July 9, 1940. E. S. MARKS ET AL 2,207,437

SHOE AND THE MANUFACTURE THEREOF

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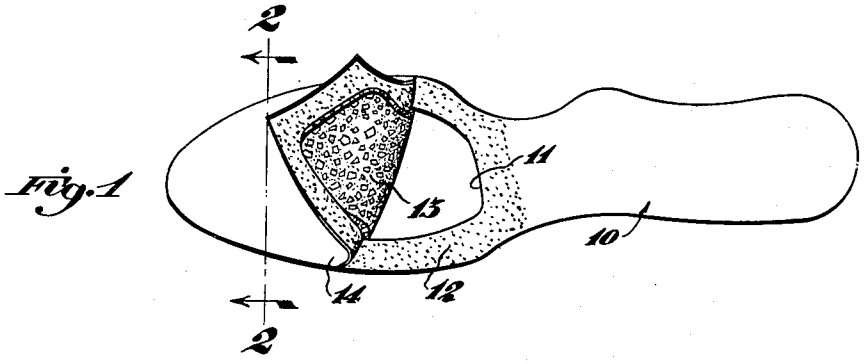


Fig. 1

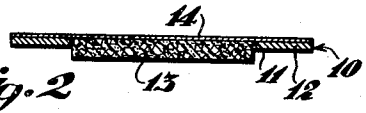


Fig. 2

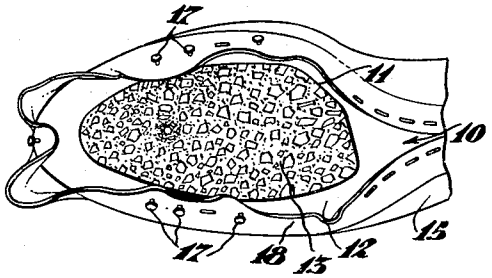


Fig. 3

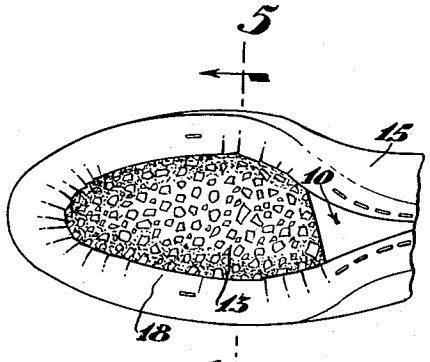


Fig. 4

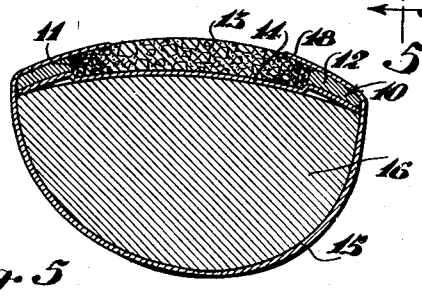


Fig. 5

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SHOE AND THE MANUFACTURE THEREOF

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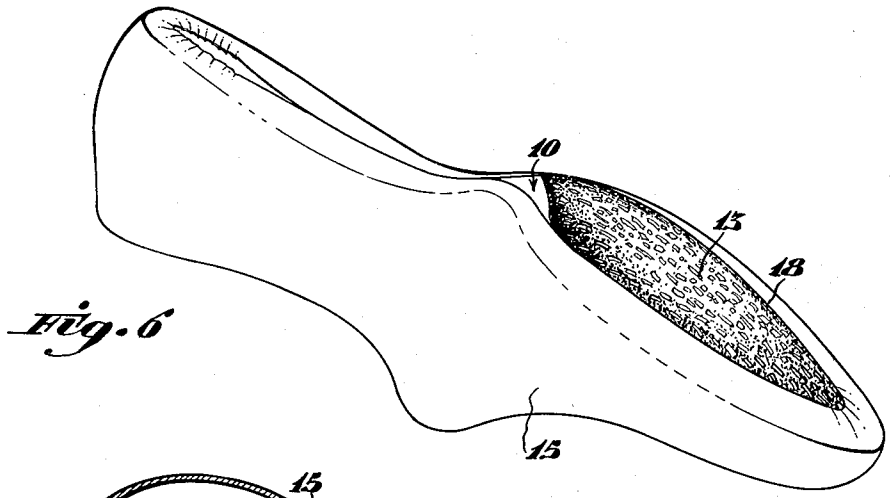


Fig. 6

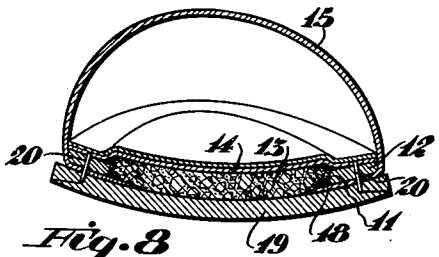


Fig. 8

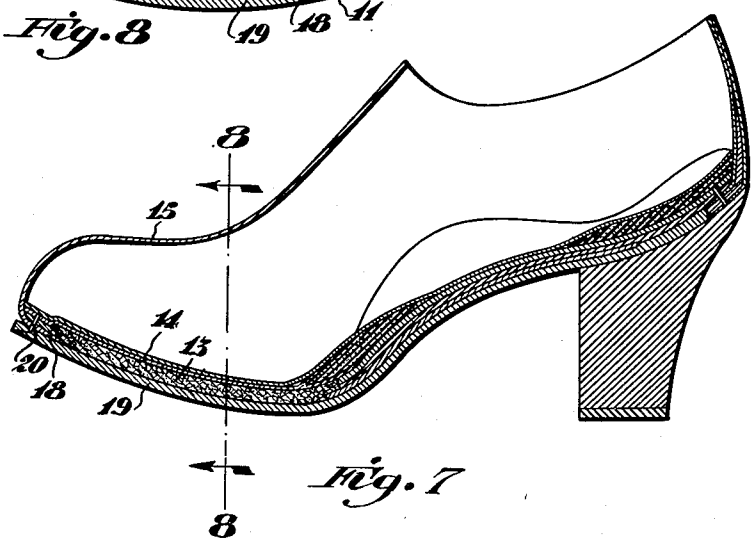


Fig. 7

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2,207,437

SHOE AND THE MANUFACTURE THEREOF

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Application March 21, 1940, Serial No. 325,254

3 Claims. (Cl. 12—142)

This invention relates to shoes and the manufacture thereof. It is particularly directed to that type of shoe which includes a cushioning means in combination with the insole, outsole, and upper.

These inventors are aware of the previous efforts to produce a comfortable, durable shoe incorporating cushioning means in the form of a resilient cushioning pad placed within an opening cut in the forepart of the insole. This structure, wherein a margin of the insole surrounds the inserted pad, is believed to be the correct basic structure provided that the shoe is properly fabricated and has the correct transverse and longitudinal shape at the forepart of the sole structure.

It is vital for reasons which will be explained later, that the insert be firmly and rigidly held in position particularly in curved condition whereby it will not flatten out in use. The repeated flexing of the shoe sole in use along with the pressure of the foot on the cushioning pad tends to cause displacement of the pad and the shoe will thereupon become very uncomfortable because of creeping or bunching.

It has been an object of the present inventors to prevent flattening of the sole structure including the insert and to hold the insert rigidly in position. Accordingly, the insert is of greater thickness than the rand or margin of the outsole. In lasting the shoe, the margin of the upper is wiped or pulled over the rand and attached by cement or the like to the margin of the insert. Since the rand is much thinner than the insert, the curvature is increased at the edges of the lasted shoe and tension is placed on the insert. In other words the insole, including the insert, is preset to the correct curvature on the last, the overlasting over the insert preventing undue spreading of the insole margins.

Additionally, it has been found advantageous, if not essential, to entirely assemble the insole including the insert prior to the lasting operation. If the insert were placed in the opening after lasting, the opening would contain cement and the irregular ends of the overlasted upper. Moreover, the lasting pressures would displace the rand and destroy the shape of the opening making it necessary to tailor each insert to fit the altered contour of the opening.

For many years, the forepart of the shoes has been made so as to present in use, a flat, or in many instances, a concave inside surface, while the bones of the foot forming the metatarsal have a natural arch which is supported by the great toe and little toe.

The constant weight of the body on a surface that does not properly support it, together with the difficulties arising from high heels, throw the weight of the body forward causing additional pressure on the metatarsal arch, with the result that today more than 75% of women over thirty-five years old have foot troubles. Concrete walks and the mode of living have caused additional trouble. This condition has been greatly relieved by the introduction of metatarsal pads which help to hold the foot in place.

The shoe of this invention, presents an entirely new idea, giving to the entire forepart of the shoe a natural cushioned support. The heavy cushion in the center is raised about one sixteenth of an inch above the outside edge of the insole. As a result of the present method, it has been possible for the inventors to so arrange the shoe that the sole structure curves generally both transversely and longitudinally with the result that the primary contact and weight support is substantially centrally of the insert, and whereas the thickness of the insert is such that the great thickness of this center pad forms, in use, a natural curve to the inside of the shoe, making the forepart of the shoe like a continuation of the oval cottage shank. Now the weight of the body presses down on the outer edges of the sole, which is the natural condition in walking. The convex or curved sole permits the margin to move downwardly under the weight and leaves the central portion bulging upwardly, causing the foot to rest on an uneven yet natural support, absorbing the entire shock from the hard surfaces and gently supporting each individual bone of the foot. This gives, for the first time in shoe making, the sensation and benefits that one would gain when walking in their stocking feet on a natural grass surface, and giving greater comfort to the wearer.

Other objects and certain advantages will be more fully apparent from a description of the drawings in which:

Figure 1 is a top plan view of the insole with a portion of the insert and attaching sheet turned back for illustrating the construction.

Figure 2 is a sectional view taken on line 2—2, Figure 1.

Figure 3 is a bottom plan view of the shoe showing it in the first step of lasting with the upper tacked into position.

Figure 4 is a bottom plan view of the lasted

shoe after the margin of the upper has been drawn over the insert margin and cemented.

Figure 5 is a sectional view taken on line 5—5, Figure 4, further illustrating the attachment of the upper and insole.

Figure 6 is a perspective view showing the lasted shoe ready to receive the outsole.

Figure 7 is a longitudinal sectional view of the finished shoe.

Figure 8 is a sectional view taken on line 8—8, Figure 7, illustrating the finished sole construction.

Referring to the drawings, the insole is indicated at 10 and shown separately from the completed shoe in Figure 1. It is formed or cut from a blank of leather or other appropriate material in the usual manner. Its forepart is cut out to form an opening 11 defined by a marginal portion or rand 12. A pliable resilient cushion 13 is inserted within the opening 11 of the insole. This inserted pad or cushion is of the same dimension and contour as the opening in order to fit snugly therein. In order to attach the insert in position, a flexible covering sheet 14 is applied over the inner face of the forepart of the insole and is cemented to the insert and the rand. This covering sheet 14 may be formed of any suitable material such as rubberized sheeting. The structure thus far described constitutes the completed insole.

Referring to Figures 1 and 2, it will be noted that the pad or insert is considerably greater in thickness than the marginal portion of the insole which surrounds it. Before it is incorporated in the shoe as shown in these views, the lower surface of the cushion extends below the plane of the surrounding insole marginal portion. The extension of the insert in this manner is important in the process of fabricating the shoe as described hereinafter. More particularly, its importance will be apparent in the lasting operations wherein the assembled insert and insole are drawn down upon the last.

The upper 15 and lining, and the prepared insole are then placed upon the last 16 and taken to a pulling over machine where the tacks 17 are applied for holding the upper in general position for lasting and cementing. The upper is drawn tightly around the edge of the last and its margin 18 is tensioned into position overlying the margin of the insert cushion 13 and cemented thereto. As usual the pulling over tacks are drawn at this time.

Thus at this step of the procedure, the insert still extends well beyond the lower surface of the rand. Accordingly, the curvature of the lasted insole is accentuated because of the relatively thin rand part (see Figures 4 and 5 showing the operation of lasting and cementing the upper to the insole). This stretching of the fabricated insole across the curve of the bottom of the last, places tension on the cushion.

In the next step in the operation, the excess material of the upper is cut away to provide a perfectly smooth well rounded bottom in condition for receiving the outsole 19.

The outsole is then laid and leveled to the contour of the lasted insole and upper. A line of stitching 20 disposed through the outsole, the lasted margin of the upper, the rand and the covering sheet securely fastens the parts together. As shown in Figures 7 and 8, the insert slightly displaces the covering sheet so as to provide a raised central area within the forepart of the shoe.

In the lasting operation, the insole including the insert, is tensioned to a shape which is curved to a considerable extent and accordingly tends to remain in this condition. Thus when the outsole is applied and is firmly rolled into position, the shoe tends to maintain its curvature. The overlapping of the marginal portion of the upper wherein it is cemented not only to the rand but to the margin of the insert, aids further in holding the insert tightly across the last and there is less tendency for the rand to pull away from the insert.

It will be apparent that virtually the entire upper surface of the insole presents a soft cushion for yieldably supporting the metatarsal arch of the foot. The materials which have been found best suited to this usage are either sponge rubber or a composition made up of cork bonded with latex. The latter has the additional advantage of having an increased degree of firmness which keeps the cushion from becoming easily flattened or permanently distorted because of constant pressure. The exact materials from which the cushion is formed are naturally in no sense the essence of the invention as it may be desirable to have the cushion very resilient in certain types of shoes and less so in others.

The entire structure comprises in effect, a cushion pad mounted directly upon the outsole of the shoe, the upper surface of the pad being securely bonded to the flexible sheeting 14. The sheeting in turn, is secured around its marginal edges to the margin of the insole. It may be seen from this arrangement that the insole effect upon the pliability of the forepart of the shoe is negligible. Moreover, the flexing of the forepart of the shoe will not tend to work or displace the pad forwardly since the pad is inherently flexible and resilient. In addition, the cushion is securely attached to the sheeting 14 and is maintained within the marginal edge 12 to which it may be adhesively attached so that any creeping or bunching tendency is effectively prevented.

In manufacturing the insole, the blanks are formed in the usual manner, by dieing. After the blank has been formed, the forepart of the insole is then cut out by means of a die to form the opening 11. The cushioning pad is of the same size as the opening and it has been found most convenient to cut the pads from sheets, using the same die which has been used to form the opening. In this manner, a very accurate fit is obtained. Since all of the parts of the insole may be formed by direct dieing operations usually a plurality of members being cut from stacked sheets, the insoles are inexpensive and are adaptable to production methods of manufacture.

The weight of the body presses down on the margins of the sole, this being the natural condition in walking. The convex or curved sole permits the margin to be lowered under the weight and causes the transverse interior shape of the sole assembly to bulge upwardly to fit the natural transverse curvature of the foot. Although, as stated, this presents an uneven surface, it does fit the foot. Each bone of the forepart of the foot is gently supported on the cushioned surface in its natural position.

In the present construction, the insole is manufactured or assembled with the insert or resilient pad as a definite part prior to placing the insole on the last. This arrangement has several advantages. In the first place, if the insert were not in position, the cement used in lasting the

upper over the insole would get into the cavity onto the covering sheet and make it difficult to subsequently place the insert in the cavity. Also, portions of the overlasted upper and lining margins would extend over the cavity and interfere with installation. Since the operation of lasting is a wiping action inwardly over the edge of the sole, it would tend to wrinkle the covering sheet and would destroy the true contour of the opening. In other words, the opening would have a different contour in each shoe depending on the amount of displacement of the rand and buckling of the canvas.

This application is a continuation in part of our application Serial No. 303,272, filed November 7, 1939, which is in turn a continuation in part of our previously filed application Serial No. 198,098, filed March 25, 1938.

Having described our invention, we claim:

1. The method of making shoes which includes providing an insole having a cut-out portion surrounded by a rand, a soft resilient insert in the central forepart thereof, said insert being of greater thickness than the rand of the insole, assembling the upper to said insole, wiping the margin of the upper over the rand and attaching it to the margin of the insert whereby the insole including the insert is tensioned in outwardly bowed position prior to attachment of the outsole, and, thereafter laying, leveling, and attaching, the outsole on the lasted shoe.

2. In a shoe, an upper, an insole having an opening in its forepart, an insert in said opening having greater thickness than the rand of the insole, said upper having its overlasted margin overlapping the rand and insert and attached to the insert and holding the insert and insole under tension in outwardly bowed condition, and an outwardly bowed outsole secured in position over the lasted insole and upper.

3. The method of making shoes which includes providing an insole having a cut-out portion surrounded by a rand, a soft resilient insert in the central forepart thereof, and a cover over the forepart of the insole, secured to the upper faces of the insert and rand, said insert being of greater thickness than the rand of the insole, assembling the upper to said insole, wiping the margin of the upper over the rand and attaching it to the margin of the insert whereby the insole including the insert is tensioned in outwardly bowed position prior to attachment of the outsole, and, thereafter laying, leveling, and attaching, the outsole on the lasted shoe.

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