

[54] **FOOTWEAR**
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[51] **Int. Cl.**.....**A43b 13/38**
[58] **Field of Search**.....**36/44, 19.5**

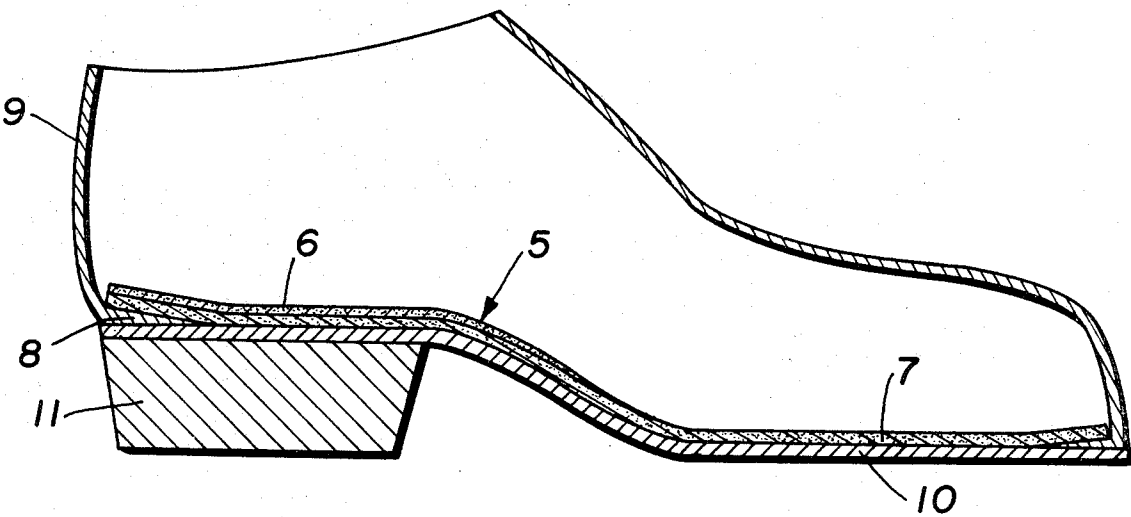
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[57] **ABSTRACT**
This invention relates to footwear and particularly to an article of outer footwear, such as a boot or shoe, which comprises an insole assembly of novel construction. The invention also relates to the insole assembly itself. Said novel insole assembly comprises an extruded thermoplastic foamed sheet having bonded thereto a textile fabric which forms the lower surface of the insole assembly so as to improve the strength of the adhesive bond to the outer edge of the upper and the sole proper.

16 Claims, 4 Drawing Figures



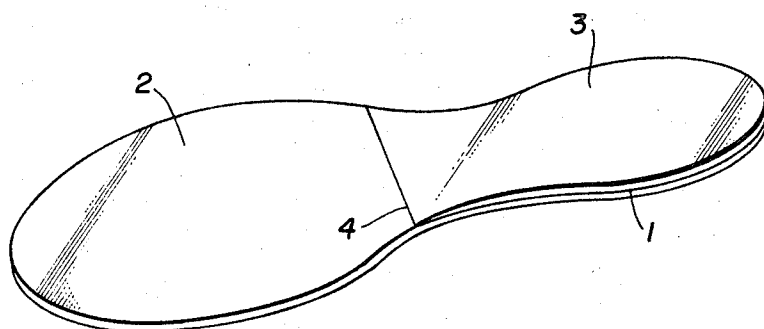


FIG. 1.

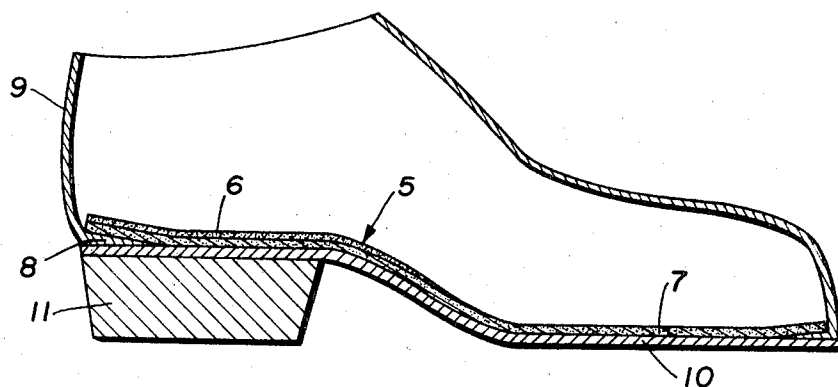


FIG. 2.

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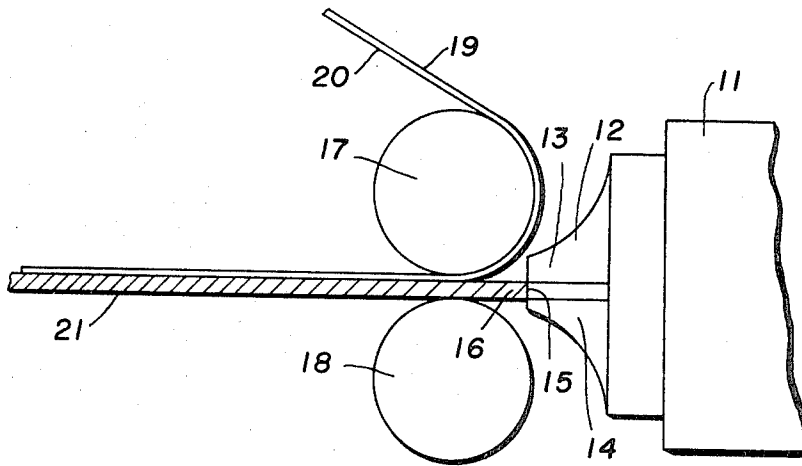


FIG. 3.

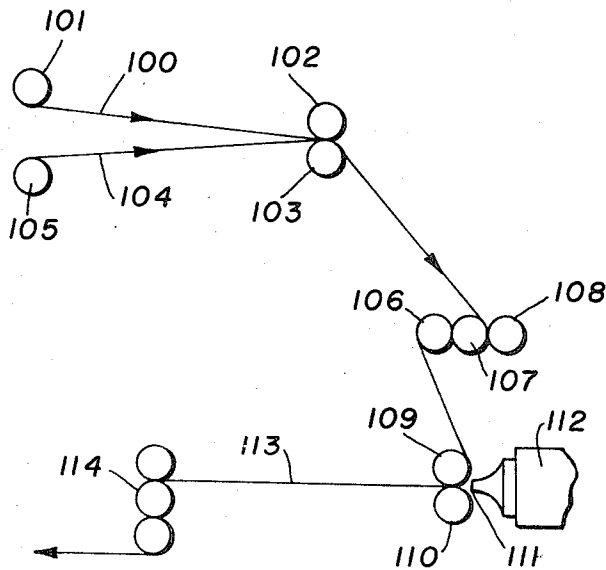


FIG. 4.

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FOOTWEAR

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the right of priority of British Pat. application No. 50504/70, filed Oct. 23, 1970.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to articles of footwear, such as a boot or shoe and to insole assemblies for such footwear.

2. Description of the Prior Art

In the construction of articles of outer footwear such as boots and shoes, the upper is normally fastened to an assembly comprising a forepart and a heel board. While this "insole assembly" is held on a last, a sole and heel are fastened to the underside of the assembly and then the part of the insole assembly visible within the shoe is finally covered by a lining or sock. The heel board is normally made of a relatively rigid material such as fibre board, but the forepart needs to be of a more flexible material.

The nature of the insole assembly is of great importance in determining the quality of the shoe. The forepart needs to be flexible in the interest of comfort, but another important requirement that generally militates against flexibility is the need for a good "recovery" or "dimensional stability," by which is meant the ability of the shoe to regain its original shape after being subjected to deformation in use. Insole assemblies having acceptable flexibility and "recovery" are described in, for example, U.S. Pat. No. 3,624,191 and U.S. Pat. No. 3,643,353, being composed of foamed resin.

The method employed for fixing the downturned edge, otherwise known as the "lasting edge," of the upper to the insole assembly is of vital importance, since a failure here results in damage to the whole boot or shoe. It is generally convenient to use adhesives in forming the bond between the upper and the flexible forepart of the insole assembly but it has always been necessary to use nails at the heel board where a particularly strong bond is an essential requirement. The use of nails has certain disadvantages because they rust and eventually lose their hold. Thus, it would be desirable to eliminate the necessity for this nailing operation.

SUMMARY OF THE INVENTION

It has now been found that a good adhesive bond can be effected if the lower surface of an insole assembly composed of resin comprises a textile fabric. The textile fabric assists the formation of a good adhesive bond between the upper and the flexible forepart and heel board.

Accordingly, the invention comprises an article of outer footwear such as a boot or shoe, having an upper the outer edge of which is bent round an insole assembly and adhesively bonded to the lower surface thereof, the insole assembly comprising a sheet of thermoplastic resin and a textile fabric which forms the lower surface of the insole assembly so as to improve the strength of the adhesive bond.

Also part of the invention is an insole assembly for use in constructing an article of outer footwear such as a boot or shoe, comprising a sheet of thermoplastic resin and a textile fabric which forms the lower surface of the insole assembly. The sheet of resin is preferably bonded

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directly to the textile fabric, and the laminate so formed constitutes a part of the flexible forepart or heel board, the flexible forepart and heel board being the two essential components of the insole assembly. It is preferred that the flexible forepart should be entirely composed of the laminate and that the laminate should extend completely over the lower surface of the heel board. In a particularly preferred insole assembly the laminate extends over the whole of the lower surface of the insole assembly and the heel board is integral with the flexible forepart.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an insole assembly having a textile fabric bonded to the lower surface thereof (not shown).

FIG. 2 is a section through a shoe incorporating the insole assembly shown in FIG. 1.

The insole assembly consists of a heelboard 1 and a flexible forepart 2, the flexible forepart and the lower surface of the heelboard being composed of a sheet of foamed resin. In addition, the heelboard 1 comprises a shank board 3, for example of cellulose fibre, skived to zero thickness at its forward end 4 and adhered to the upper surface of the sheet of foamed resin.

The shoe illustrated in FIG. 2 comprises an insole assembly 5 having a heelboard 6, and a flexible forepart 7. Adhesively bonded to the lower surface of the insole assembly is a textile fabric (not shown).

In constructing the shoe the outer edge 8 of the upper 9 is bent around the heelboard 6 and adhesively bonded to the textile fabric which is bonded to the lower surface of the insole assembly. The sole proper 10 is then adhesively attached to the insole assembly 5 followed by the heel 11.

FIG. 3 is a section of an apparatus used to prepare the insole assemblies of the present invention comprising a slit die.

The apparatus consists of an extruder 11 to which is attached a slit die 12 provided with upper and lower die lips 13 and 14 defining the slit die orifice 15.

The molten resin layer 16 passes into the nip between upper and lower rollers 17 and 18, respectively which are placed close to the die lips 13 and 14. It is thus brought into contact with the adhesive treated surface 19 of the textile fabric 20, the textile fabric 20 passing around the surface of the upper roller 17.

The laminate 21 produced from the textile fabric and foamed resin sheet is withdrawn in the direction shown.

FIG. 4 illustrates an example of a method which can be used to coat the fabric which is bonded to the lower surface of the insole.

A thin film of resin 100 is withdrawn from a source of the material 101 and is passed into the nip between two rollers 102 and 103 where it contacts a sheet of textile fabric 104 drawn from a source of the textile fabric 105. The two component sheet issuing from the two rollers is passed to a stack of three rollers consisting of two outer rollers 106 and 108 being maintained at a low temperature while the inner roller 107 is kept at a high temperature. The fabric and film are passed around the inner roller 107 and over an outer roller 106 by which means the film is heat sealed to the fabric.

This adhesive treated fabric is passed to the upper and lower die rollers 109 and 110 respectively, where it travels around the upper die roller 109 into the nip

between these two rollers. A molten foaming resin layer issuing from the die orifice 111 of an extruder 112 contacts the adhesive treated fabric in the nip between the upper and lower die rollers 109 and 110. The laminate 113 so formed is passed through a calendering system 114 to apply a finish to the laminate from whence the laminate is trimmed and wound up.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The textile fabric that forms the lower surface of the insole can be chosen from a wide variety of materials which include woven or non-woven fabrics and knitted fabrics. Among the non-woven fabrics that can be used there are fabrics derived from loose fibrous materials or staple fibres that have been impregnated with adhesive or otherwise bonded together, and non-woven fabrics of a three-dimensional structure of interconnected fibre elements, such as, for example, those described in British Pat. specification No. 1,114,151.

However, the preferred textile fabrics for use in the invention are materials that have been woven or knitted, being composed of natural, synthetic fibres or cotton are especially useful, for example, fabric generally referred to as cotton scrim is excellent for the present purposes.

The thickness of the textile fabric is generally in the range of from 0.05 to 0.5 millimetre, more preferably from 0.15 to 0.4 millimetre, such as, for example, 0.25 millimetre. Textile fabrics having a weight per unit area of from 20 to 300 grams per square metre, preferably from 100 to 200 grams per square metre, are especially useful.

The thermoplastic resin is preferably a polyolefin or a copolymer of an olefin and a non-hydrocarbon aliphatic monomer or a blend of such resins. The olefin component is preferably an olefin having from 2 to 4 carbons such as, for example, ethylene, propylene, butylene, or a mixture of such olefins. The most preferred olefin is, however, ethylene. The non-hydrocarbon component of the copolymer can, for example, be an alkenyl halide, for example vinyl chloride or allyl chloride, an unsaturated alcohol such as, for example, allyl alcohol or the notional vinyl alcohol, or an amide such as for instance acrylamide, but preferably the non-hydrocarbon monomer is an unsaturated ester. An unsaturated ester can be the result of the reaction of an unsaturated alcohol with a saturated acid, or a saturated alcohol with an unsaturated acid or of an unsaturated alcohol with an unsaturated acid so that suitable esters include for example, vinyl acetate, ethyl acrylate and allyl methacrylate. Preferred unsaturated esters, however, are those formed from a lower unsaturated alcohol and a lower aliphatic carboxylic acid. The unsaturated alcohol portion of such an acid comonomer can for instance contain up to 4 carbon atoms such as, for example, allyl alcohol or a methallyl alcohol but preferably the alcohol is the notional vinyl alcohol. The acid portion of the molecule can also for instance contain up to 4 carbon atoms, for example it can be acetic, propionic, or a butyric acid, acetic acid is, however, preferred. There can if desired be more than two monomers in the copolymer, for example the olefin can in fact be a mixture of two or more hydrocarbons, so that the copolymer can be, for example, a mixture of ethylene and propylene copolymerized with vinyl acetate; or there can be a mixture of two or more non-

hydrocarbon monomers, for example, the copolymer can be one of ethylene with a mixture of ethyl acrylate and methyl methacrylate or with a mixture of vinyl acetate and vinyl alcohol. The last-named copolymer can be conveniently produced by the partial hydrolysis of a copolymer of ethylene and vinyl acetate.

The copolymer resin preferably contains from 2 to 17 percent by weight of the non-hydrocarbon monomer, more preferably from 3 to 15 percent by weight and, for example from 3 to 5 or from 10 to 13 percent by weight. Excellent results have been obtained employing resins containing respectively about 4 percent and about 12 percent of the non-hydrocarbon monomer. Preferably the resin substantially consists of a copolymer of the olefin and the non-hydrocarbon monomer, but it can be a polyolefin or a blend of such a copolymer with a polyolefin, and in this latter event of course, the proportion of non-hydrocarbon monomer in the copolymer can be greater than 17 percent by weight, for instance up to 30 percent or 45 percent by weight, sufficient polyolefin being blended with the copolymer to reduce the amount of non-hydrocarbon monomer in the resin as a whole to the value desired. The polyolefin can be of the "low-pressure" type, for example, a polyethylene or polypropylene made using a chromium oxide or organometallic catalyst system but preferably it is a "high-pressure" polyethylene, for instance having a density of from 0.90 to 0.94 grams per cc.

The copolymer can itself be a blend of two copolymers of an olefinic hydrocarbon and non-hydrocarbon monomer.

Preferably the sheet has a substantially uniform thickness, by which it is meant that the thickness does not vary by more than 15 percent, and preferably any thickness variations are not greater than 5 percent. Where, as is preferred, the sheet is integral with the insole flexible forepart, the thickness is conveniently determined by requirements of this part of the sheet. In general the type of footwear being made determines the choice of insole thickness, thinner insoles normally being needed for children's and ladies' shoes than for men's boots or shoes. Preferably, the thickness is from 0.05 to 0.1 or 0.15 inch, and very often from 0.06 to 0.085 inch is particularly suitable.

According to an important preferred feature of the invention, the resin sheet is foamed. Preferably the foam has a substantially closed cell structure, by which it is meant that the majority, normally at least 90 percent, of the cells are closed. Preferably the majority of the cells, more preferably at least 75 percent, of the cells have a diameter of from 0.004 to 0.04 inch, for example, from 0.01 to 0.03 inch. The density of the foamed sheet is very often from 5 to 40 pounds per cubic foot although sheet of higher or lower density can be employed. Often a density of from 20 to 40 or from 22 to 30 pounds per cubic foot, for example, a density at the lower end of this range, such as about 24 pounds per cubic foot, is most suitable. Lower density materials, for example, within the range of 5 to 10 pounds per cubic foot can be used when the resin is a polyolefin, especially polypropylene. The foamed sheet may contain fillers, or it may have a non-foamed skin on each side which is not usually thicker than about 0.002 inch.

The sheet is preferably an extruded one. A non-foamed sheet can be made by conventional methods, while a foamed sheet is normally made by extruding a foamable mixture of the resin and a suitable blowing

agent underpressure through a die into a zone of lower pressure (usually the atmosphere) so that the expansion of the blowing agent and foaming of the resin takes place. Normally a slit die is used, although it is perfectly possible to employ an annular die to extrude a tube of resin that is later slit longitudinally and opened out into a flat sheet. Where a slit die is used to produce a foamed sheet, the die can have a flared outlet if desired and a pair of rollers can be placed in front of it so that the extruding sheet passes between them; such rollers have been found to assist in the production of a smooth flat sheet free to thickness variations and corrugations. Alternatively, the use of a single roller, as described in British Pat. No. 1,264,852, gives very good results.

British Patent No. 1,264,852 describes a process for producing a flat sheet of a foamed thermoplastic synthetic resin, which comprises extruding a layer of a foamable thermoplastic synthetic resin through a slit die orifice into contact with the cylindrical surface of a single roller rotatable about an axis parallel to the slit, such that the layer foams while it is in contact with the rotating roller surface and expansion in a direction parallel to the slit is substantially limited by such contact, and withdrawing the resulting foamed sheet from the roller.

The sheet of foamed thermoplastic synthetic resin produced by the above methods can be bonded to the textile fabric by means of an adhesive, for example, a cold or hot-metal adhesive. Specific examples of suitable adhesives include polyvinyl acetate, polyurethane and neoprene adhesives, as well as hot-melt adhesives of the polyester, polyamide or ethylene/vinyl acetate copolymer type. The adhesive can also be of the type that contains a solvent for the resin which on evaporation results in a firm bond between the fabric and the sheet of foamed resin. For example, a fabric impregnated with such a solvent can be passed together with a sheet of the foamed resin into the nip between two rollers (heated if necessary) which bring the two components into intimate contact, and subsequently dried either by passing the material through a suitably heated oven or by allowing the solvent to evaporate to the atmosphere. Useful solvents of this kind include for example xylene. Alternatively the fabric can be bonded to the sheet of foamed resin by a heat-sealing method.

In a preferred method of producing the laminate of textile fabric and foamed resin sheet, the molten resin layer is extruded through a slit die into the nip between a pair of rollers while the textile fabric is simultaneously fed through the rollers, the roller contacting the molten layer being chilled so as to solidify the layer. This roller can, if desired, be embossed so that a corresponding pattern is produced on the resin sheet. An example of the apparatus which can be used in such a method is illustrated in FIG. 3 which is described above.

In general, contact between the textile fabric and the molten resin layer is made at as early a stage as possible, the slit orifice being preferably positioned from 0.05 inch to 0.5 inch from the slit orifice measured along a radius of the roller.

The adhesive employed in treating the surface of the textile fabric can be any of those described above. For example, if the adhesive is heat activated than the treated fabric can be passed through an oven or subject to radiant heaters before it travels around the upper roller and between the rollers. A particularly conve-

nient adhesive to employ is a thin resin film which is preferably of similar or identical composition to that of the foamed sheet resin, and which is heat sealed to the fabric before the latter is passed between the rollers.

An example of a method which can be used in such an instance is illustrated diagrammatically in FIG. 4, which is described in greater detail above.

Another preferred method of producing the laminate is by a modification of the process described in British Pat. specification No. 19187/69 in which a fabric is fed to the single roller and the layer of foamable resin is extruded into contact with the fabric on the roller such that the layer foams while it is in contact with the moving surface of the fabric. The laminate so formed can be passed over or between subsidiary rollers. For example the fabric and foaming resin in contact with it can be passed into the nip between the single roller and a subsidiary roller parallel with the single roller and preferably arranged vertically above it.

The resin employed in producing a foamed sheet is of course foamable, and this means that it is an admixture with a blowing agent which is preferably a gas or vapour under normally atmospheric conditions but which can be a volatile liquid. In many cases the blowing agent is one that is normally gaseous but which while under pressure before extrusion will be present in solution in the molten or semi-molten resin. Examples of volatile substances that can be used include lower aliphatic hydrocarbons such as ethane, propane, butane or pentane, lower alkyl halides such as methyl chloride, trichloromethane or 1,2-dichlorotetrafluoroethane, and inorganic gases such as carbon dioxide or nitrogen. Nitrogen and the low aliphatic hydrocarbons, especially butane or isobutylene, are preferred, and a mixture of nitrogen and a low aliphatic hydrocarbon is often particularly useful. The blowing agent can also be a chemical blowing agent, which can, for example, be a bicarbonate such as, for example, sodium bicarbonate or ammonium bicarbonate, or an organic nitrogen compound that yields nitrogen on heating, such as, for example, dinitrisopentamethyldiamine or barium azodicarboxylate. From 3 to 30 percent especially from 7 to 20 percent by weight based on the weight of the resin is often a suitable proportion of a liquid or readily liquifiable blowing agent. Where the blowing agent is a permanent gas it is more convenient to consider relative volumes at Standard Temperature and Pressure, and, for example, the use of 0.5 to 5 parts, preferably from 1 to 2 parts by volume of nitrogen at S.T.P. in conjunction with 1 part by volume of polyethylene has given excellent results. Often the use of amounts of blowing agent at the lower end of the above ranges results in the production of a thicker sheet.

Sometimes the blowing agent is employed in conjunction with a nucleating agent, which assists in the formation of a large number of fine cells. A wide range of nucleating agents can be employed, including finely divided inert solids such as for example silica or alumina (if desired in conjunction with zinc stearate), or small quantities of a substance that decomposes at the extrusion temperature to give a gas can be used; an example of the latter class of nucleating agents is azodicarbonamide. Boric acid, calcium acetate, calcium propionate and calcium benzoate are each excellent nucleating agents. A small proportion of the nucleating

agent, for example, from 0.02 to 5 percent by weight of the resin, is usually effective.

The resin can also contain such additives as coloring agents, antioxidants, stabilizers, lubricants and so on, if desired. For example, it is often desirable to color the resin where it is to form part of a sandal, the construction of which renders the edge of the insole assembly visible as the welt. A clay or other brown pigment is very often suitable for this purpose.

The production of the articles of footwear can follow normal practice, except for the use of an adhesive at the heel end instead of nails, although it is necessary where the resin sheet is foamed to ensure that the degree of exposure of the resin sheet to elevated temperatures, for instance when using a hot melt adhesive, is not sufficient to cause collapse of the foam structure. This can generally be arranged where the necessary bonding between the sheet and other components of the shoe is achieved by means of a hot melt adhesive such as a polyamide or polyester adhesive or with a polyurethane adhesive or water-based adhesive such as rubber latex or neoprene adhesive, or even by injection molding of a plasticized polyvinyl chloride sole and heel, provided that contact with elevated temperatures is maintained for as short a time as possible. It is for instance surprising that a polyamide or polyester hot melt adhesive can be used at 240°C. with a resin having a softening temperature of only 120°C. or even less, if the period of time for which the insole is exposed to this temperature is not more than 5 seconds. Even better results in this respect can be obtained if the resin contains a relatively small proportion of non-hydrocarbon monomer, for example, from 3 to 7 percent, or 3 to 5 percent, by weight. Any metal plate or press foot maintained in contact with the insole during the process should normally be at a temperature lower than the softening point of the resin. Rubber vulcanizing is not in general a suitable method, owing to the excessive temperature/time cycles involved. Traditional methods such as stitching or nailing can of course be employed, for example for fixing the sole and heel, but this is not preferred since full benefit from the advantages of the invention is not thereby achieved.

The material of the heelboard itself is not of great importance, any conventionally used material such as for instance cardboard or a resin-bonded cellulosic fibre board being normally suitable. However, it should be remembered that the invention may permit the employment of a somewhat cheaper material than would otherwise be possible.

Where, as is preferred, the resin sheet is integral with the flexible forepart of the insole assembly, the resulting excellent flexibility of the insole assemblies renders them particularly useful as components of ladies' casual shoes and children's footwear, but they can also be very well employed in, for example, men's shoes or boots, ladies' court shoes, ladies' fashion boots or sports footwear for either sex.

The invention is illustrated by the following example.

EXAMPLE

This example describes a shoe according to the invention.

A laminate was first produced by a method as described earlier in the specification with reference to FIG. 4 of the drawings. A film of ethylene/vinyl acetate copolymer containing 12 percent by weight of vinyl ac-

etate, of 0.05 millimetre thickness and 30 centimetres width, was passed between two parallel rollers 102 and 103 where it was brought into contact with a sheet of cotton scrim having a thickness of 0.25 millimetre and a weight per unit area of 120 grams per square centimetre. The two component sheet was passed through a stack of three parallel rollers 106, 107 and 108 in the way described above and illustrated in FIG. 4 of the drawings. The temperature of the two outer rollers 106 and 108 was that of the surroundings while the inner roller 107 was maintained at a temperature of 150°C. A slight pressure was applied to the materials as they were passed through the roller system which enable a good heat-seal to be made between the film and the cotton scrim. The product was an adhesive treated cotton scrim which could be bonded directly to an extruded resin.

The extruder 112 had a barrel of nominal diameter 3½ inches and a slit die orifice 111 25 inches long and 0.010 inch wide. The resin was a copolymer of ethylene and vinyl acetate containing 4 percent by weight of vinyl acetate. 100 parts by weight of the resin in the form of granules were dry blended with 0.05 parts of azodicarbonamide as nucleating agent. The resulting mixture was fed into the hopper of the screw extruder and nitrogen under a pressure of 350 pounds per square inch gauge was injected into the molten mixture in the extruder barrel and the resulting foamable composition was extruded at a temperature of 150°C. into the nip between upper and lower die rollers (109 and 110 respectively), the surface of the upper roller being 0.020 inch from the slit orifice.

The laminate 113 formed was passed to a calendering system 114, trimmed and wound onto a reel. The total thickness of the laminate was 2 millimetres.

In making up the insole strip the laminate was cut into lengths 4 feet long and 12 inches wide. Neoprene solvent adhesive was applied to the side of the laminate not bearing the cotton scrim so as to cover an area from one edge of 4 feet by 6 inches. To the treated area was bonded under pressure and at a temperature of approximately 70°C., a cellulose fibre board, known as a "shank" or "backer board" also treated with neoprene solvent adhesive. The fibre board had a thickness of 2 millimetres skived to zero at its forward end and the foamed laminate extended over its entire lower surface.

From this blended insole strip were cut insoles which were fixed to lasts cotton side down and a leather upper lasted to the insole assembly (including the heel board) by means of a polyamide hot melt adhesive. A strong bond was formed between the cotton scrim surface of the insole assembly and the upper. Finally a rubber composition sole and heel were attached to the shoe by neoprene adhesive. No grindery (nails, staples, etc.) was employed at any stage.

The resulting shoe was found to be strong and comfortable, and survived extended wearer trials without failure of the adhesive bond between the upper and the insole assembly. The peeling strength of the bond was 25 pounds weight per inch.

What is claimed is:

1. An improved article of outer footwear such as a boot or shoe, having in combination a sole, an upper the outer edge of which is bent round an insole assembly and adhesively bonded to the lower surface thereof, wherein the improvement being the insole assembly, comprising a sheet of extruded foamed thermoplastic

resin having bonded thereto a textile fabric which forms the lower adhesive surface of the insole assembly so as to improve the strength of the adhesive bond to the outer edge of the upper and the sole.

2. An article of footwear according to claim 1, in which the sheet of resin is bonded directly to the textile fabric and the laminate so formed extends over the whole of the lower surface of the insole.

3. An article of footwear as in claim 1, in which the textile fabric is a woven fabric made from synthetic fibres or cotton.

4. An article of footwear according to claim 1, in which the resin comprises a polyolefin.

5. A article of footwear according to claim 4, in which the polyolefin is polyethylene.

6. An article of footwear according to claim 1, in which the resin comprises a copolymer of an olefin and a non-hydrocarbon aliphatic monomer.

7. An article of footwear according to claim 6, in which the copolymer is a copolymer of ethylene and vinyl acetate having present in the copolymer about 2-17 percent by weight of vinyl acetate and about 83-98 percent by weight of ethylene.

8. An article of footwear according to claim 7, in which the resin sheet is foamed, each side of said sheet having a substantially non-foamed skin less than about 0.002 inch in thickness.

9. An article of footwear according to claim 7, in which the foamed resin has a substantially closed cell

structure and the majority of the cells have a diameter from 0.004 inch to 0.04 inch and wherein the density of the foamed resin is from 5 to 40 pounds per cubic foot.

10. An article of footwear according to claim 1, in which the resin sheet is foamed and is bonded to the textile fabric by means of an adhesive.

11. An article of footwear according to claim 1, in which the resin sheet is foamed and is bonded to the textile fabric by heat sealing.

12. An insole assembly for use in constructing an article of outer footwear such as a boot or shoe, comprising a sheet of extruded foamed thermoplastic resin having bonded thereto a textile fabric which forms the lower surface of the insole assembly, said lower surface being an adhesive surface.

13. An insole assembly as in claim 12, in which the sheet of resin is bonded directly to the textile fabric and the laminate so formed extends over the whole of the lower surface of the insole.

14. An insole assembly as in claim 12, in which the textile fabric is a woven fabric made from synthetic fibres or cotton.

15. An insole assembly as in claim 12, in which the resin comprises a polyolefin.

16. An insole assembly as in claim 15, in which the polyolefin is polyethylene copolymer.

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