

A. E. GAINES AND A. A. ERB.

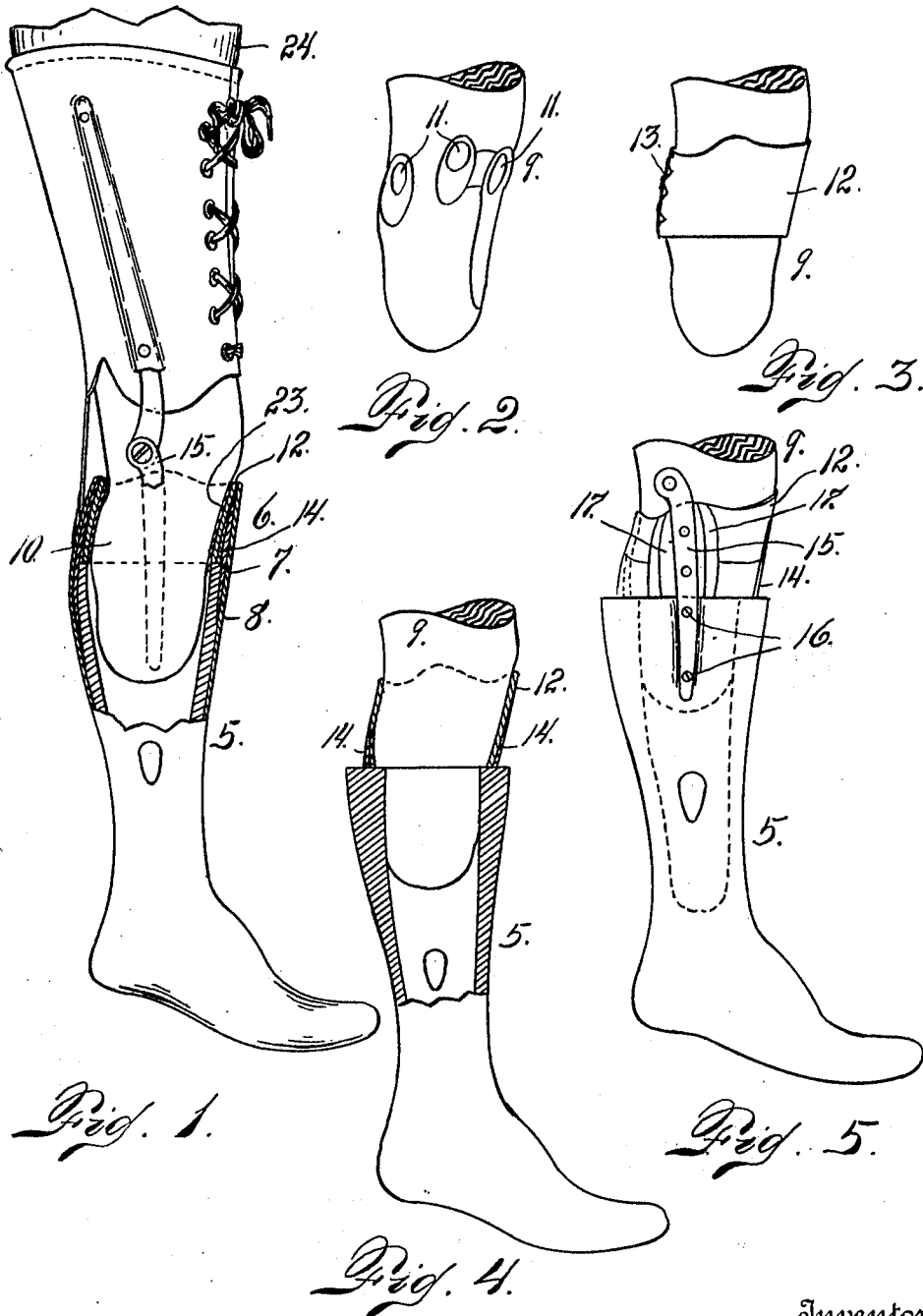
ARTIFICIAL LEG.

APPLICATION FILED FEB. 9, 1915.

Patented Aug. 26, 1919.

2 SHEETS—SHEET 1.

1,314,136.



Witnesses

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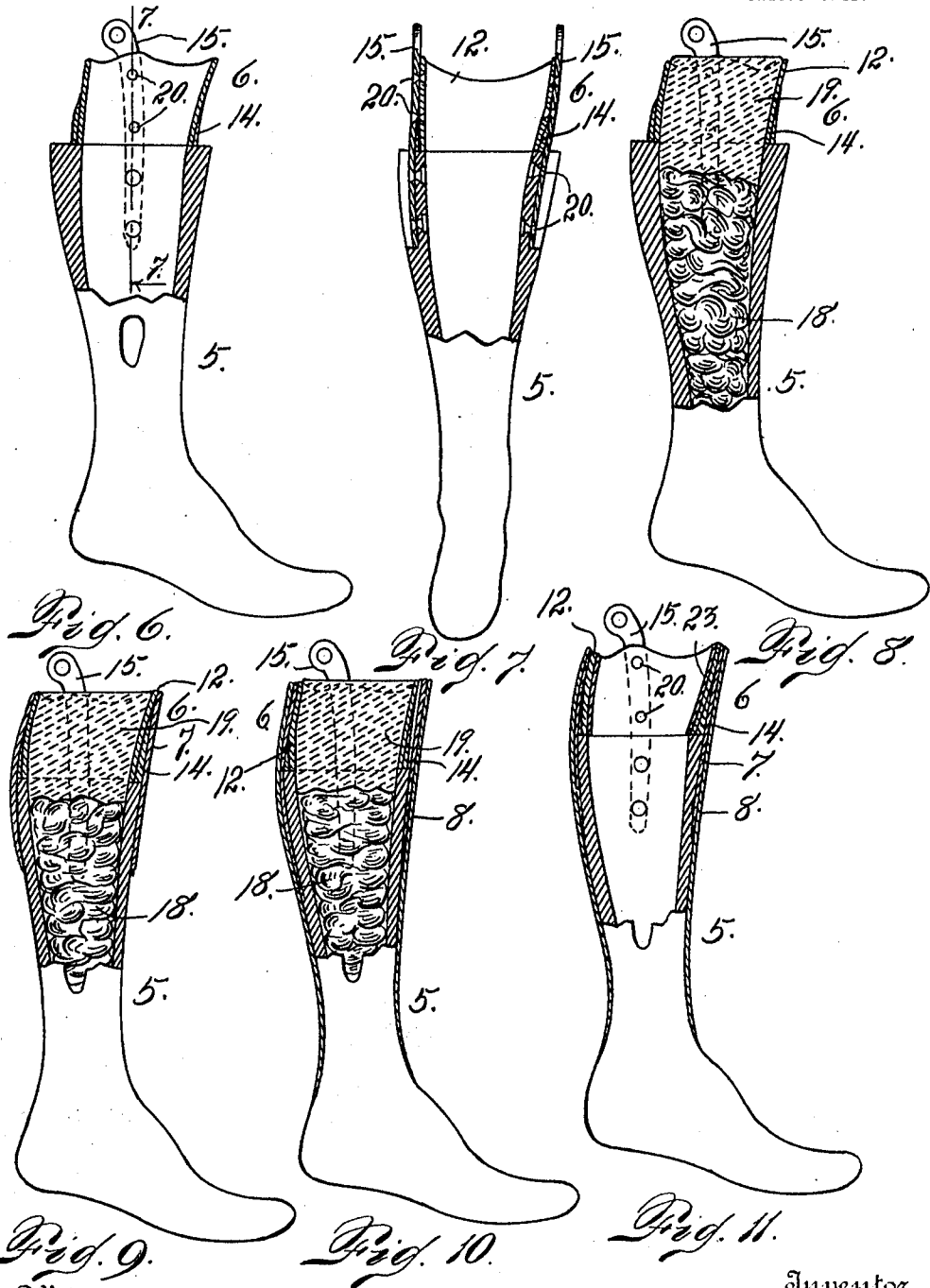
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UNITED STATES PATENT OFFICE.

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ARTIFICIAL LEG.

1,314,136.

Specification of Letters Patent. Patented Aug. 26, 1919.

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To all whom it may concern:

Be it known that we, ARTHUR E. GAINES and ARTHUR A. ERB, citizens of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Artificial Legs; and we do 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, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

Our present invention relates to a special construction of artificial leg for use where the natural limb has been removed below the knee. Heretofore, so far as we are aware, legs of this character have been so constructed as to receive the so-called stump which fits closely and tightly within the hollow portion of the artificial member. In other words, the entire surface of the stump above its lower extremity is closely engaged by the surrounding inner surface of the said member. This feature is objectionable in limbs of this character, owing to the fact that the natural stump usually perspires freely on account of the closeness of the fit of the artificial limb and the consequent lack of ventilation. Furthermore, this contact of the stump with the wood portion of the limb, which is rigid and unyielding, is apt to result in either injury to the stump or other difficulty during the use of the limb for a considerable length of time. The object of our present invention is to overcome this difficulty and to this end we make the wood portion of the limb relatively short and provide an extension above said wood portion, the extension being composed of leather and consequently, possessed of a certain degree of yielding capacity, which an entire wood member does not provide. Furthermore, this leather extension above the wood portion of the limb is so constructed and arranged that its inner surface constitutes the entire bearing for the stump, while the lower portion of the stump being approximately one-half of the length thereof, and which projects into the wood portion of the limb, is entirely free from the adjacent wall thereof, thus, to a large extent, reducing the area of the stump which is in actual contact with the artificial member,

while at the same time, the portion of the stump which does engage the said member, is in contact with a relatively yielding portion thereof, namely, the leather extension above the rigid wooden shell characteristic of artificial limbs heretofore used.

Having briefly outlined our improvement, we will proceed to describe the same in detail, reference being made to the accompanying drawing, in which is illustrated an embodiment thereof. In this drawing,—

Figure 1 is a view partly in section, illustrating an artificial limb equipped with our present improvement.

Fig. 2 is a cast conforming in shape to the stump of the limb with which the artificial member is to be used, the portions on the cast corresponding to the bony parts of the stump, being built up by the use of pieces of leather.

Fig. 3 is another view of the cast, showing the built portions surrounded by a leather band, which is shrunk thereon.

Fig. 4 illustrates the cast shown in Fig. 3 applied to the wood member of the artificial limb.

Fig. 5 is an elevation of the same, but showing the metal joint pieces attached to the wood portion of the limb.

Fig. 6 is a view of the same with the cast removed from the artificial member and its inner portion cut out to make the inner wall of the wood portion flush with the inner surface of the leather extension.

Fig. 7 is a section taken through the limb on the line 7—7, Fig. 6.

Fig. 8 is a sectional view showing the hollow wood portion of the limb stuffed with paper nearly to the top, while the upper portion thereof is filled with plaster.

Fig. 9 shows the artificial limb trimmed down to conform to the shape of the natural limb, and also showing a rawhide band exteriorly applied to the wood portion and leather extension, whereby the two parts of the limb are securely connected or bound together.

Fig. 10 is a view similar to Fig. 9 with the addition of a final rawhide covering which is shrunk over the limb.

Fig. 11 shows the limb with the plaster and paper removed and a thin leather facing secured to the inner surface of the leather extension of the limb.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the lower wood portion of the artificial limb, 6 the upper leather extension and 7 the rawhide band which connects the two members 5 and 6; and 8 the outer rawhide casing covering the two parts 5 and 6. The manner of forming this limb will now be explained. Let the numeral 9 designate a plaster cast which conforms to the shape of the stump 10 of the natural limb to which the artificial limb is to be applied. This cast is built up at a number of places, as shown at 11 to conform to the location of the bony portions of the stump. A leather band 12 is then applied to the zone of the cast, in which the built-up parts 11 are located, the band being secured by stitching as shown at 13, the stitching being of such character that the threads do not extend to the inner surface of the leather, as it is desirable that this surface shall be perfectly smooth.

The cast equipped as shown at Fig. 3, is then applied to the wood member 5 of the limb in such a manner that the leather band 12 extends above the top of the wood portion, this band being reinforced by an additional leather part 14, which is thickest at its lower extremity and tapers above to the surface of the band 12. This reinforcement increases the lower bearing surface of the leather band where it comes in contact with the upper edge of the wood member. In actual practice the leather band 12 and reinforcements 14 are shrunk on the cast to perfectly fit the projections and depressions thereof and consequently those of the natural stump on which the device is to be worn. The metal joint pieces 15 are then secured to the two parts, namely, the wood and leather portions of the limb by the employment of screws 16. The portions of these joint pieces which engage the wood part are countersunk therein, while the leather portion composed of the parts 12 and 14, is reinforced as shown at 17 on opposite sides of the joint pieces, whereby this part of the limb is made flush with the outer surfaces of the joint pieces, the leather reinforcements 17 being arranged to taper from the joint pieces to the outer surface of the leather portion. After the limb is in this condition, the plaster cast portion, illustrated in Fig. 2, is chipped out of the limb, while the entire part of the wooden portion of the latter is cut away to make this inner surface flush with the inner surface of the leather extension. At this stage of the process, the screws 16 which heretofore have held the joint pieces 15 in place, are removed and rivets 20 substituted. After this is done, the hollow wood portion of the limb is filled with light or loose readily removable material 18, as paper, to a point a short distance below its upper edge. Above the paper the limb is filled with plaster as shown at 19.

As soon as the plaster 19 is set within the limb, the leather and wood portions are further bound together by the rawhide band 7 which is shrunk thereon and allowed to set, the whole being sanded and rubbed down to form a smooth surface. The next step in the process is to apply the outer rawhide covering 8 which incases both the leather and wood parts of the limb. As soon as this is done, the plaster 19 is chipped out and the paper filling removed. Finally, an inner layer 23 of leather or other similar material, is applied to the leather extension of the limb, whereby the inner surface of this extension extends inwardly beyond the inner surface of the wood portion of the limb. This inner leather layer 23 forms the direct bearing for the upper part of the stump, while the lower part of the stump is free from the inner surface of the wood portion of the limb, as heretofore explained.

The limb thus constructed and prepared is applied to the natural limb 24 having the stump 10, in the usual manner. However, when the artificial member is thus applied, the lower portion of the stump of the limb to which it is applied, is entirely free from contact with the adjacent surface of the wood member of the limb.

Before applying the inner facing 23 to the inner surface of the leather band 7, the latter is coated with water-proof material and the leather facing is soaked in such material before applying it. This facing is secured in place by the employment of any suitable adhesive substance. The water-proof material employed is preferably ceresin.

Having thus described our invention, what we claim is,—

1. An artificial leg comprising a lower wood portion, a leather socket molded to fit a stump, said socket being mounted upon the upper edge of the wood portion and positioned wholly above said portion, and a firm covering about said socket and said wood portion permanently uniting the two.

2. An artificial leg comprising a lower wood portion, a leather socket shaped to fit a stump, said socket being mounted upon the upper edge of the wood portion and positioned wholly above said portion, and a rawhide covering bound about said socket and said wood portion permanently uniting the two.

3. An artificial leg comprising a lower wood portion, a socket of less rigid material than the wood portion and molded to fit a stump, said socket being mounted upon the upper edge of the wood portion and positioned wholly above said portion, and a firm covering about the socket and the wood portion rigidly uniting the two, said socket constituting the bearing for a stump.

4. An artificial leg comprising a lower

wood portion, a socket of less rigid material than the wood portion and molded to fit a stump, said socket being mounted upon the upper edge of the wood portion and positioned wholly above said portion, the outer surfaces of said socket and said wood portion being substantially flush, and a covering about the socket and wood portion rigidly uniting the two, said socket constituting the bearing for a stump.

5. An artificial leg comprising a lower wood portion, a leather socket shaped to fit a stump and constituting the bearing therefor, said socket being mounted upon the upper edge of the wood portion and positioned wholly thereabove, the outer surfaces of said socket and wood portion being substantially flush, and a rawhide covering about the socket and wood portion rigidly uniting the two.

6. An artificial leg comprising a lower wood portion, a socket of moldable material mounted upon the upper edge of the wood portion and molded to fit a stump and constitute a bearing therefor, said socket being positioned wholly above the wood portion, and a moldable covering about the socket and the wood portion rigidly uniting the two.

7. An artificial leg comprising a lower wood portion, a leather socket shaped to fit

a stump and constituting the bearing therefor, said socket being mounted upon the upper edge of the wood portion and positioned wholly thereabove, said socket comprising a leather band and outer reinforcing layers of leather thereabout, the outer surfaces of said socket and wood portion being substantially flush, and a rawhide covering about the socket and wood portion rigidly uniting the two.

8. An artificial leg comprising a lower wood portion, a leather socket shaped to fit a stump and constituting the bearing therefor, said socket being mounted upon the upper edge of the wood portion and positioned wholly thereabove, said socket comprising a leather band, an outer reinforcing layer of leather thereabout, and an inner leather lining whose inner surface extends inwardly beyond the inner surface of the wood portion, the outer surfaces of said socket and wood portion being substantially flush, and a rawhide covering about the socket and wood portion rigidly uniting the two.

In testimony whereof we affix our signatures in presence of two witnesses.

ARTHUR E. GAINES.

ARTHUR A. ERB.

Witnesses:

MAZE KIRBY,

A. EBERT O'BRIEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."