

[54] **SHOE SOLE AND METHOD OF MAKING IT**

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[63] Continuation of Ser. No. 643,501, June 5, 1967, abandoned.

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[51] Int. Cl. A43b 13/00

[58] Field of Search 36/22 R, 25 R, 30 R, 31, 32, 36/43, 44

[56]

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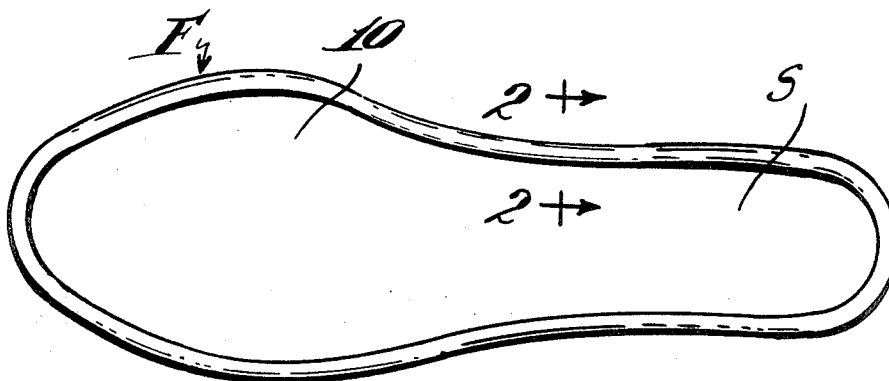
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[57]

ABSTRACT

A sole element for shoes having an edge band of thermoplastic material in lieu of a textile or other tape, and a method of making it.

1 Claim, 5 Drawing Figures



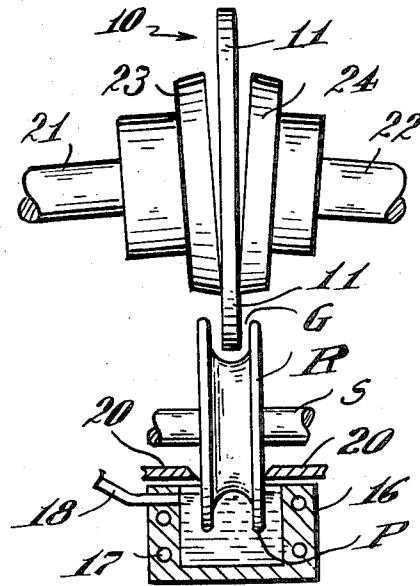


Fig. 4

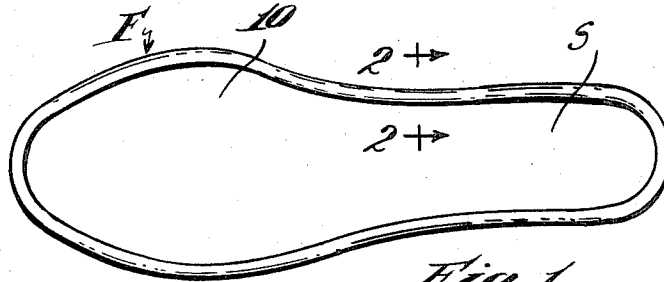


Fig. 1

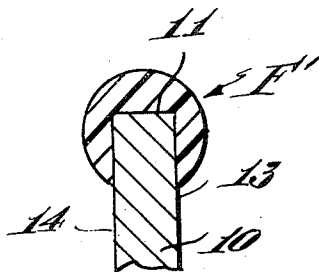


Fig. 3

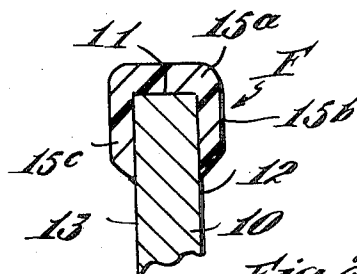


Fig. 2

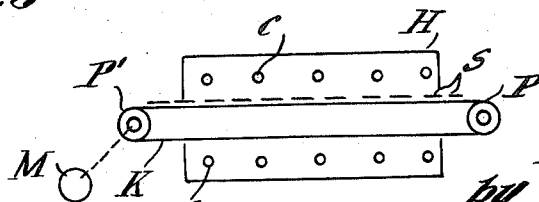


Fig. 5

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SHOE SOLE AND METHOD OF MAKING IT

This application is a continuation of application Ser. No. 643,501, filed June 5, 1967, now abandoned.

BACKGROUND OF THE INVENTION

Several types of footwear, for example, slippers, hereinafter referred to simply as "shoes," comprise, as a sole element, such as may be referred to in accordance with the particular type of shoe, as a midsole, a slip sole and an insole or the like, which is or may be, to a certain extent, visible in the finished shoe and which, because of its visibility, or because the sole blank needs reinforcement, is customarily provided with a marginal band which may be confined to its forepart or to its rear portion or which may extend about the entire peripheral edge, and which customarily has been provided by folding a textile or other tape about the edge of a sole blank and permanently securing the tape to the sole blank by sewing or by adhesion.

Although as to certain soles this band contributes little, if anything, to the functional value of the shoe, the provision of a textile tape and the assembling and the attaching of the tape to the sole blank adds in appreciable amount to the cost of manufacture.

SUMMARY

Briefly stated, the present invention contemplates the application of a synthetic plastic material in liquid condition to a selected portion or to the entire peripheral edge of a sole blank to form a coating for the edge face and for a predetermined width of the margin, inwardly from the edge, at both upper and lower faces of the sole blank. After the plastic has been applied, the blank, with its marginal coat of plastic, is exposed to conditions such as to cure the plastic. For example, if the plastic be of thermosetting tape the blank with its marginal coat of plastic is placed in a curing chamber where it is subjected to a temperature of, for example, 350° F. for a period such as completely to cure the plastic.

The operation of applying the fluid to the edge of the sole may be carried out in any appropriate way, for example, by the use of a suitably devised implement which is manually employed in drawing a stripe of the liquid coating along the sole edge, but it is preferably applied by means of a mechanical device having means for gripping and turning the blank while moving that portion of the edge of the blank, which is to be coated, through a body of the liquid material after which the blank, with the plastic still in fluid condition, may be placed upon a suitable rack or other support and installed in a heating chamber.

A sole embodying the present invention, and apparatus useful in the manufacture of said insole, is illustrated more or less diagrammatically in the accompanying drawings wherein:

FIG. 1 is a plan view of a sole embodying the present invention drawn to smaller than actual size;

FIG. 2 is a fragmentary section, to much larger size, on the line 2—2 of FIG. 1;

FIG. 3 is a view similar to FIG. 2, but showing an edge finish of somewhat different transverse shape;

FIG. 4 is a fragmentary elevation illustrative of apparatus such as might be used in the practice of the invention, but for clarity in illustration omitting the plastic material; and

FIG. 5 is a diagrammatic vertical section illustrating apparatus such as may be suitable for curing the plastic after its application to the sole blank.

Referring to the drawings, the numeral 10 (FIGS. 1, 2, 3 and 4) designates a sole blank of conventional type and material, usually prepared by a die-cutting process from sheet material and having an outer edge face 11 which, when the sole is in use, is substantially vertical — the opposite, normally horizontal faces 13 and 14 usually being parallel and perpendicular to the edge face 11. In accordance with the present invention the edge face 11 and marginal portions of the faces 12 and 13 are concealed by a band F consisting of or comprising, in major portion, a unitary body of a synthetic plastic material which is

integrally bonded to the blank 10 by its inherent adhesiveness. This finish band F, as illustrated, for example, in FIG. 2, is generally U-shaped in transverse section, comprising the U-bend 15a which units substantially parallel leg portions 15b and 15c respectively — the bend 15a concealing and adhering to the edge face 11 of the sole blank and the leg portions 15b and 15c of the U-shaped band overlying and adhering to the margins of the top and bottom faces 12 and 13, respectively, of the blank. As shown in FIG. 2 the thickness of the bend 15a is substantially the same as the thickness of the leg portions 15b and 15c of the band. The width of the respective leg portions 15b and 15c inwardly from the edge 11 of the blank may be as great or as little as may be desired for any given type of sole, for instance one-eighth inch.

In the arrangement illustrated in FIG. 3, the finish band F' is shown in transverse section as being somewhat thicker at the bend portion of the U than at the leg portions, for example, being approximately 0.5 mm. thick, with the result of providing a bead-like finish band whose exposed outer surface, in transverse section, is arcuate, providing a desirable ornamental effect.

The material which forms the finish band in either case is applied to the edge portion of the blank while in a liquid or semiliquid condition and may be applied, for example, as a purely manual operation by the use of a suitably designed implement (not here shown) containing a supply of the liquid material and having a delivery orifice or nozzle such that by drawing the orifice or nozzle along the marginal portion of the blank, a band of the desired shape and dimensions will be deposited.

Preferably the material employed in forming the bead is a quick-setting plastisol which is applied in liquid form and at a viscosity such that it will adhere to the edge of the sole without dripping off in the short interval between its application to the sole blank and its response to a curing temperature. One such material, among others, is that sold by Chemical Products Corporation of Providence, Rhode Island under the name of "Chem-o-sol." This is a vinyl chloride dispersion, devoid of volatiles, which sets within a period of three minutes when exposed to a curing temperature of 350° F. and which, when cured, may have a Shore D75 hardness; which is available at the desired viscosity for this particular purpose and in assorted colors, and which is impervious, after curing, to most detergents, perspiration, or oil. This material is stable in liquid form until subjected to the curing temperature and becomes solid with substantially no change in volume or weight.

While such a thermosetting plastisol is considered preferable in making the edge band for a sole blank, it is contemplated that instead of using such a normally liquid thermosetting plastisol, a hot-melt vinyl dispersion might be employed which would be applied hot and flowable, but which would cool substantially instantly, when exposed to the ambient temperature, after application to provide a finish having the desired characteristics.

Obviously, if desired, any suitable material, for example, a granular substance, or very short fibers might be incorporated in the liquid plastisol to impart special characteristics, either for physical or ornamental purposes.

While as above noted the plastisol may be applied by a pure manual operation, using for the purpose an appropriate implement, it is preferred to use some suitable mechanism whereby the marginal portion of the sole may be automatically advanced with reference to a body of plastic so as to pick up the plastic progressively at that portion of the margin of the sole blank which is to be provided with the finish band. Thus, for example, as diagrammatically illustrated in FIG. 4, an applicator (of a known type) in the form of a rotary, peripherally grooved roll R may constitute the holder for the fluid material, this roll being mounted on a rotatable shaft S and having the peripheral groove G which is of a transverse sectional shape approximating that of the shape of the desired edge band which is to be applied. The roll R is shown with its lower portion dipping into an open topped container 16 (shown as hav-

ing coils 17 by means of which it may be heated or cooled), and having a supply conduit 18 through which liquid plastic may be supplied to the container 16 from any suitable source (not shown) and at a controlled rate such as to keep the level of the liquid plastic P substantially constant within the container.

For ease in illustration, the peripheral groove G in the roll R is of somewhat greater dimensions than might be required — it being understood that the transverse shape of the groove will be proper to form a band such, for example, as shown in either of FIGS. 2 or 3, respectively, of the desired dimensions.

As shown in FIG. 4, the sole blank 10 is shown as interposed between rotating clamping discs 23 and 24 carried by shafts 21 and 22 respectively, whose axes are inclined to each other so that the sole contacting faces of the discs 23 and 24 converge toward each other at a steep angle. The discs 23 and 24 would be resiliently urged toward each other by any suitable means, for example, by mounting the shafts 21 and 22 in bearings in which the shafts may move axially with suitable springs (not shown) urging them toward each other, and with means for driving these shafts at the same angular velocity. With this arrangement when a sole blank is interposed between the discs 23 and 24 and the latter are rotated, the blank will be gripped and turned thereby slowly revolving the sole blank about a varying axis whereby the edge portion of the blank will always remain at the same depth within the groove of the roll R, and the margin of the blank will thus pick up adhesive plastic from the roll R, forming an edge finishing band according to the contour of the groove in the roll. Apparatus of the general type of that shown in FIG. 4 is well known for other uses.

It will be understood that the blank will be inserted manually between the discs 23 and 24 and will remain between the discs while such portion of the periphery of the blank as may be desired is traversed through the groove in the roll R. If, as shown in FIG. 1, the finish band is to extend along the entire edge of the sole blank, then the sole would make one complete revolution while undergoing the treatment. On the other hand, if only a portion of the sole is to be treated, then the blank will be inserted between the discs in such a way that during a partial revolution of the blank the band will be applied to the desired portion, only, of the sole blank and the

blank thus removed from between the parts 23 and 24. Simple experiments will inform the operator as to how to obtain the desired result.

After the fluid has been applied to the sole blank, the blank, with its band of sticky material, will now be exposed to such treatment as may be necessary to cause the plastic material to become hard and permanent. Such treatment, as above suggested, may include the exposure of the blank to an elevated temperature and for a length of time appropriate to cure the particular material — or if the material be of the thermosetting type, mere exposure of the blank with its marginal band to ambient temperature or to a refrigerating temperature will cause the plastic to set.

Thus, as diagrammatically suggested in FIG. 5, the character H designates the wall of a suitable housing provided with conditioning coils C or the like whereby the interior temperature may be kept substantially uniform and such as to cure the particular plastisol as the soles S are advanced through the chamber while resting upon the upper run of an endless conveyor K trained about pulleys P and driven at a predetermined speed, for example, by a motor M.

While one desirable embodiment of the invention has herein been disclosed by way of example, it is to be understood that the invention is broadly inclusive of any and all modifications falling within the terms of the appended claims.

I claim:

1. A shoe sole of the kind which comprises a blank whose peripheral edge is substantially vertical when the sole is in use and whose upper and lower surfaces, at least at their margins, are substantially parallel and perpendicular to said edge face, said sole having a marginal band extending along and concealing a selected portion of the edge of the blank, the band being approximately U-shape in transverse section with the legs of the U overlying the opposite margins, respectively, of the blank and with the outer edge face of the blank bend the band of the U; characterized in that the band is an endless unitary mass without joints of relatively rigid material comprising polyvinyl chloride integrally bonded to the material of the sole in an unstressed state of equilibrium, has an exposed surface which is hard and glossy and has a thickness at the edge face which is in the order of 0.5 mm.

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