

July 16, 1935.

H. GREENBERG

2,008,207

FOOT SUPPORT

Filed Aug. 3, 1934

3 Sheets-Sheet 1

Fig. 5.

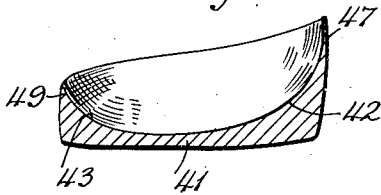


Fig. 8.

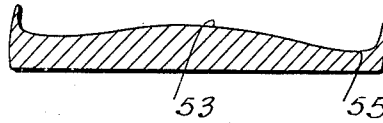


Fig. 6.

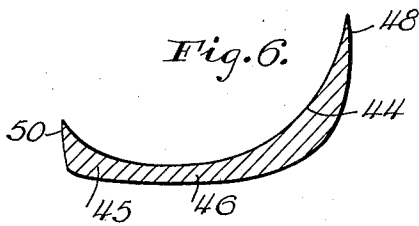


Fig. 9.

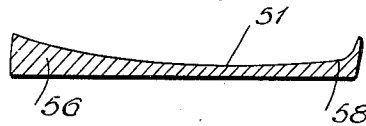


Fig. 7.

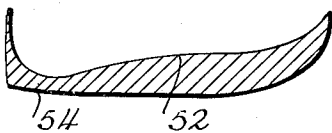


Fig. 10.

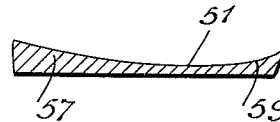
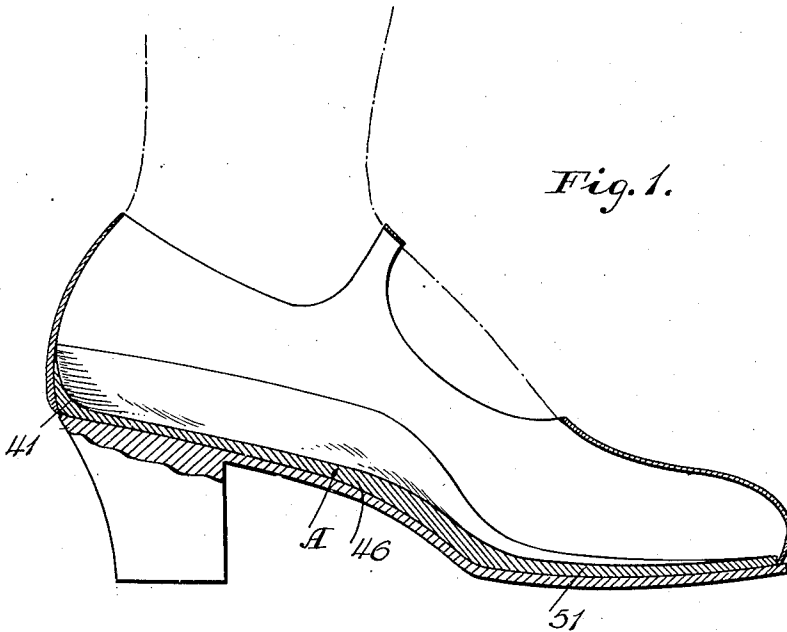


Fig. 1.



INVENTOR
HARRY GREENBERG
BY *Richards & Green*
ATTORNEYS

July 16, 1935.

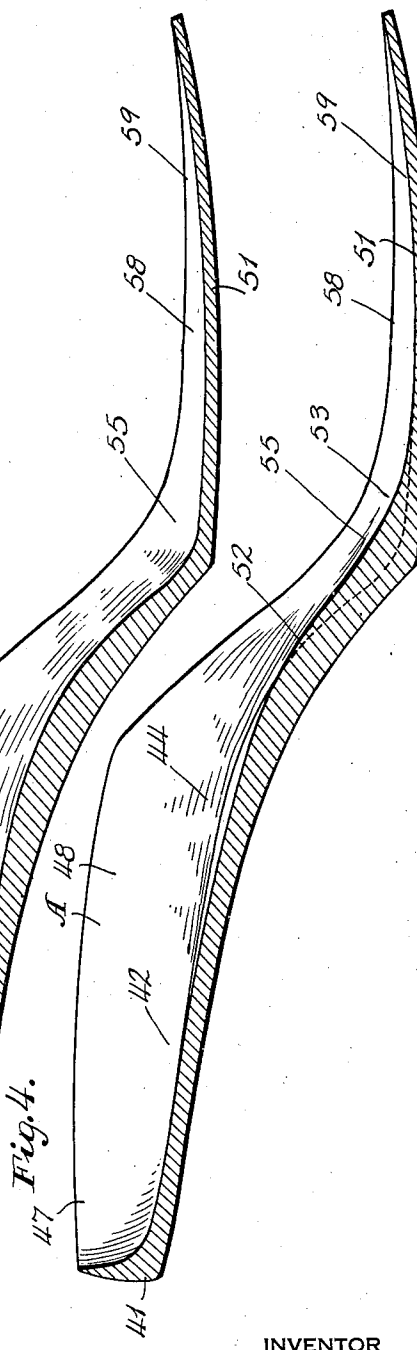
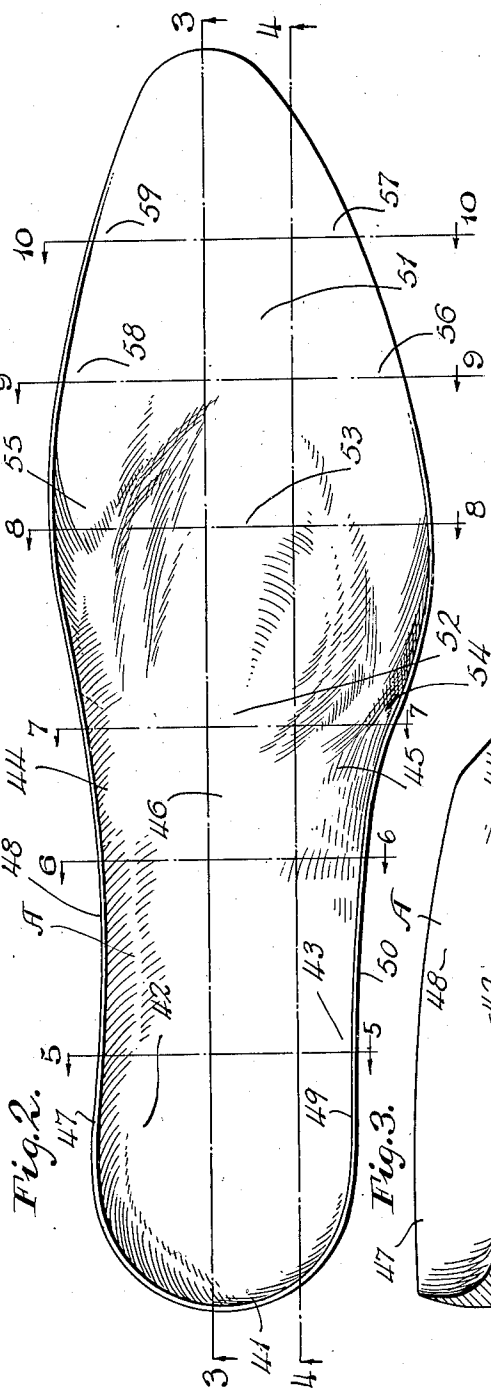
H. GREENBERG

2,008,207

FOOT SUPPORT

Filed Aug. 3, 1934

3 Sheets-Sheet 2



INVENTOR
HARRY GREENBERG
BY *Richards & Geier*
ATTORNEYS

July 16, 1935.

H. GREENBERG

2,008,207

FOOT SUPPORT

Filed Aug. 3, 1934

3 Sheets-Sheet 3

Fig. 11.

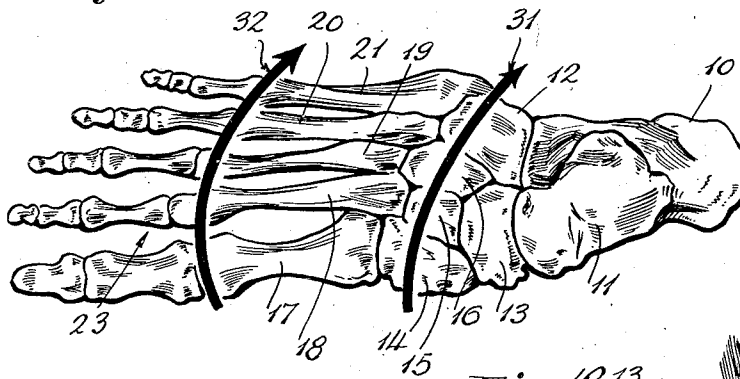


Fig. 12.

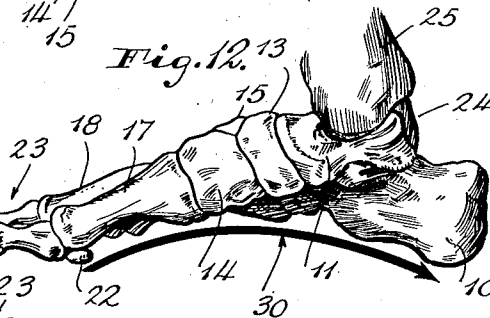


Fig. 13.

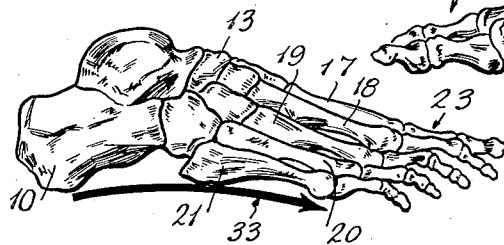
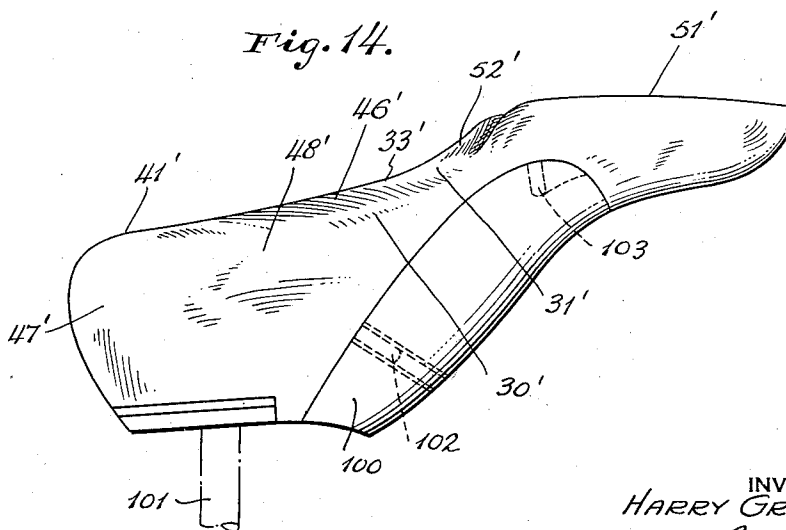


Fig. 14.



INVENTOR
HARRY GREENBERG
BY *Richard & Geier*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,008,207

FOOT SUPPORT

Harry Greenberg, New York, N. Y., assignor of
one-fourth to Harry Palter and one-fourth to
George J. Fitzgerald, both of Brooklyn, N. Y.

Application August 3, 1934, Serial No. 738,255

5 Claims. (Cl. 36—71)

The present invention relates to footwear and it particularly relates to a new and improved shoe construction or foot support pads which are adapted to support the foot in proper position.

5 The foot of man was originally designed and made to accommodate itself to natural turf and to relatively soft springy ground. It was not developed for walking on flat hard surfaces or in shoes with flat soles, which are pressed against
10 flat hard surfaces, pavements and so forth.

When the foot is utilized on flat hard surfaces or in shoes of the customary design, the muscles holding the arches in the foot become weakened and strained and permit gradual break-down, and flattening of such arches, with the result that the
15 foot becomes more or less deformed and as a result the health and comfort of the wearer is decreased.

The various bones and other elements of the
20 foot tend to become displaced, with the result that certain portions of the foot are under-strained, while other portions are overstrained and withstand excessive pressures. These excessive pressures on some parts of the foot cause the
25 formation of corns, callouses and other deformities.

An object of the present invention is to provide a shoe construction, or a foot support which may be inserted within shoes of present design,
30 which will support the foot in the proper manner and cause it to be equally stressed and to properly receive the weight of the body.

Another object is to provide a shoe construction, or insert for shoes of usual design in which the various muscles, ligaments and tendons of the foot and the arches thereof will be supported and prevented from overstraining and in which the foot will be prevented from spreading with resultant deformation and permanent injury.
35

Another object of the present invention is to provide a shoe construction, or an insert for shoes of ordinary design, in which the foot will be supported and held in such a way that it will be stressed substantially the same as if the normal undeformed foot without footwear were to be positioned on turf under the normal weight of the body.
40

Other objects will appear during the course of the following specification.

50 In accomplishing the above objects it has been found that either the entire shoe may be so constructed, or an insert may be provided in shoes of slightly greater depth which will support and turn certain portions of the foot in certain directions, with the result that the foot will be main-
55

tained free of injury, and in proper position, even though it be utilized for walking on hard pavements and over cobbles and for other purposes causing relatively high stress and strain.

Among the particular features of the present invention are the provision of a foot support which will so elevate and position the various arches, muscles and so forth, of the sole and bottom of the foot of the wearer that they will be correctly located in respect to each other and so that they will be maintained in their position while walking without strain and without deformity.
10

The above and other objects will appear more clearly from the following detailed description, when taken in connection with the accompanying drawings, which illustrate a preferred embodiment of the inventive idea.
15

In the drawings:

Fig. 1 is a side view of one embodiment of the invention showing the insert in a shoe of normal construction with the foot of the wearer diagrammatically illustrated.
20

Fig. 2 is a top view of the insert.

Fig. 3 is a side sectional view upon the line 25 3—3 of Fig. 2.

Fig. 4 is an approximate side sectional view upon the line 4—4 of Fig. 2.

Figs. 5, 6, 7, 8, 9, and 10 are transverse sectional views upon the lines 5—5, 6—6, 7—7, 8—8, 9—9, and 10—10 of Fig. 2.
30

Fig. 11 is a top view of the foot skeleton illustrating the various bones thereof and the approximate anatomy view thereof.

Fig. 12 is an inside view of Fig. 11.
35

Fig. 13 is an outside view of Fig. 11.

Fig. 14 is a side view of the last, which may be utilized for forming the insert of Figs. 1 to 10.

To aid understanding of the present invention it is thought best to describe the bony structure of the foot. From an understanding of said bony structure the purpose and exact function of the various elements of the foot support of the present application will be immediately apparent.
40

As shown in Figs. 11, 12 and 13, the foot is composed of some 26 bones, which form four arches or four natural bridges to enable the foot to support and sustain the body weight.
45

The bones are the os calcis bone 10, the astragalus 11, the cuboid bone 12, the scaphoid bone 13, the internal middle and external cuneiform bones 14, 15 and 16, respectively, the first, second, third, fourth and fifth metatarsal bones 17, 18, 19, 20 and 21 respectively, the sesamoid bone 22, (see Fig. 12) and the various phalangeal bones 23.
50
55

The fibula bone 24 and the tibia bone 25 are best shown in Fig. 12.

The inner longitudinal arch is indicated by the arrow 30 in Fig. 12, while the rear transverse arch and the anterior transverse arch are respectively indicated by the arrows 31 and 32 on Fig. 11. The exterior longitudinal arch is indicated by the arrow 33 in Fig. 13.

It will be understood, of course, that the various bones described are suitably connected by ligaments, tendons and muscles and serve to support the various arches. The muscles, ligaments and tendons hold up these arches and when the foot sustains the body weight they take up the downward stresses, tending to deform or depress the arch. These stresses are particularly great when the foot is placed on a flat hard surface, such as the usual city pavement, or in a shoe with a flat sole of usual design.

The inner longitudinal arch 30 is usually the weakest point of the foot because it is the highest and because the muscles thereof must stand the greatest stress during usage. The outer longitudinal arch stands considerable stress inasmuch as a considerable portion of the weight of the body must be borne at the outer side of the foot. The anterior transverse arch or the metatarsal arch which forms a bridge from the fifth toe to the great toe joint and must be properly supported to enable functioning of the various toes during actuation of the foot.

It is to the supporting of these various arches in their proper position so that they will take up the stress placed on them by the body when walking over hard surfaces that the present invention is particularly directed.

Normally, under city usage, the unsupported foot tends to flatten and the arches tend to break down with weakening the muscles, with the result that the foot spreads in all directions and does not properly function.

The shoe form or foot support to be now described and shown in Figs. 1 to 10 is particularly advantageous in supporting these various arches so that the foot will function properly at all times, and particularly in giving the effect of supporting the foot as if it were walking upon natural turf.

It has been found, when the foot inclines to be weak and the muscles and arches tend to breakdown, that the heel bone or os calcis bone 10 instead of being tilted toward the outside, will tilt toward the inside, causing pronation, and will not permit the foot to attain an equal balance. The heel portion 41 of the shoe form A, see particularly Figs. 1 to 5, is of such construction that it tends to throw the os calcis or heel bone 10 toward the outside, this being achieved by making the inside portion 42 in the cup-shaped heel 41 of substantially greater elevation than the outside portion 43.

The relatively high inside elevation also continues into the arch portion of the form A as designated at 46, where it will be noted in Fig. 6 that the inner curve 44 is substantially more elevated than the outside curve 45. This will have the effect of elevating the inner longitudinal arch indicated at 30 in Fig. 12 and will tend to throw the foot to a greater degree on the outer longitudinal arch indicated by the arrow 33 in Fig. 13, as has been found to be most desirable.

It will be noted in both Figs. 5 and 6 that the upwardly extending inside edges 47 and 48 substantially support the side of the foot as do

also the outside edges 49 and 50 to a lesser extent.

As we pass the arch portion 46 and approach the sole portion 51 of the form there is a longitudinally extending ridge shown at 52 on Fig. 7 and 53 on Fig. 8 which will support the rear transverse arch. This arch extends obliquely from where the section 1 of Fig. 8 cuts the inside edge of the form to where the section of Fig. 7 cuts the outside of the form, the extreme valleys being indicated at 54 in Fig. 7 and at 55 in Fig. 8.

As a result the rear longitudinal arch will be supported obliquely of the section lines 6 and 7 indicated upon Fig. 2 and will be elevated and turned to cooperate with the turned heel.

In the positioning of the foot as described by the form A there will be a tendency to throw excessive weight on the fifth or little toe at the outside of the foot. To overcome this tendency, the outside portion of the form is elevated as the toe of the shoe is approached, as indicated at 56 in Fig. 9 and 57 in Fig. 10. As a result the inside toes will rest in a concavity or at a relatively lower height as indicated at 58 in Fig. 9 and 59 in Fig. 10. This location of the front portion or toes of the foot by the relative elevations 56 and 57 in respect to 58 and 59 shown in Figs. 9 and 10 has the effect of properly supporting the anterior transverse arch indicated at 32 in Fig. 11.

By supporting the foot, as described, the weight of the body will substantially be along the center line of the foot and the arches 30, 31, 32 and 33 will all function properly in supporting the weight of the body without undue stress or strain upon the accompanying muscles.

The toe portion of the foot 51 will be best supported so that it may function as a power element, while the weight sustaining portion of the shoe, principally the arches 30 and 33, will be properly supported so as to sustain the weight of the body.

A special feature of the present invention resides in the fact that the entire foot is properly supported without any special attempt being made to support merely one arch or portion of the foot without regard to the other portions of the foot. This is the usual difficulty with most foot appliances upon the market which devote their attention to correcting one part of the foot without tending to support the entire foot which results in increasing the strain on the remainder or various arches and supporting elements.

By utilizing the form as described the causes of the growth of bunions, corns and other foot deformities are greatly eliminated, since they largely are caused by excessive pressure unequally distributed over the foot and the reaction of the flesh to overcome these uneven stresses.

Although the form of Figs. 1 to 10 may be made integral with the shoe, according to the present methods of shoe manufacture it is found most convenient to make a special form to be inserted in the shoe. A shoe of substantially the same size may be utilized except that such shoe is made of slightly greater depth without any change in width, and this additional depth is designed to accommodate the form A.

In manufacturing, the form A may be made of a large variety of materials. One combination which has been found satisfactory is to provide a facing or lining of pigskin together with a body of cork. Other skins may be utilized as liners, as may also be other vulcanized cloth

and other porous or light weight fabric, to form the body A.

Although the form A may be manufactured in a large number of ways it has been found satisfactory to apply a pigskin covering to wooden forms made and shaped as indicated in Figs. 2 to 10 and as shown in Fig. 14, to which the pigskin or other fabric liner is tacked or attached. Then the cork may be conveniently built up thereon to form the remainder of the mold. If desired then the entire shoe may be built up around the combined last or mold or the shoe may be built up about a standard last having slightly greater depth to accommodate the mold or form of Figs. 1 to 10.

The form of Fig. 14 approximately takes the shape of the normal foot and the various surfaces thereof which correspond to the arches of Figs. 11 and 12 and to the contacting surfaces of the form of Figs. 1 to 10 are designated by the same numerals prime. The heel portion is designated 41' and the toe portion is designated 51'. The form of Fig. 14 is provided with a removable section 100 and with connecting pins 101, 102 and 103, which enable it to be utilized in forming the mold of Figs. 1 to 10.

The maximum depth of the mold or form is preferably not over three-eighths of an inch and in length and width it is the same as the shoe size to which it is to be applied.

The mold may be used broadly for men's, women's, and children's shoes and it may be made in various shapes for different styles of shoe, either those having wide toes, narrow toes, low heels or high heels. In all cases although the external shape of the mold may be different the contours shown in the form A, Figs. 1 to 10 are always present.

It will be noted in the shoe mold of the present invention that there are elevations both along the inside and the outside edges of the foot, the outside elevation being indicated by the successive numerals 43, 45 and 54 on Figs. 5, 6 and 7, and the inside elevation being indicated by the successive numerals 42 and 44 on Figs. 5 and 6.

The inner elevation 43—45, see Figs. 5 and 6, is somewhat greater than the outside elevation as indicated by numerals 42 and 44 in Figs. 5 and 6. This inside elevation is very important since it serves to support the outer longitudinal arch 33, giving the cuboid stream which extends from the os calcis through the cuboid to the head of the fifth metatarsal bone. This elevation serves to take the weight off the inner arch and assures a proper distribution of the weight between the inner and outer longitudinal arches.

It will be noted as a result of these elevations 43—45—54 and 42—44, the heel portion is cup-shaped and the vertical axis of the cup is inclined outwardly as it extends upwardly from the axis of the body.

The portions 47 and 48 of Figs. 4 and 5 along the inside of the foot extend upwardly sufficiently to cover the lower curvature of the foot and terminate where the side surface of the foot becomes substantially vertical and flattens out.

The outside elevation 43—44 and the inside elevation 42—44 gradually decline until they terminate in the depressions 54 and 55 indicated in Figs. 7 and 8. By arranging the mold as shown in the present invention not only is a proper support given to the foot for a forward and backward rocking movement, but also for any lateral rocking movement to which it may be subjected.

What is claimed is:

1. In combination with a shoe, a foot conforming interior bottom therefor having concaved supporting portions for the heel and forepart of the foot, the concaved supporting portion at the heel being more elevated at the inside than at the outside to roll the heel outwardly and the supporting portion at the forepart being more elevated at the outside than at the inside to roll the forepart of the foot inwardly, and an outside elevation to support the outside longitudinal arch, and a medial elevation to support the metatarsal arch.

2. In combination with a shoe, a foot conforming interior bottom therefor having concaved supporting portions for the heel and forepart of the foot, the concaved supporting portion at the heel being more elevated at the inside than at the outside to roll the heel outwardly and the supporting portion at the forepart being more elevated at the outside than at the inside to roll the forepart of the foot inwardly, and an outside elevation to support the outer longitudinal arch.

3. In combination with a shoe, a foot conforming interior bottom therefor having concaved supporting portions for the heel and forepart of the foot, the concaved supporting portion at the heel being more elevated at the inside than at the outside to roll the heel outwardly and the supporting portion at the forepart being more elevated at the outside than at the inside to roll the forepart of the foot inwardly, and a medial elevation to support the metatarsal arch.

4. A foot conforming insert for shoes having concaved supporting portions for the heel and forepart of the foot, the concaved supporting portion at the heel being more elevated at the inside than at the outside to roll the heel outwardly and the supporting portion at the forepart being more elevated at the outside than at the inside to roll the forepart of the foot inwardly, an outside elevation to support the outside longitudinal arch, and a medial elevation to support the metatarsal arch.

5. In combination with a shoe having an insole, a molded foot conforming insert having the outline of said insole formed of a covered cork material, said insert having concaved supporting portions for the heel and forepart of the foot, the concaved supporting portion at the heel being more elevated at the inside than at the outside to roll the heel outwardly and the supporting portion at the forepart being more elevated at the outside than at the inside to roll the forepart of the foot inwardly, an outside elevation to support the outside longitudinal arch, and a medial elevation to support the metatarsal arch.

HARRY GREENBERG.