No. 714,052. Patented Nov. 18, 1902.

S. E. STAGGS.

ARTIFICIAL LEG AND ANKLE JOINT.

(Application filed Apr. 24, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

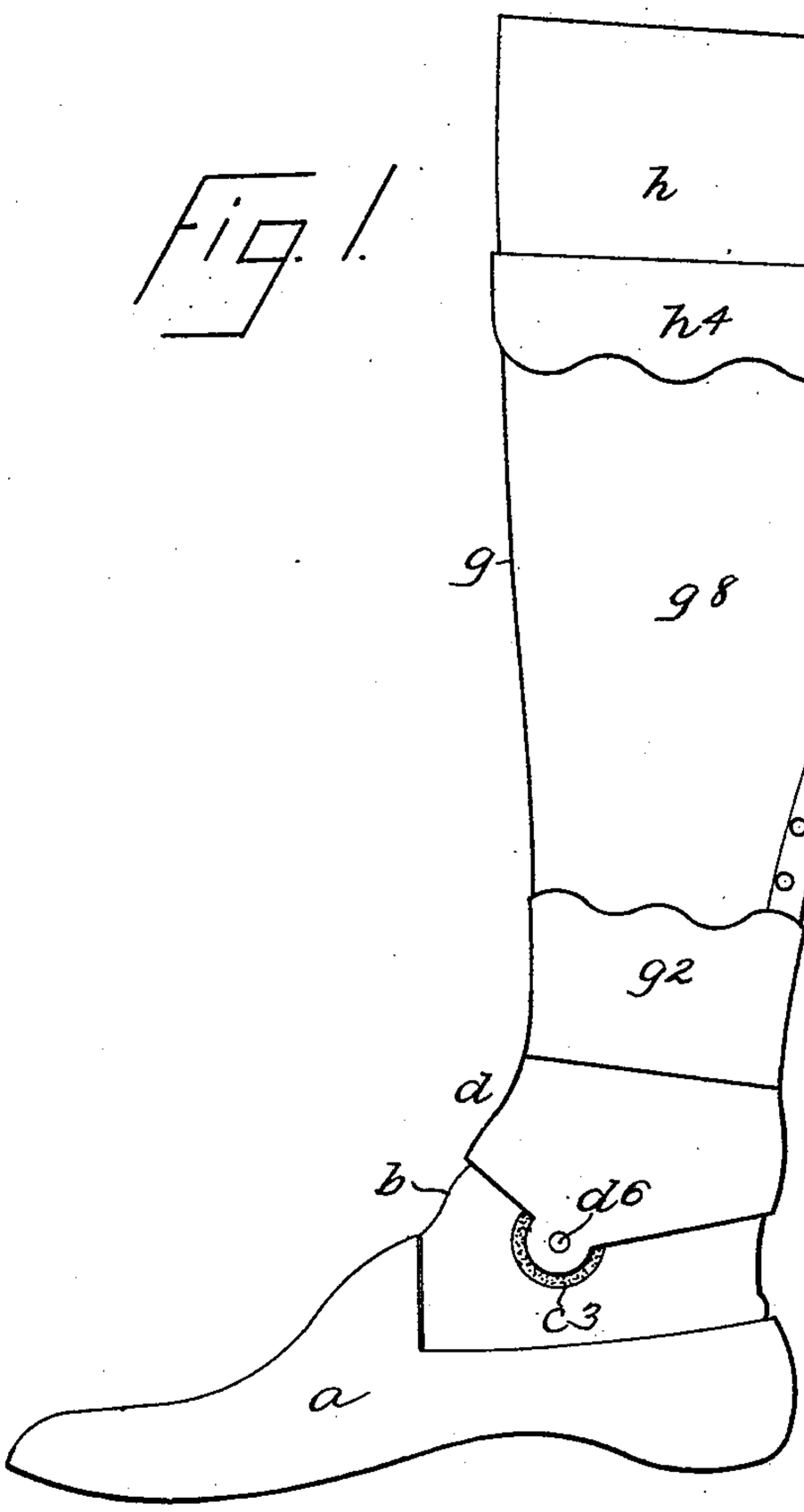

Fig. 2.

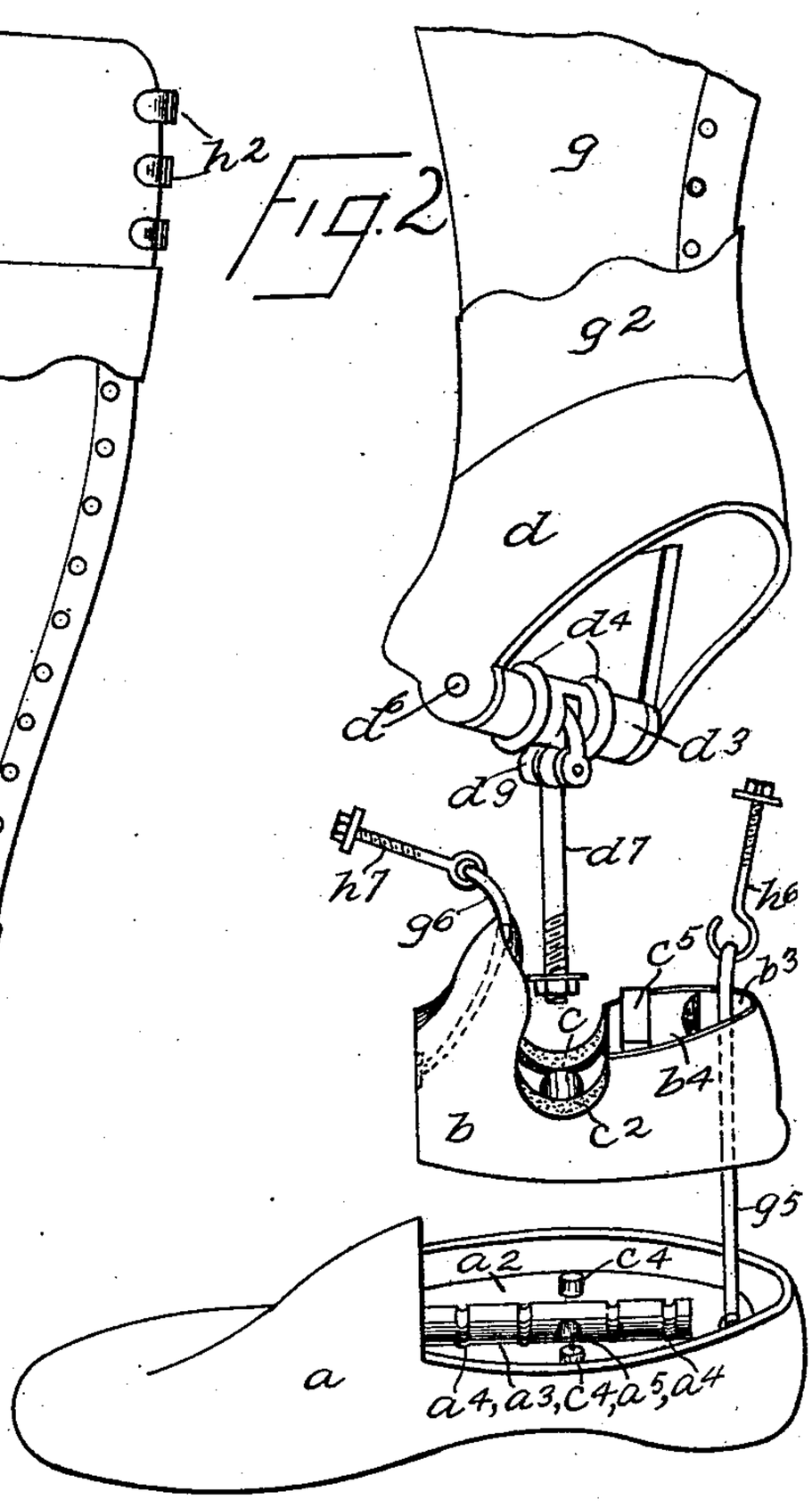

Fig. 3

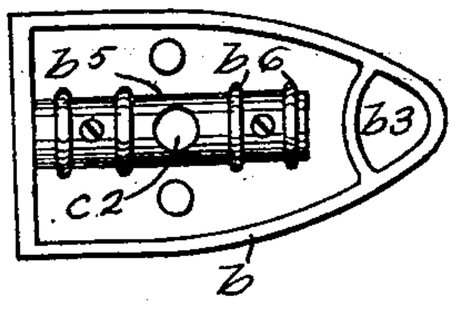

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Fig. 4.

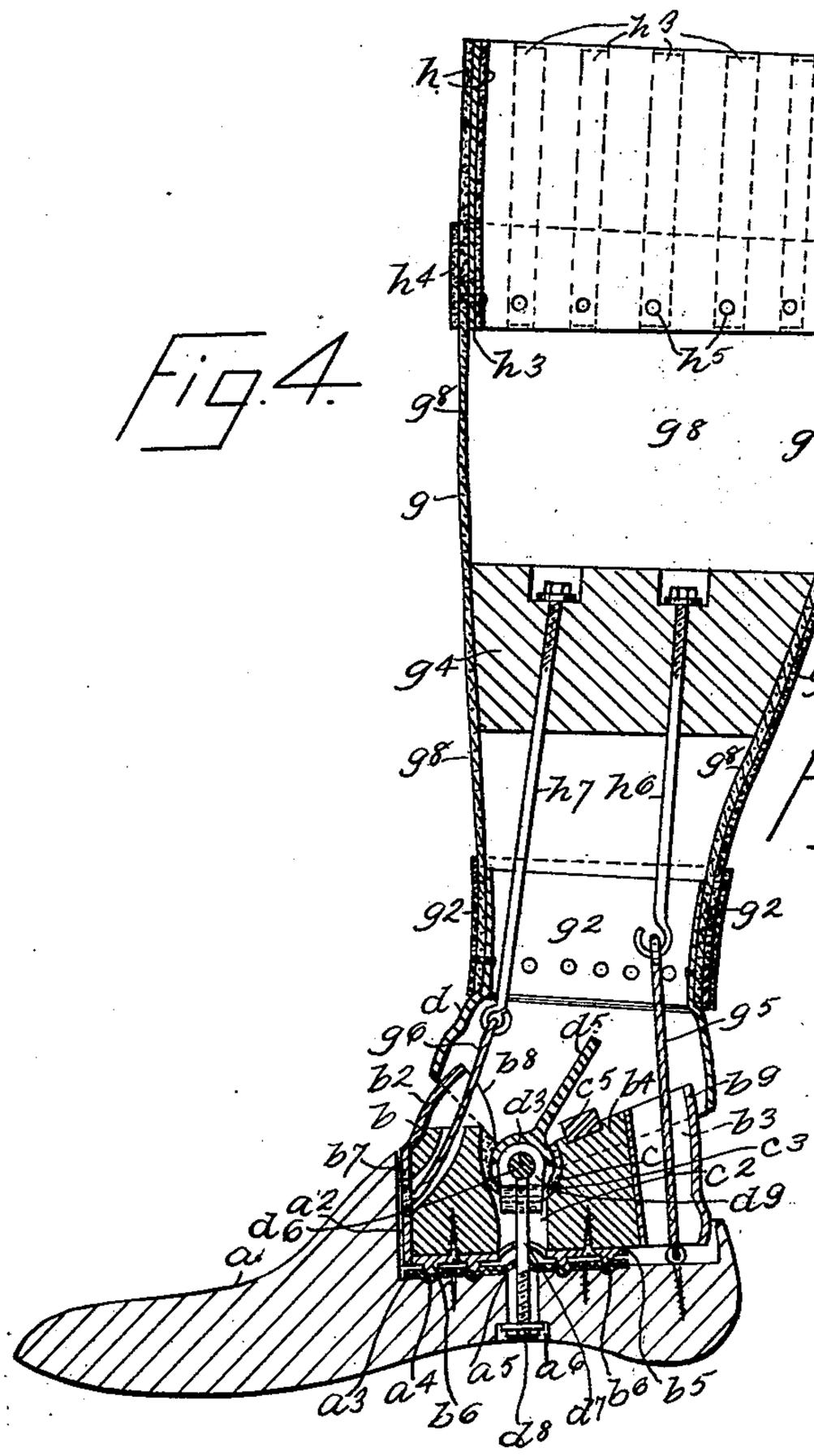


Fig. 5

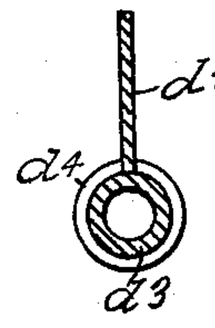


Fig. 6.

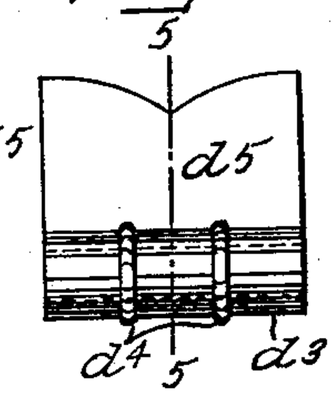
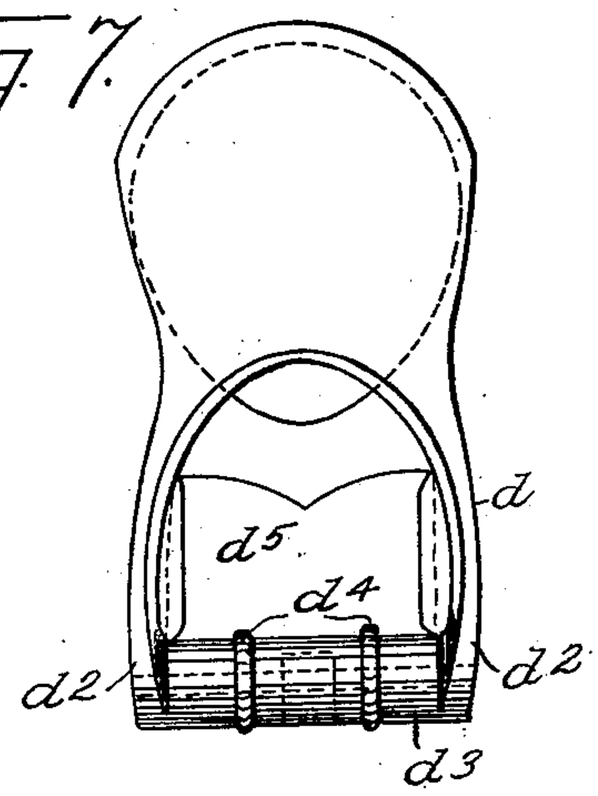


Fig. 7.



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UNITED STATES PATENT OFFICE.

SYLVESTER E. STAGGS, OF NEW YORK, N. Y.

ARTIFICIAL LEG AND ANKLE JOINT.

SPECIFICATION forming part of Letters Patent No. 714,052, dated November 18, 1902.

Application filed April 24, 1902. Serial No. 104,446. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER E. STAGGS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Artificial Leg and Ankle Joints, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

The object of this invention is to provide an artificial leg member and also an improved artificial ankle-joint construction and foot connection; and the invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which—

Figure 1 is a side view of my improved artificial leg and ankle member; Fig. 2, a perspective view showing the parts detached; Fig. 3, a bottom plan view of an ankle-block which I employ; Fig. 4, a sectional side elevation showing the parts in the same position as in Fig. 1; Fig. 5, a transverse section of a detail of an ankle-piece which I employ, taken on the line 5 5 of Fig. 6; Fig. 6, a side view thereof, and Fig. 7 a perspective back view of the ankle-piece.

In the practice of my invention I provide an artificial foot a, an ankle-block b and ankle-piece d, and a leg member g, and the foot a is preferably composed of wood, and the rear upper portion thereof is cut out to form a recess a^2, adapted to receive the ankle-block b, and in the bottom of this recess and centrally thereof is placed a longitudinal plate a^3, which is concave in cross-section and provided with transverse grooves a^4, four of which are shown, and formed centrally in the bottom of the recess a^2 and the plate a^3 is an opening a^5, which registers with a corresponding hole or opening a^6 in the bottom portion of the foot a or in the bottom of the recess a^2. The ankle-block b is composed of an aluminium shell b^2, in the back of which is a vertically-arranged opening b^3 and the body portion of which is filled in with a core b^4, of wood, to the bottom of which is secured a plate b^5, composed of brass or any other suitable material and convex in cross-section and adapted to fit on the plate a^3 and provided with transverse ribs b^6, adapted to fit in the grooves a^4 in the plate a^3. The shell b^2 of the ankle-block is provided at the front end with a transverse vertical wall b^7 and with a backwardly and upwardly directed flange b^8, and the rear wall thereof is extended upwardly and curved slightly inwardly, as shown at b^9, and the central core b^4, of wood, which fills the major portion of the casing b^2 of the ankle-block b, is cut out transversely, as shown at c, to form a journal-bearing, as hereinafter described.

In the bottom of the core b^4 is a vertical passage or opening c^2, and the bearing c is provided with a leather bushing c^3. The bottom of the recess a^2 in the heel portion of the foot a is also provided at each side of the plate a^3 with rubber cushions c^4, and a similar rubber cushion c^5 is placed on the top of the core b^4 rearwardly of the bearing c.

The ankle-piece d is hollow and of the usual form, and the bottom portion thereof flares outwardly, so as to fit around the front flange b^8 of the ankle-block and the rear flange b^9 thereof, and the side portions thereof are projected downwardly to form jaws d^2, in which is mounted a hard-metal journal d^3, having annular beads d^4, which fit in corresponding grooves in the leather bushing c^3, with which the bearing c in the ankle-block is provided, and this hard-metal journal d^3 is preferably provided with a backwardly and upwardly directed web d^5 to facilitate the casting of the ankle-piece d onto said journal, so as to securely hold the latter.

The journal d^3 rests in the bearing c, and passing through said journal is a hard-metal bolt or shaft d^6, with which is loosely connected a bolt d^7, which passes downwardly through the ankle-block and through the opening a^6 in the bottom of the recess a^2 and is provided, as shown at d^8, with a washer and nut, by means of which the ankle-block b and ankle-piece d are secured to the foot, and the connection between the bolt d^7 and the bolt or shaft d^6 is made by means of a link or other suitable coupling d^9. By means of this construction it will be seen that the ankle-block b is free to turn laterally within certain limits in the recess a^2 and the ankle-piece d is free to swing forwardly and backwardly, and I thus provide for the necessary movement of these

parts and also the necessary movement of the leg member g on its ankle connection, said leg member being rigidly secured to the ankle-piece d, as herein described. The main part of the leg member g is composed of rawhide, which is rigidly secured to the top portion of the ankle-piece by means of rivets at g^2, the rawhide being passed around the top portion of said ankle-piece and being provided with a leather band g^3, and within the rawhide portion of the leg member is secured a block g^4, of wood, which serves as an attachment for the heel-cord g^5 and the ankle-cord g^6 in the usual manner. The edges of the rawhide part of the leg member are connected at the top thereof and covered by a strip g^7, of leather, and these parts may be secured together in any desired manner and are preferably secured by rivets. The rawhide portion of the leg member is designated in Fig. 4 by the reference character g^8, and connected with the top thereof is a leather member h, which is open at the back and provided with fastening devices h^2, by means of which the size of the top portion of the leg member may be regulated to a slight extent, and said top portion may be caused to securely grasp and hold the stump of the leg, and this leather portion is composed of two parts, an outer and an inner part, as shown in Fig. 4, and between these parts at intervals are placed vertically-arranged metal strips h^3, which are intended to give the requisite strength and stiffness to the leather portion of the top of the leg member, and a stiff leather band h^4 is passed around the connection between the rawhide part of the leg member and the leather part thereof, and the connection between the rawhide and leather parts of the leg member is made by means of rivets, as shown at h^5, and the band h^4, of leather, covers and conceals these rivets and may be secured in any desired manner.

The rivets g^2, which connect the bottom portion of the rawhide part of the leg member with the ankle-piece d, are also covered by the band g^2, of leather, which is secured in place in any desired manner—as, for instance, by cement.

The heel-cord g^5 is connected with the bottom heel portion of the foot a and passes upwardly through the opening b^3 in the casing b^2 of the ankle-block b and is connected with the block g^4 in the rawhide portion of the leg by a rod h^6 in the usual or any preferred manner, and the ankle-cord g^6 is secured in the front end of the ankle-block and passes upwardly through the front end thereof and is connected with the block g^4 by a rod h^7 in the usual or any preferred manner.

The block g^4 in addition to serving as a connection for the heel and toe cords also gives strength and stability to the rawhide part of the leg member g, and by making the leg member in this way I am enabled to produce the requisite strength, stiffness, and rigidity with the least possible weight.

It will be understood, of course, that the rawhide portion of the leg member is worked into shape and secured while in a soft or flexible condition, and when it becomes dry and hard it will stand any amount of pressure or weight, and, if necessary, two thicknesses of this material may be employed.

The rubber cushions c^4 in the bottom of the recess a^2 at the opposite sides thereof are designed to prevent the jolt and jar occasioned by the lateral movement of the ankle-block, and the transverse rubber cushion c^5 at the top of the ankle-block and rearwardly of the bearing c of the journal d^3 serves as a stop for the transverse web-plate d^5 in the bottom portion of the ankle-piece and to arrest the backward movement of the leg member without occasioning jolt or jar. It will also be observed that by making the casing of the ankle-block and the ankle-piece of aluminium I am enabled to produce an artificial leg which is much lighter than has heretofore been possible, and by employing the core b^4 in the ankle-block I secure the necessary means for attaching the parts and a bearing for the hard-metal journal d^3, which supports the ankle-piece and serves as a connection for the bolt d^7.

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

1. An artificial foot provided with an ankle-block which is adapted to swing laterally, said ankle-block being composed of a casing of aluminium and a wood core, and being provided with a transverse bearing and an ankle-piece composed of aluminium and provided with a transverse hard-metal journal adapted to fit in said bearing and provided with a central shaft and a bolt loosely connected with said shaft and passing downwardly through the ankle-block and the foot, substantially as shown and described.

2. An artificial foot provided with a recess in the rear top portion thereof adapted to receive an ankle-block, said recess being provided in the bottom thereof with a longitudinal plate which is convex in cross-section and said ankle-block being composed of an aluminium casing and a wood core, the bottom of said core being provided with a longitudinal plate which is convex in cross-section, said ankle-block being also provided in the top thereof with a transverse bearing and the front and top portions of said block being curved inwardly, and a hollow ankle-piece, the bottom of which is flared outwardly and adapted to receive the top portion of said block, said ankle-piece being provided with downwardly-directed side members and a hard-metal journal secured between said members and adapted to rest on said bearing, a shaft passing through said journal and a bolt loosely connected with said shaft and passing downwardly through the ankle-block and through the bottom of the foot, substantially as shown and described.

3. In an artificial leg, a leg member, a foot member provided with a recess adapted to receive an ankle-block which is adapted to swing laterally, and which is provided with a transverse bearing, cushions placed in the bottom of said recess, a cushion on the top of the ankle-block rearwardly of said bearing and an ankle-piece provided with a journal adapted to fit in said bearing and with a transverse web or plate adapted to operate in connection with said last-named cushion, substantially as shown and described.

4. In an artificial leg, a footpiece, an ankle-block mounted in the heel portion thereof and adapted to turn laterally, said ankle-block being also provided with a transverse bearing in the top thereof, and an ankle-piece provided with a transverse journal adapted to fit in said bearing, and means for securing said ankle-block, ankle-piece and the footpiece together, substantially as shown and described.

5. In an artificial leg, a footpiece, and ankle-block placed in the heel portion thereof and provided with a wood core having a transverse bearing in the top thereof, and an ankle-piece provided with a metal journal adapted to fit in said bearing and means for securing the ankle-piece, ankle-block and the footpiece together consisting of a bolt connected with said journal and passing downwardly loosely through the ankle-block and the footpiece, substantially as shown and described.

6. In an artificial leg, a leg member consisting of rawhide and provided with a block which gives strength and rigidity thereto and which serves as a connection for the heel and ankle cords, said leg member being provided with a top portion of leather open at one side, and provided with fastening devices, said leather portion being also provided with vertically-ranging stiffening-strips, and the rawhide leg member being provided at the lower end with an ankle-piece, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 23d day of April, 1902.

SYLVESTER E. STAGGS.

Witnesses:
F. A. STEWART,
F. F. TELLER.