

May 9, 1933.

E. A. MURPHY

1,907,856

RUBBER FOOTWEAR

Filed Sept. 5, 1930

Fig. 1.

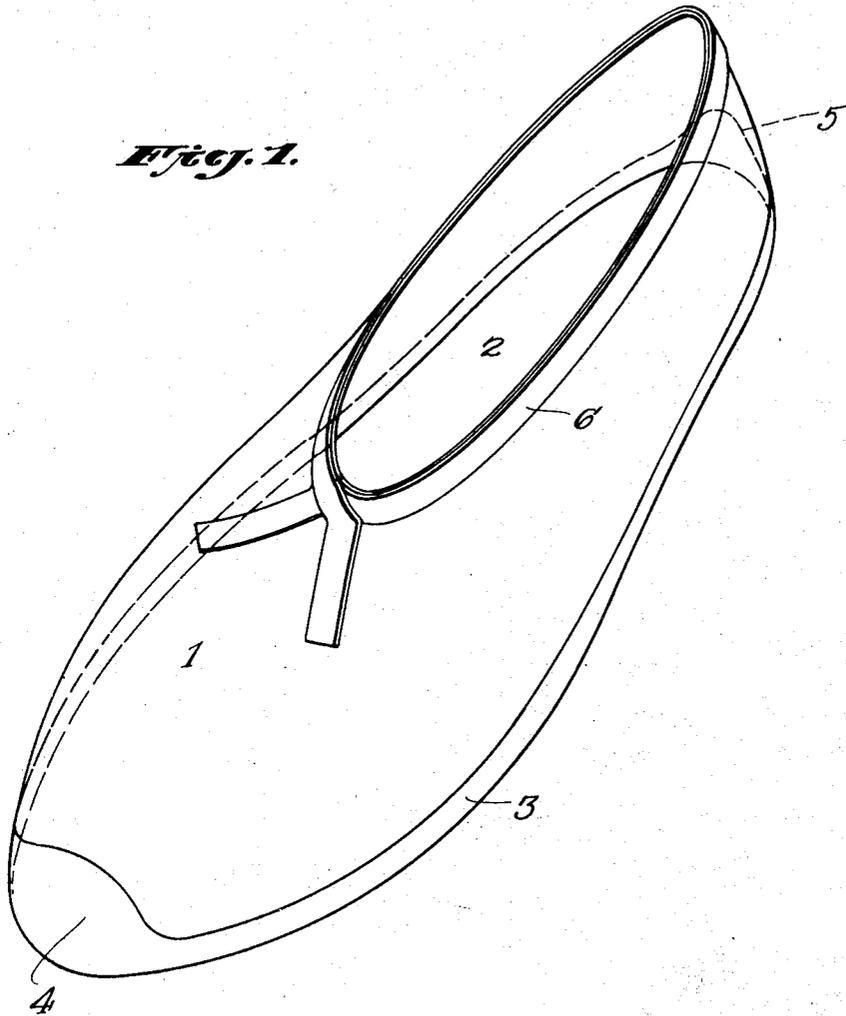
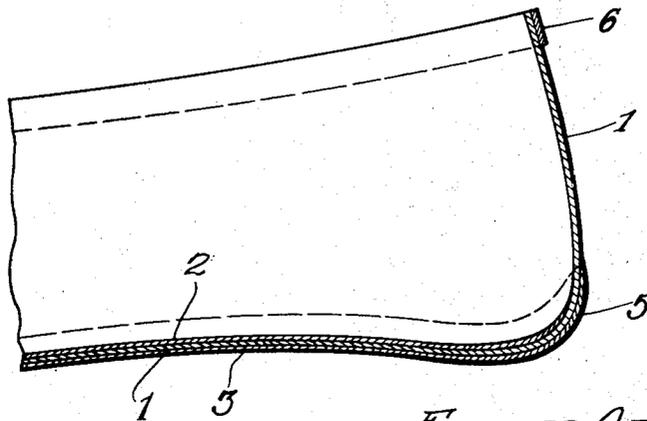


Fig. 2.



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RUBBER FOOTWEAR

Application filed September 5, 1930, Serial No. 479,829, and in Great Britain October 5, 1929.

This invention relates to rubber footwear and refers more particularly to bathing shoes or beach shoes.

The object of the invention is to provide bathing shoes or beach shoes of an improved construction or arrangement wherein the shoes are constructed so as to form seamless articles of rubber or waterproof compositions in those parts which are likely to be subjected to extra stress or wear, the bonding between the layers being perfect throughout, and wherein the sole and/or upper parts of the shoe are provided with a roughened or wrinkled or cellular or embossed surface, thereby providing a shoe of increased durability and improved appearance, having at the same time provision against any tendency to slipping.

Heretofore bathing shoes and similar footwear have generally been made by forming the different parts, such as the uppers, sole and insole, of different pieces of compounded crepe rubber, then securing these pieces together by adhesion with a cement, or otherwise, and vulcanizing them. In making shoes in this manner the bonding between the different parts is not always perfect, there being planes of division or adhesion between the different parts which always do not have the desired strength and which, in any event, are weaker than the parts themselves, each particle of which is joined to the other in a single mass by cohesion.

An object of my present invention is to provide a bathing shoe, or other article of footwear, in which the entire shoe or the essential parts thereof, are formed in a single mass without any planes of adhesion between the separately formed parts, and in which particular parts may yet be made of rubbers of different appearance or characteristics suited for that particular part or area of the shoe; and to provide a method by which these shoes may be made.

In accordance with my invention, the bath-

ing shoe or other footwear is made from aqueous dispersions of rubber materials in any suitable manner, such as by forming deposits of the dispersed material on a suitable form, by dipping, spreading, electro-deposition or otherwise. Different elements of the shoe structure, such as the sole, the insole, toe and heel reinforcements, and even ornamentation, may be added in this manner on appropriate parts of the shoe structure. In the case of insoles, the insole may be first formed on the sole of the former, then the bottom and sides of the shoe may be formed over the insole deposit and sides of the former, and finally an outer wearing sole may be formed on the bottom of the shoe structure and, if desired, a toe reinforcement may be formed. These various deposits or layers are thus formed in integral masses without any planes of adhesion inasmuch as they are all formed in the same process and cured as a unit. The color, type and characteristics and, if desired, the compounding of the various deposits may, however, differ. For example, the insole may be formed of highly porous rubber to give a soft cushion and the outer sole may be compounded and treated to give a hard wearing surface while, at the same time, maintaining the unity of the structure mentioned above. The sole and upper part may, moreover, be given appropriate colors and their surfaces may be given a wrinkled effect or other configuration suited for their particular purposes. These effects may be obtained either by chemical or osmotic effects on the rubber before curing, or by a suitable embossing before final curing.

The rubber compositions are used in the form of solutions of rubber or like vegetable resins in organic solvents or as emulsions or dispersions comprising natural or artificial aqueous dispersions of rubber or similar vegetable resins such as gutta-percha or balata with or without the addition of aqueous dispersions or emulsions of rubber-like sub-

stances such as the so-called synthetic rubber or mineral rubbers or rubber substitutes such as factice or rubber reclaim or rubber waste or oils, e. g. rape oil or vulcanized oils or cellulose esters, viscose or proteins, for example, casein.

The dispersions may be concentrated and/or compounded or vice versa. The compounding ingredients may be chosen from vulcanizing agents such as sulphur, fillers and reinforcing agents such as whiting, clay, barium sulphate, lithopone, lamp black, gas black, zinc oxide, accelerators of vulcanization coloring matters and preservatives or softeners. Compounded concentrates such as are described in Patent No. 1,846,164 of February 23, 1932, are particularly suitable for use.

Aqueous dispersions of artificial rubber with or without any one or more of the hereinbefore mentioned compounding ingredients can also be employed.

The shoes are constructed or formed on suitable formers, for example, of aluminum, from the solutions or dispersions hereinbefore specified, by the use of one or more operations such as dipping, spreading, spraying, or electrophoresis.

The roughening or wrinkling of the surface of the soles and the uppers, if desired, may be effected by the process described and claimed in British Patent No. 324,988. The embossing effect may be obtained, for example, by the application of rollers having the desired indentations and projections on their cylindrical surfaces to the rubber surface before vulcanization.

Furthermore, the seamless soles and upper parts of shoes may be made from sponge rubber, for instance, from aqueous emulsions or dispersions of the kinds hereinbefore specified which have been converted into a frothy condition wherein the froth comprises a gas and the emulsions or dispersions aforesaid still in the reversible condition, subsequently causing the frothy mass to set to a permanent structure of irreversible solid material.

Decorative designs can also be provided upon the uppers of the shoe integrally united therewith. These decorations can be effected by, for example, the operation of piping with the aid of tubes which are supplied with rubber compositions of creamy or viscous consistency, or by spraying using pencil sprays of one or more colored dispersions of the kinds hereinbefore specified. The bathing shoes or beach shoes can also be provided with colored jazz type patterns or ornamentations, for instance, according to the method described and claimed in Patent No. 1,832,514.

Patent No. 1,832,514 refers to a method of forming a deposit on a form surface from an aqueous dispersion, coagulating the deposit and dipping it into water containing

on its surface bodies of color solution in jazz-wise arrangement.

The shoe, if desired, may be provided with a part or parts, for example, an edging or insole produced separately by known means, as for instance, from calendered sheet or rubber fabric.

The accompanying drawing shows by way of example, an embodiment of the invention. Fig. 1 is a perspective view of a bathing shoe or beach shoe constructed so as to form a seamless article of rubber composition reinforced with extra layers of rubber or waterproof compositions in those parts which are likely to be subjected to extra stress or wear, the bonding between the layers being perfect throughout and wherein the sole and upper parts of the shoe are provided with a roughened or wrinkled surface.

Fig. 2 is a sectional elevation view of the heel portion of the shoe showing the layers of rubber or waterproof compositions.

According to the figures the shoe shown includes as the upper part 1 a seamless shell of rubber, prepared for instance, by a dipping operation into the aqueous dispersions aforesaid superimposed upon the insole 2 also formed from the aqueous dispersions aforesaid, by for example, a dipping operation.

Upon the shell 1 is superimposed, if desired, by dipping, a seamless sole 3 made to cover the toe-cap 4 and to rise at the heel 5 for purposes of reinforcement. The heel and toe portions may be formed by a proper dipping movement, either automatically or by hand, or the entire sole and toe and heel parts may be formed by depositing in any other suitable manner the dispersed material from the latex. The outer sole layer, which includes 3, 4 and 5 has again a wrinkled effect as, for instance, according to British Patent No. 324,988. The top of the shoe is strengthened by a binding 6. The binding 6 may be applied in the same manner as other parts, or may be applied in the usual way with adhesives, if desired.

When the shoe is completed there are no planes of division nor of adhesion between the shell 1 and the inner and outer soles 2 and 3. The entire shoe is one mass in which any given portion is united cohesively with adjacent portions, as contrasted with one in which some parts are joined adhesively to others. This particular structure is attained while still permitting the characteristics in various parts of the shoe to be varied at will.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Rubber footwear comprising a shell, an insole and an outer sole all in a single unitary mass united cohesively without planes of adhesion, said inner sole being of foam structure, and said outer sole being dense.

2. A method of making rubber footwear

which comprises depositing an insole mass of porous rubber from a dispersion thereof, forming a wall of rubber material on and in a unitary mass with said insole deposit and continuing into the upper portion of the shoe, forming on the bottom part of said wall a compact outer sole of rubber material from an aqueous dispersion thereof, and thereafter curing said elements in a single structure.

10 In witness whereof, I have hereunto signed my name.

EDWARD ARTHUR MURPHY.

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