Oct. 19, 1954 H. N. LURIE 2,691,832

PLATFORM SHOE

Filed Sept. 7, 1951

Fig. 1

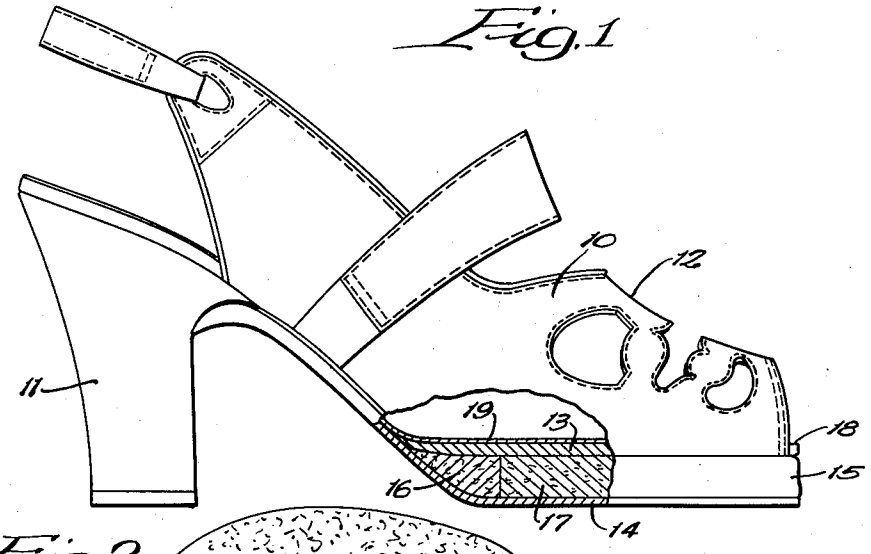



Fig. 2

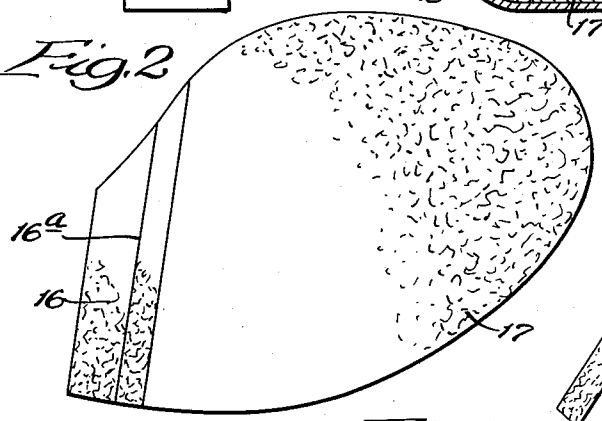



Fig. 5

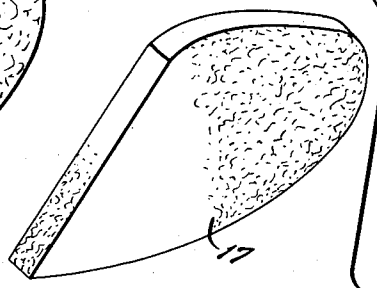



Fig. 3

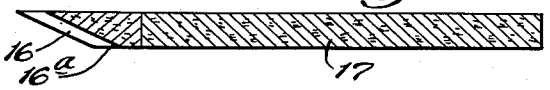
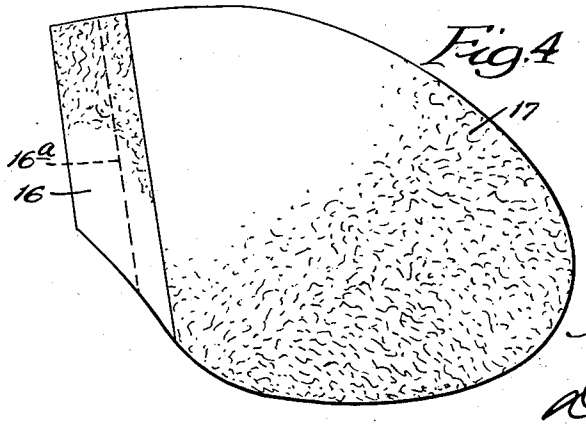
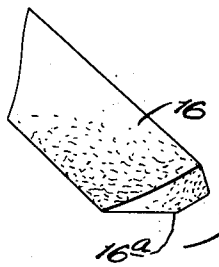



Fig. 4




INVENTOR:
Hillis N. Lurie,
BY
Dawson & Orme,
ATTORNEYS.

Patented Oct. 19, 1954

2,691,832

# UNITED STATES PATENT OFFICE

2,691,832

## PLATFORM SHOE

Hillis N. Lurie, Chicago, Ill.

Application September 7, 1951, Serial No. 245,558

4 Claims. (Cl. 36—8.5)

1

This invention relates to shoes, and is concerned particularly with a novel shoe construction adapted for incorporation in platform shoes which may embrace all types of footwear, including oxfords, dress shoes, hard-soled slippers, gymnasium shoes, etc.

My invention represents a novel solution of the problem inherent in designing shoes which reconcile the demands of fashion with foot comfort and proper weight distribution. While my invention is of the greatest importance in correcting the foot damage normally caused by fashionable shoes, it does not require any deviation from stylish lines and does not reveal by any external sign the fact that it is incorporated in the shoe.

While my invention is concerned, as I shall explain more fully hereafter, with the distribution of weight to the various parts of the human foot, and is particularly concerned with relieving the metatarsal heads from excessive concentrated weight and forward thrust, my invention is definitely not a metatarsal arch support and must not be confused with such supports, which are old in the art and known in almost infinite variety.

My invention does not involve any shifting of the relative positions of the metatarsal bones. A person whose metatarsal bones are malformed, or whose metatarsal arch is abnormal, does not, in wearing a shoe made according to my invention, experience any rearrangement of the bones of his foot; walking, however, is much easier for such a person when he wears a shoe incorporating my invention than when he wears a conventional shoe. This effect results from the effective redistribution of weight accomplished by my invention, rather than by any modification of the position of the metatarsal bones.

While my invention is extremely valuable in providing foot comfort for persons with malformed metatarsal bones, the benefits of my invention are by no means limited to persons with abnormal feet. Shoes made according to my invention will provide greatly improved walking, running, or standing comfort, as compared with ordinary shoes, for everyone, including persons whose feet are perfectly formed.

My invention is an improvement upon the platform shoe. Platform shoes, which are very popular as dress shoes, "wedgies," and loafers, and also as gymnasium shoes, slippers, etc.

Before describing the physical structure which characterizes my invention, I shall review briefly the conditions which make its use so desirable.

The metatarsal heads form a part of one of the four main joints in the human lower extremity,

2

this particular joint being known in anatomical terms as the metatarsal phalangeal articulations. Each of the five metatarsal bones forms a condyloid joint with its corresponding proximal phalanx bone, and the five joints operate together as a hinge during all movements of the leg and foot.

The axis of weight bearing is in the center of the heads of the metatarsal bones, and they normally support a sizeable part of the body weight even when one is standing still. During walking, of course, the metatarsal heads ordinarily carry nearly all the body weight during portions of each step.

The burden on the metatarsal heads is tremendously increased when the feet are encased in shoes having heels, since even a low heel places a very pronounced forward thrust on the metatarsal heads. Thus the effect, essentially, of heels is to impose on the metatarsal heads during standing a considerable part of the peak load that they are normally called upon to carry during a portion of each walking or running step.

The load on the metatarsal heads just described is a substantial strain even for normal feet wherein the five metatarsal phalangeal articulations are all in the same plane, so that the hinge can function smoothly. The strain, however, is enormously magnified when one of the metatarsal hinges is longer than the others—a type of bone malformation which is very common.

The behavior of such a foot, when walking barefoot or in ordinary shoes, is quite similar to the behavior of a door having two hinges in line and a third hinge inaccurately placed so that its axis of rotation is out of alignment with those of the other two hinges. As everyone knows, a door having such a mis-aligned hinge will not swing unless excessive force is applied, and then only by deforming the misplaced hinge.

Exactly the same phenomenon occurs, during walking, to a foot having an abnormally elongated metatarsal bone. The effect is to cause cramping or dislocation of skeletal bones operatively connected with the abnormal bone, and the effects are by no means local. It is not uncommon for pains in the small of the back and in the hip joints to be caused by mechanical displacement of one of the metatarsal phalangeal articulations.

My invention substantially eliminates foot troubles caused by overloading of the metatarsal heads by employing the principle of a lever of the second class to accomplish distribution of weight over a large area of the foot and to facilitate walking with the toe of the shoe as the principal fulcrum of movement, thus relieving

the metatarsal phalangeal articulations from the necessity for excessive hinge action.

The novel result of my invention is accomplished in a platform shoe by providing a cross-bar transversely of the foot, back of the metatarsal heads and between a substantially rigid insole and a conventional outsole. This transverse bar I form of any suitable material which is substantially rigid and considerably harder than the cork composition or rubber filler material which separates the insole and the outsole anterior of the cross-bar. The cross-bar may, if desired, be made of a harder composition substance, or it may be made of the same leather that forms the insole and the outsole. It is to be understood, of course, that in any event the cross-bar is integrally built into the platform of the shoe and is entirely invisible in the completed shoe.

With my invention, the cross-bar, the insole, and the toe of the shoe cooperate with the soft material between the insole and the outsole to provide a "wheelbarrow" action. The forepart of the foot is thus actually cradled within what is functionally a wheelbarrow, wherein the insole forms the body, the toe of the shoe the wheel, and the cross-bar the supporting uprights.

Thanks to this novel construction, the weight normally concentrated on the metatarsal heads is distributed over the whole forepart of the foot and is transmitted from the insole to the outsole primarily through the cross-bar and to a lesser extent through the portion of the soft separating material which lies immediately under the toe of the shoe. Similarly, the "wheelbarrow" support provided for the forepart of the foot by my invention minimizes hinge action of the metatarsal phalangeal articulations during ordinary walking and removes from the metatarsal heads substantially all of the forward thrust normally imposed upon them by the heels, the thrust being taken instead through the cross-bar which lies a short distance posterior to the metatarsal heads.

From the foregoing description of the principles which underlie my invention, it will be noted that the principal object of the invention is to provide in a platform-type shoe a shoe construction wherein a layer of relatively soft material interposed between a substantially rigid insole and the outsole and a transverse insert of relatively hard, rigid material, are employed in combination to provide for the forepart of the foot a support in the form of a lever of the second class, wherein the toe is the fulcrum, the metatarsal heads the load, and the transverse insert the source of the upward thrust.

A secondary object of my invention is to provide, in a dress shoe, a construction which relieves the metatarsal heads of a large part of the strain normally placed upon them without having any externally visible components to reveal that the shoe has orthopedic properties.

A further object of my invention is to provide a platform shoe having, as a built-in invisible characteristic, a "wheelbarrow"-like structure operative to support the forepart of the foot and reduce the hinge movement of the metatarsal phalangeal articulations during walking and thereby to ease greatly the walking strain incidental to the common foot malformation in which one of the metatarsal bones is abnormally long.

Other objects and advantages of my invention will appear from the following detailed description of an illustrative embodiment thereof.



Having thus described the principles which underlie my invention and having stated the objects thereof, I shall now describe, with reference to the appended drawing, a typical embodiment of my invention in a lady's dress shoe.

In the drawing, Fig. 1 is a side elevation view, partly in section, showing a smart lady's dress shoe of stylish lines, wherein my invention is incorporated in the platform structure. Fig. 2 is a bottom elevation view of the separating elements which form the platform of the shoe of Fig. 1, being built between the insole and the outsole thereof. Fig. 3 is a side elevation view of the platform structure of Fig. 2, and Fig. 4 is a top elevation or plan view of the same platform structure. Fig. 5 is a perspective view showing the transverse, rigid bar insert which characterizes my invention, broken away from the softer composition material which forms the remainder of the platform structure of Fig. 2.

In the drawing, the shoe **10** is of conventional construction except for the platform sole portion. It may be provided, if desired, with a high heel **11**, since my invention avoids the greater part of the foot discomfort which is normally associated with high heels and which women have traditionally endured for the sake of style. The upper **12** may be of any desired construction.

The shoe in Fig. 1 is provided with a rigid, thick leather insole **13**, substantially similar in material and physical properties to the outsole **14**. Both of the soles **13** and **14** will normally be made of rigid, relatively thick sole leather, although any desired substitute material may be used provided it has stiffness approximately equivalent to that of sole leather. The conventional thin, flexible leather sock lining **19** may, if desired, be used to overlie insole **13**.

Built into the shoe and carried by the insole **13** and outsole **14** is a platform **15** consisting of two parts—a transverse bar portion **16**, and an anterior portion **17** of relatively soft, resilient material such as cork composition.

The transverse bar **16**, which forms one of the vital elements of my invention, must be made of material substantially rigid and considerably harder than the material of which platform portion **17** is made. If desired, it may be made of sole leather, or it may be made of a composition material less hard than sole leather but substantially harder than the material of which platform portion **17** is made.

I do not wish to limit my invention to any particular positioning of transverse bar **16**, since it may be located with considerable latitude without greatly affecting the performance of the shoe. It must, however, be located in a position posterior to the metatarsal heads, and preferably it should be placed in a slightly slanting position relative to the axis of the shoe, with the "inside" end somewhat further forward than the "outside" end. (It will be understood that by "inside," I refer to the right side of a left foot or the left side of a right foot.)

Similarly, while the rear portion of the bar **16** is tapered to conform to the line of the shank, as may be seen from Figs. 1 or 5, the bar should have a full-thickness zone of substantial width anterior to the tapered portion. This construction may be seen clearly in Figs. 2, 3 and 5, where the line of demarcation between the full-thickness zone and the tapered zone is denoted **16***a*.

If desired, bar 16 and platform element 17 may be pre-assembled, as by cementing, before they are assembled into the shoe proper. Figs. 2–4 show the appearance of the assembled platform subcombination prior to its incorporation in a finished shoe.

As I have previously described, in my discussion of the principles underlying my invention, shoe 10, when worn, provides, in the combination of a substantially rigid insole 13, transverse bar 16, soft platform portion 17, and outsole 14, a lever of the second class which relieves the metatarsal heads of the major portion of their burden and directs the weight of the wearer's body to the earth primarily via the toe portion 18 and the transverse bar 16, the outsole 14 being, in both cases, the element which actually contacts the earth's surface and transmits the force to it.

While I have, in the present specification, described in considerable detail an illustrative embodiment of my invention, it is to be understood that that description is exemplary only, and the scope of my invention is to be measured primarily with reference to the appended claims.

I claim:

1. A platform shoe, comprising in combination an outsole, a stiff, rigid insole, a transverse bar of relatively hard, substantially unyielding material disposed between the two soles anterior of the shank portion of the shoe and posterior to the part of the sole which supports the metatarsal heads, and a platform element interposed between the two soles anterior of the bar, said platform element being formed of material softer and more



yielding than the bar, said bar and said platform element being integrally assembled into the platform of the shoe and being externally invisible.

2. A shoe according to claim 1, wherein said transverse bar is disposed across the shoe at an acute angle to the midline axis of the shoe, the inside end of said bar being slightly anterior to the outside end thereof.

3. A shoe according to claim 1, wherein said transverse bar is provided with a zone extending along its entire length wherein it is of equal thickness to the platform element and having posterior of said zone a tapered portion converging to an edge, substantially as shown and described.

4. A shoe according to claim 1, wherein the platform element is made of a relatively soft, cork-and-rubber composition and wherein said transverse bar is formed of a substantially harder, less yielding cork composition.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 1,239,628 | Shoemaker et al. | Sept. 11, 1917 |
| 1,278,375 | Ogilvie | Sept. 10, 1918 |
| 1,717,968 | Gartner | June 18, 1929 |
| 1,930,304 | Brown et al. | Oct. 10, 1933 |
| 2,276,949 | Everston | Mar. 17, 1942 |
| 2,436,050 | Miner | Feb. 17, 1948 |
| 2,464,355 | Storner | Mar. 15, 1949 |
| 2,547,480 | McDaniel | Apr. 3, 1951 |
| 2,611,978 | Joyce | Sept. 30, 1952 |