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2,557,946

NONSKID RUBBER SOLE CONSTRUCTION

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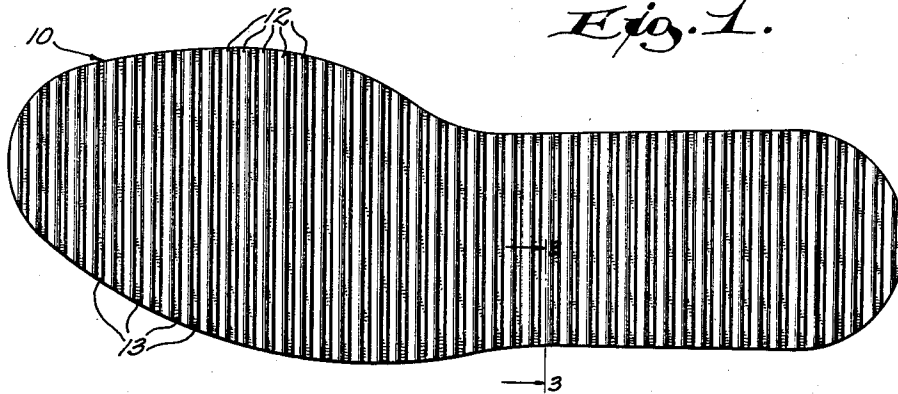


Fig. 1.

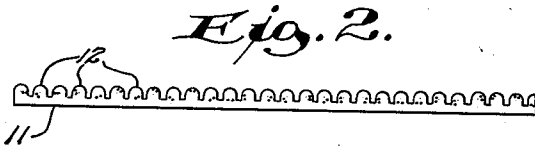


Fig. 2.

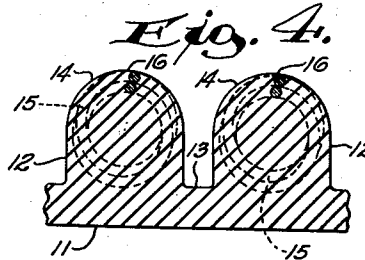


Fig. 4.

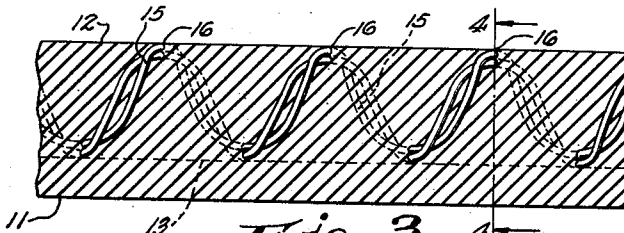


Fig. 3.

Fig. 5.

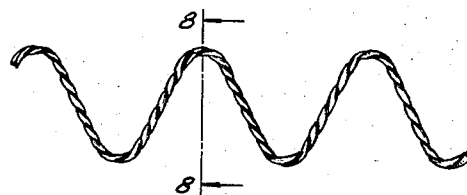
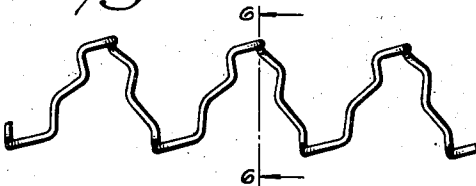


Fig. 7.



Fig. 6.

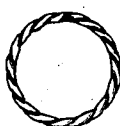


Fig. 8.

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NONSKID RUBBER SOLE CONSTRUCTION

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4 Claims. (Cl. 36—32)

1

This invention relates to improvements in non-skid rubber sole construction.

In localities where the winters are relatively cold and the populace must contend with icy streets, sidewalks and the like, it is desirable to have footwear which will provide adequate traction on ice as well as on other slippery surfaces, thereby preventing costly and painful accidents. In addition to footwear worn by the general public, there are special applications wherein a non-skid sole is particularly desirable. Some of these are: lumbermen's footwear, hunters' boots, railroad workers' shoes, and fishermen's wading boots. Heretofore, no non-skid sole has been developed which has proved entirely satisfactory in all of the above applications.

It is therefore a general object of the present invention to provide a sole for footwear which will effectively grip slippery surfaces such as those covered with ice and thereby provide adequate traction and insure the safety of the wearer.

A further object of the invention is to provide a non-skid rubber sole which will not interfere with the normal flexing of the article of footwear during use.

A further object of the invention is to provide a non-skid rubber sole which is relatively easy to attach and which has exceptional wearing qualities.

A more specific object of the invention is to provide a non-skid rubber sole formed with transverse ribs having wire coils embedded therein.

A further object of the invention is to provide a non-skid rubber sole which is simple and easy to manufacture, which is applicable during original manufacture of footwear or during a resoling operation, and which is otherwise well adapted for the purposes described.

With the above and other objects in view, the invention consists of the improved non-skid sole construction, and all of its parts and combinations, as set forth in the claims, and all equivalents thereof.

In the accompanying drawing, illustrating one complete embodiment of the preferred form of the invention, in which the same reference numerals designate the same parts in all of the views:

Fig. 1 is a plan view of the bottom of the improved sole;

Fig. 2 is a fragmentary side view thereof;

Fig. 3 is an enlarged fragmentary transverse vertical sectional view taken along the line 3—3 of Fig. 1;

2

Fig. 4 is an enlarged fragmentary longitudinal vertical sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is an enlarged fragmentary side view of a modified form of coil which may be used in the improved sole;

Fig. 6 is an enlarged end view of the coil shown in Fig. 5;

Fig. 7 is an enlarged fragmentary side view of a second modified form of coil which may also be used in the improved sole; and

Fig. 8 is an enlarged end view of the coil shown in Fig. 7.

Referring more particularly to the drawing, the numeral 10 indicates a sole of rubber, synthetic rubber, or other material, having rubber-like characteristics, of a size and shape suitable for attachment to a selected article of footwear. The sole 10 is provided with a flat inner surface 11, and on its outer surface is formed with transverse ribs 12 spaced apart by transverse grooves 13. The ribs 12 have a rounded outer surface contour as at 14 (see Fig. 4). Extending longitudinally, preferably within each of the transverse ribs 12, is a helical coil 15. The coil 15 has an outside radius of curvature which is preferably slightly less than the radius of curvature of the rounded portion 14 of the ribs 12. The coil 15 is preferably so positioned within the rib 12 that a side portion of the coil 15 is substantially flush with the outer rounded surface 14 thereof as at 16 (see Figs. 2 and 4).

In the preferred form of the invention shown in Figs. 3 and 4, a two strand twisted wire coil is used, the double strand twisted wire forming irregularities which interlock with the rubber to prevent displacement of the coil during wear. Other forms of wire which may also be used for the coil 15 are a single round strand formed of corrugated wire as shown in Figs. 5 and 6, or a single, twisted strand which is a concave-sided triangle in cross-section, as shown in Figs. 7 and 8.

When one of the improved soles described hereinbefore is put into use, the outer portions 14 of the ribs 12 immediately become subject to wear. This wear quickly exposes the outer portions of the coils 15 at the points 16 and thereby provides a multiplicity of road gripping elements exposed along the wearing surfaces of the ribs 12.

With continued use, the rounded surfaces 14 of the ribs 12 and the portions of the coil 15 therein wear to a substantially flat outer surface, and portions of the coil 15 which originally projected into the rounded portions of the rib 12 wear away, leaving four wire ends exposed in

place of each of the worn-away elements. The improved sole will then present a maximum number of traction augmenting elements and, in this condition, possesses maximum non-skid efficiency.

It will be noted that by the novel arrangement of the coils 15 and the transverse ribs 12, a sole is provided which readily adapts itself to the normal flexing of the footwear while in use, without causing deformation of the coil as a result of said flexing. This feature provides greater comfort for the wearer and prevents breakage of the coils because of said flexing which takes place during use.

While the invention as illustrated is particularly adapted for use on the complete sole and heel area, it is obvious that it may be applied to the heel portion only or to selected portions of the sole portion only.

Various changes and modifications and other adaptations may be made without departing from the spirit of the invention, and all of such changes and adaptations are contemplated, as may come within the scope of the claims.

What I claim is:

1. In a sole adapted for attachment to footwear, a flexible rubber tread provided with a plurality of transversely extending spaced ribs, metal coils embedded in said ribs and extending longitudinally thereof, the width of a rib being at least equal to the width of a coil, and each coil having at least its major portion confined in a rib with a side flush with the wearing surface of its rib.

2. In a sole adapted for attachment to footwear, a flexible rubber tread provided with a plurality of transversely extending spaced ribs, metal coils embedded in said ribs and extending longitudinally thereof, the width of a rib being at least equal to the width of a coil, and each coil having at least its major portion confined in a rib with a side flush with the wearing surface of its rib, the convolutions of the coils having ir-

regularities which interlock with the rubber to prevent displacement of the coil during use.

3. In a sole adapted for attachment to footwear, a flexible rubber tread provided with a plurality of transversely extending spaced ribs, metal coils embedded in said ribs and extending longitudinally thereof, the width of a rib being at least equal to the width of a coil, and each coil having at least its major portion confined in a rib with a side flush with the wearing surface of its rib, each coil being formed of two twisted together strands and the rubber of the sole interlocking with the twisted strands to prevent displacement of the coils during use.

4. In a sole adapted for attachment to footwear, a flexible rubber tread provided with a plurality of transversely extending spaced ribs, metal coils embedded in said ribs and extending longitudinally thereof, the width of a rib being at least equal to the width of a coil, and each coil having at least its major portion confined in a rib with a side flush with the wearing surface of its rib, the coils being formed of wire having a plurality of concave sides in cross-section and said wire being axially twisted in addition to being in coil form.

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