to the foot at the under side thereof. Connected with the knuckles are plates 8, whose inner edges face each other in such manner that they abut when the toes are in their normal position and form stops which limit the downward motion of the toes and relieve the hinge thereof of strain that may be imposed upon them when in use and excessive pressure of the spring F, which presses forwardly against the rear wall of the toes, said spring being located in a recess 10 in the sole of the foot and bearing at one end against the depending portion 11 of the ankle portion C, and also against a plunger or rod 12, which is arranged in a horizontal recess in the foot and is in contact with the rear of the toes, said rod freely moving in the recess which it occupies. In order to prevent displacement of the spring, the end which bears against the rod is encircled by a cup or flange 13, which is secured to the rod and projects rearward from the front wall of the recess 10. The other end of the spring encircles a rod 14, which is provided with a head or ball 15, the latter freely entering the socket in the front wall of the portion 11 of the ankle. The rear portion of the plunger or rod 12 has a shoulder *b*, which is adapted to abut against the front wall of the recess 10, so as to limit the forward motion of said rod.

G represents a plate which is secured to the sole of the foot below the portion 11, and serving to connect the side walls of the recess 10 and form a brace for the sole at or about the place of connection of the sole of the foot with the heel at the rear of the re-

cess, whereby the walls of the latter are prevented from springing laterally or breaking apart.

It will be seen that the foot readily turns on its axis when the leg is in use and the toes turn on the foot. When the heel touches the ground or floor, the body of the foot lowers and the spring F is partially compressed. The weight is then transferred to the toes, and the foot turns on the hinge 7, whereby rearward motion is imparted to the plunger 12 and the spring compressed to full extent. When the foot is raised, the spring F is relieved and exerts its pressure, so as to restore first the toes and then the foot to their normal positions, it being evident that these operations are accomplished by a single spring and complicated mechanism is obviated. The spring conforms to the motions of the foot and toes, the head 15 of the rod 14 readily turning on the part 11 with but little friction, owing to the ball-and-socket joint of the head of the rod and its bearing.

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

1. An artificial limb having a skeleton body portion, consisting of a single piece of metal formed in horizontal and vertical bars, substantially as described.

2. In an artificial limb, the combination of the skeleton body portion, consisting of a single piece of metal formed in horizontal and vertical plates, with an ankle-piece, and metallic straps secured to the vertical plates and the ankle-piece, substantially as and for the purpose described.

3. An artificial foot having a recess for the spring thereof and a plate connected with the side walls of the recess for bracing the same, substantially as described.

4. In an artificial limb, a foot-piece with a recess in the base and an opening in the front thereof, a toe-piece pivoted to said foot-piece, a plunger with shoulder portion, a cup secured to the foot-piece in said recessed portion, a socketed stud secured to a downwardly-projecting portion of the foot-piece, and a coiled spring surrounding said stud and bearing against the plunger, said parts being combined substantially as described.

5. A foot and toes hinged thereto, in combination with a spring which bears against the ankle portion, and also against the foot and toes, by means of a rod which passes freely through the foot and is in contact at one end with the spring and at the other end with the toes, substantially as described.

6. A foot having toes hinged thereto and a sliding rod passing freely through said foot and bearing against the toes, in combination with a spring which bears against a stationary portion of the ankle and one end of the rod, and a guard around the contiguous end of the rod and spring, substantially as described.

7. A foot having a spring, in combination with a sliding rod, and toes pressed forwardly by said spring through the medium of said rod, the latter passing freely through the foot and having a shoulder at its rear end, substantially as described.

8. A foot and toes and a spring therefor, in combination with a rod which is connected at one end with said spring and provided at the other end with the head, which latter, with its bearing, forms a ball-and-socket joint, substantially as described.

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