

[54] **RUNNING SOLE FOR SPORTS SHOE**

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[58] **Field of Search**..... **161/62, 63, 64, 65, 66,**
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28/74 P; 36/2.5 A, 25 R, 30 A, 30 R

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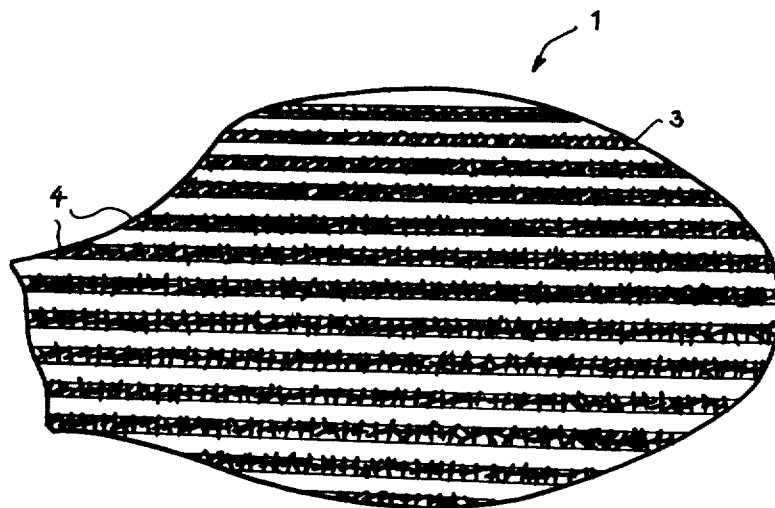
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[57] ABSTRACT

A running sole for a sports shoe and a method of manufacturing such a sole, wherein the carrier of woven fabric has fiber bristles projecting downwardly therefrom at least over certain areas of the carrier, the bristles being stiffened and glued to one another by impregnation with a synthetic resin, such as an epoxy resin adhesive, which is applied to the bristles by moving an applicator relative to the woven fabric carrier such that the fiber bristles come into contact with the applicator and take up the resin therefrom.

15 Claims, 2 Drawing Figures



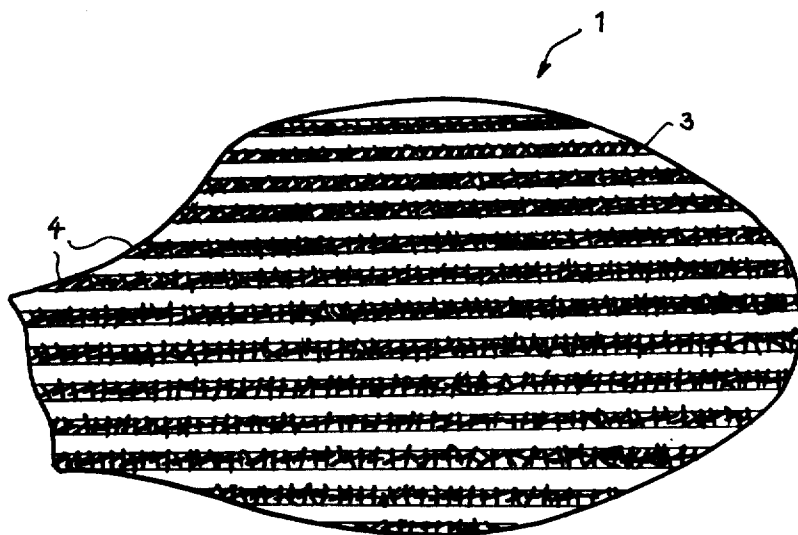


Fig. 1

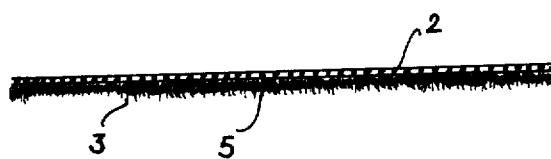


Fig. 2

RUNNING SOLE FOR SPORTS SHOE

The invention relates to a running sole for a sports shoe, more particularly a running shoe, having downwardly projecting bristles of synthetic or textile material distributed over at least part of the area of the running sole.

The introduction of synthetic material tracks for sporting running and jumping competitions has resulted in entirely new problems with respect to the design of running soles for sports shoes. The conventional spikes proved increasingly unsuitable for the synthetic material track since they penetrate too deeply into the track and are virtually immovably constrained by the track at least during part of the rolling off process and thus interfere with the rolling off process and particularly with the natural lateral movements of the foot which occur during the rolling off process. For this reason a variety of proposals for design of running soles have already been put forward. These proposals are essentially directed to replace the conventional spikes by a multiplicity of small, comparatively short gripping bodies or elements which, while not penetrating too deeply into the artificial track, are intended to claw into the track and thus afford the required non-slip safety for the athlete.

In one such known track shoe it is contemplated that comparatively strong bristles of steel or synthetic material are secured to the running sole and cover the latter entirely or in some areas only. These bristles must be comparatively strong so as to prevent their collapsing under the weight of the athlete and for the same reason a sufficiently strong anchoring to the running sole is necessary. To this end they pass through the running sole, which leads to a relatively complex and costly production. Additionally, because of their thickness, the bristles must not be of less than a certain length, since their gripping effect will otherwise be impaired. This, however, can result in the artificial track being damaged, especially if the bristles are of steel, although even worse damage is known to result from the conventional spikes.

It has furthermore already been proposed to cover the running sole of track shoes, at least in some areas, with shark skin from a certain kind of shark. This shark skin has uniformly distributed, very short (about 1 mm) and fine spikes which hook into the surface of the track and because of their great number provide a safe grip. But shark skin of this kind is comparatively expensive so that this too results in an increased price of the thus equipped sport shoes.

Finally it has already become known, although not from sport shoes, to affix fibres adhesively to the underneath surface of the outer sole of footwear in such manner that the fibres are sprinkled into a film of adhesive present on the sole or are sprayed onto the underneath surface of the sole together with the adhesive. But this method of manufacture always results in an arrangement of the fibres on the running sole which imparts a velour of velvet-like appearance thereto. Adequate support on a track of synthetic material, as is demanded of the running sole of a sports shoe, cannot be obtained by this method.

According to the invention there is provided a running sole for a sports shoe comprising a carrier, fibre bristles distributed at least over certain areas of said carrier and extending downwardly therefrom, and a

synthetic resin impregnation stiffening and gluing said fibre bristles to one another.

Advantageously the carrier for the fibres is a fabric with which the fibres are interwoven and arranged in velvet-like manner, but preferably in the manner of a Manchester or cord weave, in parallel longitudinal ribs.

By virtue of the textile or plastics fibres protruding from the woven fabric being impregnated with the synthetic resin the fibres are adhesively interconnected and form minute bunches to which the synthetic resin imparts a comparatively great rigidity against being bent over or flattened. The fine fibre tips which still protrude from these bunches of fibres cooperate with the artificial track in a manner very similar to that which has earlier been described in connection with the shark skin sole. Since the fabric carrying the fibres is totally flexible it has no stiffening effect on the base of the shoe so that the latter can be constructed according to known principles, irrespective of the subsequent application of the synthetic fibres.

A synthetic resin adhesive such as is used for metals, for example an epoxy resin adhesive, is advantageously used as the synthetic resin. This adhesive is preferably so applied into or onto the fibres that the carrier, e.g. the woven fabric, remains free of adhesive.

Manufacture of the running sole according to the invention is extremely inexpensive. As far as the production of the Manchester cloth or velvet-like textile starting material is concerned no detailed explanations need be given herein since the production thereof is known. It suffices to indicate that the production is performed on a double loom, the material being subsequently separated in the middle between the woven layers so that the fibres interwoven with the basic fabric protrude in the manner of bristles. The production of the running sole according to the invention is then carried out in such manner that the carrier having such upstanding textile or plastics fibre bristles is passed through under an applicator to which liquid synthetic resin is uniformly fed, so that the synthetic resin is absorbed by the fibre bristles. The running sole is subsequently cut out of the carrier in known manner. A suitable applicator is for example a slit nozzle or the like, under which the carrier web is so displaced that the fibre bristles come into contact with the nozzle and wipe the synthetic material off its mouth. The arrangement whereby the carrier is displaced below the applicator has the advantage of some of the liquid synthetic resin absorbed by the fibres running along the fibres so that the tips of the fibres slightly protrude from the fibre/resin combination.

It is also feasible to apply the synthetic resin to the fibres by means of a rotating applicator drum, the synthetic resin being continuously and uniformly fed to the applicator drum. It is advantageous for the amount of synthetic resin supplied to be metered in such a way that no excess of synthetic resin reaches the carrier for the fibres.

Further features and advantages of the present invention will become apparent from the description of a preferred exemplary embodiment which follows with reference to the accompanying drawings, in which:

FIG. 1 is a plan view of the running surface of a portion of one example of running sole according to the invention; and

FIG. 2 is a longitudinal section taken along line II—II of FIG. 1.

The running sole 1 shown in FIG. 1, only the foresole region of which is illustrated as far as the arch, consists of a woven cotton fabric 2 with which plastics (polyester) fibres 3 are interwoven in such manner that the fibres 3 are arranged in parallel ribs 4 in the manner of a Manchester or cord fabric. The fibres contain a synthetic resin impregnation 5 surrounding the fibres up to the running surface of the woven fabric 2 and firmly gluing them to each other. As is apparent from FIG. 2 only tips of fibres protrude from the synthetic resin impregnation 5 which tips have become very hard as a result of a fine layer of synthetic resin effected by the synthetic resin impregnation. The woven fabric 2 itself is free of synthetic resin so that it retains original flexibility to bending in any direction.

While the fabric 2 is of cotton or advantageously of polyester-reinforced cotton (ratio e.g. 50:50) the fibres 3 are of synthetic material. For the synthetic resin impregnation 5 any synthetic resin is suitable which can be applied to the fibres in molten or dissolved state, which after cooling or evaporation of the solvent solidifies to a rigid body and thereby adhesively joins the fibres 3 to each other and stiffens them. A particularly suitable adhesive is an epoxy resin adhesive such as that sold under the Registered Trade Mark "Araldite".

In order to produce the inventive running sole according to FIG. 1 it is merely necessary to introduce the synthetic resin into the erect fibres of a web of Manchester or cord cloth. This can be done by spraying or drop-wise application of synthetic resin. Since it is advantageous, although not essential for the fibre-carrying fabric 2 to be kept free of synthetic resin and this cannot be ensured with certainty during the spraying or drop-wise application of the synthetic resin, the latter is suitably applied in such manner that the fabric web is moved past an applicator, e.g. a slit nozzle or an applicator drum continuously fed with liquid synthetic resin and the synthetic resin is wiped off the applicator. It is thus possible to limit the quantity of synthetic resin taken up by the fibres to such an extent that only the fibres contain synthetic resin. When, moreover, care is taken that after application onto the fibres the liquid synthetic resin can additionally run a little downward under the effect of gravity, toward the fabric, then the effect of the fibre tips slightly protruding from the subsequently obtained synthetic resin body and forming a multiplicity of minute spikes results.

The synthetic resin impregnation 5 of the fibres 3 forms synthetic resin bodies extending longitudinally of the sole and having a multiplicity of fibre tips which claw into the synthetic material track in the manner similar to the scales of shark skin and which provide an extremely safe grip. The synthetic resin impregnation 5 of the fibres also rigidifies to such a degree that the fibres do not bend over, even under full load, since the ribbed synthetic resin body is supported by the woven fabric 2.

The design of the running sole according to the invention is by no means limited to the particular embodiment illustrated. Depending on hardness and consistency of the artificial track for example, it is conceivable to arrange the fibres so that the rows 4 extend transversely of the sole, rather than longitudinally. Moreover, it is possible to provide any kind of pattern of fibres plus synthetic resin impregnation, instead of rows on the sole. When, for example, the rows are regularly broken in their longitudinal extent, then a

diamond or checker-boardlike pattern is obtained. Only partly covering the running sole with fibres is, of course, also possible, such covering then being arranged at the sites of greatest demand, e.g. in the fore-sole and heel regions.

The gripping property of the running sole according to the invention may furthermore be varied by the use of varying thickness of fibre and more particularly different synthetic resins. When for example a synthetic resin is used which remains comparatively resilient after solidifying, then a weaker gripping effect of the fibre tips is obtained than when using a synthetic resin which hardens in relatively brittle manner and produces glass-like tips.

The running sole according to the invention is always considerably less expensive, for the same gripping effect, than the heretofore known, comparable, running soles having bristles as gripping elements, since the fabric used as starting material for the fibres is very inexpensive and even when costly synthetic resins are used their costs are of minor importance because of the small quantities required.

The length of the fibres in the running sole according to the invention is not critical. But, if only for reasons of weight, it is desirable for them not to be too long. A length of 1½ to 3mm is adequate in the embodiment of FIG. 1. The mutual spacing of the rows 4 should amount to about 3mm in this case.

I claim:

1. A running sole for a sports shoe comprising a carrier, fiber bristles distributed at least over certain areas of said carrier and extending downwardly therefrom, and a synthetic resin impregnation stiffening and gluing said fiber bristles to one another.

2. A running sole as claimed in claim 1, wherein said carrier is a woven fabric with which the fiber bristles are interwoven and project therefrom in a velvet-like manner.

3. A running sole as claimed in claim 2, wherein the fiber bristles are arranged in the manner of a Manchester cloth in parallel ribs.

4. A running sole as claimed in claim 3, wherein the ribs extend longitudinally of the sole.

5. A running sole as claimed in claim 2, wherein the fiber bristles are arranged on said carrier in a specific pattern.

6. A running sole as claimed in claim 2, wherein the woven fabric carrier is formed from cotton and the fiber bristles are formed of polyester.

7. A running sole as claimed in claim 6 wherein the woven cotton fabric carrier is reinforced with polyester.

8. A running sole as claimed in claim 1 wherein the synthetic resin impregnation is a synthetic resin adhesive.

9. A running sole as claimed in claim 8, wherein the adhesive is an epoxy resin adhesive.

10. A running sole as claimed in claim 1, wherein the carrier is entirely free from synthetic resin impregnation.

11. A running sole as claimed in claim 1, wherein the carrier is adhesively secured to the insole of a sports shoe.

12. Method of manufacturing a running sole comprising the steps of forming a carrier with fiber bristles extending downwardly from at least certain areas of the carrier, uniformly feeding a synthetic resin impregna-

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tion to an applicator, displacing the carrier relative to the applicator such that the fiber bristles come into contact with the applicator and take up the synthetic resin therefrom, and cutting out the running sole to the desired shape from the carrier.

13. A method as claimed in claim 12, wherein the carrier is moved below the applicator so that the syn-

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thetic resin impregnation taken up by the fiber bristles runs a short distance along the fiber bristles.

14. A method as claimed in claim 12 wherein the applicator is a slit nozzle applicator.

5 15. A method as claimed in claim 12 wherein the applicator is a rotating drum applicator.

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