Sept. 14, 1954 G. FORTE 2,688,760

METHOD OF MAKING FOOT SUPPORTING DEVICES

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FIG. 1

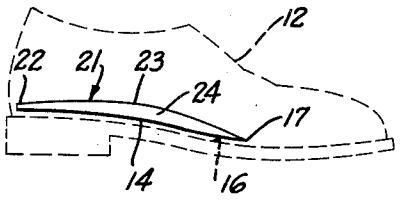


FIG. 2

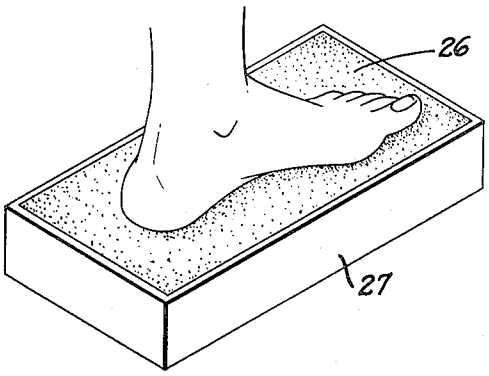


FIG. 3

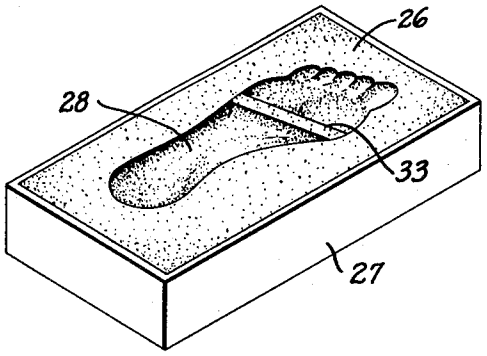


FIG. 4

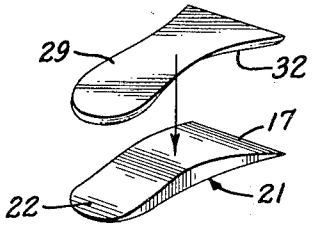
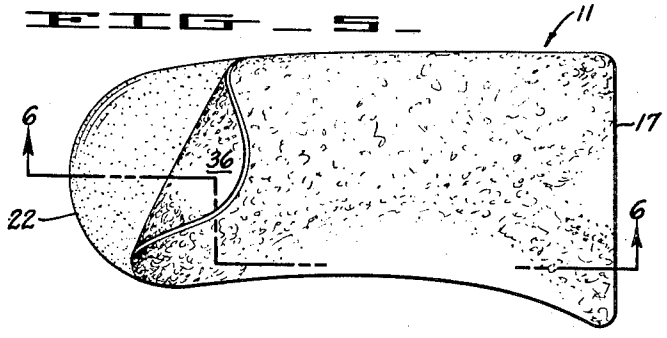


FIG. 5



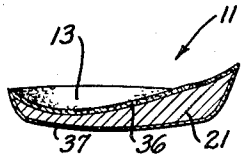
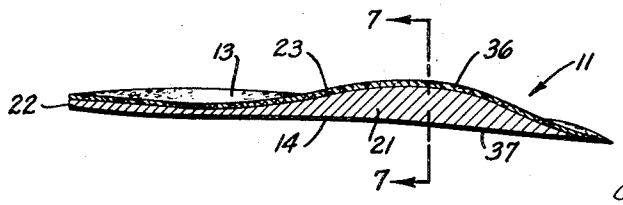


FIG. 7

FIG. 6



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METHOD OF MAKING FOOT SUPPORTING DEVICES

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5 Claims. (Cl. 12—146)

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The invention relates to devices worn in the shoe for better supporting the foot and to methods for producing such devices.

It has long been recognized that the maximum in foot comfort can be attained by making the supporting surfaces of the shoe fit the contours of the weight supporting areas of the foot when under partial or full load conditions. The contouring of the floor of the shoe necessary to provide such a mating with the bottom of the foot is not practical in the mass production of shoes in standard sizes and lasts as now practiced. Accordingly, various forms of inserts and arch supports have been used to obtain a better fitting shoe. Attempts have been made to form such inserts to the individual foot by molding or casting them in plaster of Paris forms using the foot as a pattern. Such construction does not put the foot under a normal load supporting condition and hence the contours obtained will not be entirely comfortable in use.

It is also recognized that one of the most beneficial foot exercises is walking in sand and that a most complete and perfect support for the foot is obtained while standing or walking in sand. The latter has the unique property of resisting deformation while at the same time flowing to conform to and support the entire foot. The impressions left behind by the foot when walking through sand thus record the contours of the bottom of the foot when it is in an ideal weight supporting condition.

An object of the present invention is to utilize the two, above described, recognized principles in producing shoe inserts which will effect a fitting of the shoe to the individual foot of the user to afford an improved support of the character described.

Another object of the present invention is to produce a device of the character described which combines in its construction the natural qualities of wood and leather in obtaining maximum foot comfort.

A further object of the invention is the provision of a durable device of the character above which may be manufactured at modest expense and by a technique which may be readily mastered by the ordinary skilled worker.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following descriptions of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description

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may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

Figure 1 is a side elevational view of a wooden blank from which the foot supporting device of the present invention is formed, the blank being shown in its normal position in a conventional shoe.

Figure 2 is a perspective view of a human foot in operative association with apparatus used in obtaining an impression of the foot in accordance with the method of the present invention.

Figure 3 is a perspective view of the apparatus shown in Figure 2 and illustrates the impression made and a later step in the method.

Figure 4 is a perspective view of the blank shown in Figure 1 and a cooperating metal casting as positioned during another step of the method.

Figure 5 is a plan view on an enlarged scale of the foot supporting device of the present invention.

Figure 6 is a longitudinal sectional view of the device taken substantially on the plane of line 6—6 of Figure 5.

Figure 7 is a cross sectional view of the device taken substantially on the plane of line 7—7 of Figure 6.

The foot supporting device of the present invention and as shown in the accompanying drawing includes a member 11 made of wood and formed to fit within a shoe 12 to underlie the foot and having the upper surface 13 thereof relieved so as to precisely mate with the bottom of the foot to be supported thereon. The underside 14 of the member 11 is likewise shaped to conform to the floor 16 of the shoe 12 so as to precisely position the member within the shoe and to retain it in such position in use. In order to permit the bending of the shoe at the ball of the foot, the member 11 is proportioned to underlie the heel and adjacent longitudinal arch of the foot and terminates forwardly in a feathered edge 17 designed to lie across the foot just to the rear of the ball thereof.

In accordance with the present invention and as a first step in the method, a suitable piece of wood is rough shaped into a blank 21 of the general configuration shown in Figure 1 of the drawing. The blank is rounded at the rear or heel portion 22 and widens out as it approaches the forward edge 17 when viewed in plan aspect, see Figure 5, so as to conform to the outlines of the floor 16 of the shoe 12. When viewed in side elevation as in Figure 1, the blank preferably has a thickness of one half inch or more at the

portion **24** underlying the longitudinal arch of the foot and tapers therefrom to a thin section at edge **17** and rear portion **22**. The underside **14** of the blank is formed as by cutting or carving or the like so as to fit the floor **16** of the shoe to properly position the blank within the shoe and retain the finished device firmly in position and against displacement during walking and with the weight generally distributed over the floor of the shoe. In this manner a much more uniform weight distribution and an attendant decrease in wear over the interior floor of the shoe is obtained in the use of the present device.

As a further step in the method of the present invention, an impression of the contours of the bottom of the individual foot to be fitted is formed in the upper surface **23** of the blank and such impression corresponds, as above noted, to that obtained with the foot under a properly loaded condition. To do this, an impression of the foot is first made in sand **26**, here shown contained within a suitable pan or box **27**. Ordinary foundry sand, such as commonly used in iron foundries, may be used. The foot is placed on the sand, as illustrated in Figure 2 of the drawing, and the weight of the body allowed to rest in a normal manner thereon in order to compact the sand under foot and provide a flowing of the sand into all of the voids and crevices under the foot so as to obtain, when the foot is removed, an impression **28**, as illustrated in Figure 3, of the foot as the same is ideally supported in the sand. Good foundry practice may be followed in making the impression, with care being taken to insure that the impression follows the contours of the foot exactly.

Molten metal is then poured into the impression **28** formed in the molding sand **26** and allowed to cool until it solidifies into a casting or form **29** which has a lower surface **32** exactly conforming in shape to the bottom of the foot. While any suitable metal may be used in making the form **29**, it must subsequently be used at elevated temperatures, as will be described, and hence a metal having a fairly high melting point is required. A suitable metal which is easily available and which possesses the necessary qualities is common cast iron. Conveniently, and as shown in Figure 3, a dam **33** of molding sand or clay may be formed across the impression **28** at a position corresponding to the edge **17** of the blank **21** so that the resulting casting will generally conform in over all dimensions to the blank.

After the casting, or form, **29** has solidified, but while the metal is still at an elevated temperature (or as it may be subsequently heated to such elevated temperature)—somewhat above the charring point of the wood—the form is placed with its undersurface **32** upon the upper surface **23** of the blank **21** in the manner illustrated in Figure 4, that is with the casting **29** in direct superimposed position upon the blank and in general registration therewith. Preferably, the mass of metal and its elevated temperature are sufficient to cause the casting to burn its image into the upper surface of the wood in a fairly rapid charring action without the need for reheating of the casting. Where cast iron is used, a mass of two to three pounds is sufficient, and in such case the iron may be at or about a red heat before placing upon the blank. Under such circumstances the burning-in process is effected in a minute or so.

After the form has burned its impression into the blank, the charred portions of the wood are carefully scraped away so as to leave solid wood having a contour mating with the engaged portions of the metal form. Where deep impressions are to be made, the burning in and scraping out step, as above described, may be repeated until the upper surface **23** of the blank is relieved so as to exactly fit the bottom of the foot.

The casting formed as above may be permanently retained by the user and subsequently re-used as often as desired in the forming of shoe inserts in accordance with the processes of the present invention.

As a final step in the forming of the device and in order to obtain maximum foot comfort, great wear and added strength, sheets **36** and **37** of leather are secured as by gluing to the upper and lower surfaces **23** and **14**, respectively, of the wood blank. In the gluing or fastening of the sheets of leather to the wooden form, the leather is caused to adhere in close fitting relation to the wood over the contours thereof so as to preserve the precise mating with the bottom of the foot in the case of the upper surface and the confirmation with the floor of the shoe in the case of the lower surface. The upper layer **36** may be somewhat thicker than the lower layer **37** so as to provide a desired cushioning of the foot. In both cases the glued leather layers provide an important reinforcement of the wood and greatly add to the durability and life of the device.

A foot supporting device constructed in accordance with the foregoing has many advantages. Of foremost importance, it will precisely fit the shoe to the individual foot of the wearer to provide a maximum of foot comfort as hereinabove described. It is very light in weight as compared to other shoe inserts made of steel or other metal or composition and yet is very tough and durable and will have a long and useful life. It will increase the life of the shoe and particularly the shoe interior by improving the weight and resultant wear distribution over the shoe. Finally the porosity and foot comfort provided by the leather layer **36** cooperates ideally with the porosity and rigidity of the wood form to afford a desired breathing and perspiration absorption by the device while permanently retaining its built in confirmation to the foot of the wearer.

I claim:

1. The method of making a foot supporting member adapted for insertion into a shoe to underlie and conform to the shape of the foot comprising, forming a blank of wood to fit into the heel and adjacent main longitudinal arch section of the shoe, making an impression of the foot in molding material, casting a metal form in said impression, placing said form while heated above the charring temperature of wood upon the upper surface of said blank to burn into said surface the shape of said form corresponding to said impression, and removing the charred wood from said blank so that said upper surface will conform to said impression.

2. The method of making a foot supporting member adapted for insertion into a shoe to underlie and conform to the shape of the foot comprising, forming a blank of wood to fit into the heel and adjacent main longitudinal arch section of the shoe, making an impression of the foot in molding material, casting a metal form in said impression, placing said form while heated above the charring temperature of wood upon the upper surface of said blank to burn into said surface the shape of said form corresponding to said impression, removing the charred wood from

said blank so that said upper surface will conform to said impression, and covering said upper surface with a leather sheet conforming to the shape of said upper surface.

3. The method of making a foot supporting member adapted for insertion into a shoe to underlie and conform to the shape of the foot comprising, forming a blank of wood to fit into the heel and adjacent main longitudinal arch section of the shoe with the underside of said blank shaped to conform to the floor of the shoe, making an impression of the foot in molding material, casting a metal form in said impression, placing said form while heated above the charring temperature of wood upon the upper surface of said blank to burn into said surface the shape of said form corresponding to said impression, removing the charred wood from said blank so that said upper surface will conform to said impression, and covering said underside and upper surface of said blank with sheets of leather conforming to the shapes thereof.

4. The method of making a foot supporting member adapted for insertion into a shoe to underlie and conform to the shape of the foot comprising, forming a blank of wood to fit into the heel and adjacent main longitudinal arch section of the shoe, making an impression of the foot in molding sand, pouring molten iron into said impression to provide a casting corresponding to said foot, placing said casting while heated above the charring temperature of wood upon the upper surface of said blank to burn into said surface the shape of said casting corresponding to said impression, and removing the charred wood from said blank so that said upper surface will conform to said impression.

5. The method of making a foot supporting member adapted for insertion into a shoe to underlie and conform to the shape of the foot comprising, forming a blank of wood to fit into the heel and adjacent main longitudinal arch section of the shoe with the underside of said blank shaped to conform to the floor of the shoe, making an impression of the foot in molding sand with the weight of the body resting on said foot, casting an iron form in said impression, placing said form while heated above the charring temperature of wood upon the upper surface of said blank to burn into said surface the shape of said form corresponding to said impression, removing the charred wood from said blank so that said upper surface will conform to said impression, and covering said underside and upper surface of said blank with sheets of leather conforming to the shapes thereof.

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