May 22, 1956 F. MACCARONE 2,746,177

FOOTWEAR AND PROCESS OF MAKING SAME

Filed April 29, 1953 4 Sheets-Sheet 1

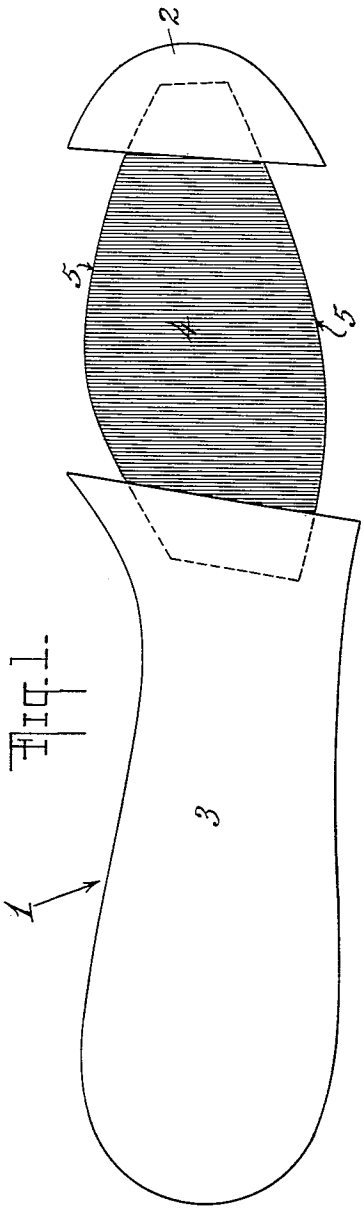


Fig. 1.

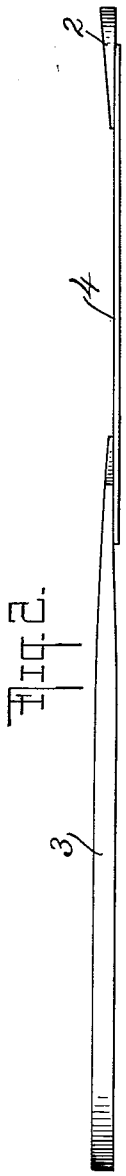


Fig. 2.

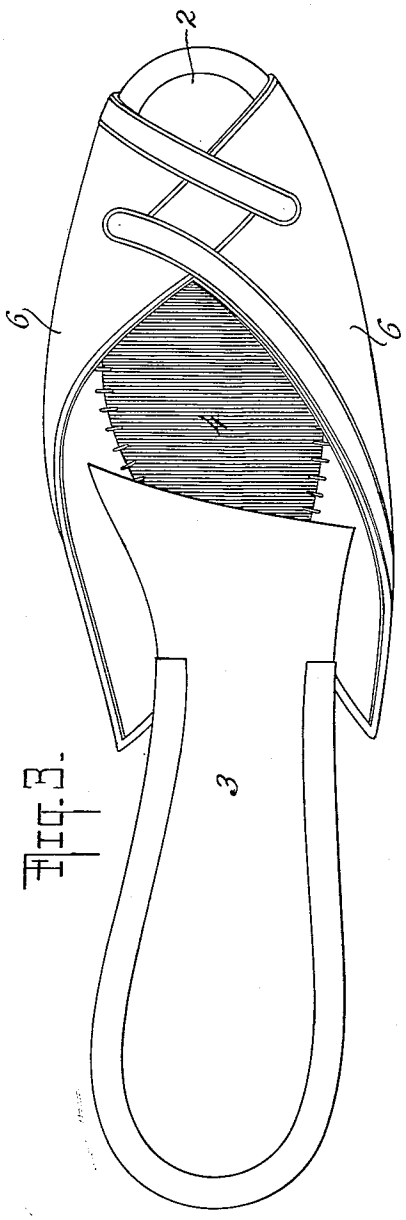


Fig. 3.

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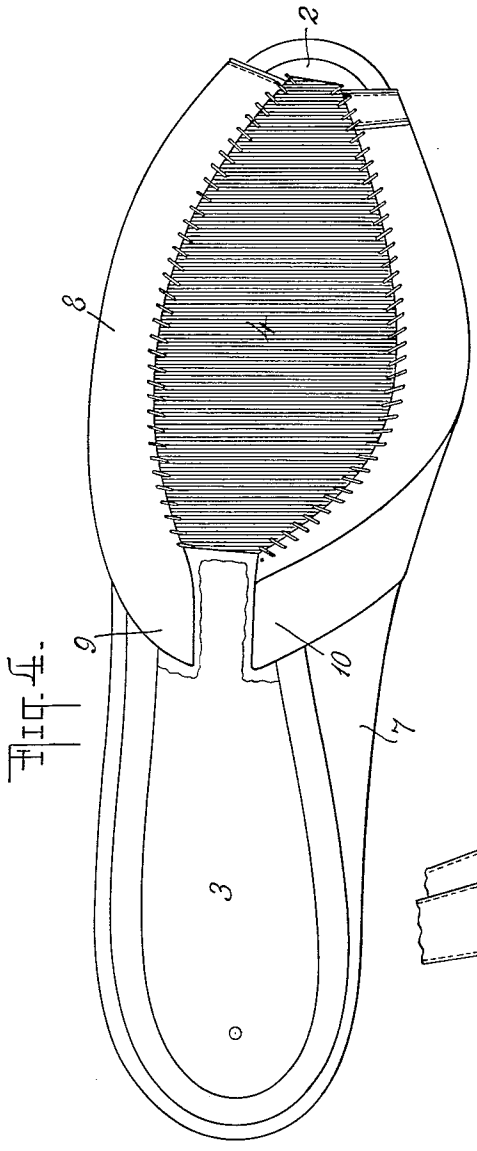


Fig. 4.

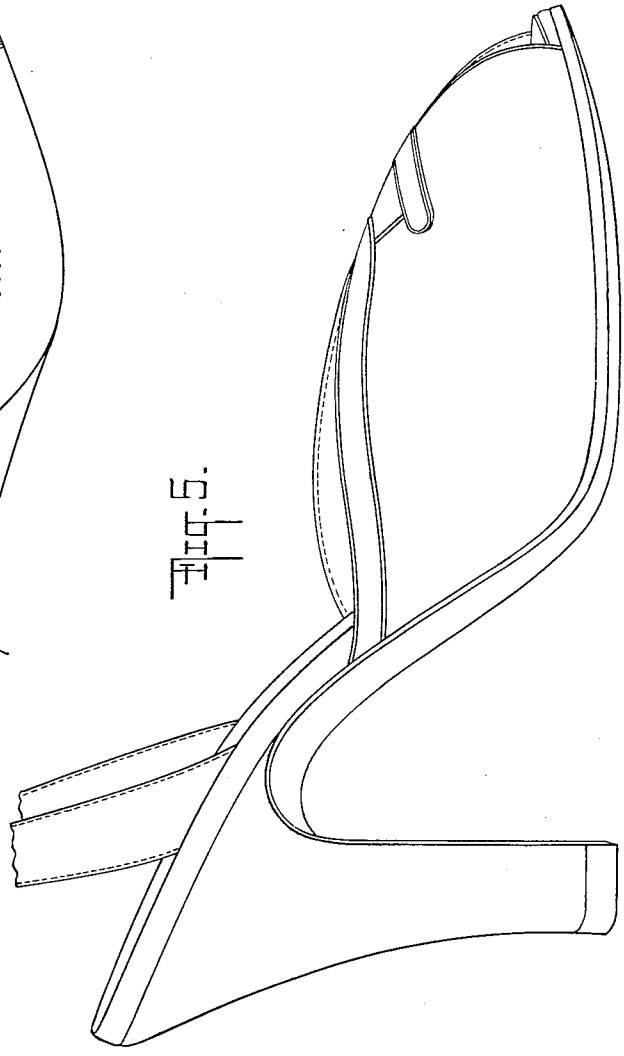


Fig. 5.

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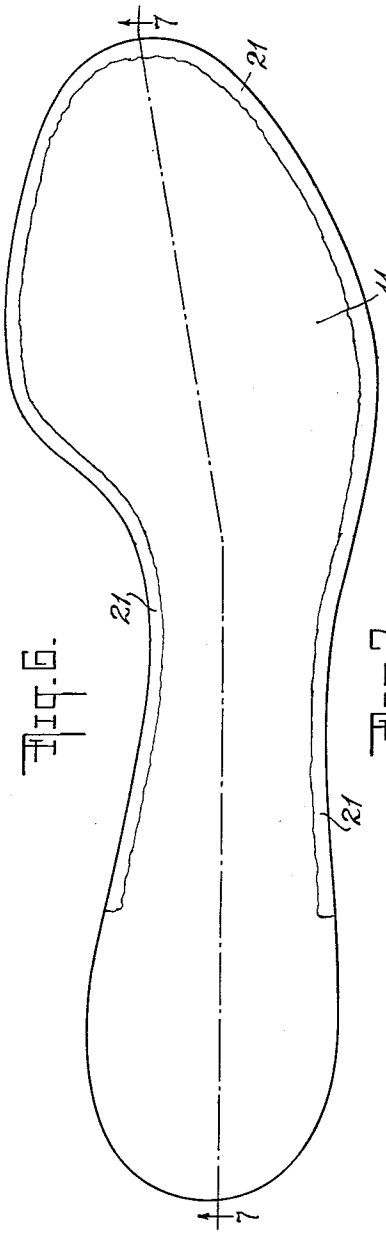


FIG. 6.

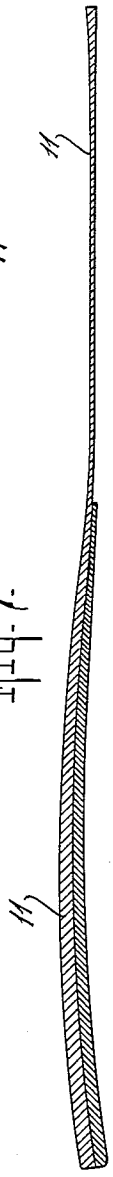


FIG. 7.

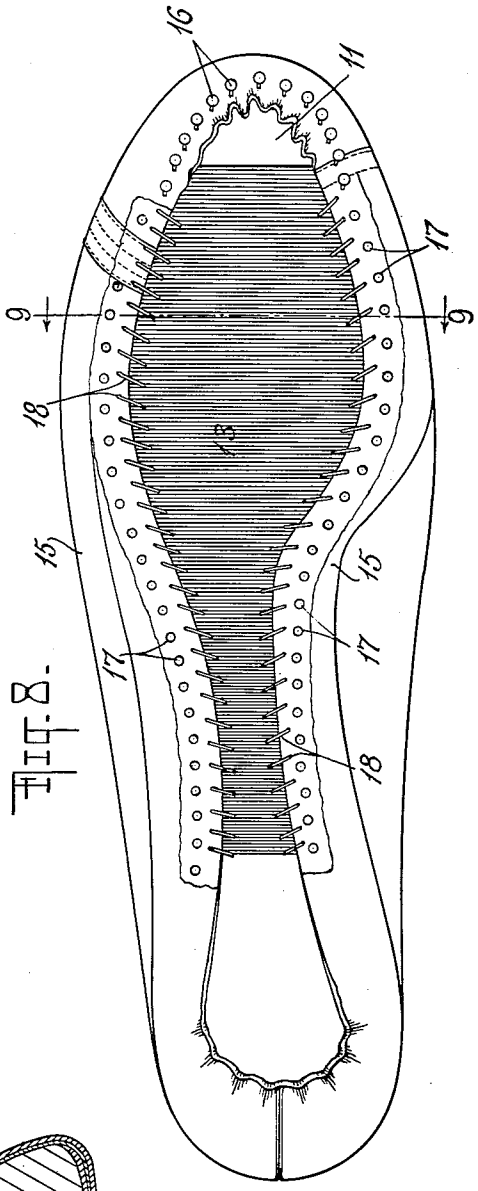


FIG. 8.

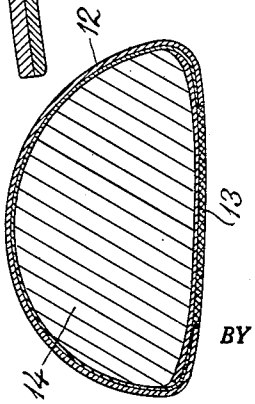


FIG. 9.

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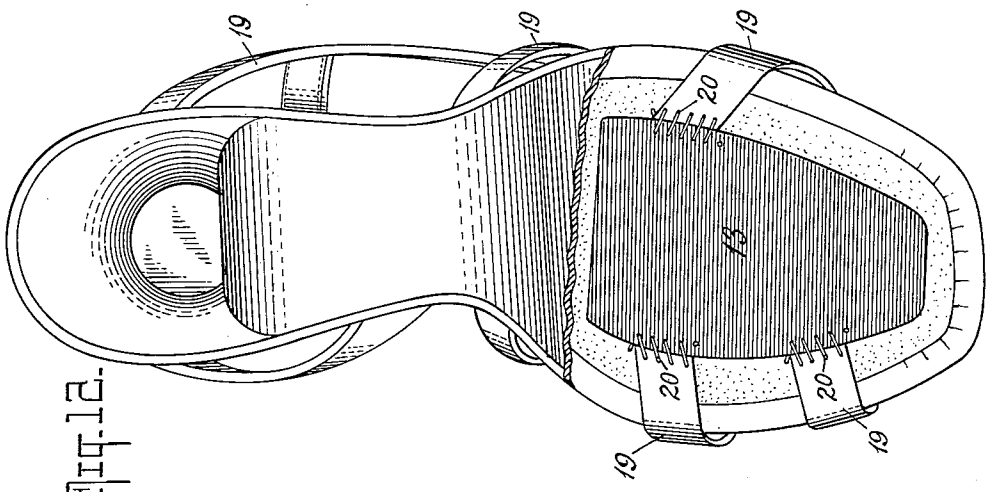


Fig. 12.

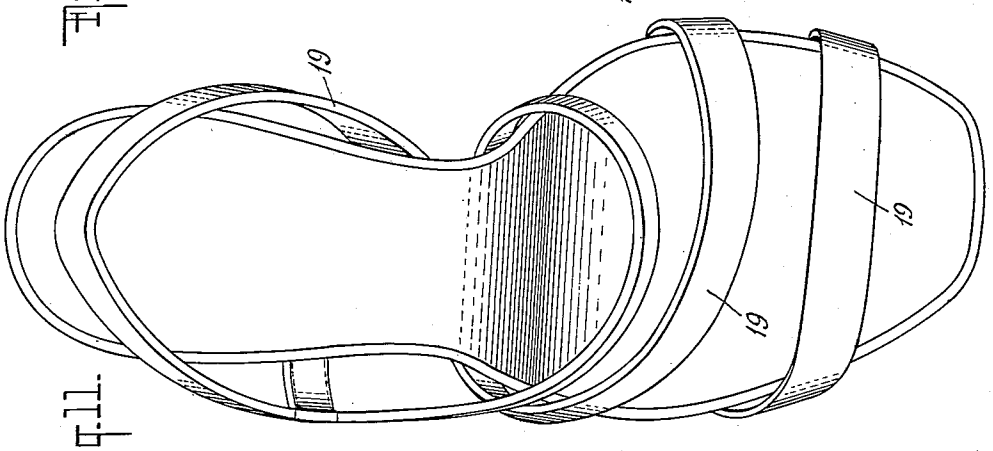


Fig. 11.

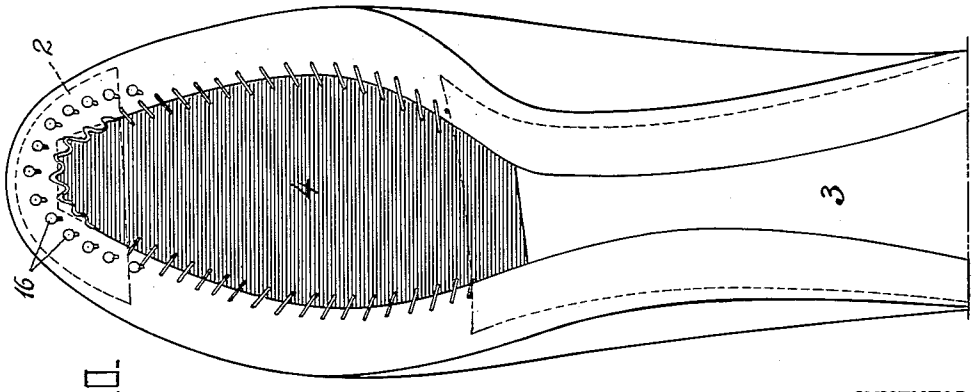


Fig. 10.

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FOOTWEAR AND PROCESS OF MAKING SAME

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Application April 29, 1953, Serial No. 351,933

10 Claims. (Cl. 36—46.5)

This invention relates to footwear and the process of making same.

Flexibility of footwear across the sole has received wide consideration among shoemakers for many years and many suggestions have been advanced with the purpose of increasing such flexibility. Some suggestions involved reducing the amount of material embodied in the portions of footwear which are subject to bending or flexing during use by the wearer. Many of such suggestions required great accuracy in preparing the parts embodied in the footwear and assembly thereof.

The object of this invention is to produce footwear, both open and closed, pumps, strap, and other types, flexible across that portion which bends during use by the wearer.

In the practice of this invention, standard shoe making equipment, with which shoe factories are now provided, may be largely used and the major portions of shoe parts are utilized with no changes therein.

In one phase of this invention, the use of an insole is entirely eliminated and in another phase thereof the full insole is used but not united centrally to the outsole, leaving that portion of the footwear free to flex.

This invention provides means which can be utilized in making a series of consecutive shoe sizes whereas heretofore each shoe size required that the parts making up the shoe be specially cut or prepared for that particular size.

In the drawings, Fig. 1 is a plan view of an assembly of parts which comprise the shank, toe piece and center piece; Fig. 2 an outside edge view of Fig. 1; Fig. 3 a plan view of the combined upper and assembly of Fig. 1; Fig. 4 underside of Fig. 3 with the last in position; Fig. 5 a side elevation of the completed shoe; Fig. 6 a plan view of an insole; Fig. 7 a section on line 7—7 of of Fig. 6; Fig. 8 a modification showing the underside of a shoe with the last therein; Fig. 9 a section on line 9—9 of Fig. 8. Fig. 10 is a view of the underside of a closed shoe having the assembly represented by Fig. 1 incorporated therein. Fig. 11 is a plan view of a modification showing the shoe upper in the form of straps stitched to the center piece and a full insole incorporated therein; Fig. 12 is a bottom view partly in section of the shoe of Fig. 11.

The drawings, Figs. 1 to 5, illustrate this invention in connection with the manufacture of an open toe and open back shoe, the illustrations representing, in actual size, a 3½C ladies shoe.

The assembly 1 is composed of three parts, the toe piece 2, the rear part member or shank 3, and the resilient girth stretcher or center piece 4. The toe piece 2 and shank 3 represent these parts cut from a normal insole of the size required for the specific shoe size as aforementioned, to more readily explain these features of the invention, and the portion of the full insole lying between the parts 2 and 3 has been discarded. Actually, in the manufacture of the parts 2 and 3, they would be cut independently from a sheet of suitable material,

leather or composite material usually used in making shoe shanks.

The center piece 4 consists of a section of resilient material the edges 5 whereof have a contour generally conforming to the corresponding portions of the lower edges of the upper 6 and is preferably one-half of an inch narrower than the corresponding portion of the distance across the forepart of the shoe. The resilient material or fabric from which the center piece 4 is cut is preferably of the woven type having incorporated therein rubber threads, which under stretching action extend and thereby cause the same to be extended and which tends to contract when released and permitted to relax. Such resilient material is preferably one with the rubber of latex threads running crosswise, which type of material is known as one way stretch fabric. Other types of resilient material may be utilized including two way stretch fabrics with rubber or latex threads, providing they have the capacity and power to draw or pull the edges of the upper 6 and the usual lasting allowance 8 toward one another and hold them in position on the last with the lasting allowance overlying the bottom of the last.

The center piece 4 has secured to it at its forward edge the toe piece 2 and at its rear edge, the forward edge of the shank 3. The amount of overlap of the center piece with the toe piece and shank may be varied according to the size of the shoe in which it is to be placed. The assembled center piece, toe piece and shank shown in Fig. 1 and utilized in Figs. 2, 3, 4 and 5 represents the proper size for a 3½C shoe. The length of the resilient center piece 4 is sufficient to allow the initial positioning of these parts to utilize the assembly, in a series of shoe sizes, viz: 3C and B; 3½C and B; 4C and B.

A shoemaker will readily know how each of the members 2 and 3 must be positioned with respect to the center piece to provide the proper predetermined size of the shoe he contemplates making. The parts 2, 3 and 4, when placed in their proper relation, may be cemented together, or stitched, stapled, or riveted together.

In the same manner, the parts 2, 3 and 4 may be initially cut to such sizes in order that they may be utilized to make other ranges of shoe sizes as will be readily understood by a shoemaker.

The upper 6 is cut to the usual size (to 3½C size as illustrated in Figs. 1 to 5). The lasting allowance 8 of the upper 6 is stitched as illustrated in Fig. 3 to the edges of the center piece 4 while the center piece is relaxed, thereby uniting upper, center piece, toe piece and shank. Any suitable type of stitches may be used which will leave the seam line generally flat. The shank is then shaped in the usually employed molding machine to the required configuration.

The shoe last 7, of the required size to make the shoe under construction, is then inserted into the upper in the manner usually practiced in shoemaking and the last is driven home in the usual manner, whereupon the center piece 4, the toe piece 2, shank 3, the upper 6, and the lasting allowance 8 assume their proper relative positions.

When the last is inserted in the assembled upper, center piece, toe piece, and shank, the pressure or force of seating the last causes the resilient material to stretch or extend at such places and along such lines so as to permit the shoe upper to assume the size and configuration of the last to which it corresponds in size. The lasting allowance will also conform to the edge of the last and lie in close relation to the last edge after the last has been driven home and the lasting allowance has been hammered.

The shank may then be tacked to the last as usually practiced in shoemaking. Cement is then applied to the

toe piece and the forward ends of the center piece in order to secure such parts together and the rear edge of the center piece is likewise cemented to the shank even though these parts might have been previously stitched, riveted or stapled together.

If necessary, the piece of footwear is given the usual roughening operation along the surface of the lasting allowance. Cement is then applied over the lasting allowance, the outsole is put in place and the last carrying the piece of footwear is then inserted in a conveyor machine or other suitable machine whereby the outsole is securely cemented to the piece of footwear. The shoe is then finished in the usual manner.

In some instances, the shoemaker prefers to form shoes with wings **9** and **10** as shown in Fig. 4. Such wings are also cemented to the shank as illustrated in Fig. 4.

It is to be noted that the major portion of the normal shoemaking procedure has not been changed. The uppers, lasting allowance, soles, shank reinforce, back straps, all retain their normal cut and configuration. The lasts are of standard size and so used; the last molding machines and the sole attaching machines are also of standard types.

In the drawing, Figs. 1 to 5, the center piece **4** lies next to the outsole and the toe piece and shank overlie the center piece. The center piece may be used reversed whereby the toe piece and the shank lie undermost and the center piece overlies them.

In the modification shown in Figs. 6 to 9 a full insole **11** is utilized as shown in Fig. 6 which insole is prepared in the usual manner (a size 4B as illustrated) for use in the production of a given shoe size. The upper **12** is likewise cut and formed to a predetermined size, corresponding to the size of the insole **11**. The center piece **13** of resilient material is cut to a width smaller than the insole (it may be cut one-half inch smaller in width than the insole) and less in width than the measurements of the shoe size under construction and is secured to the upper by the stitches **18**. The difference in crosswise dimensions of the center piece to the shoe size is sufficient when the last **14** is driven home into the upper to put the elastic under tension, which causes the lasting allowance **15** on both sides of the upper to be drawn into position with respect to the last.

In the manufacture of the shoe of Figs. 6 to 9, cement is applied on the underside of the lasting allowance at the shoe toe, and a series of tacks **16** are then driven through the cemented portion of the lasting allowance and into the last as usually practiced in shoemaking by the use of a bed lasting machine whereby the toe portion of the lasting allowance is cemented to the underlying insole **11**. In this type of operation a narrow line of cement is applied to the edges of the forepart and shank of the insole corresponding in width to the overlap of the lasting allowance as indicated at **21** in Fig. 6. This application of cement is made before the insole is inserted in the shoe and is allowed to dry as is well understood in shoemaking. In this type of shoe it is preferred to form a series of perforations **17** through both sides of the lasting allowance wherethrough cement or a solution is applied to soften the cement on the insole. The cement or solution spreads through the perforation **17** and contacts the cement, softening it and causing it, when it resets, to cement the underside of the lasting allowance and the top surface of the edges of the insole together while the parts are on the last. The outsole is then attached in the conveyor machine and the shoe finished in the usual manner. If desired, a small area of flexible cement may be applied to the center portion of the forepart of the outsole to keep it centered with respect to the flexible insert and the shoe.

In Fig. 10, the bottom of a closed shoe is illustrated, having incorporated therein the assembly **1** of the construction shown in Fig. 1. In this construction, the centerpiece **4** is stitched along its side edges, usually called the forepart, to the edge of the lasting allowance as shown in Fig. 10. The last is then inserted and driven home. Cement is applied to the toe piece **2** and to the underside of the lasting allowance underlying the toe piece. Cement is also applied to the shank **3** of the shoe and to the lasting allowance overlying it. The shoe with the last therein is then put into the bed lasting machine which drives the tacks into the toe of the shoe and into the last and simultaneously tacks the shoe seat (not shown) to the shank and to the last. It is to be noted that when the last is driven into the shoe of Fig. 10 the resilient material of the centerpiece stretches to conform the shoe size to the last size and retains the lasting allowance over the edge of the last. The shoe is then finished by the usual method of cementing a sole to the upper and the shoe otherwise finished in the usual manner.

In Figs. 11 and 12, a strap type sandal is illustrated which embodies a full size insole such as is shown in Fig. 6. The straps **19** are stitched to the resilient centerpiece by the stitches **20** as shown in Fig. 12. The insole is then inserted in the shoe and is preferably at this stage not secured therein. The selected size last for the shoe is then inserted in place and driven home. The resilient centerpiece will stretch in order to compensate for the size of the shoe. It is to be noted that the straps actually form the upper of the shoe and are to be considered as the upper in the appended claims. If necessary, the portion of the upper to which the sole is to be applied is roughened, cement is applied and the sole then cemented in position in the usual method of shoemaking and the shoe finished in the usual shoemaking manner.

The center pieces **6** and **13** preferably have outer edges which conform generally in contour to the shape of the lower edge of the shoe upper and are materially smaller than the desired shoe size. In fact, the varying widths of the center pieces must be less than the distance between the inner edges of the lasting allowance when in the position in the footwear. The difference in the relative widths of the center piece and the opening which it is to span must be such as to require the center piece to be stretched from the relaxed position when the last is inserted and pressed into the upper. This construction insures that pull will be exerted on the upper and force it to conform to the shoe last and retain it and the lasting allowance in fixed position until the outsole is attached, which then secures the parts in their permanent relation.

According to this invention, the width of the shoe, or other piece of footwear, is determined and formed by the last when driven home. Inasmuch as the resilient center piece is of less width than the ultimate shoe size and has the capacity to stretch when the last is driven home (and tends to relax when the force or pressure is released) it will compensate for the extra amount of material required to form the shoe to the size of the last. Thus, putting the center piece under tension while inserting the last, draws the lasting allowance over and downwardly with respect to the edges of the last. When the sole of the shoe is applied and secured to the upper, while the last is still within the shoe, the shoe size is fixed and the removal of the last and release of pressure on the center piece will not affect the shoe size. The center piece, when released of the pressure of the last, remains under some tension in position in the shoe and provides a foot rest for the ball and sole portions of the wearer's foot.

I claim:

1. In a shoe,, a bottom assembly including a toe piece, a rear part member and an elastic girth stretcher in the space between the toe piece and the rear part member, said girth stretcher being attached at one end to the toe piece and at its other end to the rear part member, said girth stretcher being of less width than the toe piece and the rear part member along the portions to which it is attached to the toe piece and the rear part member.

2. In a shoe, an upper having a bottom margin, and a shoe bottom assembly including a toe piece, a rear part

member and an elastic girth stretcher positioned between the toe piece and the rear part member and secured in edge-to-edge abutting relation to the bottom margin of the upper, said girth stretcher having less width than the interior of the shoe forepart.

3. In a shoe, a bottom assembly including a toe piece, a shank member and an elastic center piece bridging the space between the toe piece and the shank member and having its side edges offset inwardly from the side edges of the toe piece and the shank member respectively, said elastic center piece having less width than the interior of the shoe forepart.

4. In a shoe, a bottom assembly including a toe piece, a rear part member and a center piece bridging the space between the toe piece and the rear part member and having its side edges offset inwardly from the edges of the toe piece and the rear part member, and a fitted shoe upper having a bottom margin arranged in edge-to-edge abutting relation to the center piece and in underlying relation to the toe piece and the rear part member respectively, said center piece being attached at one end to the toe piece and at its other end to the rear part member, said center piece being of less width than the interior of the shoe forepart.

5. In a shoe, a bottom assembly comprising an outsole, an insole assembly comprising a toe piece, a rear part member and a center piece in the space between the toe piece and the rear part member and having its side edges offset inwardly from the edges of the toe piece and the rear part member, and a shoe upper having a bottom margin arranged in edge-to-edge abutting relation to the center piece and positioned between the outsole and the toe piece at the toe end of the shoe and between the outsole and the rear part member at the rear part of the shoe, said center piece being attached at one end to the toe piece and at its other end to the rear part member, said center piece being of less width than the interior of the shoe forepart.

6. In a shoe, a bottom assembly including a toe piece, a rear part member and a center piece having its side edges offset inwardly from the edges of the toe piece and the rear part member, and a shoe upper having a bottom margin arranged in coplanar relation to the center piece and in overlapping relation to the toe piece and the rear part member, respectively, said center piece being attached at one end to the toe piece and at its other end to the rear part member, said center piece being of less width than the interior of the shoe forepart.

7. A shoe comprising a bottom assembly including a toe piece, a rear part member, an elastic center piece expanded widthwise of the shoe and a shoe upper member

having a lasting margin secured to the center piece in edge-to-edge abutting relation thereto, secured to the toe piece in overlapping relation thereto, and secured to the rear part member in overlapping relation thereto, said elastic center piece having less width than the interior of the shoe forepart.

8. The process of shoemaking which comprises the steps of providing a fitted upper having a lasting allowance, providing a fabricated unit comprising a shank piece of size corresponding to the heel and shank portions of the bottom of a last on which the shoe is to be conformed, and a center piece of thin flexible elastic material of width less than the forepart of the last by an amount greater than the lasting allowance of the upper on opposite sides of the shoe, attaching said fitted upper to the center piece in edge-to-edge relation by stitching, then forcing the last into the shoe thereby stretching the elastic center piece to draw the upper snugly against the forepart of the last, lasting the upper to the shank piece, and thereafter attaching an outsole.

9. A shoe comprising an upper, an outsole and a fabricated insole, the insole having a shank piece co-extensive with the interior bottom of the shoe in the heel and shank areas and a relatively thin flexible center piece of elastic fabric having width less than the interior of the shoe forepart, the margins of the upper being secured in over lasted relation to the shank piece and in edge-to-edge relation to said elastic fabric.

10. A shoe comprising an upper, a tread sole and a fabricated unit comprising a heel, shank and toe portions respectively co-extensive with corresponding interior areas of the shoe bottom, and a relatively thin, flexible ball portion of elastic fabric having width less than the ball portion of the shoe, the margins of the upper being secured in edge-to-edge relation to said elastic fabric in the ball portion and in over lasted relation to the shank and toe portions.

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