Feb. 20, 1962 W. M. SCHOLL 3,021,846

ORTHOPEDIC ARTICLE OF FOOTWEAR

Original Filed Nov. 13, 1957 3 Sheets-Sheet 1

Fig. 1

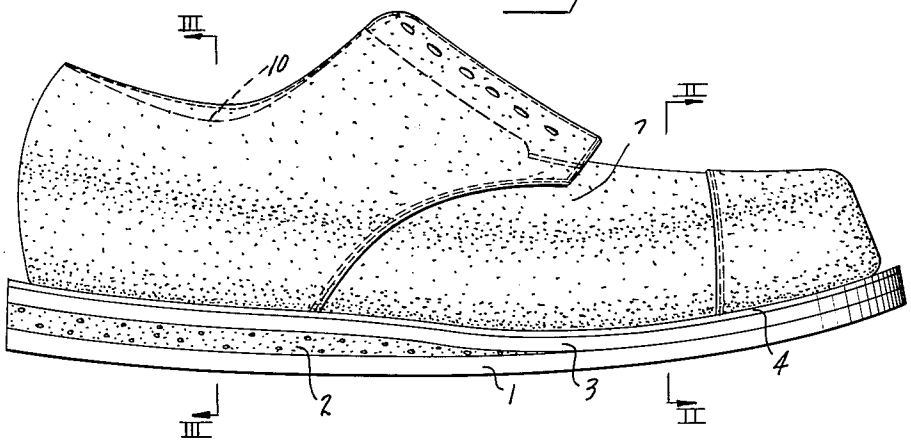


Fig. 2

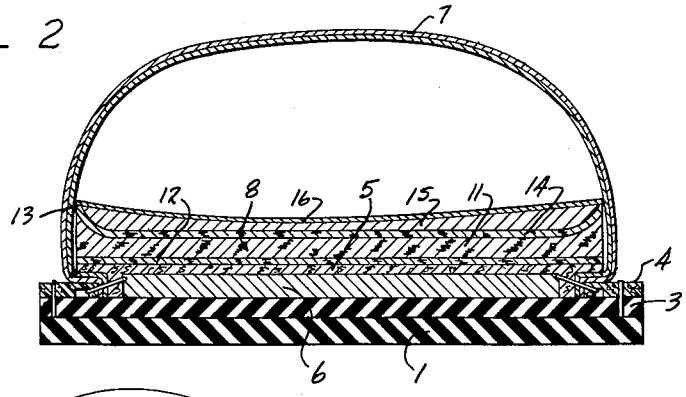
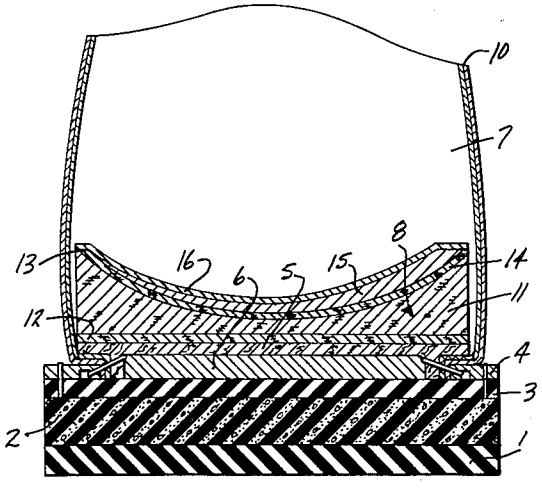


Fig. 3



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Fig. 4

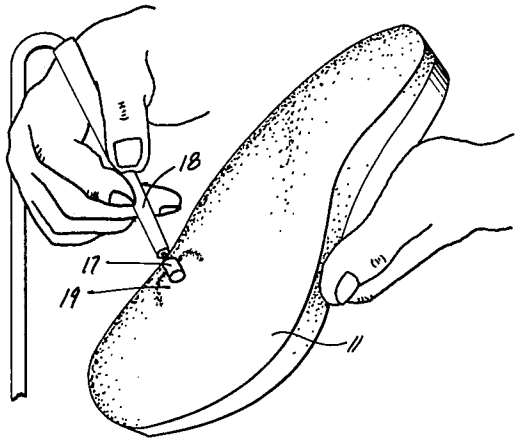


Fig. 5

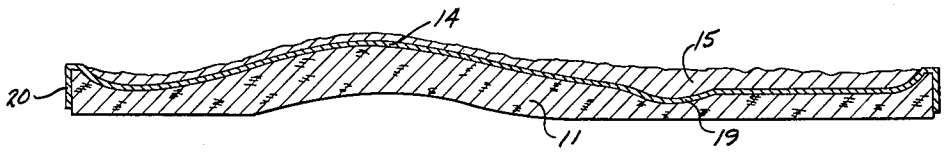
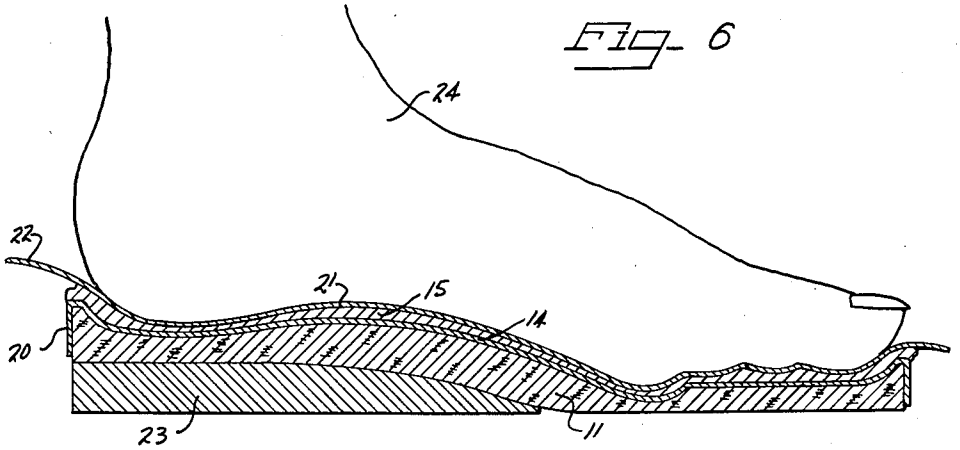


Fig. 6



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Fig. 7

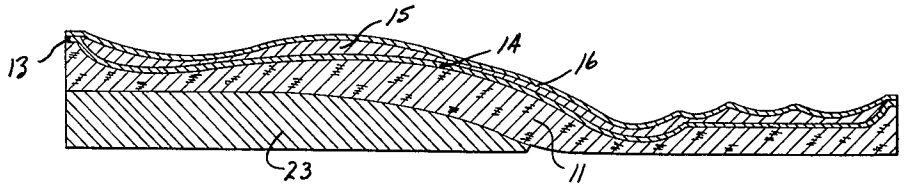


Fig. 8

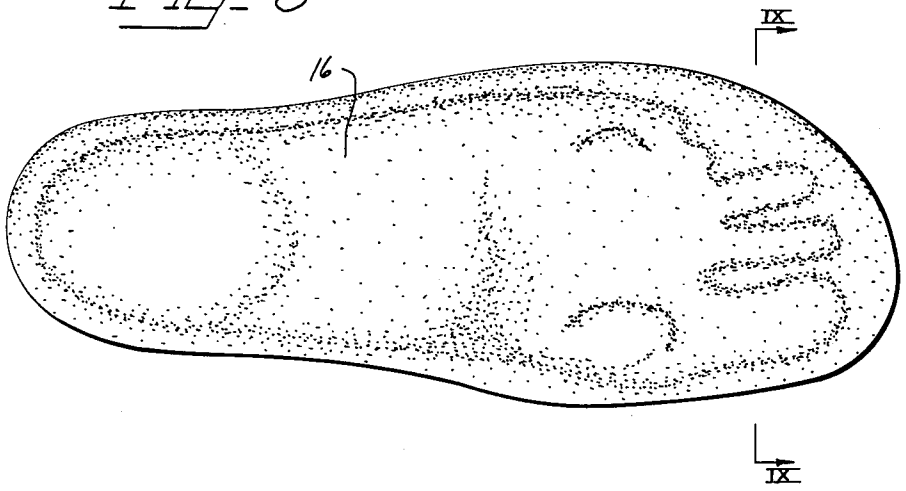
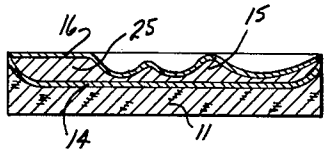


Fig. 9



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3,021,846

ORTHOPEDIC ARTICLE OF FOOTWEAR

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Original application Nov. 13, 1957, Ser. No. 696,274, now Patent No. 2,917,757, dated Dec. 22, 1959. Divided and this application Sept. 11, 1959, Ser. No. 839,406
5 Claims. (Cl. 128—595)

This invention relates to improvements in an orthopedic article of footwear, the invention being highly desirable for use by a chiropodist or other foot specialist in the comfortable and proper fitting of feet afflicted, deformed, partially amputated, or having some other temporary or permanent affliction, the article of footwear being individually fitted to a particular foot by the specialist at the time of purchase, although the invention may have other uses and purposes as will be apparent to one skilled in the art.

This application is a division of my copending application entitled "Method of Fitting an Orthopedic Article of Footwear" filed November 13, 1957, Serial No. 696,274, issued December 22, 1959, Patent No. 2,917,757.

In the past, where a patient had a deformed, afflicted, partially amputated, or otherwise impaired foot, it was customary to have shoes made to order or specially built to acquire a proper fit for that particular foot. Such, of course, was a highly and sometimes prohibitively expensive procedure, frequently resulting in a patient utilizing a more economical pair of footwear, suffering discomfort, aggravating the affliction, or causing the patient to walk in an awkward or unnatural manner. In most cases, where specially designed shoes were utilized, it was frequently necessary to make a complete cast of the patient's foot, and then form a last from that cast and build the shoe around that last. In no instance of which I am aware was an orthopedic shoe provided in which a portion of the shoe could be initially shaped, and then utilized as a mold pan for an impression which remained in the portion after it was replaced in the shoe.

The instant invention seeks to overcome the foregoing disadvantages in the provision of an economical orthopedic shoe capable of being fitted to an individual foot contemporaneously with the time of purchase.

Also an object of this invention is the provision of an orthopedic shoe or the like with a removable insert or inlay made of material that may be readily carved, fashioned, or sculptured to intimately fit an individual foot.

A further object of the invention is the provision of an orthopedic shoe or the like having a removable insert with a relatively high bounding edge, whereby that insert itself may be utilized as a molding pan to take an impression of a particular foot in some moldable material which thereafter remains in the inlay when it is replaced in the shoe.

It is also an object of this invention to provide a relatively thick removable inlay in an orthopedic shoe or the like, with the upper of the shoe being built higher than is customary in order to give the appearance of the ordinary dress shoe, the insert being usable as a pan in which to mold impression material which remains on the insert after it is replaced in the shoe.

Still another object of the instant invention resides in the provision of an orthopedic shoe or the like having an upper slightly higher than usual to accommodate an insert with molded impression material thereon, the upper being lower at the top on the outer side than on the inner side, to better accommodate the outer ankle bone.

While some of the more salient features, characteristics and advantages of the instant invention have been above

pointed out, others will be apparent from the following disclosures, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a side elevation of a shoe embodying principles of the instant invention;

FIG. 2 is an enlarged transverse vertical sectional view, taken substantially as indicated by the line II—II of FIG. 1, looking in the direction of the arrows;

FIG. 3 is also a transverse vertical sectional view, taken substantially as indicated by the line III—III of FIG. 1;

FIG. 4 is a fragmentary diagrammatic view illustrating a possible preliminary treatment of the insert or inlay removed from the shoe, prior to the taking of a foot impression;

FIG. 5 is a longitudinal vertical sectional view, taken substantially centrally through the removed inlay or insert, showing the same provided with material for the taking of an impression of the foot;

FIG. 6 is a fragmentary vertical sectional view taken longitudinally of the removed insert or inlay and indicating the manner in which the impression of the foot may be taken;

FIG. 7 is a longitudinal vertical section through the completed insert or inlay after it has been conformed to the patient's foot;

FIG. 8 is a top plan view of the structure of FIG. 7; and

FIG. 9 is a transverse vertical sectional view taken substantially as indicated by the line IX—IX of FIG. 8, looking in the direction of the arrows.

As shown on the drawings:

The illustrated embodiment of the instant invention is a shoe or similar article of footwear, particularly designed for sale by a chiropodist or other foot specialist, and the shoe is intimately fitted to a particular foot contemporaneously with the purchase of the shoe. The shoe is not designed for general sale in a shoe store, but is one that may be altered contemporaneously with the purchase thereof by a skilled operator, such as a chiropodist or foot specialist, whereby the purchaser has a proper fit regardless of the afflictions or deformity of his particular foot, and need not go to the expense and delay of having a specially built pair of shoes made for him.

The shoe itself has the appearance of an ordinary dress shoe of the conventional type, but there is sufficient difference in the construction of the shoe to permit the individual fitting of the shoe to a particular foot. After the shoe has been properly fitted to an individual foot, the wearer may use it without embarrassment, since it would require expert inspection to determine that the shoe was specially fitted and orthopedic in character.

Conditions for which the instant invention is indicated include the following: foot strain, hallux valgus, enlarged sesamoids, dropped metatarsal heads, arthritic or enlarged joints, tailor's bunion, longitudinal arch weakness, corns, calluses, excrescences on plantar surface, heel spur, forefoot and metatarsal imbalances, pes cavus, leg shortage, partial amputations, etc.

The illustrated embodiment of the instant invention is a shoe of the low-cut or oxford type, and comprises a laminated outer sole made of any suitable material, but in the illustrated instance, the outer sole consists of a bottom tap 1 which may be crepe rubber or the like, an elevating tap 2 in the rear portion to elevate the heel, and which may be of sponge rubber or other suitable material, and an inner or upper tap 3 of solid sheet rubber, leather, or the like. A welt 4 may be secured to the outer sole by stitching in a known manner, and this welt is also stitched to a structural insole 5 disposed over the usual filler 6. An upper 7 is secured in position by the same

seam that joins the welt with the structural insole. Outside of a change in the upper to be later described, the shoe so far described is of known construction, and other known ways of connecting the outer sole and the upper may equally as well be utilized.

Inside the shoe is a removable insert or inlay, generally indicated by numeral **8**, and which functions as the insole and is thicker than the ordinary structural insole consisting of a single thin sheet of material utilized in commonly known shoes or the like. The inlay may be made extra thick for fitting purposes, if so desired, and in that event the shoe upper **7** is made additionally higher than usual along the sides and around the toe portion thereof, so as to accommodate the thicker inlay and still have the shoe present the appearance of a commonly seen shoe to the ordinary observer. In order to better fit the foot, and particularly to accommodate the outer ankle bone of a user in a comfortable manner, the upper is preferably cut lower at the top on the outer side of the ankle region than on the inner side, as indicated by numeral **10**. By way of example, the upper may be as much as ⅜ of an inch lower on the outer side than on the inner side so that the outer ankle bone may freely extend over the upper without discomfort.

In order to acquire a properly sized upper to accommodate the inlay **8**, particularly if the same is thick, the shoe is preferably lasted around the inlay during the construction of the shoe. In other words, the inlay is initially made a part of the last, in effect, and the shoe built entirely around it.

The inlay **8** may be made of any suitable material that can readily be carved, sculptured, or otherwise fashioned by the use of easily manipulatable abrasive or cutting tools. One satisfactory substance for the inlay is cork, and the inlay may be made of compressed ground cork and cement, latex, plastic, or equivalent material preferably molded in one piece.

As initially provided with the shoe, the inlay includes a thick body portion **11**, and this body portion may or may not be provided with a denser under layer **12**, which is, of course, much thinner than the body portion **11** of the inlay. In many cases the body portion will be partially removed during the fitting of the insole to a particular foot, and less frequently, the under layer **12** may be ground or cut away in certain locations dependent upon the particular foot being fitted.

Preferably, the insert is so shaped as to have a relatively high bounding edge entirely therearound, as indicated at **13**. This enables the inlay to be used as a mold pan when an impression is taken of the foot. Prior to utilizing the inlay as a mold pan, it is preferable to cement a sheet of aluminum foil or equivalent material **14** to the upper surface of the inlay, such sheet being smooth so as to precisely follow the contours in the upper face of the inlay. This sheet functions as a non-absorbent base for a moldable substance or compound **15**, which when set, firmly attaches itself to the surface of the sheet **14**.

In FIGS. 2 and 3, a finished or fitted insert or inlay is illustrated, and it will be seen that the inlay contains a quantity of set or hardened compound **15** in keeping with the particular foot to which the device was fitted. After a proper fit is established, it is preferable to provide a thin smooth cover layer **16** of light leather, monk's cloth, or other equivalent material which may be cemented to the shaped inlay, and is preferably intimately fitted so that it accurately follows all the contours on the upper face of the inlay.

As stated above, the insert or inlay **8** is not cemented or otherwise secured within the shoe, as it is provided with the shoe initially, and it is not necessary to cement or secure that inlay within the shoe after it has been provided with the compound **15** and otherwise shaped for intimately fitting a particular foot. It is sufficient to merely place the completed inlay in the shoe, because it fits the shoe so finely by virtue of the shoe being lasted therearound, that it will not change shape or position during use. This provides the advantage of being able to remove the inlay from the shoe at any time desired, and thus effect a reshaping of the inlay as may be desired if the foot affliction is improving by virtue of use of the inlay.

While the method of fitting the shoe to the individual foot of a patient is fully described and claimed in my aforesaid copending application, reference to that method is made herein in order to better present and make more understandable the instant invention and the advantages derived from it. The method may vary through a wide range of individual steps, and a satisfactory and usually preferred course of procedure will be described. It will be apparent to one skilled in the art that certain steps so described will not always be necessary, and in certain instances additional steps might be required, the procedure being dependent to a reasonable extent in regard to specific operations indicated by the individual foot being fitted.

The particular inlay is first removed from the article of footwear, and the patient's bare foot is placed on that inlay to make certain that the size and width of the inlay are correct. The inlay may then be marked with chalk or equivalent material to denote points where allowance is to be made for bony prominences on the foot, such as enlarged sesamoids, tailor's bunion, dropped metatarsal heads, hallux valgus, hammer toes, etc., and for other afflictions where pressure elimination is required.

Now if any such marks were made on the inlay, pockets may then be ground out of the inlay at the points marked, as seen in FIG. 4, by utilizing a suitable burr **17** carried on the end of an office drill **18**, or with other equivalent apparatus. The device may be held in the hand of the operator as shown, during this operation, and should the cut away portion **19** be larger than originally intended, the molding compound to be later described will fill it in so that ultimately the prominence or other affliction of the foot will be properly fitted. In FIG. 4, I have illustrated the inlay as comprising only one piece **11**, without the aforesaid denser under layer **12**, merely to indicate that that particular under layer is not necessary unless it is desired for some purpose.

Now with reference to FIG. 5, it will be seen that after a recess such as **19**, or more of them, is ground in the inlay, the aforesaid sheet of aluminum foil or equivalent material is preferably cemented to the upper surface of the inlay and formed intimately thereto by the fingers of the operator. This sheet **14** may be trimmed with scissors or the like to allow an overlap **20** entirely around the inlay, and a satisfactory length for this overlap is approximately ½ inch. As shown in FIG. 5, the overlap is preferably pressed down tight against the bounding edge of the inlay.

The molding compound is then prepared and this may satisfactorily be a mixture of cork flour or ground cork, wood flour or fine sawdust, and ground rubber, although other mixtures as will be apparent to one skilled in the art might equally as well be used. This mixture is then mixed in any suitable vessel with a quantity of liquid latex or equivalent material until the compound has a relatively stiff but spreadable consistency, substantially that of peanut butter. Using a spatula or equivalent tool, the mixed compound is then applied to the inlay on top of the sheet **14** to provide the aforesaid applied compound **15**. In applying the mixed compound, it is preferable to apply a little at a time, smoothing it away from the center so that the outside edge **13** of the inlay acts as a scraper. Usually 3/16 of an inch is sufficient for the forward part of the inlay, and a thickness of approximately ⅛ inch for

the heel and arch part, but such thicknesses may obviously be varied to suit the requirements of the particular foot. Corrections may be built up by adding more of the compound at specific locations, and it is well to apply a little extra compound at the point coinciding with the ridge of the metatarsophalangeal joints.

Next, the soft but spread compound is preferably covered with a relatively thin and impervious plastic film or sheet as indicated at 21 in FIG. 6, leaving ample overlap as indicated at 22. The inlay is next placed upon the floor, with the heel portion thereof resting upon a temporary heel block 23, and with the patient seated and the leg perpendicular to the floor, the foot is carefully placed on the inlay in the position the foot will assume in the finished article of footwear, as indicated in FIG. 6, the foot being indicated at 24. After making sure that the heel is in correct position, pressure is exerted downwardly on the patient's knee to seat the heel of the foot in the heel cup of the inlay. The patient is then assisted to a standing position, keeping the weight mostly on the other foot, and the patient is then caused to simulate a walking step by flexing his knees, without raising the heel of the foot under treatment from the inlay. Now with the patient standing upright, pressure is exerted firmly in a downward direction on the toes and forepart of the foot so as to properly position each toe on the inlay.

With the patient reseated, and the foot still on the inlay, inspection may be made to determine that the inlay properly conforms to the foot, and any smoothing-out adjustments that may appear necessary may then be made, with particular regard to the distal ends of the toes, so as to permit the toes to elongate. The foot may then be removed, the sheet 22 elevated, and a spatula run around the edge of the inlay to trim off the excess mold compound.

The inlay for the other foot may then be prepared in similar manner, and after both molds or inlays are made, the sheets 22 are carefully removed and the inlays put aside to dry.

After approximately 24 hours, the molds will have dried to quite an extent, but will still be pliable, and when the patient returns, substantially 24 hours after the first visit, the marginal portion 20 of the foil sheet is trimmed off so that the sheet is flush with the edge 13 of the inlay as seen in FIG. 7. The two molds may then be covered with a sheet 22, placed in a pair of shoes or the like, and the patient may walk around with them in use for fifteen to twenty minutes, to create perfectly balanced molds. At this time, if necessary, the sheets 22 may be removed and minor adjustments made to each mold.

When the molds fit the feet exactly, the sheets 22 are removed, and the cover 16 cemented over the upper face of each mold. After this cement, which is preferably quick-drying, has set, the cover 16 may be trimmed to be flush with the upper edge of the inlay. The inlays may then be placed back in the shoes, and the patient may walk in them for a time to make the cover 16 conform precisely to the contours and indentations of the mold.

The molds may be then put aside for complete hardening, and should then be ready for continuous use, although some operators may prefer a further inspection. It should also be noted that some specialists may apply the cover 16 immediately rather than utilize the sheet 22, but such does not give the freedom of adjusting the mold or inlay during its preparation, as the process described above does.

Of course, when the mold is placed within the shoe or other article of footwear, the temporary heel block 23 is eliminated.

Now looking at FIGS. 8 and 9, I have illustrated a completed mold which allows for dropped first and fifth metatarsal heads and also for an amputation of the fourth and fifth toes. With reference particularly to FIG. 9, it will be noted that the compound 15 is elevated as at 25 in front of the fourth and fifth toe stubs.

In the case of a sandal or similar article of footwear, the inlay 11 is preferably built into the sandal as a part thereof. Accordingly, it is then preferable to turn back the straps of the sandal and buckle them underneath the outer sole, if possible, or in some other manner retain them turned away from the inlay so that the same is free to function as a mold pan. The same general operation of conforming each inlay to the foot of the wearer is followed as above described, with the exception that the foil layer is preferably eliminated, and the mold compound is applied directly to the upper face of the inlay 11. Also, during the initial impression into the soft mold compound, the straps are preferably buckled around the patient's foot.

With the instant invention it will be especially noted that if the patient does not have a permanent disability or deformity of the foot, but does have an affliction that will respond to treatment and gradually improve, the inlay may be adjusted to compensate for the improvement at substantially any desired time. More mold compound may be added and fashioned to the insole to compensate for a reduction in size of the affliction, and various other adjustments made so that as the affliction improves, it is not necessary to purchase new articles of footwear periodically, but the first pair may be utilized until they are worn out.

From the foregoing, it is apparent that I have provided an orthopedic article of footwear that is extremely economical in comparison with shoes made to order for special purposes, and which may be readily and easily fitted to any particular individual foot substantially regardless of the condition of the foot, and which gives the appearance of the commonly seen dress shoe when worn. Obviously, the instant invention enables the patient to walk in as close to a natural manner as possible, and at the same time provides the comfort and benefit of a correct fitting article of footwear. It will, of course, be understood that the instant invention is not limited to a shoe, but may be utilized in substantially any article of footwear such as sandals, slippers, high top shoes or boots, sport shoes, etc. And herein and in the appended claims the term "shoe" is to be deemed an all-inclusive term of various types of footwear.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. An orthopedic shoe of the oxford type including an outer sole and an upper connected to said sole, a thick orthopedic inlay including a material on its upper face molded to conform it to an individual foot and serving as the insole for the shoe, said upper being higher than the standard for the particular size of shoe so as to accommodate the foot above said thick insole inlay, and said upper being lower on the outer side than on the inner side to accommodate the outer ankle bone of said foot.

2. An orthopedic shoe including an outer sole, an upper connected to said sole, an inlay freely disposed in said shoe, said inlay having a high bounding edge to enable it to function initially as a moulding pan, and a set compound in and secured to said inlay and conformed to an individual foot, said inlay and said set compound as a unit serving as the insole of the shoe.

3. An orthopedic shoe as defined in claim 2, wherein a thin sheet of non-absorbent material is secured to the upper face of said inlay under said set compound.

4. An orthopedic shoe as defined in claim 2, wherein said inlay comprises compressed ground cork.

5. An orthopedic shoe as defined in claim 2 wherein

said inlay comprises ground cork, and said set compound comprises a hardened mass of cork flour, wood flour and latex.

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