RIVET SPIKE FOR A SHOE


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ABSTRACT
A shoe sole spike having a frustum-shaped steel rivet with a flared bottom and a shank extending from the flared bottom. The end of the steel shank includes a tungsten carbide insert. The sole of a shoe is injection molded around an array of these spikes. The bottom of the rivet spike is firmly seated in the sole material with the tungsten carbide insert extending outwardly to provide a highly wear-resistant spiked shoe sole suitable for use, for example, on golf shoes. The sole can be integrally molded with a heel, the rivet spikes being in both areas.

7 Claims, 7 Drawing Figures
The present invention relates to shoe spikes, and particularly, to steel rivet-type spikes adapted to be molded into shoe sole material and wherein each spike includes a tungsten carbide insert.

For many years, spiked shoes such as golf shoes have used spikes which were threadably or otherwise removably mounted to plates imbedded in the soles of the shoes such that, as the spikes become worn during use, they could be replaced. Although this type of spike provides adequate traction, the spikes require frequent tightening to prevent their loss by becoming loosened and falling off during use. Thus, such an arrangement is somewhat of a nuisance to the wearer, who has to carry a special wrench for tightening the spikes, and extra spikes to replace the ones lost.

Recently, golf shoes have been provided with permanent spikes which are rigidly affixed to a mounting plate which in turn is molded within the shoe sole. U. S. Pat. Nos. 3,492,744, L. E. Bernier, et al., issued Feb. 3, 1970, and U.S. Pat. No. 3,537,193, L. E. Bernier, et al., issued Nov. 3, 1970, each describe such a method for mounting permanent types of spikes including tungsten carbide inserts to a shoe sole. The spikes therein described, however, require the use of a mounting plate to which they can be attached. Such an arrangement, therefore, becomes relatively costly, both as to the materials employed, since a mounting plate is required, as well as to manufacturing costs since additional manufacturing steps are necessary to attach the spikes to the plate. Thus, although the problem of losing spikes has been solved by such apparatus, the cost of such permanent spikes which require a mounting plate remains relatively high.

Conical-shaped solid ceramic spikes have been directly mounted within elastomeric sole material, but such spikes are relatively expensive and have not provided as much wear-resistance as often desired. If they become quite worn, they, of course, are not replaceable.

**SUMMARY OF THE INVENTION**

The rivet spikes of the present invention are shaped such that they can be securely molded directly within the sole material without the requirement of a mounting plate. Additionally they are manufactured of steel and include a tungsten carbide insert for wear resistance. Rivet spikes embodying the present invention comprise a frustum-shaped rivet having a relatively wide flared bottom portion and a shank extending from the flared bottom. The shank has an aperture therein in which a tungsten carbide insert is fitted and swaged to permanently hold the tungsten carbide insert within the rivet. The bottom surface of the flared bottom of the rivet has a dimple formed therein to aid in securely holding the rivet in place within the sole material.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a plan view of a shoe bottom which includes an array of rivet spikes embodying the present invention in the sole and heel areas;

FIG. 2 is a side elevational view of the shoe bottom with the rivet spikes mounted therein;

FIG. 3 is an enlarged perspective view of a rivet spike embodying the present invention;

FIG. 4 is an enlarged side elevational view of the rivet spike of the present invention;

FIG. 5 is an enlarged view of the bottom of the rivet spike shown in FIG. 4;

FIG. 6 is an enlarged plan view of the rivet spike shown in FIG. 4; and

FIG. 7 is an enlarged sectional view of the rivet spike shown in FIG. 4 and shows the tungsten carbide insert mounted within the shank of the spike.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to the figures, the bottom of the shoe includes a sole portion 10 and a heel portion 20 which can be a unitary structure molded from any suitable polymeric material 15 generally used in the manufacture of shoe soles. In one embodiment, polyvinyl chloride is employed. Other typical polymers include styrene-butadiene rubber (SBR), polyurethane, and other suitable, well-known materials. Within the sole and heel portions, are imbedded a plurality of rivet-type spikes 30. The spikes are of the shape shown in FIGS. 3 through 7 and are held in a suitable array or pattern by the molding machine such that the polymeric material can be injection molded around the spikes in the sole and heel areas 10 and 20. The spikes 30 are manufactured from steel to which any standard commercially available bonding agent can be applied if necessary prior to the molding step to ensure proper bonding between the particular polymeric material selected and the surface of the spikes.

The spikes 30 comprise a generally frustum-shaped body having a flared bottom 32 which is curved inwardly in a continuous manner to form a shank 35 which extends from said bottom. The bottom 32 is imbedded in the polymeric material to securely hold the rivet spike in position. To aid in stabilizing the rivet spike in place, the bottom 32 has a vertical side wall 33 extending around its periphery. The bottom surface 31 of bottom 32 also includes at least one dimple 34 shown in FIGS. 5 and 7 into which the polymeric material protrudes to further stabilize the spike by providing additional side surface areas which resist lateral forces against the side of the spike. In other embodiments, the bottom surface may include a plurality of generally dimple-shaped indentations for this purpose.

The upward projecting shank 35 of the spike has a flat shoulder or end 36 with an aperture 37 drilled therein along the longitudinal axis of the spike. Aperture 37 is adapted to receive a rod-shaped tungsten carbide insert 40 which is securely fitted into the aperture 37 by first placing the insert 40 within the aperture, and then swaging the upper portion of the shank indicated as the area 38 in FIG. 7. By so swaging the material, the tungsten carbide insert 40 is securely held in position and will not work loose during the use of the spikes.

As seen in FIG. 2, the shank 35 and the carbide tip 42 extend outwardly from the bottom of the polymeric material 15. The shoe sole and heel so formed can thereby be cemented or otherwise attached to a shoe upper to provide, for example, a golf shoe with the improved permanent spike therein.

The tungsten carbide insert 40 is somewhat longer than the aperture 37 and has an end 42 which therefore extends from shoulder 36. Such an arrangement reduces wear on the steel shoulder 36 of the spike during use since the more durable tip 42 will contact the
ground surface. When used in golf shoes where the wearer frequently walks over hardened surfaces such as concrete, this feature greatly extends the life of the spike.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A shoe sole spike including a rod insert, said spike comprising a generally frustum-shaped steel body having a flared bottom which is curved inwardly in a continuous manner to form a shank extending therefrom, said shank having a vertically extending cylindrical side wall and an aperture in one end for receiving said insert, said cylindrical side wall being deformed toward said insert to secure said insert within said aperture.

2. The spike as defined in claim 1 wherein said insert comprises a tungsten carbide rod.

3. The spike as defined in claim 1 wherein said flared bottom has a bottom surface including at least one dimple formed therein.

4. The spike as defined in claim 1 wherein said flared bottom further includes a vertically extending side wall extending around the periphery of said bottom.

5. A polymeric shoe sole comprising polymeric material having at least one rivet spike therein, said spike comprising a generally frustum-shaped metal body having a flared bottom held within said molded polymeric material, said bottom of said spike including a bottom surface having at least one dimple formed therein, and a vertical side wall extending around the periphery of said bottom, said flared bottom being curved inwardly in a continuous manner to form a shank extending therefrom which shank further extends from said sole, said shank including an aperture in one end and a tungsten carbide insert rod securely mounted within said aperture of said spike and having an end extending from said shank.

6. The sole as defined in claim 5 wherein said spike is manufactured of steel and said tungsten carbide insert is rod-shaped and swage mounted in said aperture.

7. A polyvinyl chloride shoe bottom comprising a sole portion and a heel portion in which a plurality of rivet spikes are mounted by molding said polyvinyl chloride around an array of said spikes, each of said spikes comprising a tungsten carbide insert, a generally frustum-shaped metal body having a flared bottom which is curved inwardly in a continuous manner to form a shank extending therefrom, said shank including an aperture in one end for receiving said tungsten carbide insert and a vertically extending cylindrical side wall which is deflected inwardly toward said insert to secure said insert within said aperture said insert including an end extending from said shank.