

July 22, 1924.

G. H. SHRODES

1,502,593

ARTIFICIAL LIMB

Filed Nov. 9, 1923

2 Sheets-Sheet 1

Fig. 1.

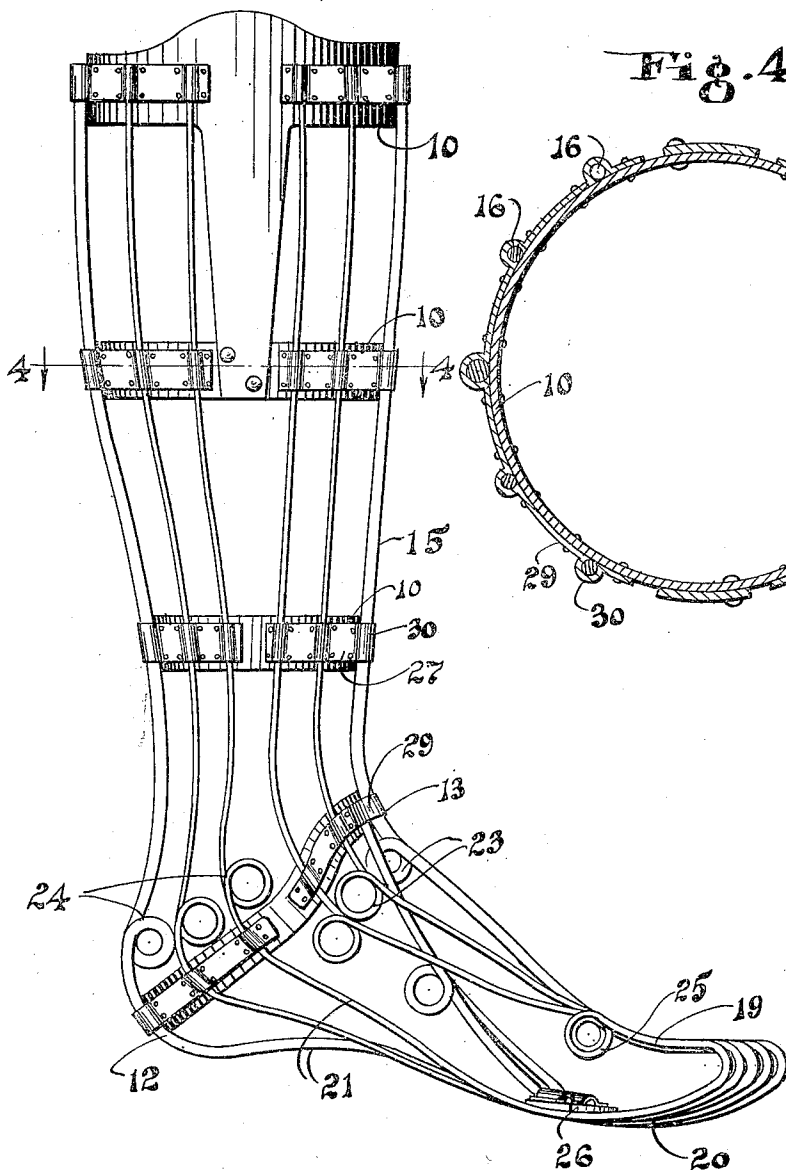
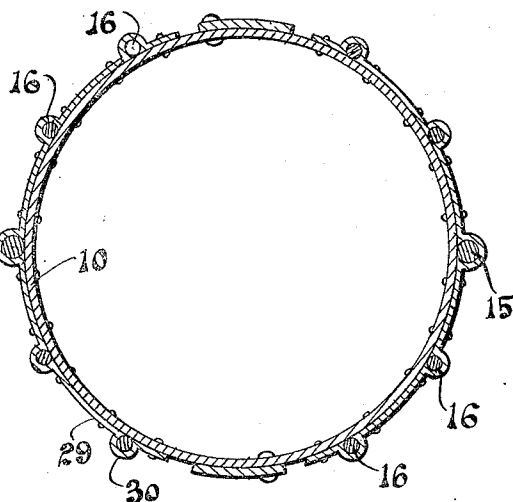


Fig. 4.



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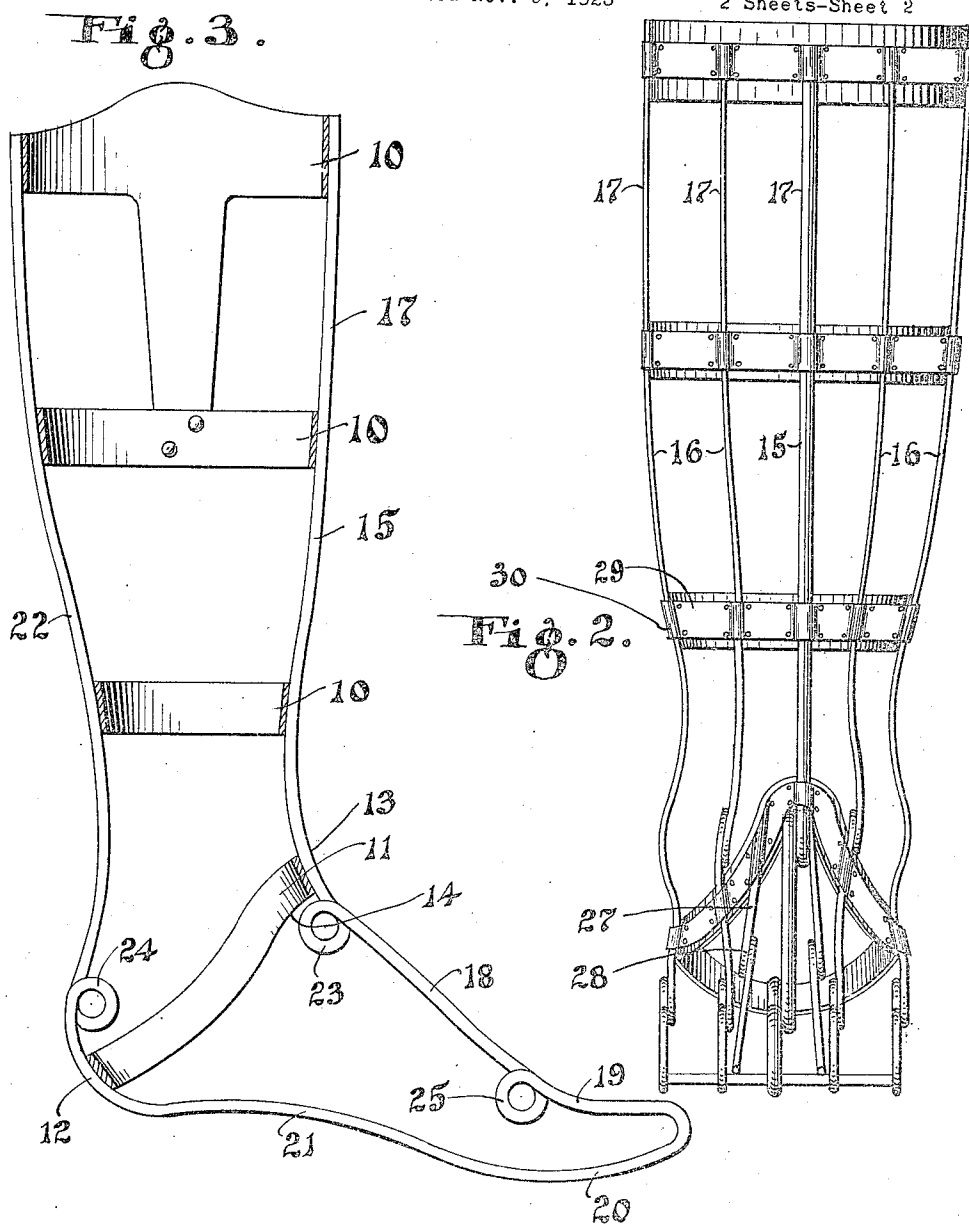
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Inventor
George Hamilton Shrodes

Patented July 22, 1924.

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UNITED STATES PATENT OFFICE.

GEORGE HAMILTON SHRODES, OF PORTERVILLE, CALIFORNIA.

ARTIFICIAL LIMB.

Application filed November 9, 1923. Serial No. 673,757.

To all whom it may concern:

Be it known that GEORGE HAMILTON SHRODES, citizen of the United States, residing at Porterville, in the county of Tulare and State of California, has invented certain new and useful Improvements in Artificial Limbs, of which the following is a specification.

This invention relates to artificial legs, and has special reference to an improvement in the artificial leg of the type shown in my prior patent, Number 1,424,264, dated August 1, 1922.

In the type of artificial leg shown in the prior patent referred to, there is employed a series of wires which are there shown as of uniform diameter, and these wires are arranged to correspond to the contour of the lower portion of the leg, being held in position by bands at various points in their length. One of these bands is placed in position to correspond to the transcrucial ligament of the foot, as illustrated in Fig. 1 of the prior patent.

One important object of the invention is to improve the shape and construction of the artificial limb at this point, this corresponding to the said ligament.

Furthermore, the wires in the prior patent, as before noted, are of uniform diameter, and a second important object of the invention is to improve the construction by making the wire which occupies a central position and represents, in its posterior portion, the tendo achillis or heel cord of the human limb, heavier than the remainder of the wire.

A third important object of the invention is to provide for flexure of the foot of the artificial limb in front of and below the encircling band representing the transcrucial ligament, and above the rear portion of said band so that the construction at point resembles very closely the construction and operation of the ordinary human foot.

A still further object of the invention is to provide certain brace wires for this transcrucial ligament band.

With the above and other objects in view as will be hereinafter more fully described, the invention consists in general of certain novel details of construction and combinations of parts hereinafter more fully described, illustrated in the accompanying drawings and specifically claimed.

In the accompanying drawings, like char-

acters of reference indicate like parts in the several views, and:

Fig. 1 is a side elevation of the improved artificial limb.

Fig. 2 is a front elevation thereof.

Fig. 3 is a view of the bands in section, and one wire with its convolutions in elevation.

Fig. 4 is an enlarged detail section on the line 4—4 of Fig. 1.

In the present embodiment of the invention it will be seen that there is provided a series of transverse bands 10 conforming in contour to the lower portion of a human leg above the foot, and that below the bands is a further band 11 which corresponds to the transcrucial ligament and extending from the heel portion 12 to the ankle portion 13 of the artificial limb. This particular band is arched upwardly at its forward part as indicated at 14. In connection with these bands there is employed five wires, the central wire being shown at 15, while the lateral wires are indicated at 16, there being two of these wires on each side. Each of these wires is shaped to conform in general to the outline of a section of a human limb taken from the front to the rear, and all are provided with certain loops of the same general character and located in the same general position. This loop arrangement is seen best in Figures 1 and 3, wherein it will be noted, that each wire has a front leg portion 17, an instep portion 18, an upper toe portion 19, the wire being then bent back to form an under toe portion 20, and extending rearwardly through the arch 21 to the heel 12 which is raised considerably above the portion 20, and thence upward to the back leg portion 22. Just below the band 11 on each front portion, there is provided a single coil spring loop 23 and similarly just above this band at the rear is provided a single coil spring loop 24. At the position between the portions 18 and 19, there is also provided on each wire another spring coil loop 25. The portions 20 of the wires are connected together with a plate 26, and extending from points adjacent the wires corresponding to the section of four toes, on this plate, to points adjacent the wire 15 on the plate 11 are brace wires 27 provided intermediate their ends with loops 28. It is preferred to hold the wires to the various points by means of cover plates 29 riveted or otherwise secured to the bands

10, and provided with loop portions 30 for receiving the wires.

With the construction of foot as thus formed, the person using the limb in walking forward will not only cause the wires to flex at the points 25, but they will also flex at the points 23 and 24 in such a manner as to accurately resemble the action of the ankle joint. It is to be noted that by reason of this arrangement there is no sudden jerking action as is common with the usual jointed artificial limbs, but the entire movement is as smooth and natural as that which takes place in a normal human limb. It will also be noted that each of these wires has its lower portion forming the arched foot, and these portions replace in an artificial manner the flexor hallucis longus muscle, and the loops above the heel portion and the wires running up the back represent and substitute the tendo calcaneus cord and form the posterior surface of the artificial limb.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that minor changes may be made in the form and construction of the invention without in any way departing from the material spirit thereof. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is wished to include all such as properly come within the scope claimed.

Having thus described the invention, what is claimed as new, is:

1. An artificial lower limb comprising in combination a plurality of wires forming the lower limb construction and foot, and a plurality of bands engaging said wires and attached thereto to maintain said wires in proper spaced relation, one of said bands being positioned to represent the transcrucial ligament, said wires each having its forward portion provided with a spring coil immediately beneath the last mentioned band, and its rearward portion provided with a similar coil immediately above the last mentioned band.

2. An artificial lower limb comprising in combination a plurality of wires forming the lower limb construction and foot, and a plurality of bands engaging said wires and attached thereto to maintain said wires in proper spaced relation, one of said bands being positioned to represent the transcrucial

ligament, said wires each having its forward portion provided with a spring coil immediately beneath the last mentioned band, and its rearward portion provided with a similar coil immediately above the last mentioned band, said wires further having their forward portions shaped to correspond to the contour of a human toe as viewed laterally, and each having a spring coil in its upper part in the joint of said toe.

3. An artificial lower limb comprising in combination a plurality of wires forming the lower limb construction and foot, and a plurality of bands engaging said wires and attached thereto to maintain said wires in proper spaced relation, one of said bands being positioned to represent the transcrucial ligament, said wires each having its forward portion provided with a spring coil immediately beneath the last mentioned band, and its rearward portion provided with a similar coil immediately above the last mentioned band, said wires further having their forward portions shaped to correspond to the contour of a human toe as viewed laterally, each having a spring coil in its upper part in the joint of said toe, a plate extending transversely across and tying the lower toe portions of the wires together, and brace wires secured to said plate and converging toward each other upwardly and rearwardly to the last mentioned band and being there secured, said brace wires having spring loops intermediate their ends.

4. An artificial lower limb comprising in combination a plurality of wires forming the lower limb construction and foot, and a plurality of bands engaging said wires and attached thereto to maintain said wires in proper spaced relation, one of said bands being positioned to represent the transcrucial ligament, said wires each having its forward position provided with a spring coil immediately beneath the last mentioned band, and its rearward portion provided with a similar coil immediately above the last mentioned band, said wires including a centrally disposed wire and lateral wires, the centrally disposed wire being heavier than the lateral wires and adapted to constitute a substitute for the tendo achillis and the middle flexor longus digatorum.

In testimony whereof I affix my signature.

GEORGE HAMILTON SHRODES.