(No Model.)

D. HERSHBERGER.

ARTIFICIAL LEG.

No. 514,225. Patented Feb. 6, 1894.

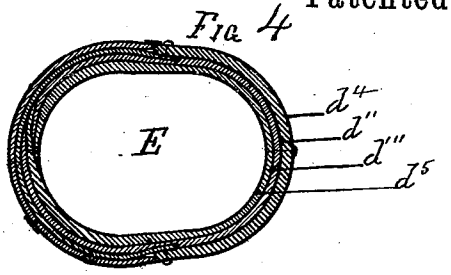

Fig 4

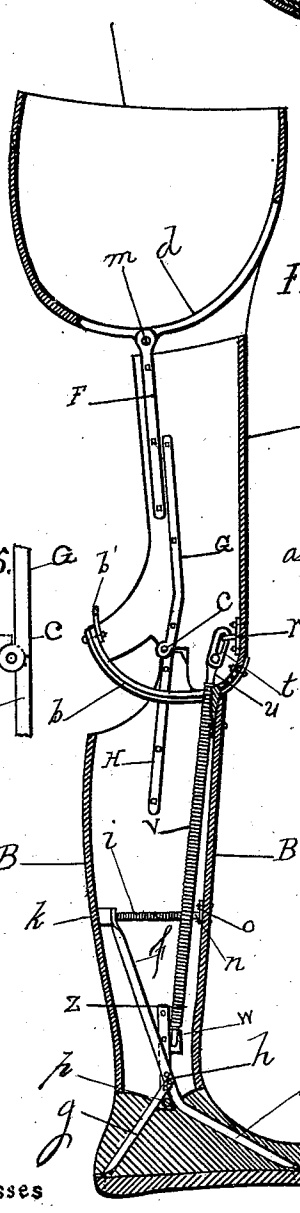

Fig 2

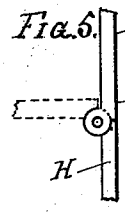

Fig 5.

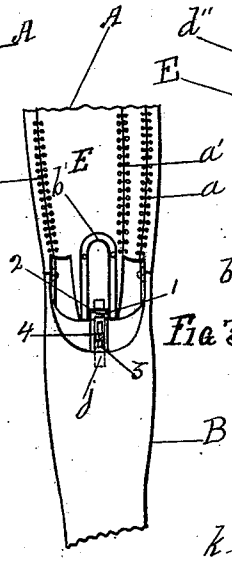

Fig 3

Fig 1

Witnesses

Wm Droindhoff

Mary E Swain

Inventor

Daniel Hershberger

by W. J. Dennis

attorney

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

DANIEL HERSHBERGER, OF IDAVILLE, INDIANA.

ARTIFICIAL LEG.

SPECIFICATION forming part of Letters Patent No. 514,225, dated February 6, 1894.

Application filed November 13, 1893. Serial No. 490,765. (No model.)

To all whom it may concern:

Be it known that I, DANIEL HERSHBERGER, a citizen of the United States, residing at Idaville, in the county of White and State of Indiana, have invented certain new and useful Improvements in Artificial Legs; 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.

My invention relates to that class of artificial legs used by persons whose legs have been amputated above the knee.

My invention consists first in a housing or receptacle for the hip and buttock which is provided with waistbands by which it is attached to the body and which is also made fast to the socket or upper section of the artificial leg supporting the same and secondly in forming said socket or upper section of layers of leather or other suitable material the edges of the layers being joined by lacings by which the area of the socket may be increased or diminished to fit the stump, and constituting the socket flexible and elastic as well as adjustable. Also in other devices of mechanical construction as will more fully appear.

In the drawings Figure 1 is a side elevation of the leg showing the hip housing hinged to the stump socket and the connection of the same with the leg and foot below the knee. Fig. 2 is a vertical section of the same showing the hinges, springs and braces which operate the leg. Fig. 3 is a rear elevation of the leg showing that portion immediately above and below the knee. Fig. 4 is a cross section of the upper portion of the stump socket showing the layers of leather forming the inside portion of the same and Fig. 5 is a side elevation of the stop joint or hinge used in the knee joint.

In Fig. 1 A represents that portion of the leg between the hip and knee and B that portion below the knee including the foot.

D′ represents the hip housing which is a hemispherical sack made of canvas or other suitable material having a metal framing in semicircular form to which the material is attached forming an opening of proper shape in the lower portion to allow the stump of the amputated leg to pass into the socket E while this frame is curved upward, *d* to which the material is firmly attached forming an opening which receives the lower portion of one side of the body to which it is secured by waistbands D D D. The metal frame *d* of the housing is hinged to the stump socket A slightly in front of its vertical center leaving a space between the two sufficient to allow a free swinging motion of the housing to accommodate the motion of the body relatively to the stump.

The metal frame of the housing D′ is made of two pieces *d* and *e* while *e* constitutes the outer front portion thereof on which the eye of the hinge *m* is formed. The parts *d* and *e* being overlapped in this manner and held together by being wrapped firmly by edges of the material which is turned under and secured to the same allows the space between the upper ends of *d* and *e* to be separated or brought nearer together by which the front opening of the housing can be made to accommodate different dimensions.

A represents the case or shell of the socket made of any light strong suitable material constituting the entire front and lower portion of the same. It is cut away at the line *x* and the rear upper portion is made up in corresponding form of sheets of leather or other suitable flexible material secured to the case or shell by lacings *a* which attach the outside sheet of the flexible material to the case or shell A. The succeeding layer *d′* is laced to its own opposite edge *a′* and in the succeeding layers or sheets going toward the inner surface some of the edges of the sheets or layers are made with the edges beveled or shaved down thin and others alternately and conforming to each other are provided with eyelets and lacings. In this manner a cylindrical socket or receptacle is formed which is semi-flexible and semi-elastic capable of adjustment in its caliber by the use of the lacings durable and light. This flexible and elastic portion of the stump socket can be extended downward toward the knee joint as far as may be required to conform to the requirements of the stump on which it is to be applied.

The hinge *c* in Fig. 1 is a stop hinge as seen in Fig. 5 and allows a perfect knee action.

That portion of my improved leg below the knee is in the ordinary form and the foot C is

attached thereto by metallic bars *f* and *g*, the bar *f* being attached to metallic plate *s* at the ball of the foot while the bar *g* is similarly attached at the heel. The bar *f* has an upward angular direction from the connection with the plate *s* to the ankle at *h* where it is pivoted to the upper end of the bar *g* adjustably and is then continued upward to the inner surface of the case or shell forming the calf of the leg where by means of a lug *k* it is connected with a horizontal coiled spring *i* working on a rod *n* which is secured to the case of the front of the leg by a lug *o*. The foot C is composed of cork or other suitable material and hinged to that portion of the leg below the knee at *p* on the ankle Fig. 2. By this means a pressure on the heel forces the bar *g* up forcing the upper end of the bar *f* forward against the resisting force of the spring *i* and as the weight is tranferred to the ball of the foot in making a step the reaction of the spring *i* restores the foot to its original position.

In Fig. 2 a bracket *r* is secured to the inside surface of the stump socket just above the knee to which a link *t* is attached the link *t* being pivoted to the upper end of a rod *u* which supports a coiled spring *v* the lower end of the rod *u* working vertically in a bracket *w* which is attached to a vertical bar *z* which is made fast to the inner surface of the case of the leg by screws the heads of which are seen in Fig. 1.

In bending the knee by means of the hinge *c* the rod *u* is raised and the spring *v* compressed until carried past the center when it is relaxed and serves to hold the lower portion of the leg at a right angle with the upper part, yet allowing a free motion of the knee joint making it easy to lift the lower portion of the leg while walking by the action and reaction of the spring *v*.

The semicircular bars *b b* constitute the frame forming the bottom of the stump socket and the rod *u* passes between them as it moves forward and backward in bending the knee.

F is a vertical bar secured to the upper inside surface of the stump socket by screws the upper end terminating in an eye forming the hinge *m* upon which the hip housing D' is moved.

G H are the arms of the stop hinge *c* and are secured to the inner surfaces of cases or shells A and B one above and the other below the knee joint which they form.

E represents that portion of the stump socket which is composed of laminated flexible material and its conformation is shown in Fig. 4, in which d^4 represents that part of the socket formed by the case or shell of the stump socket while d'' d''' and d^5 represent layers or sheets of leather or other flexible material composing the inner and part of the outer surface.

In Fig. 3 *j* is a vertical bar attached to the inner front surface of the case or shell B to which it is secured a screw bolt passing through the casing from the outside and into a slot 3 in said bar and fastened by a nut. This arrangement allows a vertical motion to the bar *j* controlled by the screw bolt 4. The upper end of the bar *j* is provided with a cushioned stop 1 which impinges on bar 2 on the lower front edge of the shell A. The object of this stop 1 is to control the traverse of the lower section of the leg and foot the forward motion being shortened as the bar *j* is raised.

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

1. In an artificial leg a hip housing of hemispherical form adapted to the shape of the hip and buttock the lower portion being provided with an opening to receive the stump said opening having a circular wire frame supporting the lower and largest part of its circumference to which the housing is secured said wire frame being pivoted to the stump socket of the leg at the lower portion of the curve the upper part of the housing provided with a continuous waist band as set forth.

2. In an artificial leg the combination of bars *f* and *g* pivoted at *h* with the lug *k* spring *i* and rod *z* constructed and operating in the manner and for the purpose as set forth and described.

3. In an artificial leg a stump socket composed of a cylindrical case of stiff material cut away on the back side and provided with an inner lining corresponding in form consisting of layers or sheets of leather or other flexible material the edges of some of which overlap each other while the edges of some other sheets are provided with eyelets and lacings in the manner and for the purpose substantially as set forth and described.

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

DANIEL HERSHBERGER.

Witnesses:
W. I. DENNIS,
A. M. GARDNER.