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SHOE AND INSOLE

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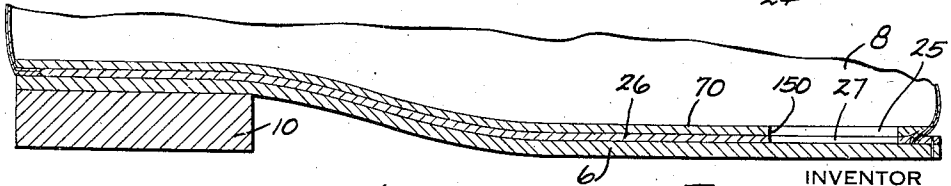
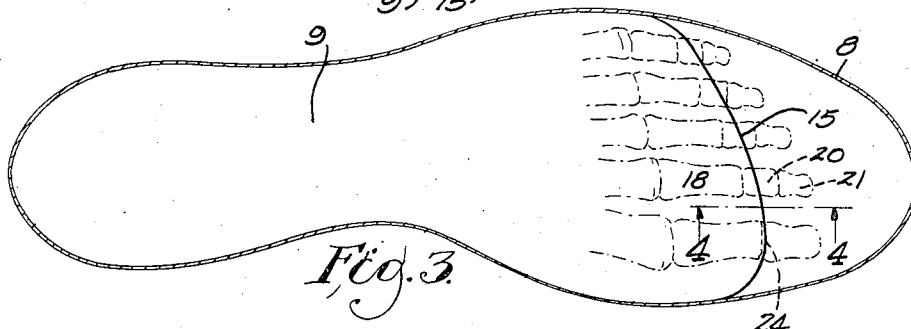
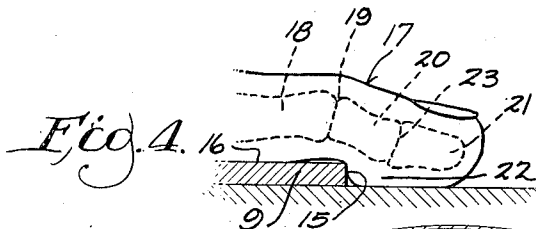
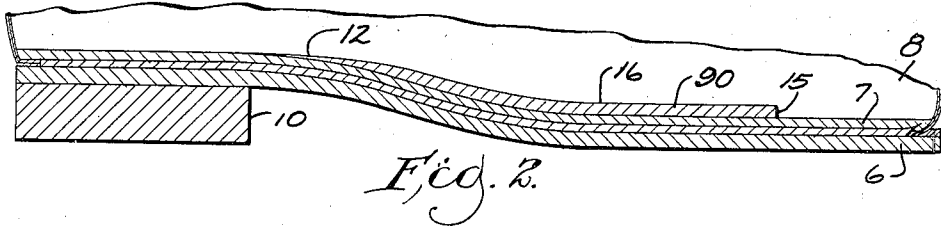
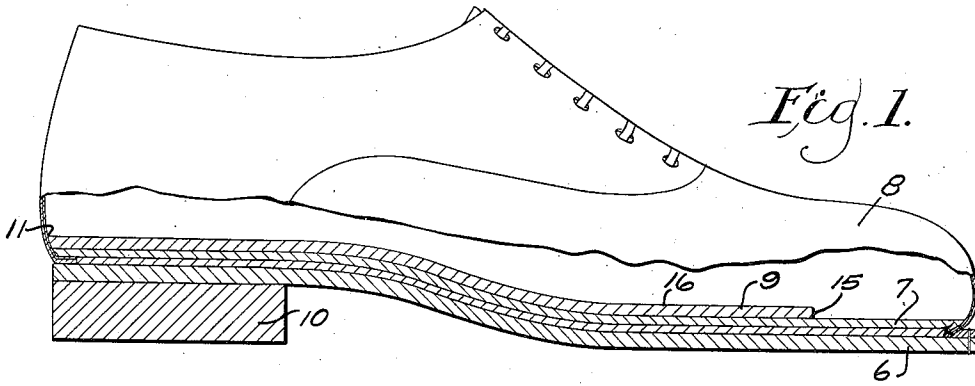


Fig. 5.

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SHOE AND INSOLE

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This invention relates to improvements in shoes and sole inserts therefor.

The invention has for its object the provision of means whereby an otherwise conventional shoe may be made to afford, first, a clearance or space within which the toes of the wearer may have freedom of flexing movement and, secondly, even more importantly, a shoulder having an extremely well defined location beneath the wearer's toes to permit the toes to exert a gripping action thereon. I have found in prolonged experiments with shoes having transverse shoulders variously located respecting the toes, that there is a very narrow range within which such shoulder will satisfy the objective of this invention. When properly located, such shoulder almost completely relieves many kinds of foot strain and enables the wearer of the shoes to stand and walk more normally than is otherwise possible, thereby relieving muscular and nervous strain throughout the body.

It is my purpose to provide for the achievement of these advantages, either in a newly manufactured shoe or by means of an insole insert which may be incorporated in a shoe previously manufactured to satisfy the purpose of this invention.

While my insert does not in any way function as an arch support, and while it may, if desired, be incorporated in an arch support or added to an arch support, the fact is that where a person wears shoes made or equipped in accordance with this invention, he will strengthen the arches of his feet in a normal manner and, hence, will not require arch supports. Other objects of the invention will be apparent to those skilled in the art upon analysis of the following disclosure.

In the drawing:

Fig. 1 is a view, partially in side elevation and partially in longitudinal section, showing a shoe equipped in accordance with the present invention.

Fig. 2 is a fragmentary illustration in longitudinal section showing the sole portion of a shoe having a modified equipment in accordance with this invention.

Fig. 3 is a diagrammatic plan view of a sole insert made in accordance with this invention, the relation of the shoe sole thereto being indicated in broken lines and the relation of the bones of the wearer's foot also being indicated in relation to the insert by means of dotted lines.

Fig. 4 is a fragmentary detail view in longitudinal section taken on the line 4—4 of Fig. 3.

Fig. 5 is a view similar to Fig. 2, showing a further modified embodiment of the invention as incorporated in a shoe at the time of manufacture.

Like parts are designated with the same reference characters throughout the several views.

The shoes illustrated in Figs. 1 and 2 are, save

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for the incorporation of my invention therein, of conventional construction. Each includes an outer sole 6, an insole 7 and an upper 8. In each there is a sole insert. In the Fig. 1 construction, the insert 8 extends back over the heel 10 into contact with the counter portion of the shoe at 11 and, hence, this insert may be loose within the shoe.

In the construction shown in Fig. 2, the insert 9 is so skived at 12 as to terminate in a thin edge at or near the breast of the heel. This insert will have to be anchored adhesively or otherwise to prevent its displacement under the gripping pressure of the wearer's foot, as hereinafter to be described.

Each insert has a rather abruptly-shouldered forward end at 15 which should be located with reference to the position of the foot of the wearer of the shoe. The precise requisite location of this shoulder is indicated in Fig. 3, where it will be observed that the shoulder 15 passes beneath the second phalanges of the lesser toes, approximately midway between the first and second joints. In passing beneath the great toe, the shoulder 15 preferably lies just forwardly of the joint.

When the wearer's foot rests upon a sole or sole insert thus shouldered, there is space below the foot supporting surface 13 into which the wearer may curl his toes downwardly. This downward curling or flexing movement of the toes is of the greatest importance in stimulating the muscles and ligaments of the feet and legs. This flexible gripping action of the toes increases the blood circulation through these parts, thus preventing and relieving many ailments such as tiredness, fallen arches, cold feet, varicose veins, poor circulation, nervousness, body strain and helps the postural alignment of the body. The ordinary shoe has flexibility chiefly or solely in an upward direction. It can only with difficulty be forced to a position which is flat and it normally turns slightly upwardly toward the toes. In consequence, the normal gripping movement of the toes which is constantly exercising when walking barefoot in a natural manner is substantially impossible in the conventional shoe.

When my improvement is incorporated, there is a space below the foot supporting surface at 16 into which, regardless of the shoe sole proper, the wearer's toes may be curled downwardly. Moreover, in addition to permitting a downward curling of the toes, I make possible the even more important normal gripping action of the toes and actually give the wearer's foot, for the first time, traction within the shoe so that the wearer may pull himself forwardly on each step by manipulating his toes instead of merely pressing his heel against the counter. This is not only beneficial to the wearer of the shoe, but is also beneficial

to the shoe itself, since it tends to prevent the shoe from becoming run over at the counter or heel.

This result is accomplished by the specific location of the shoulder edge as best illustrated in Fig. 4. When the muscles of the foot are tensed in a manner to cause a gripping action of the toe 17, the phalange 18 will have imparted to it a slight upwardly inclination to raise the joint 19. The phalange 20 will have a very substantial downwardly inclination across the shoulder edge 15 of the insert 9. The phalange 21 will be forced, under downward pressure, to substantially parallelism with the underlying surface of the shoe. The fleshy portion 22 of the toe will be urged, under pressure of the phalange 20, against the shoulder at 15, to give the desired gripping action. Thus, as in normal barefoot walking, the forward traction of the foot is secured by the toes and not by the heel, or merely by friction, as is required by the ordinary shoe.

If the shoulder 15 were located directly beneath the second joint 19, most, and in many cases all, of the gripping action of the toe would be lost. This gripping action depends upon so locating the shoulder 15 that the phalange 20 can push rearwardly thereon through the intervening pad of flesh. Since only a very limited inclination can be imparted to the phalange 20, it will be evident that the shoulder 15 must be located forwardly of the joint 19 to get results. On the other hand, if the shoulder 15 were located as far forwardly as the joint at 23 between the first and second phalanges, the gripping action would again be lost. The shoulder must, therefore, be located beneath an intermediate portion of the phalange, forwardly of the second joint and rearwardly of the first joint of the toe.

The great toe is differently constructed but the same principles apply. The shoulder 15 should pass beneath the great toe just forwardly of at least a portion of its joint at 24.

Where it is desired to incorporate the invention in shoes at the time of manufacture, a variety of constructions are possible. For example, the insole 70 of an otherwise conventional shoe may have an opening cut into it at 25, leaving a shoulder 150, corresponding exactly in outline and function to the shoulder 15 of the sole inserts already described. In the resulting recess the toes will have freedom of downwardly curling movement for gripping purposes. Where greater depth of recess is desired, a mid-sole 26 may be incorporated between the outer sole and the inner sole and this also may be cut away, together with any filler, as indicated at 27, thus extending the recess to the upper surface of the outer sole 6. Whatever the construction, the sole element which actually provides support for the wearer's foot is cut away to provide a shoulder forwardly of the second joint of the lesser toes and at least partially forwardly of the next corresponding joint of the great toe, whereby to afford the gripping action as above described.

I claim:

1. A shoe having an outsole, and an insole comprising a foot-supporting element of substantially uniform thickness throughout its forepart and having a foot-supporting surface of less length than the length of said shoe and terminating in an abrupt shoulder of relatively firm and unyieldable material extending transversely of the element in a position to be disposed beneath the respective second phalanges of at least the intermediate toes of such a foot, whereby said

shoulder affords means against which the toes of a foot properly fitting said shoe may grip to facilitate walking.

2. The structure defined in claim 1, in which said shoulder further extends beneath the position of the great toe of such a foot at least partially forwardly of the first joint.

3. The structure defined in claim 1, in which said shoulder extends arcuately from one side of the element beneath the position of the second phalanges of all of the lesser toes well forwardly of the second joints thereof, said shoulder thence extending sharply curvilinearly rearwardly beneath the position of the great toe of such a foot and, for at least a part of the width of such toe, disposed slightly forwardly of the first joint therein.

4. A shoe having an outsole, and an insole comprising a sole element of such dimensions as to be adapted to extend substantially from one side of the shoe to the other and being of substantially uniform thickness in the forepart and having an abrupt forward marginal shoulder extending arcuately across said elements, and being specifically located with reference to the position of the foot of a wearer of the shoe to lie between the first and second joints and beneath the second phalanges of at least some of the toes, said element being of relatively firm and unyielding material, whereby said shoulder may be gripped by such toes.

5. The structure defined in claim 4, in which said insert is fitted to extend to the heel of the shoe for which it is designed.

6. The structure defined in claim 4, in which said insert terminates short of the heel of the shoe for which it is designed.

7. A shoe having an inner sole and an outer sole, the inner sole having an aperture disposed inwardly from its margins and opening downwardly therethrough toward the outer sole and being provided along the rear margin of such aperture with a shoulder specifically located respecting the position of the foot of a wearer of the shoe to extend transversely of the shoe beneath the second phalanges of at least some of the toes of the wearer's foot and materially forwardly of the second joints of such toes, said aperture providing a recess into which the toes of the wearer's foot may be curled downwardly.

8. The structure defined by claim 7, in further combination with a mid-sole portion intervening between the inner sole and the outer sole, and provided with an aperture corresponding to the aperture of the inner sole whereby to increase the depth of such recess.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,286,086	Peterson	Nov. 26, 1918
2,120,370	Murray	June 14, 1938
246,931	Williams	Sept. 13, 1881
1,815,843	Higdem	July 21, 1931
2,381,846	Thomas	Aug. 7, 1945

FOREIGN PATENTS

Number	Country	Date
827,645	French	Apr. 29, 1938
195,016	British	Mar. 22, 1923