April 14, 1936. A. A. KOTZIN 2,037,170

SHOE

Filed Jan. 20, 1934

Fig. 4.

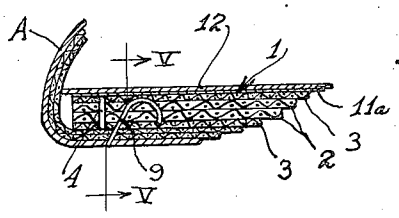


Fig. 1.

Fig. 2.

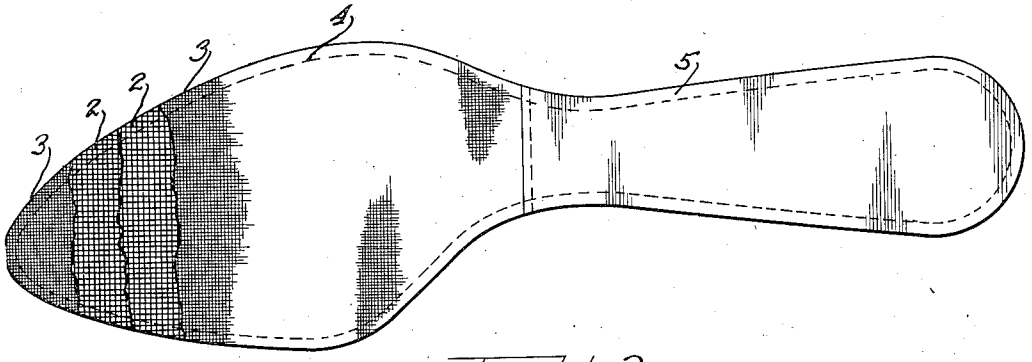


Fig. 3.

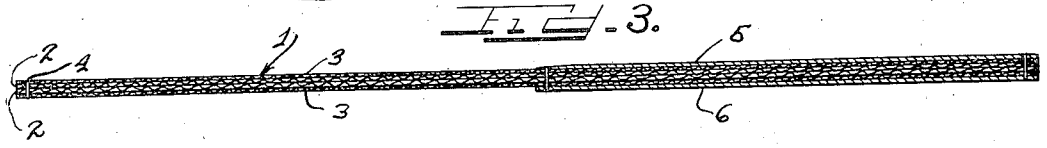
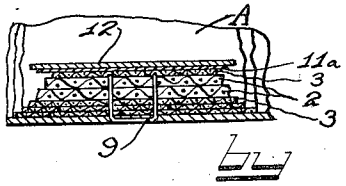


Fig. 5.



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UNITED STATES PATENT OFFICE

2,037,170

SHOE

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Application January 20, 1934, Serial No. 707,433

3 Claims. (Cl. 36—44)

This invention has to do with shoe construction and is concerned more particularly with an improved insole. It is an object of the invention to provide a construction which materially increases the flexibility of the ball of the shoe.

It is another object of the invention to provide an insole structure affording improved cushioning qualities for the foot.

It is a further object of the invention to provide an insole of suitable strength and increased flexibility to thereby increase the flexibility of the shoe as a whole.

Another object of the invention resides in the provision of a laminated insole structure affording requisite strength yet increased flexibility for a shoe.

A further object of the invention resides in the provision of an insole structure affording an improved anchorage for a sock lining or sole.

Another object of the invention consists in the provision of a laminated insole affording increased flexibility for a shoe, and made of such material as not to render the shoe unduly warm.

It is a further object of the invention to provide a yielding insole structure of such character as to keep its shape notwithstanding varying pressures on different areas thereof and perspiration and the like to which the same may be subjected in use.

Another object of the invention resides in the provision of an improved process of shoe construction.

In the construction of shoes, the item of comfort is paramount, and in accordance with the present invention a decided contribution to this end is made. One of the principal causes of discomfort and fatigue arises through insufficient flexibility of the shoe throughout the area from the ball forward. Another arises from the stiffness of the shoe, particularly at the insole, affording insufficient cushioning to the tread. A third arises as a result of certain processes of shoe manufacture, wherein wire staples are employed for securing the turned in margin of the upper to the insole. A fourth arises from the fact that perspiration and the like in shoes of present day construction causes the sock lining to become loosened from the insole, early in the wear of the shoe, resulting in the inconvenience and expense attendant upon having the sock lining re-cemented to the insole, and discomfort resulting from the loosening of the sock lining.

In accordance with the present invention, there is provided an insole of laminated fabric, the laminations being intimately secured to one another as by cement and preferably bound together in any suitable way at their margins, as by stitching. The material employed in the laminations is preferably of such character as not to cause the shoe to be unduly warm, and this applies particularly to ladies' shoes. Accordingly any material having such an effect is undesirable. The number of layers or laminations may be varied, an intermediate layer or layers of burlap and outer layers of cotton fabric having been found suitable. This insole structure is of a yielding character which adds materially to the comfort of the wearer, and by virtue of the aforesaid laminated structure, will keep its shape throughout the life of the shoe. The stiffness of a shoe at the ball thereof is largely dependent upon the flexibility of the insole, and I have found the shoes made in accordance with my invention to be considerably more flexible at the area from the ball forward than shoes employing one-piece leather or leather or other composition insoles.

The upper layer of the improved insole provided by the present invention affords a very satisfactory base by which the sock lining may be cemented in place, so that the latter will not become loose notwithstanding the perspiration and possibly wettings and drying to which the shoes are subjected in use.

The invention makes possible an improvement in shoes wherein the margin of the upper is turned in under the insole and is stapled thereto in any suitable manner, as by what is known in the art as the Littleway process, wherein curved fine wire staples secure the upper to the insole. In shoes heretofore made wherein a single thickness insole of leather or composition or the like is employed, oftentimes the rounded portions of these staples protrude on the upper side of the insole, with attendant possibility of reaching the foot of the wearer. With the laminated construction of the present invention, each layer offers resistance to the penetration of the staple, with the result that upon reaching the uppermost layer short of the upper surface thereof, the staple points reach their greatest depth and commence return movement.

It will be seen from the foregoing that the subject matter of the present invention affords a number of distinct advantages over constructions heretofore in vogue.

Other objects and advantages of the invention will appear as the description proceeds.

This invention (in a preferred form) is illus-

trated in the drawing and hereinafter more fully described.

Figure 1 is a longitudinal vertical sectional view of a shoe embodying the invention, certain parts being shown for convenience in elevation.

Figure 2 is a plan view of an insole embodying the invention, portions thereof being broken away to show the laminated construction.

Figure 3 is a longitudinal sectional view of the insole of Figure 2.

Figure 4 is an enlarged fragmentary sectional view showing how the upper is secured to the improved insole.

Figure 5 is a view similar to Figure 4, but taken at right angles thereto as indicated at V—V in Figure 4.

Referring now more particularly to the drawing, wherein, for convenience, a lady's shoe A is illustrated, the reference character 1 designates generally an insole constructed in accordance with the present invention. This insole embodies a laminated structure comprising two intermediate layers 2 of burlap or other material having physical characteristics or properties similar to those of burlap, and two outer layers 3 preferably of cotton or linen or like sheet material such as cotton muslin, drilling and the like. The several layers are cemented in laminated form into a unitary insole member as indicated generally at 1. If desired, the margins of the layers may be additionally bound together by stitching 4. This may be found desirable in the event the insole is to be stitched to the outsole, since the resultant stiffening of the insole margin facilitates stitching to the outsole. This insole, by reason of its laminated construction, has the desirable quality of strength exhibited by an ordinary leather or composition insole and, because of the yielding character of the material forming the various layers, has a yielding or cushioning quality not found in leather and composition insoles. A shoe made with my improved insole is capable of flexing more readily than others not only at the ball and remainder of the forepart as the heel is raised, but permits of the slight twisting to which shoes are subjected due to uneven ground.

It is desirable that the shank and heel portions of the insole be reinforced to afford a proper support for the corresponding portions of the foot. To this end, the corresponding laminated portions of my improved insole structure are provided above and below with relatively stiff outer layers of composition material such as fiber, as shown at 5 and 6. This portion of the insole is known as the shank, and preferably a spring steel shank piece 7 as is usual in shoe construction is secured in any suitable manner to the bottom side of the shank. This composition covering material or leather, whichever is used, provides a proper anchorage for the nails and the like employed in fastening the metallic shank piece to the insole and for fastening the heel 8, as well as those for fastening the inturned heel portion of the upper to the bottom of the heel portion of the insole.

While the insole forming the subject matter of the invention is capable of use in any kind of shoe in which an insole is employed, in the illustrated embodiment of the invention a shoe constructed by the so-called cemented process is depicted. In this process, the insole and outsole are not united to each other by stitching or nails, but, rather, the turned in margin of the upper at the forward portion and shank is united to the insole as by curved staples 9 such as are employed in the Littleway process, a filler piece 10 preferably of fabric or the like is cemented to the bottom of the insole between the stapling, and the outsole is secured to the stapled margin of the upper by cement 11. The bottom layer of the insole provides a strong adhesion base for the filler material so that the latter forms in effect a further layer at the corresponding portion of the insole.

When shoes are made by the cemented process, using an ordinary single thickness insole, it is rather common for the staples to continue on through the insole. These projecting portions of the staples sometimes wear through the sock lining 12, causing chafing of the skin and consequent discomfort.

When an insole embodying the present invention is employed in this process, each succeeding layer affords resistance to the progress of the staples therethrough, with the result that the staples are turned back without substantially piercing the uppermost layer and assume the position illustrated in Figure 4. The staples thus securely unite the turned in marginal portion of the upper to the laminated insole, and yet the latter prevents the staples from contact with the sock lining so that the latter, when secured in place, provides a uniformly smooth surface for the foot.

Moreover, by virtue of the fabric upper layer 3 of the insole, a strong adhesion base is provided for securing the sock lining thereto by cementing 11a or the like, so that the sock lining will not work loose in wear, regardless of perspiration and wetting and drying to which the sock lining and insole may be subjected in use, a waterproof cementing material being of course employed.

In employing other processes in the manufacture of shoes including insoles, such as those wherein the turned in margin of the upper is cemented to the bottom of the insole, the present invention affords an advantage over single layer leather or composition insoles for the reason indicated above, namely, that it affords a more secure adhesive base because of the relatively rough and soft property of my improved insole.

While the insole made in accordance with the present invention is substantially more flexible than the single layer type of insole heretofore in use, it is nevertheless sufficiently stiff by virtue of its laminated structure to be substantially form-retaining to hold its shape. It may be made by first forming sheets of the laminated material and cutting out the insole to shape, or the individual layers may first be cut out to shape and then laminated together as described above.

The laminated structure forming the subject matter of the present invention will always keep its shape and will not "bunch" at places of little or no pressure and become thin at places of relatively great pressure, this disadvantage being true of the single layer insoles of felt and the like.

It will be observed that in addition to the foregoing advantages, the insole embodying the present invention is susceptible of being manufactured very cheaply and in simple operations.

The laminations are preferably made of cloth made largely or entirely from vegetable fibers, the outer layers comprising a cloth such as cotton and the inner layer or layers comprising a cloth such as hemp or jute woven to form burlap. Such material as will not make the shoe unduly warm and will permit the insole to "breathe" and promote evaporation of moisture is desired. Cloth

of the above mentioned character has been found satisfactory for the purpose.

The layers are preferably secured together by adhesive such as rubber cement which may be moisture-proof. The woven character of the layers permits passage of air and thus enables the insole to "breathe", an advantage not afforded by insoles heretofore except in only a relatively insignificant degree.

By placing these laminations together so that the threads of each run respectively longitudinally and at right angles thereto, in relation to the general longitudinal axis of the insole, the laminated structure is made shape-retaining and will have no appreciable stretch.

The laminations being of pliable cloth, a cementing material of such character as to lend itself readily to flexing of the insole is employed to secure the laminations together.

The intermediate layer or layers of the laminated insole embodying the present invention are preferably of a coarse weave to impart a cushioning quality to the insole, and the outer layers are preferably of a relatively fine weave to provide a sufficiently smooth surface for comfort of the foot. An intermediate layer weave of about 12 x 12 threads to the inch and an outer layer weave of about 24 x 36 threads to the inch have been found suitable. These are mentioned merely as exemplary and not for the purpose of limitation of the invention.

The number of laminations or layers may be varied as desired and to obtain any thickness desired, and it is preferred that the resulting thickness be substantially the same as that of an ordinary one-piece insole which, in a lady's shoe, is about $\frac{3}{32}$ inch.

The laminated insole of the invention, as stated above, is susceptible of employment in connection with any process of shoe construction in which an insole is used. Its laminated structure makes the insole sufficiently strong to allow the same to be securely stitched to the upper and outsole in the event a stitching process is employed.

By virtue of its shape-retaining and pliable property, the insole of the invention will not curl upward at its margin notwithstanding a long period of use of the shoe. This is another drawback to be found in shoes made with a one-piece insole of the leather or composition type which, after a short period of wear of the shoe, turns up at its marginal edge and forms ridges which chafe the skin and make wearing of the shoe uncomfortable.

The reinforcing stitching or the like at the margin of the insole renders the same better able to be secured to the outsole by stitching but the insole stitching may be omitted if desired. Other means such as stapling or the like may be employed in securing the pieces **5** and **6** to the insole laminations.

If desired, the intermediate layer structure may be relatively finely woven and the outer layer structure may be relatively coarsely woven, the illustrated embodiment of the invention having, however, been found satisfactory.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. In combination, a flexible and porous insole comprising a top cover and a bottom cover of porous fabric, a plurality of layers of burlap or the like material interposed between said covers, flexible adhesive means uniting said covers and said layers, and yieldable shank stiffening means secured to one of said covers.

2. In combination, a flexible and porous insole comprising a top cover and a bottom cover of porous fabric, a plurality of layers of burlap or the like material interposed between said covers, flexible adhesive means interposed between said covers and uniting said covers and said layers, and yieldable shank stiffening means secured to one of said covers.

3. A flexible and porous insole structure comprising a top cover and a bottom cover of porous fabric, a plurality of layers of coarse woven material, such as burlap, interposed between said covers to provide an insert of substantial thickness, and flexible adhesive means interposed between said covers and uniting said covers and said layers.

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