Oct. 5, 1971 T. D. CALVIN ET AL 3,609,889

SPIKED GOLF SOLE

Filed July 14, 1969 2 Sheets-Sheet 1

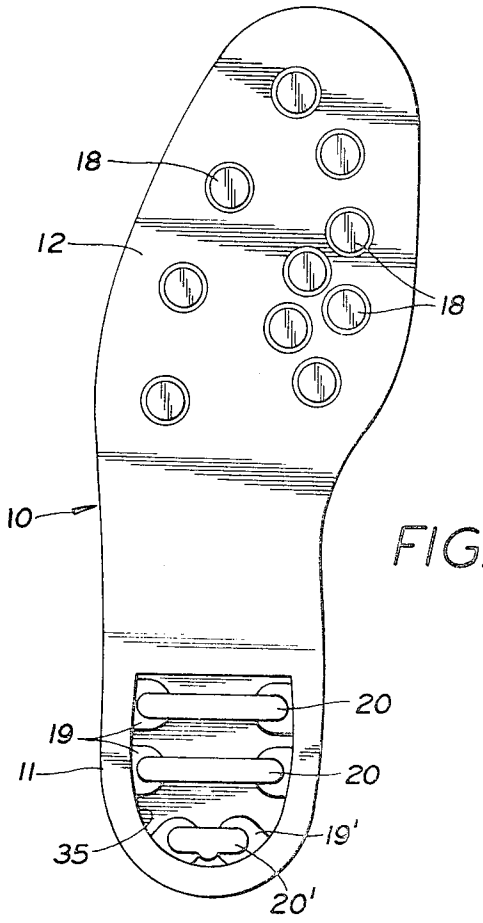


FIG. 2

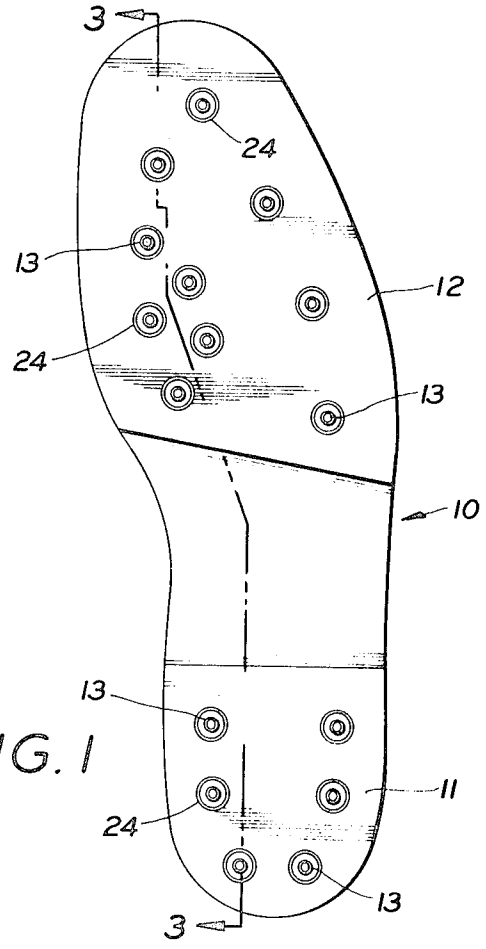


FIG. 1

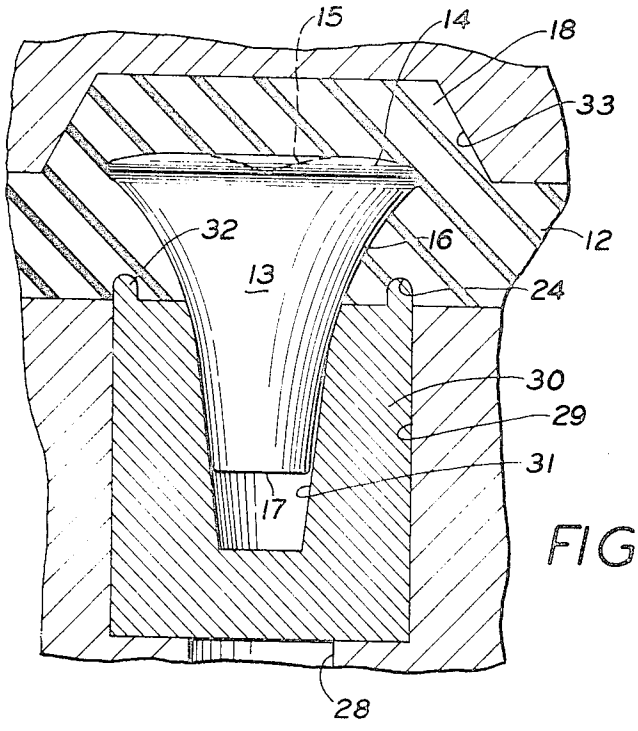


FIG. 5

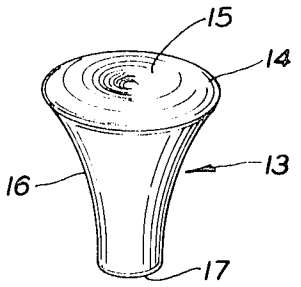


FIG. 6

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2 Sheets-Sheet 2

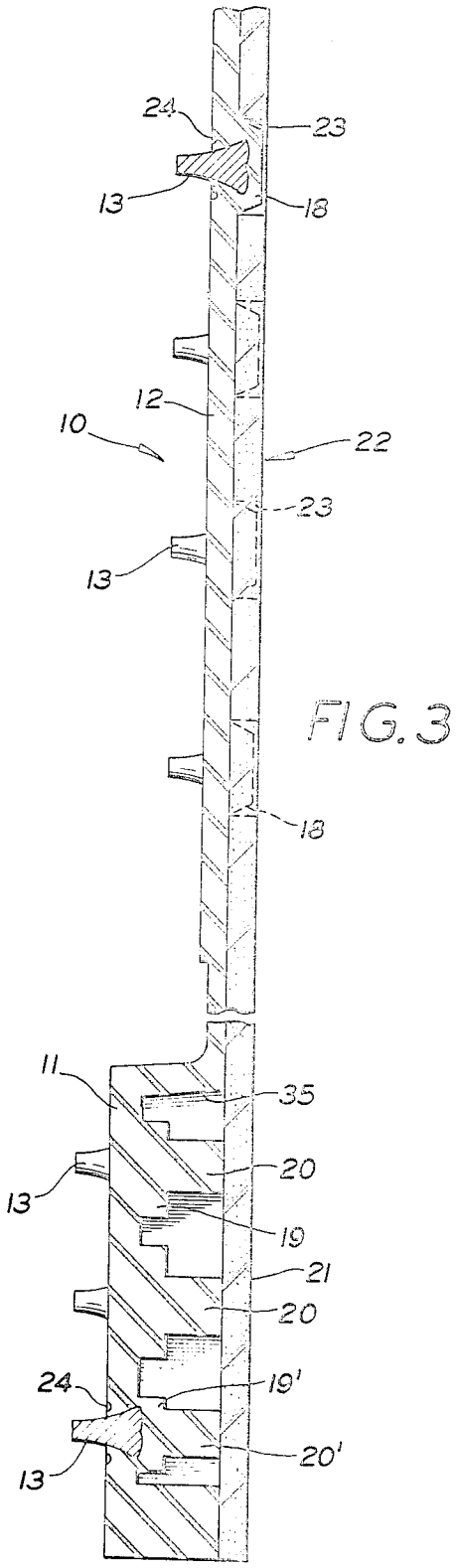


FIG. 3

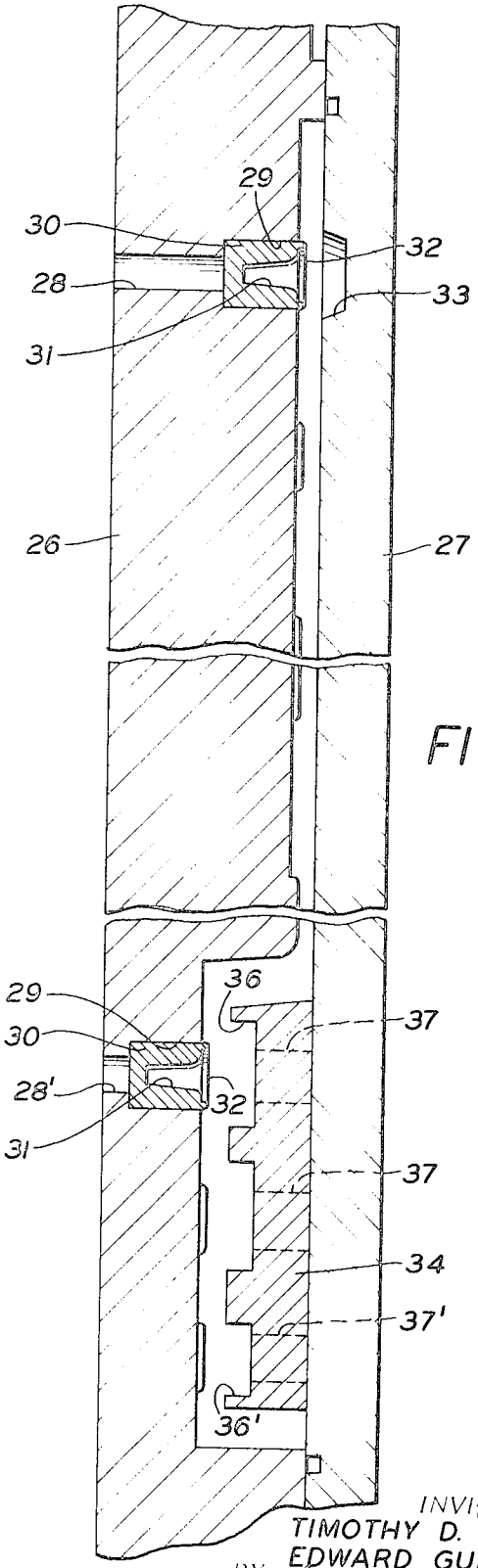


FIG. 4

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United States Patent Office 3,609,889 Patented Oct. 5, 1971

3,609,889

SPIKED GOLF SOLE

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Filed July 14, 1969, Ser. No. 841,378
Int. Cl. A43c 15/00
U.S. Cl. 36—67 R 13 Claims

ABSTRACT OF THE DISCLOSURE

An elastomeric golf shoe sole having frusto-conical spikes of titanium-coated aluminum oxide with their bases molded into the sole and their tapered end portions projecting therefrom, the sole surface areas surrounding said projecting portions being relieved so as to transfer flexing caused by forces applied to said projecting portions radially outward thereof, said spikes being bonded to said elastomeric material by a combination of compatible cements which when subjected to molding heat make a permanent bond between the titanium coating of the spikes and the elastomeric material.

BACKGROUND OF THE INVENTION

Conventional golf shoe soles having metal spikes require screw threaded sockets embedded in the sole into which the threaded metal spikes having relatively large bases are screwed. Thus the number of spikes which can be mounted in a sole and heel is limited by the areas of the bases, with the result that fewer spikes are employed than would be desirable for optimum support and traction. Moreover, there is always a danger of cross threading in installing the spikes which may require replacement of a socket and add to the manufacturing cost.

Further, conventional metal spikes wear off rather rapidly due to the necessity for the wearer to tread on hard surfaces such as cement and gravel walkways and the like, out of doors, and in and to and from locker rooms and other facilities. Such wear results in burrs and sharp edges on the spikes which make them injurious to carpeting walked over to and from the locker and clubhouse rooms. Also, such wear requires fairly frequent replacement of the spikes with the attendant likelihood of cross threading.

An additional disadvantage resulting from the use of conventional spikes is that the large metal bases thereof tend to compress or hammer the golf course greens as they are constantly walked upon, thus tending to harden the greens in spots and impede grass growth thereon.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a novel and improved spiked golf shoe sole which overcomes the disadvantages of conventional spiked shoes, and is simple and inexpensive to manufacture.

Another object is to provide a novel spike design and construction which is molded in place with the sole and does not require replacement.

A further object is to provide a novel spike design which is so constructed that more spikes per sole can be used, thereby obtaining better support and traction.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a bottom plan view of a molded shoe sole embodying the invention.

FIG. 2 is a top plan view thereof.

FIG. 3 is an enlarged section thereof as on line 3—3 of FIG. 1, with a midsole applied to the top surface.

FIG. 4 is a longitudinal sectional view through the mold for making the sole, showing the mold inserts for positioning the novel spikes.

FIG. 5 is an enlarged fragmentary sectional view showing one of the novel spikes as molded in the sole.

FIG. 6 is a detached perspective view of one of the novel spikes.

DESCRIPTION OF A PREFERRED EMBODIMENT

The shoe sole indicated generally at **10** is molded from elastomeric material such as synthetic rubber of the styrene butadiene type. Although other types of synthetic rubber or natural rubber may be used, we have found that a synthetic rubber compound, preferably of a high silica content and having a controlled durometer hardness of approximately 70 has given excellent results.

The novel spikes **13** molded into the sole are substantially conical with a circular base portion **14** having a rounded periphery and a shallow recess **15** at the center. Preferably, the side wall **16** of the spike is curved inwardly or concave as shown, and the small end has a substantially flat surface **17**. The material of which the spikes are made is substantially pure corundum (aluminum oxide) and is extremely hard and wear-resistant to the extent that such spikes in a golf shoe will last at least as long as the shoe with substantially no wearing down of the surfaces **17**.

The base portion **14** and the adjacent conical portion of each spike **13** is embedded in the sole, and in the sole portion **12** a frusto-conical projection enlargement or button **18** encases the base portion **14** of each spike so as to securely support the spike when its projecting end is walked upon and subjected to lateral forces. Similarly, while the heel portion **11** is hollow, the bases **14** of the spikes **13** therein are encased in rounded bosses or buttons **19** and **19'**, with transverse bridge portions **20** and **20'** connecting laterally opposite bosses **19**, the top surfaces of the bridges **20** and **20'** being preferably coplanar with the upper periphery of the heel so as to provide a firm support for the heel portion **21** of a midsole **22** applied to the top of sole **10** (FIG. 3). The midsole **22** preferably is substantially the same or slightly greater in thickness than the buttons **18** and is provided with circular openings **23** for surrounding the buttons.

In the bottom surface of sole portion **12** and the heel portion **11**, an annular groove **24** is provided concentric with and spaced radially from each spike. The purpose of the groove is to transfer the flexing area radially outward from the spike, so that the high stresses to which the spike is subjected are not concentrated at the joint between the spike and the surrounding rubber of the sole.

As shown in FIG. 4, the mold for forming the spiked sole **10** comprises two mating parts or plates **26** and **27** forming at least one cavity for the combination sole and heel. The bottom plate **26** has counterbored holes **28** and **28'**, with the larger portions **29** thereof opening into the inner face of the plate, and positioned at the predetermined locations for the spikes. Hardened tool-steel inserts **30** are tightly fitted into the holes **29**, each insert having a conical recess **31** therein for wedgably receiving the tapered end portion of a spike **13**. As best seen in FIG. 5, the inner end of each insert **30** has an annular rib **32** around its periphery for forming the annular groove **24** in the bottom surface of the sole.

The top mold plate **27** is provided with frusto-conical recesses **33** registering with the inserts **30** in the sole portion of the mold for forming the buttons **18** surrounding the base portions **14** of the spikes in the molded sole. In the heel portion of the mold a metal insert plate **34** is attached to the inner face of the top plate as by screws (not shown). The insert **34** has an outer periphery shaped to form the heel cavity **35** with recesses **36** and **36'** on its exposed face to form the bosses **19** and **19'** encasing the bases of the spikes **13** in the molded heel, and with

through slots 37 and 37' to form the bridge portions 20 and 20'.

In order to make a good bond between the extremely hard and smooth surface of the corundum spikes 13 with the rubber of the sole 10, the spikes are coated with titanium by a special process developed and owned by Coors Porcelain Company of Golden, Colo. The process of applying the titanium coating to the spikes per se forms no part of the present invention. Suffice it to say that the titanium coating overcomes the extreme smoothness of the corundum so that the spike surfaces can be fully bonded to the rubber with suitable cements.

We have discovered that best results are obtained by using two compatible resin cements, one as a primer and the other as a finish coating on the spikes. Two such cements are manufactured and sold by Hughson Chemical Company, Division of Lord Corporation, Erie, Pa., under the trade names Chemlok 205 and Chemlok 220. The exact composition of these cements is not available, but they are described generally as being mixtures of polymeric compounds and fillers in a solvent system.

We use Chemlok 205 as the primer coating by diluting it in a mixing container with about 20% methyl ethyl ketone (MEK) to bring the viscosity to 29 plus or minus 1 second at 70° F. when checked with a No. 1 Zahn cup. The Chemlok 220 is used as the finishing coat is diluted with about 20% toluol to bring the viscosity to 29 plus or minus 1 second at 70° F. when checked with a No. 2 Zahn cup.

A thin coating of continuously agitated Chemlok 205 is first applied in a suitable manner, as by brushing, dipping or spraying, to the base portion and so much of the conical portion of the spikes as will be encased in the rubber sole, excess cement removed, and the coating thoroughly dried to leave a coating preferably 0.3 to 0.5 mil thickness. A thin uniform coating of the Chemlok 220 is then applied from a continuously agitated supply in a similar manner and dried. The coated spikes are then positioned in the mold inserts 30, substantially all of the coated portion projecting into the mold cavity for bonding with the rubber sole during vulcanization. The uncured rubber blank which is to form the sole is then placed in the cavity, the mold closed in a vulcanizing press and the blank molded and cured. During the curing process the Chemlok cements form a complete and permanent bond between the elastomeric sole and the titanium coating of the spikes, such as to withstand stresses during walking on the spikes, in all kinds of weather conditions. Any tendency of cracking of the sole material around the spikes is prevented by the concentric stress-relieving grooves around the spikes.

The substantially conical shape of the novel spikes with the frustoconical buttons surrounding the bases provides optimum stability and support for the spikes under all conditions. Because the bases of the spikes are relatively small as compared with the metal bases of conventional screw type spikes, more spikes can be distributed over the sole and heel area, thereby obtaining better distributed support and more traction. Reference to FIGS. 1 and 2 makes it apparent that at least two additional spikes can be arranged on the sole area as compared with conventional spikes.

Further, the absence of the large metal bases of conventional spikes on the bottom surface of the sole results in less hammer and damage to the golf greens as they are walked upon.

Finally, the extremely hard and wear-resistant properties of the spikes provide a durable spiked golf shoe sole which does not require replacement of the spikes, with attended cross threading as in conventional spikes, and in which the spikes do not become uneven or burred so as to damage carpeting or other floor surfaces.

We claim:

1. An elastomeric golf shoe sole having substantially conical spikes of corundum with their bases molded within the sole and their opposite ends projecting therefrom, said spikes being coated with titanium and bonded to said elastomeric material by polymeric cement which forms a permanent bond when subjected to molding temperatures for curing said elastomeric material.

2. An elastomeric golf shoe sole as in claim 1, in which the elastomeric material is a styrene butadiene synthetic rubber compound of high silica content having a durometer hardness of about 70.

3. An elastomeric golf shoe sole as in claim 1, in which the areas of the sole surface surrounding the spikes have concentric stress-relieving grooves spaced radially outward from said spikes.

4. An elastomeric golf shoe sole as in claim 1, in which the bond between the spikes and the elastomeric material is formed by a combination of two compatible polymeric cements.

5. An elastomeric golf shoe sole as in claim 1, in which the bases of the spikes are encased in bosses formed on the upper surface of the sole.

6. An elastomeric golf shoe sole as in claim 2, in which the areas of the sole surface surrounding the spikes have concentric stress-relieving grooves spaced radially outward from the spikes.

7. An elastomeric golf shoe sole as in claim 2, in which the bond between the spikes and the synthetic rubber compound is formed by a combination of two compatible polymeric cements.

8. An elastomeric golf shoe sole as in claim 4, in which the bond formed between the spikes and the elastomeric material consists of a primer cement coat and a finish cement coat on the spikes comprising two compatible mixtures of polymeric compounds and fillers in a solvent system.

9. An elastomeric golf shoe sole as in claim 7, in which the bond formed between the spikes and the synthetic rubber compound consists of a primer cement coat and a finish cement coat on the spikes comprising two compatible mixtures of polymeric compounds and fillers in a solvent system.

10. An elastomeric sole for a shoe, said sole having a bottom surface and comprising, a plurality of spike means partially embedded in the bottom surface so that a portion of said spike means extends therefrom for contact with the ground, and stress-relieving means within said sole, said stress-relieving means being a groove formed within said bottom surface and extending around said spike means so that the high stresses to which said spike means is subjected when in contact with the ground are transferred to said stress-relieving means.

11. An elastomeric sole as in claim 10, wherein said groove is annular and spaced radially outward from and concentric with said spike means.

12. A shoe having an elastomeric sole comprising, a plurality of spikes having base portions embedded within said sole and projecting portions extending outwardly therefrom, said sole having groove means formed therein, said groove means being spaced from and extending around said spikes so that stress-creating forces applied to said projecting portions of said spikes are transferred to said sole at said groove means.

13. A shoe as in claim 12, wherein said base portions of said spikes are circular and said groove means is spaced radially from and concentric with said spike means.

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