Nov. 1, 1927. 1,647,639

M. LARSON

CAST OR TEMPORARY SHOE LAST AND METHOD OF MAKING SAME

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Fig. 1.

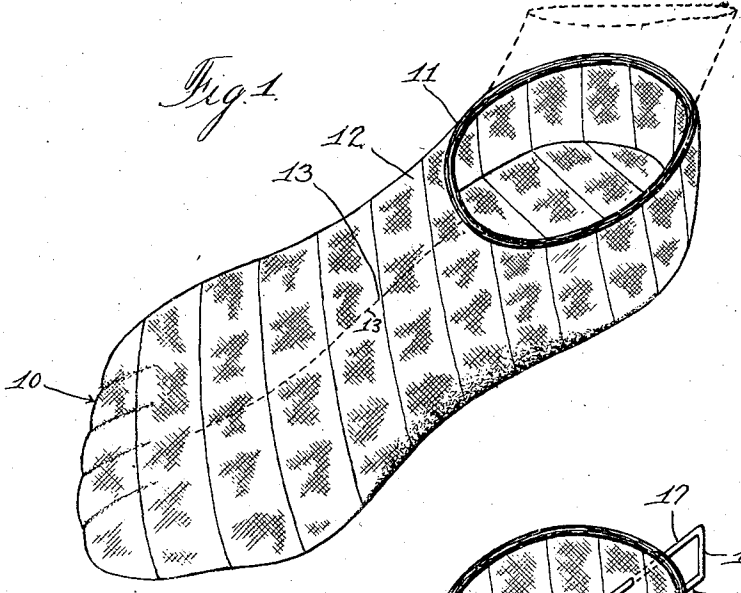


Fig. 2.

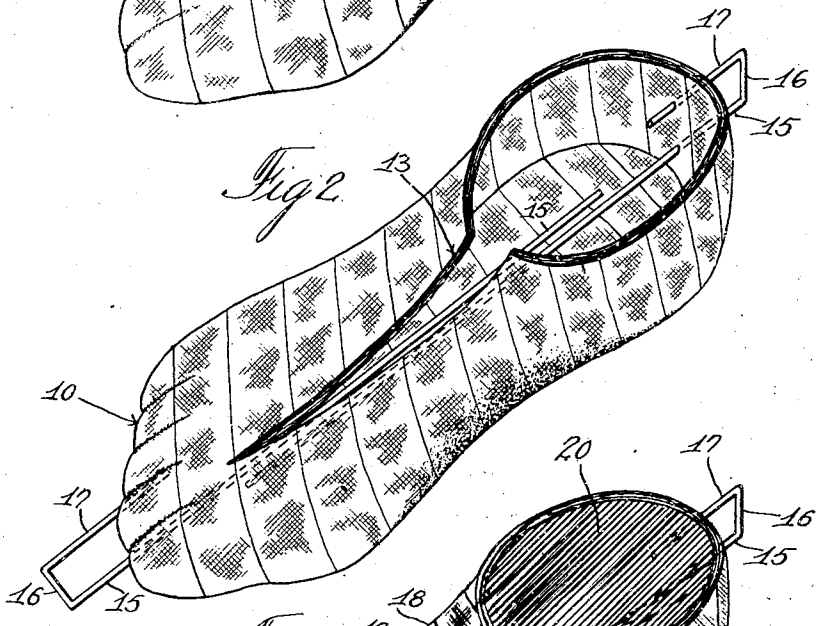
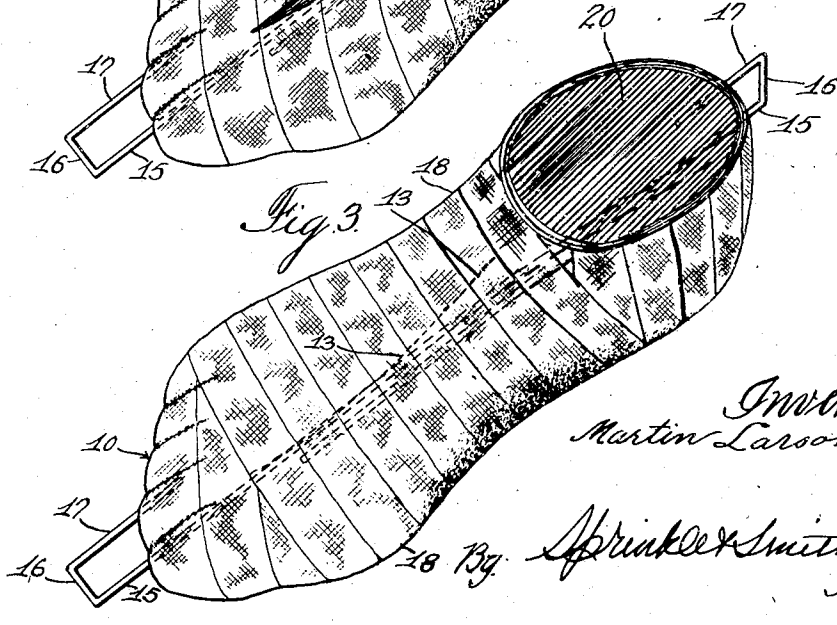


Fig. 3.



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Fig 4.

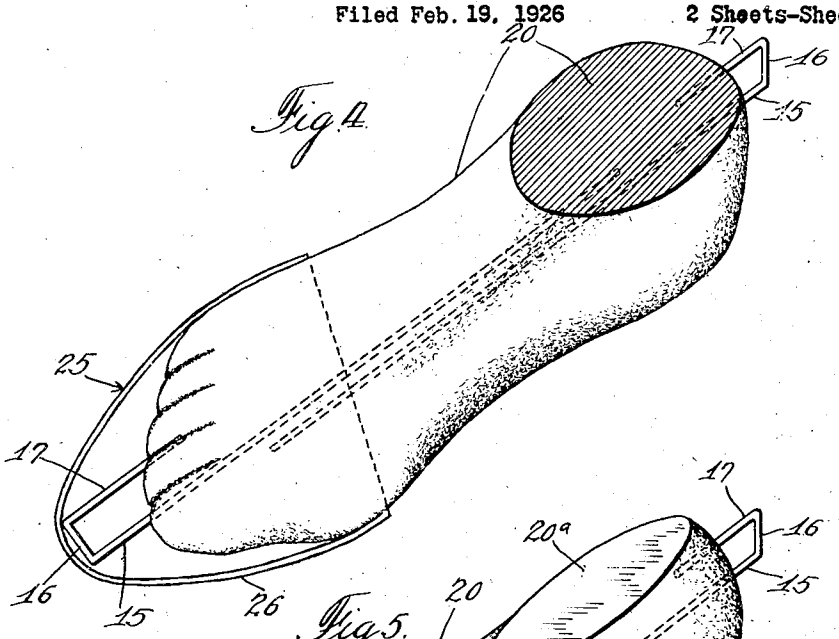


Fig 5.

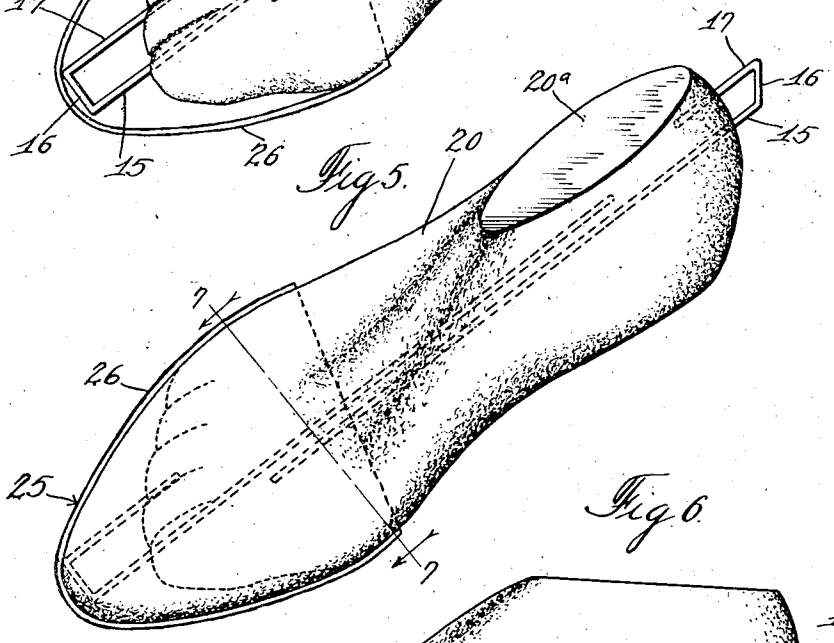


Fig 6.

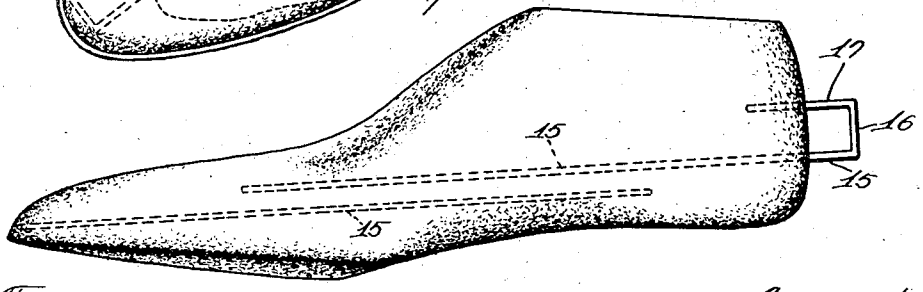
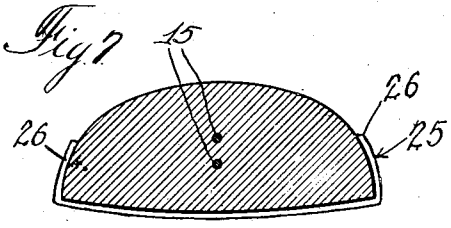


Fig 7



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UNITED STATES PATENT OFFICE.

MARTIN LARSON, OF LA GRANGE, ILLINOIS.

CAST OR TEMPORARY SHOE LAST AND METHOD OF MAKING SAME.

Application filed February 19, 1926. Serial No. 89,346.

The invention relates to an improved form of cast or temporary shoe last and to an improved method of making the same from which a last of wood or other material of a more firm and enduring character may be made if desired for use particularly in the manufacture of custom made footwear fashioned in the form of boots or shoes from leather or other suitable materials.

My invention has been found particularly adapted to custom made shoes for feet that are deformed or diseased or where for any reason it is required that exceptionally accurate fits of such shoes or other footwear is required, although the use of the invention is not necessarily so restricted, because it may be used equally well in all cases where custom made footwear of accurate fit is desired.

It is the primary object of my invention to provide an improved method of making a cast or temporary shoe last preferably of a flexible material so constructed and reinforced that it may be reproduced in a facsimile from wood or other material of a more firm and enduring character to be used for the manufacture of footwear thereover.

It is a further object of this invention to provide an improved method of casting a temporary shoe last that shall be capable of producing an accurate last or cast of the foot of the subject with a minimum amount of inconvenience to the subject.

Other objects of the invention will appear from the following description of my improved method of producing a cast or temporary shoe last taken in connection with the accompanying drawings forming a part of the specification, the novel features being set forth in the appended claims.

In the said drawings, Fig. 1 is a perspective view of an impression in position on the foot of a subject before removal, the outline of a portion of the foot of the subject being indicated in dotted lines and the line of severance of the wall of the impression being shown also in dotted lines.

Fig. 2 is a view similar to Fig. 1 of the hollow impression or mold of Fig. 1 after a portion of the wall of the mold or impression is severed, as clearly indicated in the figure, and the impression or mold also shows the insertion of metal reinforcing members adapted to appear later in the temporary last when cast.

Fig. 3 shows the mold or impression with the reinforcements in it of Fig. 2 having the casting material as plaster of Paris poured thereinto after the impression or mold has been closed along the line of severance by taping or wrapping, as indicated in this figure.

Fig. 4 is a view of the casting of Fig. 3 after the impression or mold has been untaped and removed from the casting of frangible material, the view showing the reinforcing members in the casting and also showing a temporary frame or mold, as preferably used in carrying out the process of building out the toe portion of the temporary last by the addition of plastic material thereto in the outline of the temporary mold so that when the temporary mold is removed the completed last will appear as in Fig. 6 with the built out or built on to portion in the desired relation for serving as a complete last or outline for the shoe or other footwear to be made thereon.

Fig. 7 is a sectional view taken on line 7—7 of Fig. 5 looking in the direction of the arrows and showing the manner in which the temporary mold is applied to the cast for the toe building operation.

Heretofore casts for making lasts and footwear have sometimes been produced by putting the foot of the subject into a molten material adapted to harden quickly on setting such as plaster of Paris when moistened with water, which is known to have the quality of setting within a relatively short time after being mixed to the form of a mortar or pasty mass and when molds have thus been taken the foot of the subject is placed in the molten soft material and there has been a frequent tendency of nervousness on the part of subjects so that it has been difficult to have subjects properly relax the muscles of the foot or to refrain from moving the muscles of the foot. It is obvious that the slightest movement of the foot when making such a cast will result in inaccuracies with the foot immersed in a mass of rapidly setting and often quite hot molten material. In such methods of casting it has been common after the molten material sets around the foot or member of which a cast is being taken to cut the cast so that it will be separated in two parts, sometimes by means of a thread or other suitable cutting means. The tendency to

movement of the foot of the subject in such a method of casting has been so great that inaccuracies frequently appear in the work and to overcome the defects of such methods of making casts and producing lasts particularly for the manufacture of footwear, I have provided my improved method and reinforced temporary last as herein described and claimed, which is preferably produced and practiced by producing a temporary form of mold or casing for making the cast in the manner and construction illustrated in Fig. 1. This is accomplished preferably by taking elongated strips of rather loosely woven cloth such as cheese cloth and first saturating the same in a mortar or pasty mass made by mixing water and plaster of Paris together and wrapping said strips around the foot of the subject in a plurality of layers in the manner illustrated in Fig. 1. The number of thicknesses of the cloth strips that shall be used in making up the casing is not vital just so that enough layers are utilized to give the casing or form sufficient firmness when the plaster of Paris with which the strips are saturated shall set so that the mold will have the desired firmness to support and control the form of the cast. In practice I find that I can utilize anywhere from two or three thicknesses of saturated cloth in making up the form or mold up to five or six thicknesses and since on account of the extreme irregularities of the human foot there may be some difficulties especially on the part of a novice in attempting to make a wrapping or mold that shall be uniform throughout as to the thicknesses of cloth employed in different parts of the mold, it may be stated that it is not important if the thicknesses of cloth in the mold wall shall vary at different locations therein, since it will be found that when the plaster of Paris absorbs the water in the mortar and sets, the mold or hollow form will be found to be sufficiently firm throughout the walls thereof when removed from the foot of the subject and allowed to dry, to support and give perfect reproductive form to the casting to be made from the mold thus formed.

In Fig. 1 of the drawings where the mold is shown in section around the top wall thereof it will be seen that approximately four thicknesses of cloth are indicated as designated by reference character 11, the mold generally being designated by reference character 10. The cloth strips used in the wrapping to form the mold or casing are shown in the drawings and are indicated by reference character 12. As soon as the strips of cheese cloth saturated in plaster of Paris mortar are in the form shown in Fig. 1, the mold or form is of course in condition to dry, and this result may be accomplished by causing the subject to remain quiet for a brief interval of time to allow the plaster of Paris to set, precautions being first taken to see that the walls of the mold, which when first wrapped will be flexible, are pressed into close contact with every part of the foot. I find in practice that comparatively little difficulty will be found in this respect on the top parts of the mold where it contacts with that part of the foot over the top from the toes back to the ankle, but I have experienced in practice some difficulty in being able to insure that the flexible saturated walls portions of the mold on the bottom of the subject's foot shall adhere closely to the irregularities of the foot bottom and since the weight of a person must be borne by the contact of the bottom portions of the foot with the wall of the footwear, one of the most important and essential things in producing a perfect piece of footwear is to insure a perfect fit of the foot with the bottom parts of the shoe. In order therefore to insure close contact of the mold when in its flexible condition with the bottom of the foot to get a perfect impression thereof, I have experimented with various means to obtain this desirable contact while the flexible walls of the mold are setting and I have found that the most advantageous thing to use to secure a perfect impression of the bottom of the foot is to have the subject press the foot with the wrapped mold thereon upon some cushioning material such as sponge rubber which will permit any protruding parts of the foot to project into the body of the rubber cushion without undue pressure thereon and yet will at the same time apply sufficient pressure to all parts to insure the desired contact of the flexible mold or casing with the bottom of the foot while the mold is setting or hardening. As soon as the form or casing is formed and has properly set or hardened, as described, by the use of scissors or other suitable cutting means an incision will be made in the top of the form or casing corresponding somewhat to the usual slit or opening in an ordinary pair of shoes where they are laced together, this line of severance being designated by the broken line 13 of Fig. 1 and the line of cleavage in Fig. 2 designated by the same reference character.

When the form or mold 10 has been cut as designated and removed from the foot of the wearer it will be obvious that if the plaster of Paris has had an opportunity to absorb the water of crystallization and to set that the walls of the form or mold thus cast or impressed will be comparatively firm. Since the purpose of the form or mold 10 is to make the ultimate temporary last casting it is only necessary to allow the saturated cloth material to set before beginning the operation of casting the temporary last, and this may therefore be undertaken usually at

any time even a few minutes after the first impression or form is taken, or the form or mold may be allowed to set and dry for any length of time, as a few days or months, or even years. Before making the cast in the form 10 I prefer to introduce special strengthening means for strengthening the ultimate casting and supporting the same when the temporary casting is used in an automatic machine for the production of a permanent last made of some material more permanent and durable than plaster of Paris, as for example, wood, which is the material commonly used in making shoe lasts. Into the form or mold 10 I therefore preferably insert metallic reinforcing members formed of a heavy grade of steel wire of sufficient diameter to give the necessary strengthening qualities, said reinforcing members being preferably in the form illustrated in Figs. 2 to 7 inclusive, and from which it will be seen that they are given the general shape of the capital letter L having the elongated body portions 15 of a length which may approximate the entire length of the last so as to extend longitudinally on the interior thereof usually near the bottom and they will therefore have the comparatively short angular portions 16 and bent beyond the short portions as at 17 into parallel relation with the main body portions 15 so that they may be inserted into the hollow forms or molds by puncturing the walls thereof at the heel and toe as shown most clearly in Fig. 2 so that the major portion of the part 15 will lie within the form or mold with a short U-shaped extension on the outside at the heel, the part 17 usually extending only a short distance through the wall of the form or mold.

In an application for Patent Serial No. 89,258 filed of even date herewith, I have shown, described and claimed a machine which is adapted for utilizing fragile, temporary casts in making lasts of a permanent material, and it is feature of the present invention to so strengthen the temporary last which is a product of the method herein claimed so that said temporary last or flexible material may be successfully used as a pattern. To that end the strengthening or reinforcing member 15 will be inserted at the heel end of the form or mold as shown in Fig. 2 so that the portion 16 will extend vertically while the corresponding part will extend horizontally as illustrated in Fig. 2 at the toe, this arrangement of the reinforcing members being devised for the purpose of enabling the temporary last to be more readily and easily grasped and clamped in the machine. When the reinforcing members are therefore in the form as illustrated in Fig. 2 the slit portion 13 will be closed and wrapped by suitable taping or other closure means as designated by reference character 18 in Fig. 3. The form or mold is then in position to receive plastic material for the formation or casting of the temporary last and material of this character is designated by reference character 20 in Fig. 3.

In Fig. 4 the plaster of Paris casting 20 of Fig. 3 is shown removed from the mold or form 10 and having the reinforcing members 15, 16 and 17 imbedded therein. An inspection of the view of this figure will show that the casting thus formed is a facsimile of the foot of the subject and although a most accurate form of footwear may be desired by the subject, nevertheless, it is not customary to make up footwear especially with respect to the toe portions that follows the absolute contour of the foot. Furthermore, in the removal of a last from a shoe being manufactured and in the insertion of the same into a shoe for any purpose during manufacture, and in manipulating the top portions of footwear in maunafcture, it is quite customary and desirable to trim the last around the top above the heel portion which may be advantageously done somewhat in the manner in which the casting 20 comprising the temporary last is shown trimmed in this regard in Fig. 5 so that the last will now appear in the finished form as shown in Figs. 5 and 6 where the top or part which corresponds to a section through the ankle of the subject, as designated at 20^a, is of an elongated oval form rather than the almost circular section appearing on the horizontal temporary casting of Fig. 4. It is also usually desirable to perform some special operations on casts taken in this manner at the toe portions thereof and a temporary mold as designated by reference character 25 is shown applied to the casts of Figs. 4 and 5 for use in the manner which will now be described.

This temporary mold 25 consists of a relatively flat member slightly curved to conform substantially to the bottom of the foot or the sole of the shoe, and it will advantageously have side members extending vertically as designated by reference character 26 as shown in Figs. 4, 5 and 7. Since the shoe is to be built over the last the temporary mold 25 may be advantageously used in building out the toe portions of the temporary last by the addition of plastic material such as plaster of Paris and will be shaped and allowed to harden after the removal of the temporary mold 25 in the manner illustrated in Figs. 5 and 6 so that when the toe of the last is completed the reinforcing portions 15, 16 and 17 of the metallic reinforcing device will be substantially covered at the toe and be imbedded in the material so that they will be in position to serve their strengthening function when the toe of the temporary last is grasped by the pattern holding device of a machine in the manner

described in my aforesaid co-pending application for patent, and it will be noted that the reinforcing member at the heel, while not covered as is the one at the toe, will project in a substantially vertical plane a sufficient distance as designated in the drawings to the rear of the heel so that it may be engaged by the gripping device of the last making machine.

When my improved temporary last is completed, it will be in the substantial arrangement and form shown in Fig. 6 varying in shape of course, according to the shape of the foot of the subject and when completed, as shown in Fig. 6, it may be put into the last making machine or reproduced in facsimile by any desired method in wood or any other desired permanent last material.

A last formed in the manner and by the method described will insure, especially for custom work and in making shoes under difficult conditions, the most perfect fit in footwear that is known in the art and without the employment of any objectionable or nerve racking methods that have been heretofore employed in making casts.

While in the above specification I have described one embodiment which my invention may assume in practice, it will of course be understood that the same is capable of modification and that modification may be made without departing from the spirit and scope of the invention as expressed in the following claims.

I claim:

1. The herein described method of forming a cast last of frangible material for use in the manufacture of custom made footwear which consists in producing a mold or casing of strips of flexible material saturated in wet plaster of Paris or analogous material wrapped closely around the foot of the subject and allowed to harden thereon until the walls of said mold or casing take a permanent set, slitting a part of the wall of the mold or casing thus formed and removing it from the foot of the subject, closing the slitted portion and inserting reinforcing means from the exterior through the wall of the mold or casing to be imbedded in the casting to be formed therein, casting a last of frangible material in the said mold or casing, and finally removing the casting with the reinforcing material therein from the mold or casing.

2. The herein described method of forming a cast last of frangible material for use in the manufacture of custom made footwear which consists in producing a mold or casing of strips of flexible material saturated in wet plaster of Paris or analogous material wrapped closely around the foot of the subject and allowed to harden thereon until the walls of said mold or casing take a permanent set, removing said mold or casing from the foot of the subject, casting a last of frangible material in the said mold or casing, removing the cast from the mold or casing, and finally completing the desired contour of the last casting by adding plastic rapidly drying material to the toe portions thereof.

3. The herein described method of forming a cast last of frangible material for use in the manufacture of custom made footwear which consists in producing a mold or casing of strips of flexible material saturated in wet plaster of Paris or analogous material wrapped closely around the foot of the subject and allowed to harden thereon until the walls of said mold or casing take a permanent set, removing said mold or casing from the foot of the subject, casting a last of frangible material in the said mold or casing, removing the cast from the mold or casing, finally completing the desired contour of the last by adding plastic rapidly drying material to the toe portions thereof, and trimming and shaping the top or ankle portion thereof to render operation and insertion of the last more easy.

4. As an article of manufacture, a temporary last of frangible material having reinforcing metallic members imbedded in the toe and heel portions, said reinforcing metallic members extending beyond the toe and heel portions thereof.

5. As an article of manufacture, a temporary last of cast frangible material having reinforcing metallic members imbedded in the toe portion, said reinforcing member having a looped portion extending beyond the said toe portion thereof.

6. As an article of manufacture, a temporary last of cast frangible material, as plaster of Paris, having reinforcing metallic members in the form of metallic rods or wires imbedded in the material thereof and extending substantially from the toe to the heel portion of the last, one of said reinforcing metallic members being provided with a loop projecting beyond the extremity of the heel portion of the last and the other of said metallic members having a loop at the toe portion of said last and adjacent the extremity of said toe portion thereof.

In testimony whereof I have signed my name to this specification, on this 16th day of February A. D. 1926.

MARTIN LARSON.