Nov. 10, 1942. F. L. AYERS 2,301,186

SHOE

Filed Nov. 16, 1939 2 Sheets-Sheet 1

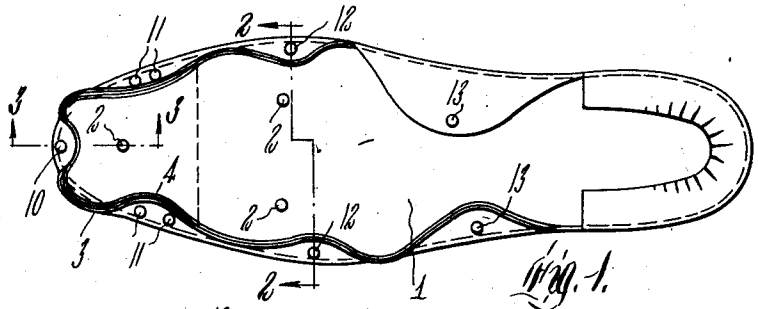


Fig. 1.

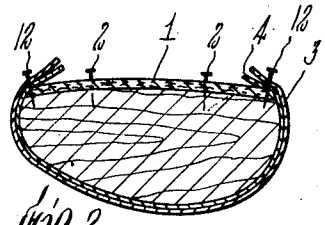


Fig. 2.

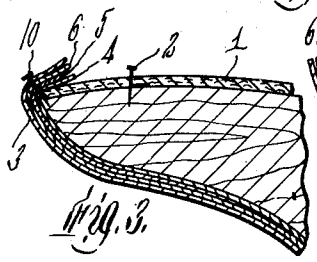


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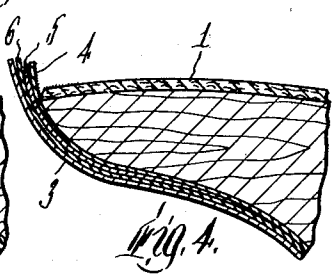


Fig. 4.

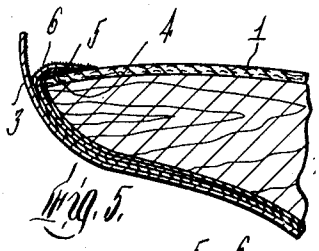


Fig. 5.

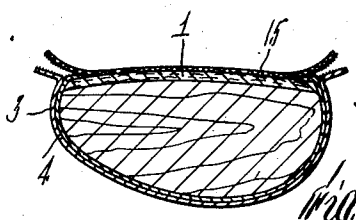


Fig. 6.

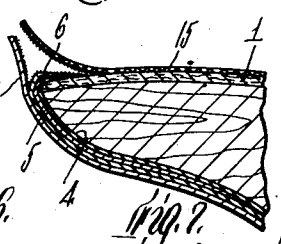


Fig. 7.

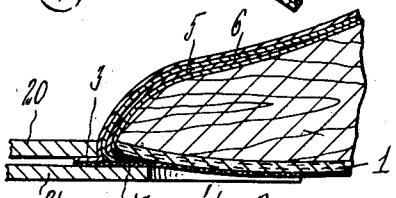


Fig. 8.

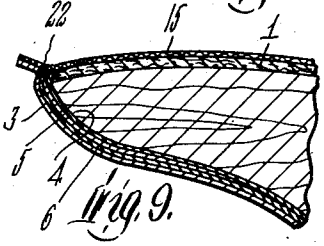


Fig. 9.

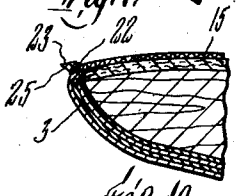


Fig. 10.

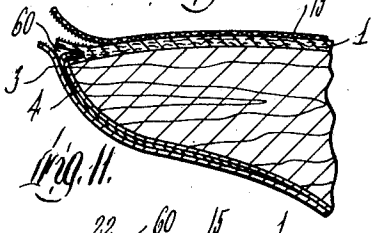


Fig. 11.

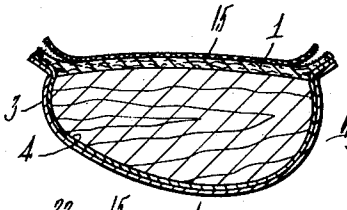


Fig. 12.

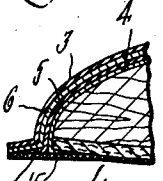


Fig. 8a

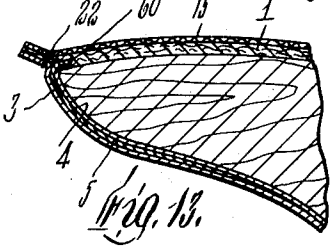


Fig. 13.

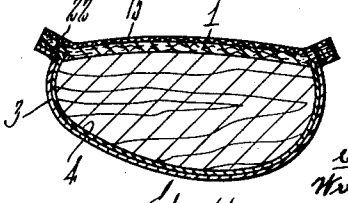


Fig. 14.

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SHOE

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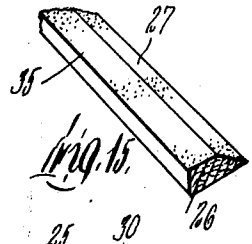


Fig. 15.

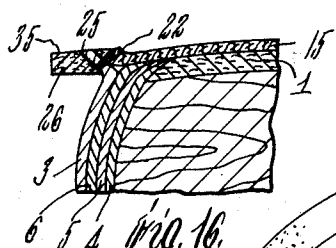


Fig. 16.

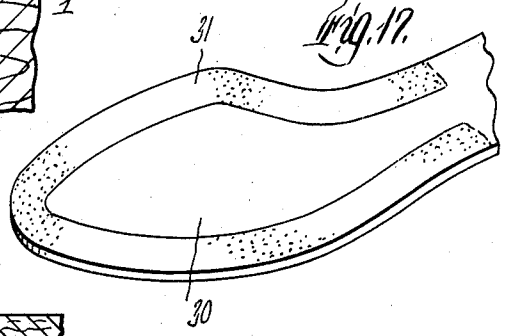


Fig. 17.

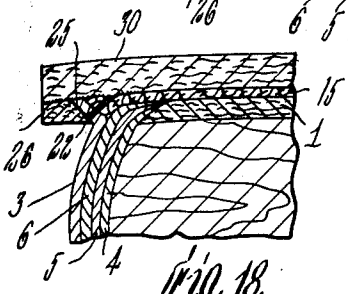


Fig. 18.

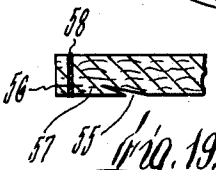


Fig. 19.

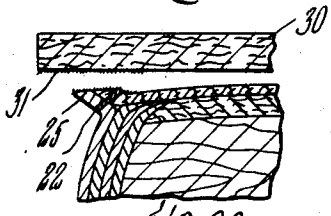


Fig. 20.

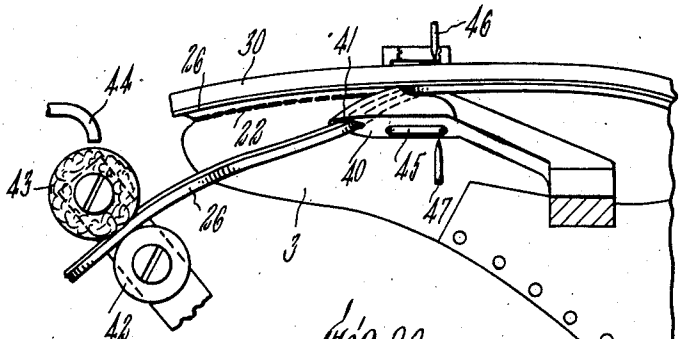


Fig. 22.

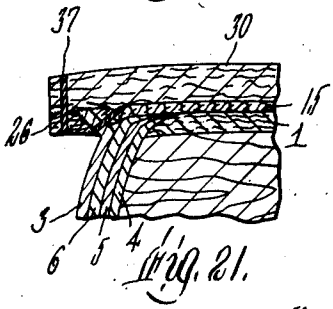


Fig. 21.

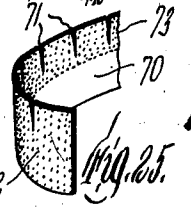


Fig. 25.

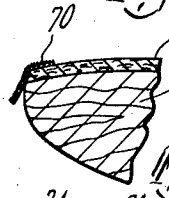


Fig. 26.

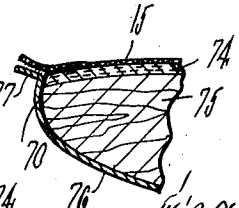


Fig. 27.

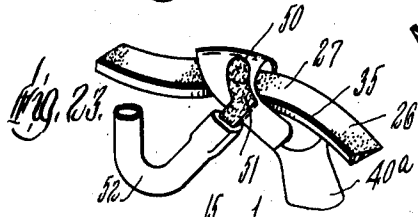


Fig. 23.

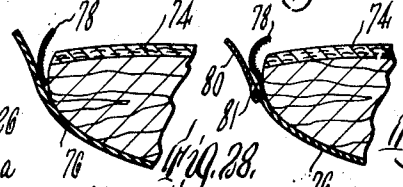


Fig. 28. Fig. 29.

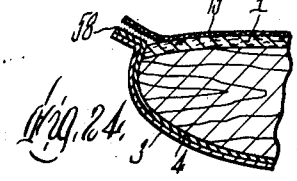


Fig. 24.

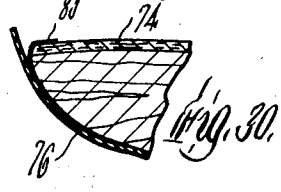


Fig. 30.

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Patented Nov. 10, 1942

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UNITED STATES PATENT OFFICE

2,301,186

SHOE

Fred L. Ayers, Watertown, Mass., assignor of one-half to Newton Elkin, Philadelphia, Pa.

Application November 16, 1939, Serial No. 304,669

1 Claim. (Cl. 36—16)

This invention relates to shoes and to their manufacture, and has for an object the making of a shoe of a highly desirable type and by a succession of manufacturing operations which can be carried through expeditiously, and which are suitable for both large and small scale commercial production. This requires that no particular skill or special care for any operation be necessary to the production of a highly satisfactory commercial product.

The shoe produced by the method of this invention has the general appearance of a welt shoe but requires no innersole channeling and no sole filler and it may be lasted with substantially the simplicity of the well known stitch down shoe. The upper materials, moreover, are securely locked into the sole structure in a waterproof manner. The process is simpler and easier to carry out than that followed in the manufacture of the usual welt shoe and results in a shoe presenting fully as good an appearance and is superior to the welt shoe in flexibility and comfort.

For a more complete understanding of this invention, reference may be had to the accompanying drawings in which

Figure 1 is an inverted plan view of a shoe assembled and partly lasted in accordance with this invention.

Figures 2 and 3 are detail sections on lines 2—2 and 3—3, respectively, of Figure 1.

Figures 4, 5, 7, 8, 9 and 10 are views similar to Figure 3, but showing successive steps in the lasting operation.

Figure 8a is a view similar to a portion of Figure 8, but showing a modification.

Figure 6 is a view similar to Figure 2, but showing the shoe in the condition of Figure 7.

Figures 11 and 13 are views similar to Figures 7 and 9, respectively, but illustrating a modified construction.

Figures 12 and 14 are views similar to Figure 2, but showing the shoe in the condition of Figures 11 and 13, respectively.

Figure 15 is a perspective view of a locking strip.

Figure 16 is a view similar to Figure 10, but to a larger scale and showing the strip of Figure 15 applied.

Figure 17 is a fragmentary perspective view of an outersole prepared for attachment to the lasted shoe.

Figure 18 is a view similar to Figure 16, but showing the outersole applied.

Figure 19 is a fragmentary sectional view through the marginal portion of an outersole showing a modified construction.

Figure 20 is a fragmentary sectional view somewhat similar in part to Figure 16, but showing a modification and showing the outersole prepared for application to the lasted shoe.

Figure 21 is a view similar to Figure 20, but showing the outersole and locking strip applied.

Figure 22 is a fragmentary side elevation of a sewing machine showing a shoe presented thereto and arranged for simultaneous cementing of the locking strip and the sewing of this strip, the lasted shoe, and the outersole together.

Figure 23 is a fragmentary perspective view of a strip guide having a cement-activating device.

Figure 24 is a view similar to a portion of Figure 6, but showing a modification.

Figure 25 is a perspective view of a member which may be used to advantage where the shoe is unlined.

Figures 26 and 27 are detail sections through one side portion of a last and related parts showing successive steps in the manufacture of an unlined shoe employing the member of Figure 25.

Figures 28 and 29 are similar detail sections showing modified constructions.

Figure 30 is a detail section through the toe end showing a further modification.

In manufacturing a shoe in accordance with the present invention, the innersole is tacked to the last as is usual in the manufacture of welt, McKay, or stitch down shoes. This innersole 1 may comprise merely a flat, sole-shaped blank of suitable material cut to the size and shape of the bottom of the last and unprovided with channeling, insole rib, or other means for securing upper materials. The innersole tacks are shown, for example, at 2 in Figures 1, 2 and 3. The bottom face of the innersole either before or after it is applied to the last may be coated with permanent cement, this acting as a priming coat, which may be allowed to harden.

The upper is then assembled on the last and this upper may comprise the outer 3 and lining 4 and about the toe it may include also a toe stiffener 5, and if desired, a doubler 6, all of these parts being positioned between the outer 3 and the lining 4. If desired, the doubler may be extended beyond the toe stiffener and may be commensurate with the lining or outer. This upper is pulled over the last and secured thereto as by the usual toe tacks 10, the forward side tacks 11, the rear side tacks 12 and preferably, also, the shank tacks 13. The tacks 10, and, if desired, the tacks 12 are then withdrawn, thus

freeing the extreme toe of the shoe. Cement is then applied to the inner face of the margin of the lining, whereupon the lining, and the doubler, if any, in the toe portion, and in some cases the box toe, are cement lasted with permanent cement against the outer face of the innersole, as shown in Figures 4 and 5, leaving the margins of the outer free as shown in Figure 5 and the tacks 12 and 13 are removed. After hardening of the cement the lasted in margins may be trimmed or otherwise flattened.

Next, there is applied to the exposed face of the innersole and to the inwardly turned margins of the lasted upper materials, a reinforcing sole layer such as 15, which may be of canvas, or the like. This canvas may be of that type commonly employed in making "Gem" innersoles which has been pre-coated with cement and allowed to dry. By applying cement to the bottom face of the innersole after which the sole tacks 2 are withdrawn, the layer 15 may be caused to adhere to the face of the innersole, to the lasted in margins of the upper materials and to the lower out-turned marginal face of the outer, as shown in Figures 6 and 7. The tacks 13 may be pulled as soon as the forepart has been adequately secured in position. By cementing the innersole rather than the layer 15, the margins of the layer, not being tacky, do not interfere with the proper positioning of the margin of the outer, nor is the cement liable to contact with unlasted parts and cause fouling of shoe parts exposed in the completed shoe.

Next, and before the cement has set, the toe portion of the shoe is molded as by the use of wipers 20 backed up by a support 21, as shown in Figure 8, causing the proper shaping of the toe with its out-turned margin overlying and secured to the top face of the layer 15. The wipers 20 and the support 21 preferably extend back at least as far as the toe stiffener, and may, if desired, extend back to the maximum width of the shoe at the ball line. Where a stiff box toe is employed, it may not be feasible to incorporate it in the upper before assembly on the last as it might become too stiff before the toe molding could be effected, for proper shaping in the absence of some effective softening treatment. In such case the box toe may be placed in position after the lasting in of the lining, in which case its margin 5a may be outturned and secured with the outer, as shown in Figure 8a, to form a portion of the marginal fin to which the outersole is later interlocked. After the toe molding operation, the layer 15 and the outwardly extending portion of the outer are preferably secured together or thread lasted as by fasteners such as a line of stitching 22 as illustrated in Figure 9. This thread lasting may be done around the whole shoe, the shank and forepart only, or the toe part only, depending upon how it is desired to complete the heel and shank portions of the shoe. With less advantage staples may be employed. If a nailed heel seat is desired, the stitching will extend about the forepart only, or about the forepart and shank. If an extension sole edge entirely around the shoe is desired, as in the stitch-down type of shoe, the stitching will be carried entirely around the shoe.

In the case of certain types of cheap shoes the pulling over and toe molding steps might be omitted, the thread lasting being sufficient as a lasting operation.

The outwardly projecting fin formed by the portions of the upper and canvas layer extending beyond the line of stitching 22, and downwardly deflected by the stitching operation, is then trimmed off as at 23 approximately alined with the lower face of the sole member 15, to tapered form. The line of stitching is downwardly and inwardly inclined. This trimming may be done first as a rough trimming and then finish trimming, or in some cases the trimming may be done in a single finish trimming operation. After the trimming operation, if the shoe is to have a stiff shank piece, this may be placed in position and secured in the usual manner, or if this is not desired, but it is desired to produce a thickened shank effect, this portion of the shoe may be provided with a plastic or other filler.

From this point on the process may follow either of two lines, depending somewhat upon whether the shoe is to present a line of outersole or outersole-simulating stitching, or whether such stitching is not desired, as would be the case, for example, where it was desired to make a close edge shoe.

If the outersole stitching effect is not desired, the upper side only of the fin 25, left after the trimming at 23, is coated with permanent cement, being previously roughened, if desired, and a locking strip 26 such as is shown detached in Figure 15 is cemented to the top face of this fin 25, as shown in Figure 16, its beveled face 27 extending over the stitches 22 and adhered thereto, or the face 27 of the strip may be cement coated and applied to the fin. This adhesion may be strengthened by employing a cement pre-treated thread for the stitching 22 which may be activated just before the stitching operation by passing it through a cement solvent. This solvent not only conditions the cement in the thread to provide a good bond with the cement on the strip 26, but it also renders the thread limber and free from the stiffness which the presence of the cement therein under dried condition would have produced and so condition it for the stitching operation.

An outersole 30, having its marginal portion 31 extending about the forepart and as far back as the inseaming stitching 22, roughened, if desired, and coated with permanent cement, is then applied as shown in Figure 18, and the parts held under pressure until the cement bond between the outersole and the lasted shoe, including the locking strip 26, is complete. This completes the soling operation, and the shoe may thereafter be completed in any desired manner.

Where it is desired to show an outsole stitch, a somewhat different procedure, after the thread lasting step, is preferably employed, as shown in Figures 20 and 21. The outersole prepared as previously described in connection with Figure 17, is applied to the lasted shoe before the locking strip 26 is secured, the sole being shown as ready to be applied in Figure 20. Thereafter the locking strip 26 is secured in position. For this purpose the locking strip 26 may have its beveled face 27 and its edge portion 35 precoated with cement and when it is applied to the shoe this cement coating may be activated and the strip applied against the upper face of the fin 25 and the upper face of the outsole 30 which extends therebeyond, and the strip 26 and the outersole may be secured together as by outersole stitching 37. If desired, however, the strip 26 may first be secured to the fin as shown in Figure 16, then the sole be applied

as shown in Figure 18, and the shoe then stitched. By cementing and then immediately stitching, however, the stitching holds the cemented parts firmly together while the cement is setting, thus insuring an excellent cement bond between the stitched parts. In whatever manner the parts are secured, however, the strip **26** serves as an extension of the outersole, which encloses the lip or fin **25** and interlocks the outersole with the lasted shoe.

Should it be desired to include the lining in the parts secured together by the stitching **22** and yet avoid a considerable variation in thickness of the fin **25**, the lining margin rearwardly of the toe stiffener may be turned outwardly with the outer as shown at **58** in Figure 24, the stiffener margin and the lining at this margin being inwardly turned as shown in Figure 7. When a doubler outwardly of this stiffener is employed, its margin may be turned outwardly with the outer, forming substantially a continuation of the outwardly turned marginal portion of the lining back of the stiffener, so that the total thickness sewed by the stitching **22** is substantially uniform. A similar construction may be employed in connection with the counter stiffener if desired.

Staples or other fastenings may be employed in place of the stitching **22**, but such fastenings do not have the desirable bonding effect which is obtained when stitching is employed, particularly when the stitching is composed of cement treated thread.

In Figures 22 and 23 are shown devices for activating the cement of the locking strip **26** just before it is guided into position against the fin **25** and the outersole margin for the stitching operation. In Figure 22 the stitching table **40** which engages in the crease between the shoe upper and the sole is provided with a guide slot **41** for the passage of the strip **26** and on its way to the table, the strip passes between a guide roll **42** and a felt roll, the latter being moistened by the cement solvent supplied thereto from any suitable source as through the feed pipe **44**. The table **40** has a slot **45** through which the usual needle **46** and awl **47** pass during the stitching operation. In Figure 23 the table **40a** is provided with a recess **50** for a wick **51** which is maintained saturated with a solvent as through the pipe **52**, the wick contacting with the faces **27** and **35** of the strip **26** as it passes therethrough.

Instead of employing a plain outersole as shown in Figure 17, it may be provided with the outwardly directed channel **55** extending toward an edge channel **56** to provide an unsevered portion **57** therebetween, a line of stitching **58** holding the marginal slit portion of the outersole together. When this form of outersole is employed, it is only necessary to cut through the stitch **58** and the unsevered portion **57** to separate the tread portion of the outersole from its marginal part which is cemented to the lasted shoe in the building up of the shoe in either of the manners hereinbefore mentioned. This sole construction is not claimed herein, as it forms subject matter of a companion application.

In Figures 11 to 14 is shown a somewhat modified construction of innersole which may be used, if desired, this being provided with a marginal slit **60** within which may be extended the margins of the lining, toe stiffener, and any other desired parts which it is not desired to have stitched together during the thread lasting operation by the stitch line **22**. This provides a firm interengagement between these parts and the innersole without requiring a variation in thickness of those parts of the shoe which are stitched together in the thread lasting operation in various portions of the circumference of the shoe. Otherwise, the operations are the same as described in connection with either of the methods hereinbefore described with reference to the lasting and securement of the outersole and the locking strip in position.

In making an unlined shoe a somewhat modified process may be employed to advantage. If an unlined shoe were made in accordance with the methods previously described, and the sole member **15** were secured to the out-turned margin of the outer, there would be no in-turned margin of the upper lasted in over the innersole. In such a situation should the stitch **22** be slightly inaccurately positioned, being spaced slightly from the outer edge of the innersole, this stitching would show, particularly at the shank, when looking at the completed shoe from the inside. Likewise, since there would be nothing to hold the innersole tight to the last about its margins, particularly at the shank, there might be danger of the needle striking the edge of the innersole, this also impairing the appearance of the inside of the shoe. In Figures 25 to 30, constructions are shown which obviate these possibilities.

Referring to Figure 25, there is shown a strip of thin material such as fabric, tough paper, or the like, at **70**. In order to facilitate the conforming of this strip to the shoe parts, if made of fabric, it may be bias tape, or if of other materials which have less inherent ability to be so conformed, one edge may be slit inwardly as at **71**. As shown, one face of this strip **70** throughout its entire area may be coated with a suitable cement as at **72**, which for ease of handling may be allowed to dry initially and then be activated when in position. The other face is cement coated for a portion only of its width, as shown at **73**. This coating may be of cement which is adhesive only to another cement-coated surface such as the exposed outer face of the innersole **74**, illustrated in Figure 26 as carried on the sole face of the last **75**. This coated face may be secured around the margin of the innersole back as far as it is desired toward the heel end, the extent of this depending upon the manner in which it is desired to last the heel of the shoe. This securement of the strip **70** in position, as shown in Figure 26, leaves the coated face **72** exposed for attachment to the outer of the shoe. This outer is shown in Figure 27 at **76** and when it has been stretched to the shoe, it is preferably caused to adhere to the outer face of the strip **70**, the margin **77** of the outer being outwardly turned. The sole member **15** is then placed in position as previously described, and its outer margin is secured to the outwardly projecting inside face of the outer, as previously described. This strip **70** thus hides from view any stitching which might otherwise show around the margin of the innersole and it also acts to tie the innersole at the shank closely against the last, so that the chances of this innersole being struck by the needle which inserts the stitching, are minimized. It also helps to keep the outer tight to the last before the thread lasting is effected.

While, as thus described, the strip **70** is first secured to the innersole and then to the upper, it may, in some cases, be first applied to the upper. This is particularly so where the upper is

provided with a fancy stitching overlay or mud-guard which determines the lasting line for the upper. In such a case this stitching may be employed to secure the strip **78** shown in Figure 28 to the outer, this strip **87** then being cemented in inturned relation to the innersole **74**.

Figure 29 shows the use of a so-called "mud-guard" **89**, which is shown as stitched at **81** to the lower portion of the outer **76**. This stitching may also secure the strip **78** in position, the margin of this strip **78** being in-turned and secured to the innersole while the marginal portion of the mud-guard **80** is outwardly turned for attachment to the sole member **15**.

In many cases, also, where a shoe is unlined, it is provided with a segmental shaped doubler extending across the toe portion. Where the shoe is so constructed, the lower margin of this doubler may be in-turned and secured to the lower face of the innersole as shown at **85**, and rearwardly from the rear edges of the doubler, a strip such as **70** or **78** may be employed running into the shank portion of the shoe and extending toward the heel to the desired extent.

Where the shoe is provided with cut-out shanks or foreparts, or both, those portions of the strip or doubler which secure the upper to the insole and which register with the cut-outs may be cut away after the shoe has been lasted.

From the foregoing description of certain embodiments of this invention, it should be evident to those skilled in the art that various changes and modifications might be made therein without departing from the spirit or scope of the appended claim.

I claim:

An unlined shoe having an innersole, an outer having a doubler at the toe portion, a marginal strip secured to the inner face of said outer on each side and extending rearwardly from said doubler into the shank portion, the lower margins of said doubler and said strips being turned inwardly and secured to said innersole, the lower margin of said outer being outwardly turned, a sole member larger than said innersole secured against said innersole and said inwardly and outwardly turned margins, said outwardly turned margins and the margin of said sole member forming a marginal fin, an outersole secured beneath said sole member, and a locking strip secured to said outersole member and overlying and secured to said fin.

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