United States Patent

[11] 3,597,864

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[21] Appl. No. **41,752**
[22] Filed **June 3, 1970**
[45] Patented **Aug. 10, 1971**

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Continuation of application Ser. No. 848,442, Aug. 8, 1969, now abandoned.

[54] **SHOE SOLE AND HEEL STRUCTURE**
8 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** ..... **36/67 D**
[51] **Int. Cl.** **A43c 15/00**
[50] **Field of Search** ..... 36/2.5 AG, 2.5 AH, 67, 59

[56] **References Cited**

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ABSTRACT: A molded shoe sole or heel having imbedded therein a receptacle with a threaded sleeve for receiving a threaded stem of a spike, such as a golf shoe spike, loggers boot spike, track shoe spike and the like, of the type having a laterally projecting flange which presses against a sealing ridge on the bottom surface of the shoe sole to thereby form with the spike a leaktight seal about the spike receptacle.

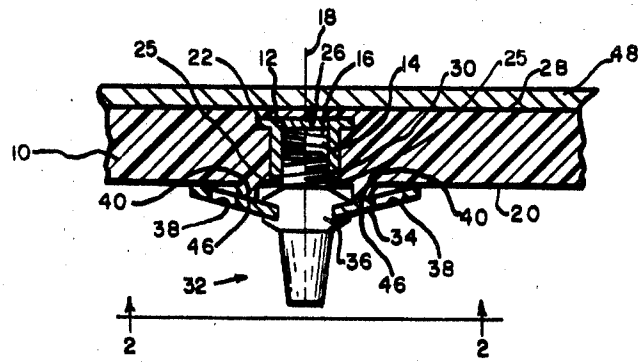


Fig. 1

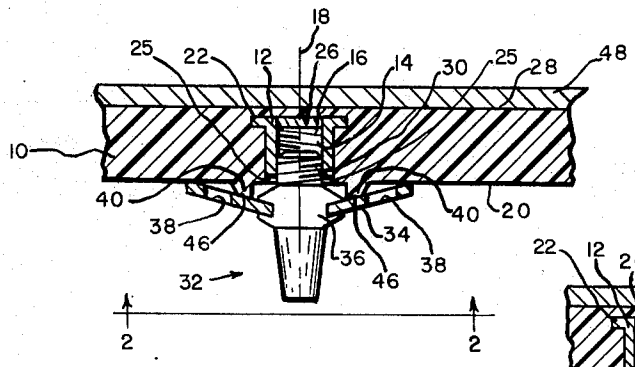


Fig. 3

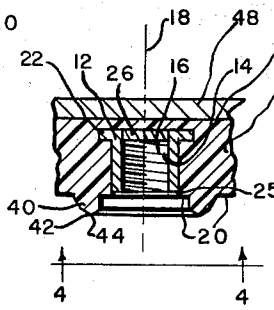


Fig. 2

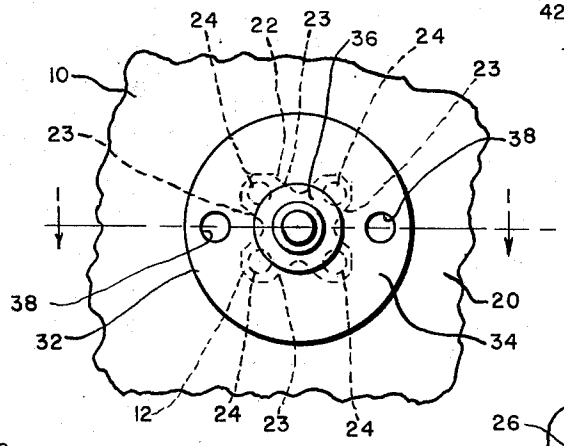


Fig. 4

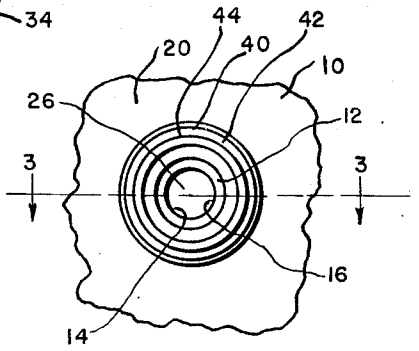


Fig. 6

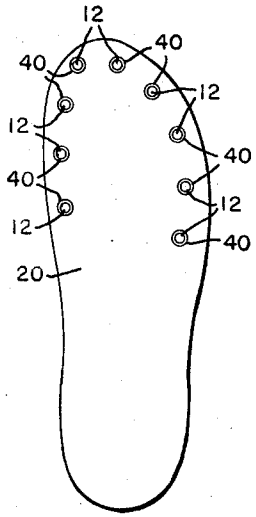


Fig. 5

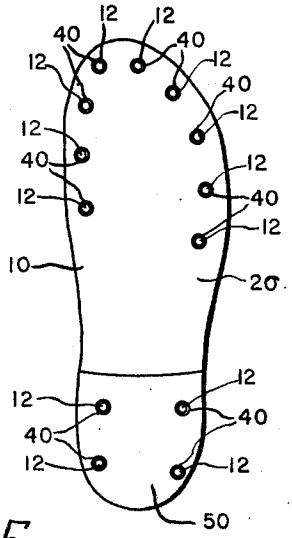
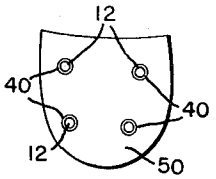


Fig. 7



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SHOE SOLE AND HEEL STRUCTURE

This is a continuation of application Ser. No. 848,442 filed Aug. 8, 1969, and now abandoned.

This invention relates to shoe soles and heels and more particularly to molded shoe soles or heels of the type having a bottom surface and at least one spike receptacle imbedded therein with an internally threaded sleeve having an axis substantially perpendicular to the bottom surface and an opening at the bottom surface for receiving a threaded stem of a spike, such as a golf shoe spike, loggers boot spike or track shoe spike, having a flange extending outwardly about the stem, a molded ridge integral with the sole protruding from the bottom surface about the sleeve opening and having a crown shaped to engage the spike flange so as to form with the spike and molded sole a leaktight seal about the threaded sleeve.

Spikes for golf shoes, logger boots, track shoes and the like are customarily made with threaded stems held in place on the shoe sole in threaded sleeves of spike receptacles imbedded in the shoe sole. An important purpose for such threaded construction is to permit replacement of worn spikes by unscrewing the worn spike from the threaded sleeve of the receptacle and screwing into place a new spike.

However, is has been found that often corrosion of the screw threads causes a freezing effect between the receptacle sleeve and spike stem such that the spike cannot be unscrewed from the receptacle sleeve. Also, the increased torque applied to the spike in an effort to overcome the corrosion "freeze" often results in breaking the grip of the receptacle against the shoe sole whereby the receptacle will "spin" in place thereafter even under light torque loads, making it practically useless as a holding device for spikes.

One way to minimize this problem would be to use noncorrosive spikes and receptacles such as of stainless steel. However, because of the difficulty of economical fabrication of stainless steel components, the increased cost would make such construction impractical for all but the most-expensive-type shoes.

This problem has been overcome by the present invention which not only permits the use of economical carbon steel, but also incorporates other desirable features and advantages. Among the other desirable features and advantages of the present invention is that of providing an inexpensive sole construction which is compatible with even the lowest priced shoes and which inherently overcomes the thread corrosion problem regardless of the moisture conditions to which the shoe is subjected. A further advantage is that of permitting the use of existing sole-molding techniques in that only a small modification in sole configuration is required without the need for any changes in molding method used. And another advantage is that of achieving a relatively simple sole construction which inherently prevents the spike receptacles from injuring printing rolls in those instances where it is desired to apply a printed pattern to the sole bottom surface.

A primary object of the present invention is the provision of a shoe sole and/or heel construction which cooperates with the spike to provide a leaktight seal about the receptacle to prevent corrosive fluids from reaching the receptacle and spike stem threads.

A further object is the provision of a shoe sole and/or heel construction with capacity for leaktight seal assembly and which is relatively inexpensive and compatible for use in even the lowest priced shoes.

And another object is the provision of a shoe sole and/or heel construction which requires only minor change in configuration from existing molded sole and heel construction to effect a leaktight capability, thereby making possible the use of existing sole-molding equipment and techniques.

And a still further object is the provision of a leaktight molded sole construction and heel construction which is particularly applicable to and desirable for golf shoe soles for use with current golf spike configurations.

These and other objects, features and advantages are achieved generally by providing a molded shoe sole or heel of the type having a bottom surface and having imbedded therein at selected positions spike receptacles, each receptacle with an internally threaded sleeve having an axis at substantially right angles to the bottom surface and a threaded sleeve opening at the bottom surface for receiving a threaded stem of an associated spike having an outwardly extending flange about the stem, a molded ridge integral with the molded sole surrounding the threaded sleeve opening and having a crown for engaging the spike flange in manner to effect a leaktight seal about the sleeve opening.

By making the sole and/or heel of a moldable natural or synthetic rubber composition, polyvinyl chloride or other equivalent plastic composition, a relatively inexpensive structure manufacturable with existing molding equipment is thereby achieved.

By making the ridge with a tapered body cross section to provide resistance to lateral deflection at its base and with a crown of narrower dimension permitting vertical deflection for making first engagement with the spike flange, vertical deformation of the ridge to accommodate variations in flange contour is facilitated to effect an overall leaktight seal with the flange.

By imbedding the threaded receptacle in the molded sole with only the spike-receiving end of the threaded sleeve being exposed at the bottom surface of the sole, a leaktight seal for the back end of the receptacle sleeve is thereby achieved.

These and other features, objects and advantages will be better understood from the following description taken in connection with the accompanying drawings wherein:

FIG. 1 is an enlarged scale cross-sectional view taken on line 1–1 of FIG. 2 showing a portion of a shoe sole having imbedded therein a receptacle carrying a spike as an illustration of a preferred embodiment of the invention;

FIG. 2 is an enlarged scale bottom view of the FIG. 1 portion and taken on line 2–2 of FIG. 1;

FIG. 3 is an enlarged cross-sectional view of the FIG. 1 shoe sole portion with the spike removed to illustrate the cross-sectional configuration of the ridge surrounding the receptacle;

FIG. 4 is a bottom view of the FIG. 3 portion taken on line 4–4 of FIG. 3;

FIG. 5 is a bottom view to reduced scale showing a molded sole and heel with a plurality of receptacles imbedded therein with each surrounded by a sealing ridge illustrating the invention;

FIG. 6 is a bottom view to the same scale as FIG. 5 showing a separately molded sole with a plurality of receptacles imbedded in the toe portion thereof with each surrounded by a sealing ridge illustrating the invention;

FIG. 7 is a bottom view to the same scale as FIG. 5 showing a separately molded heel with a plurality of receptacles imbedded therein with each surrounded by a sealing ridge illustrating the invention.

Referring to the drawings in more detail, a portion of a molded shoe sole 10 of rubber, polyvinyl chloride or other suitable flexural plastic material is shown in cross section to enlarged scale in FIGS. 1 and 3. The shoe sole 10 has imbedded therein a spike receptacle 12 having a receptacle sleeve 14 with internal screw threads 16 about an axis 18 which is substantially perpendicular to a bottom surface 20 of the molded shoe sole 10. The back end of the spike receptacle 12 also has an outwardly extending flange 22 which appears in plan view in broken lines in FIG. 2. The receptacle flange 22 preferably has openings or holes 24 which become filled with the material of the sole 10 during molding and which together with recesses or notch shapes 23 of the flange 22 provide substantial torque resistance to rotation of the receptacle 12 for purposes which will become apparent as this description progresses.

The back end of the receptacle sleeve 14 is preferably closed by a plug 26 to prevent access of the material of the sole 10 to the sleeve threads 16 during the molding of the sole

10. Alternatively, a suitable back closure and golf spike receptacle structure found in my U.S. Pat. No. 3,343,284, issued Sept. 26, 1967 and entitled Combined Golf Spike Receptacle And Anchoring Strip may also be used.

The receptacle flange 22 and plug 26 are preferably imbedded in the shoe sole 10 beneath a top surface 28 of the molded shoe sole 10 to thereby ensure being surrounded completely by the material of the molded shoe sole 10 as a leaktight seal for the back end of the receptacle sleeve 14.

The bottom end 25 of the receptacle sleeve 14 is preferably recessed about one thirty-second of an inch with respect to the bottom surface 20 of the molded shoe sole 10 where an opening is provided for receiving a screw-threaded stem 30 of a spike 32, such as a golf spike, loggers boot spike, track shoe spike or the like, carrying an outwardly extending spike flange 34 which in the present instance is swedged rigidly in place at an intermediate body portion 36 of the spike 32 and customarily carrying spaced wrench holes 38 for receiving a spanner wrench (not shown).

The bottom surface 20 of the molded shoe sole 10 carries a ridge 40 molded as an integral part of the shoe sole 10 about the threaded receptacle sleeve 14. The ridge 40 in the present instance has a tapered body to provide resistance to lateral deflection at its base and a crown 42 with a peak 44 to form a structure which is relatively easily vertically deflected when stressed in the direction parallel to the axis 18 so as to follow any contour variations of the flange 34 and is positioned intermediate the body portion 36 and wrench holes 38. When the sole 10 material is sufficiently flexible, the crown 42 need not be as sharply peaked as in FIG. 3 and may in fact have a flat contact surface or land and still permit sufficient deflection to follow contour variations. Thus when the spike 32 is screwed into the threaded receptacle sleeve 14, a leaktight seal is effected at the surface 46 where the spike flange 34 and ridge engage each other. Also, the ridge being spaced a substantial distance from the receptacle opening provides thereby a substantial torque arm with respect to the center of the spike stem which helps to prevent unscrewing of the spike under use. And such structure provides lateral support against bending loads created, for example, by scuffing.

An inner sole 48 may be used above the upper surface 28 of the molded shoe sole 10 in customary manner of shoe construction.

In the operation of the present invention, a molded shoe such as shown in FIGS. 3 and 4 carrying imbedded therein a spike receptacle 12 may have fastened thereto a spike 32 by the use of the above-mentioned spanner wrench (not shown) in the wrench holes 38 for screwing the threaded stem 30 into the threaded sleeve 14. The recess shapes 23 of the receptacle flange 22 and holes 24 carrying material of the molded sole 10, together with normal adhesion of the material of the molded sole 10 to the surfaces of the receptacle 12 provide sufficient torque resistance to withstand normal torques involved in screwing the threaded stem 30 in place in the sleeve 14 so as to cause the crown 42 to deflect and conform tightly against the golf spike flange 34 and thereby effect a leaktight seal at the ridge and flange surface 46.

Thus water and other corrosive fluids are prevented from reaching the threaded stem 30 and receptacle threads 16 of the sleeve 14 even if an individual wearing a shoe with the sole 10 walks through puddles or other wet surfaces. Thereby the threads 16 and threaded stem 30 are protected from corrosion and the spike 32 may at any time be easily removed with the above-mentioned spanner wrench and replaced without the need for injurious torque at the receptacle 12.

While the above description has been confined to a portion of a shoe sole, it should be here understood that a shoe sole such as in golf shoes, loggers boots, track shoes and the like normally carries a plurality of imbedded receptacles 12 surrounded by sealing ridges 40 as shown in FIG. 5. Also it will be noted as shown in FIG. 5 that the same construction may also be used for receptacles 12 in a molded heel 50 whether such heel 50 is molded integrally with the shoe sole 10 as shown in FIG. 5, or is a separately molded heel as shown in FIG. 7 and subsequently attached to the shoe carrying a separately molded sole, such as shown in FIG. 6, in conventional manner. The so-combined separately molded sole and heel structures of FIGS. 6 and 7 will then have the general appearance and function of the integrally molded sole and heel structure shown in FIG. 5.

By way of example, a moldable sole composition particularly well suited to the present invention is that known commercially as Neolite, however it is also well suited for other moldable rubber compositions or polyvinyl chloride and other vinyl or synthetic resinous compounds having equivalent properties.

This invention is not limited to the particular details of construction and operation as equivalents will suggest themselves to those skilled in the art.

What I claim is:

1. For a shoe, the combination of a resilient shoe bottom structure, said bottom structure including a bottom surface, at least one spike receptacle imbedded in said bottom structure, said spike receptacle including an internally threaded sleeve having an axis at substantially right angles to said bottom surface and an opening substantially flush with said bottom surface for receiving a threaded stem of a spike having a spike flange surrounding the stem, a raised annular resilient ridge extending from said bottom surface about and spaced a substantial distance from said bottom surface opening, said ridge including steep sides and a narrow crown forming a resilient engaging surface for a spike flange to provide at said resilient engaging surface with a spike flange a leaktight seal about said sleeve.

2. The combination as in claim 1 wherein said bottom structure is of flexural plastic composition.

3. The combination as in claim 2 wherein the flexural plastic composition is comprised of natural rubber.

4. The combination as in claim 2 wherein the flexural plastic composition is comprised of synthetic rubber.

5. The combination as in claim 2 wherein the flexural plastic composition is comprised of vinyl.

6. The combination as in claim 1 wherein said ridge has a cross-sectional shape which is tapered with a wider dimension at the bottom surface than at the engaging surface to facilitate conformance to contour changes at the engaging surface and provide resistance to lateral deflection at the bottom surface.

7. The combination as in claim 1 wherein said bottom structure is comprised of a separately molded sole and heel, a plurality of receptacles similar to said spike receptacle similarly imbedded in said sole and in said heel, and a ridge similar to said raised resilient ridge about each of said receptacles.

8. The combination as in claim 1 wherein said bottom structure is comprised of an integrally molded sole and heel, a plurality of receptacles similar to said spike receptacle similarly imbedded in said sole and in said heel, and a ridge similar to said raised resilient ridge about each of said receptacles.