April 3, 1934. J. J. McCANN 1,953,422

METHOD OF MAKING ARTIFICIAL LEG SECTIONS

Filed July 26, 1932 2 Sheets-Sheet 1

Fig. 1.

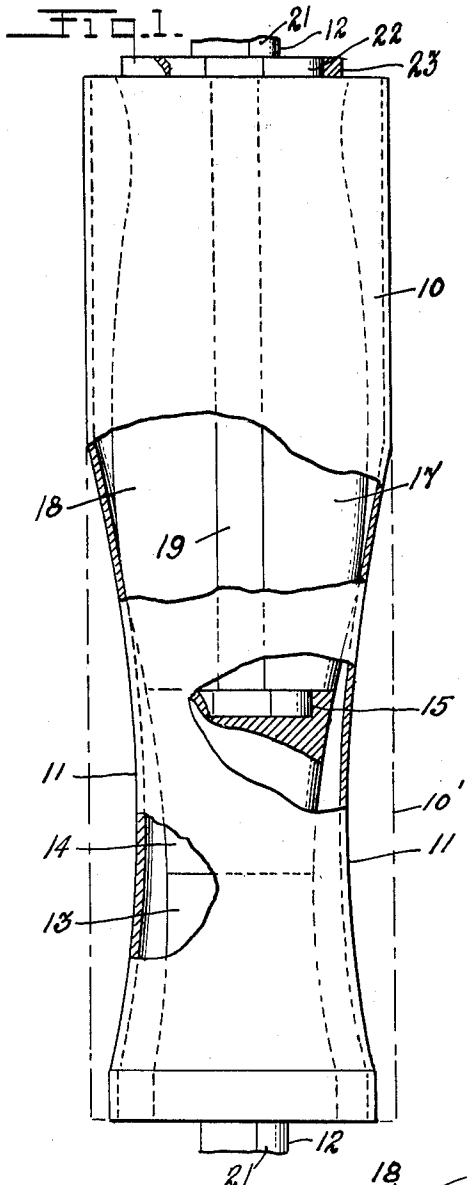


Fig. 2.

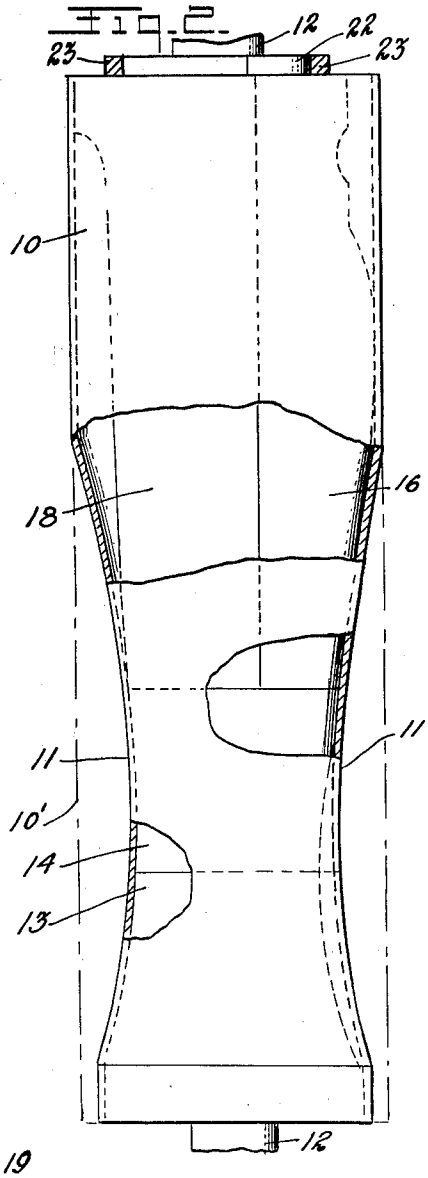
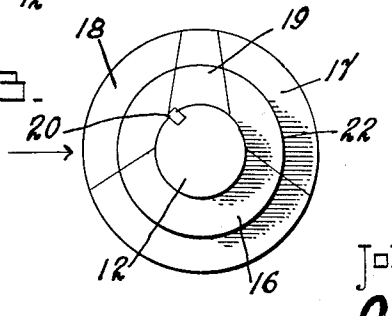


Fig. 3.



WITNESS:

A. M. Cook

Irma D. Brown

INVENTOR

John J. McCann

BY

Joshua R. H. Potts

HIS ATTORNEY

April 3, 1934. J. J. McCANN 1,953,422

METHOD OF MAKING ARTIFICIAL LEG SECTIONS

Filed July 26, 1932 2 Sheets-Sheet 2

Fig. 4.

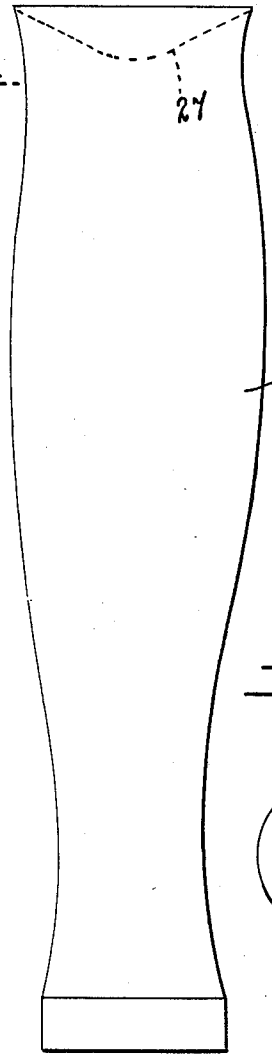


Fig. 5.

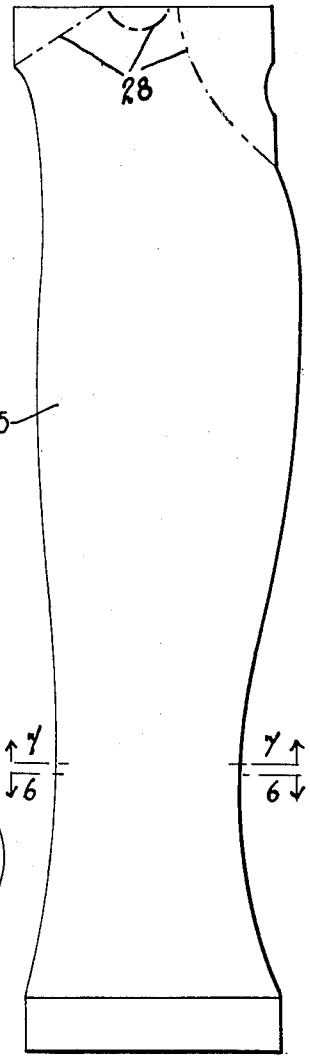


Fig. 6

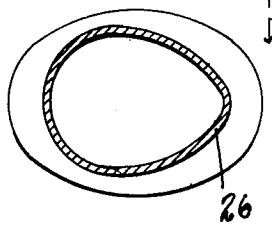
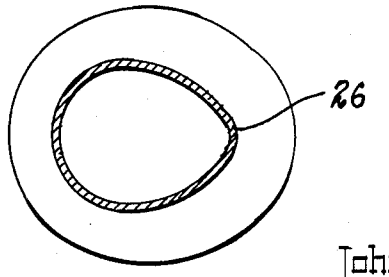


Fig. 7



WITNESS:

O. M. Cook

Irma D. Brown

INVENTOR

John J. McCann

BY

Joshua R. H. Horn

HIS ATTORNEY

Patented Apr. 3, 1934

1,953,422

UNITED STATES PATENT OFFICE

1,953,422

METHOD OF MAKING ARTIFICIAL LEG SECTIONS

John J. McCann, Burlington, N. J.

Application July 26, 1932, Serial No. 624,760

6 Claims. (Cl. 113—52)

This invention relates to artificial leg sections and method of making, and has for an object to provide shin sections spun from a seamless tube.

A further object of the invention is to provide the method of spinning from a seamless tube a leg section conforming to the normal shin section of the human leg.

A further object of the invention is to provide the method of spinning the shin section of a leg where a collapsible mandrel of substantially the form required is inserted into a terete shell and then the shell spun inwardly in irregular form into engagement with the mandrel.

A further object of the invention is to provide an artificial leg section by the method consisting in spinning a seamless tube to a form analogizing the section required, then inserting into the spun form a sectional mandrel, completing the spinning upon the mandrel and removing the sectional mandrel from the completely spun section.

The invention therefore comprises the method of spinning the shin section of an artificial leg, and the section when so spun which comprises the employment of a seamless tube of metal, spinning the tube to a form analogizing the section required, inserting into the partially completed section a mandrel corresponding to the completed shape required, inserting the mandrel into a spinning lathe, spinning the tube down onto the mandrel, and then removing the mandrel in sections from the spun form.

The drawings illustrate an embodiment of the invention and the views therein are as follows:

Figure 1 is a view of the seamless tube showing in full lines the first or initial spinning and in dot-and-dash lines the original contour of the tube, with parts broken away to show the sectional mandrel assembled within the tube and seen from the anterior,

Figure 2 is a similar view seen from the side,

Figure 3 is a top plan view of the mandrel, arrow 1 indicating the point of view of Figure 1, and arrow 2 the point of view of Figure 2,

Figure 4 is an anterior view of the completely spun section showing in dotted lines cut-outs for association with the thigh section,

Figure 5 is a similar view seen from the side,

Figure 6 is a transverse sectional view taken on line 6—6 of Figure 5, and

Figure 7 is a transverse sectional view taken on line 7—7 of Figure 1.

Like characters of reference indicate corresponding parts throughout the several views.

In practicing the method of the present invention, a seamless tube 10 of ductile metal is employed. The dot-and-dash line 10' indicates together with the section 10 the original contour of this tube.

The tube is first introduced into a spinning lathe, and in the usual well known manner spun down to the contour indicated at 11. This approximates the ankle region of the shin section and will, of course, be contoured in accordance with the requirements of the particular ultimate form required.

A mandrel is now inserted into this tube. The mandrel is constructed in sections about an arbor 12. At the lower end, a section 13 is solid except for the passage for the arbor and a section 14 is similarly solid. This section 14 has a recess 15 formed in its upper end into which the several sections of the calf portion are seated to maintain such sections in a unitary structure. The calf section is constructed of several parts as 16, 17 and 18, with a key strip 19. All of these fit about the arbor 12 as shown more particularly at Figure 3, and a key 20 is inserted through a key-way 21 that passes the entire length of the arbor 12 and prevents the rotation of any part of the mandrel relative to the arbor. The sections 16, 17, 18 and 19 are provided with an annular rabbet indicated as an entirety at 22, and a ring 23 is employed to hold the sections into an organized structure.

With the tube spun to the form shown at Figure 1, the calf section and the section 14 are inserted from the upper end and the section 13 from the lower end, all mounted upon the arbor 12 and held by the key 20 in the key-way 21.

The arbor is now inserted into a spinning lathe and in the usual well known manner of spinning, the shell is spun downward onto the irregular form shown by the mandrel. It has been heretofore taught in the spinning art, that metal could only be spun to regular forms, but it has been demonstrated in the present case that spinning to irregular forms is a possibility and that such spinning can take the form shown in the drawings.

After the spinning, the spun section will take the form shown at Figures 4 and 5 where 24 is an anterior view, and 25 is a side view. As the posterior at the ankle is narrower than the anterior, such form is shown at 26 in Figures 6 and 7.

The spinning having been completed to form, it is next necessary to remove the mandrel. This is accomplished by first withdrawing the arbor 12 together with the key 20. The arbor 12 being removed, the key-strip 19 will slide downwardly

into the space vacated by the arbor 12 and may, therefore, be withdrawn. The key-strip 19 being withdrawn, either of the strips 17 or 18 may next be withdrawn and the other strips following. The section 13 being limited at its upward position to the narrowest part of the completed part, may be removed downwardly and the section 14 removed upwardly as it is tapered only in that direction.

In dotted lines at 27 in Figure 4, and 28 at Figure 5, are shown cuts to be made in the spun section which may be followed by cutting the completely spun article to fit the thigh section of a leg. Of course, it is to be understood that these cuts, as well as the forms of the sections themselves and the mandrels, are merely illustrative. They will in all cases correspond to the requirements of the particular case and the forms will be determined by the shape of the leg section to be produced. The cuts 27 and 28 will, therefore, correspond also to the form and shape of the thigh section.

It is to be understood also, that while this disclosure illustrates a shin section intended for articulation to a thigh section, it is obvious that the same plan may be adopted where the socket is included in the shin section itself as in the case of an artificial leg section requiring only the shin part.

The invention is not in any way limited to forms, and is directed to the construction of a seamless shin section by spinning from a seamless tube irrespective of the connection of such shin section whether with a natural or artificial thigh.

Of course, the artificial leg section and method of making, herein illustrated, may be modified and changed in various ways without departing from the invention herein set forth and hereinafter claimed.

The invention is hereby claims as follows:

1. The method of forming a shin section consisting in spinning a tubular blank to a centric analogy of the required contour, removing from the lathe, inserting an irregular mandrel some parts of which are eccentric to the axis, returning to the lathe, spinning down to the mandrel, and removing the mandrel.

2. The method of forming a shin section consisting in spinning a tubular blank to a centric analogy of the required contour, removing from the lathe, inserting an irregular sectional mandrel some parts of which are eccentric to other parts, returning to the lathe, spinning down to the mandrel, and removing the mandrel.

3. The method of forming a shin section consisting in spinning a tubular blank to a centric analogy of the required contour, removing from the lathe, inserting an irregular mandrel having parts erratically eccentric to other parts, returning to the lathe, spinning down to the mandrel, and removing the mandrel.

4. The method of forming a shin section consisting in spinning a tubular blank to a centric analogy of the required contour, removing from the lathe, inserting an irregular mandrel contoured to the form of a human shin with some parts non-circularly eccentric, returning to the lathe, spinning down to the mandrel, and removing the mandrel.

5. The method of forming a shin section consisting in spinning a tubular blank to a centric analogy of the required contour, removing from the lathe, inserting an irregular sectional mandrel having parts erratically eccentric to other parts, returning to the lathe, spinning down to the mandrel, and removing the mandrel.

6. The method of forming a shin section consisting in spinning a tubular blank to a centric analogy of the required contour, removing from the lathe, inserting an irregular sectional mandrel contoured to the form of a human shin with parts non-circularly eccentric to other parts and the axis, returning to the lathe, spinning down to the mandrel, and removing the mandrel.

JOHN J. McCANN.