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Young

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[54] **SPORT SHOE WITH QUICKLY REMOVABLE SPIKES**

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[52] **U.S. Cl.** .....**36/67 D**

[51] **Int. Cl.**.....**A43c 15/00**

[58] **Field of Search**.....36/67 R, 67 D, 59 R, 36/2.5 AH

[56] **References Cited**

UNITED STATES PATENTS

2,607,135	8/1952	Langer	36/67 D
3,267,593	8/1966	Turner	36/67 D
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Primary Examiner—Patrick D. Lawson

Attorney—Curtis Ailes

[57] **ABSTRACT**

The spikes are quickly released from their connection with the sport shoe by a one-quarter turn rotation, and then an axial withdrawal. Replacement spikes, or stub spikes adapting the shoe for street use, can then be quickly installed by reversing the above steps.

12 Claims, 9 Drawing Figures

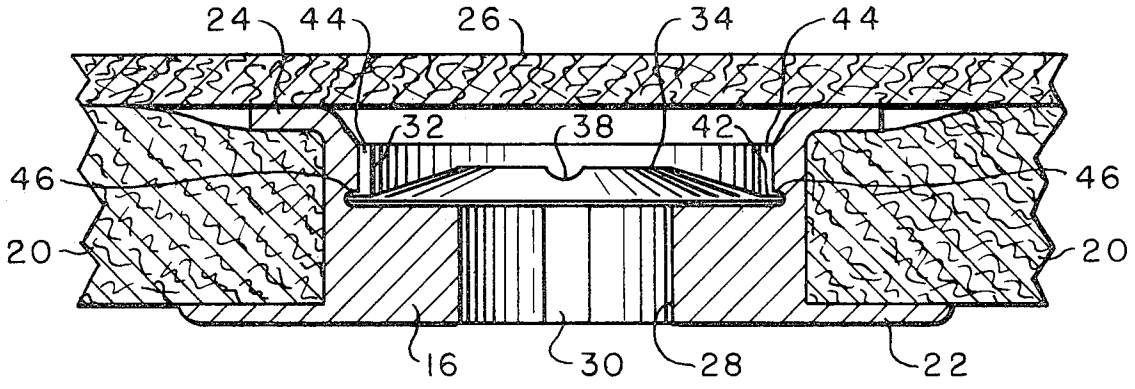


FIG_1

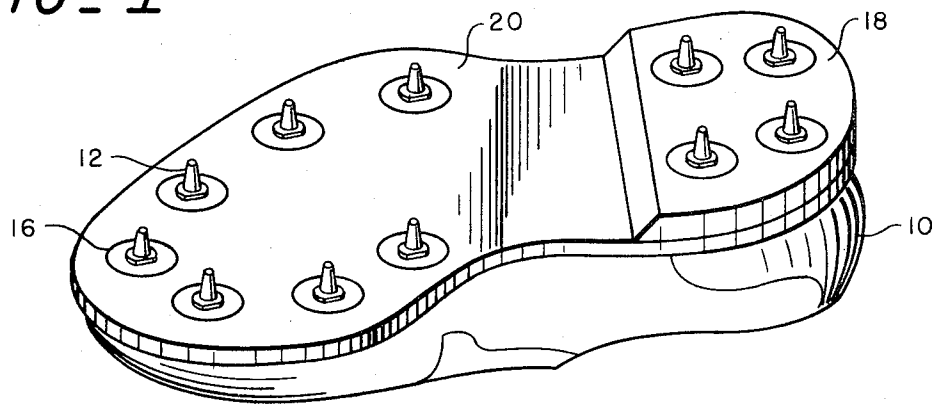


FIG_2

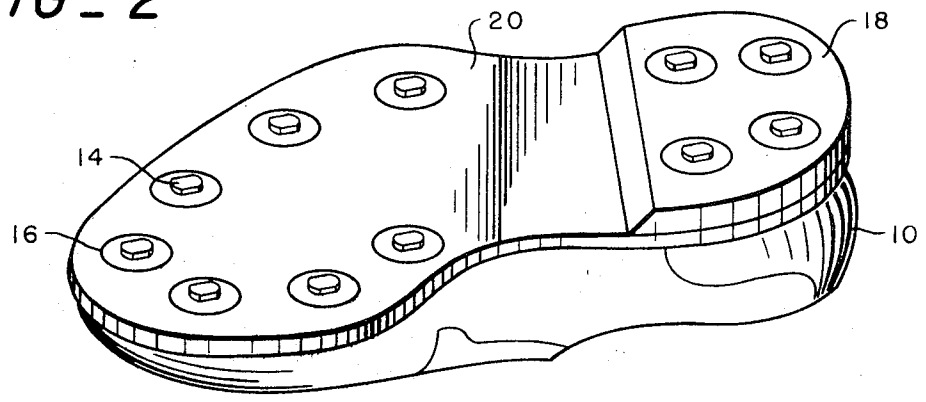


FIG_3

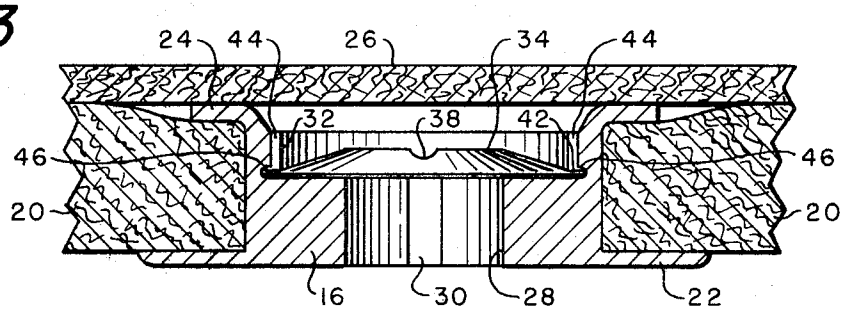


FIG_4

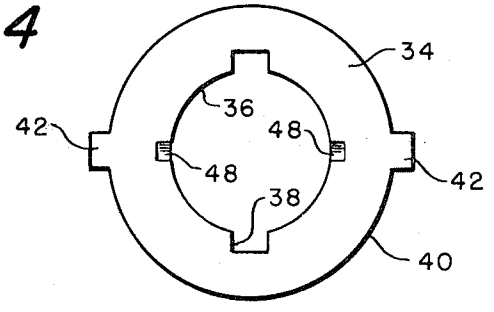


FIG_7

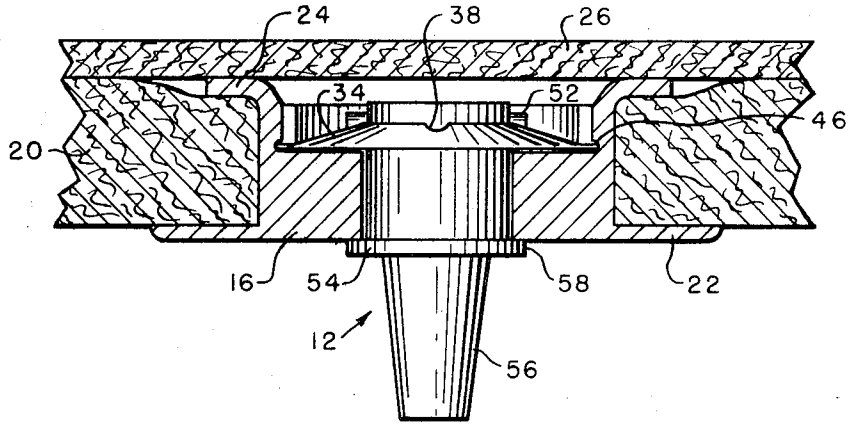


FIG_5

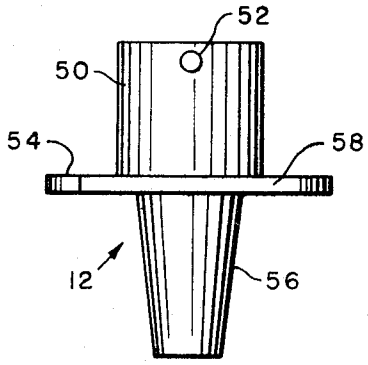


FIG_8

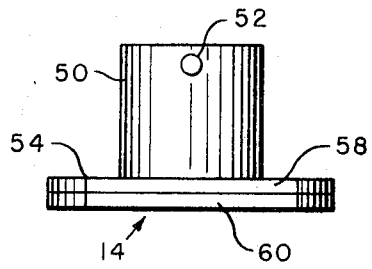


FIG_6

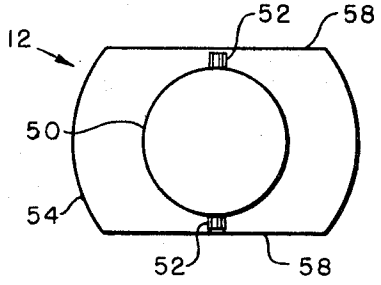
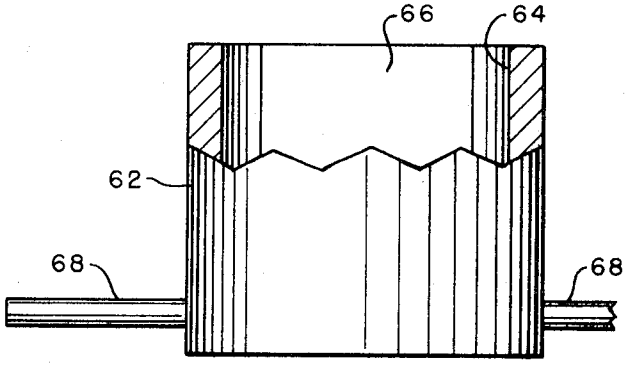


FIG_9



SPORT SHOE WITH QUICKLY REMOVABLE SPIKES

The present invention particularly relates to a new sport shoe of the type having spikes extending downwardly from the sole thereof for use in sports which are carried out on soft turf, and the invention is particularly useful for shoes of the above description which are used for the game of golf. The spikes are sometimes referred to as "calks."

An annoying problem which confronts sportsmen, and particularly golfers, is the need for carrying special spiked shoes, separate from their street shoes, which must be changed at the playing field just before the game is commenced. There is the inconvenience of carrying the sport shoes to the playing field, or golf links, and of then carrying or storing the street shoes during the game.

There are a number of reasons why the usual spiked sport shoes cannot be worn to and from the playing field. For instance, it is quite unpleasant and difficult to walk in the spiked shoes on hard smooth surfaces, it wears and dulls the spikes, it damages the floor surfaces, and it is very difficult to drive an automobile with the spiked shoes on.

Accordingly, it is one object of the present invention to overcome the problem of carrying separate spiked sport shoes and flat soled street shoes by providing a single pair of shoes which is convertible from spiked shoes to street shoes and back again.

Another problem encountered by wearers of spiked sport shoes is that, even in normal wear, the spikes become worn and dull, or broken. Thus, they need to be replaced from time to time. In the most commonly used type of spiked shoes, the spikes are held in place in the shoe by means of screw threads which engage in metal fittings installed in the lower surface layers of the shoe. However, this arrangement has major disadvantages. The screw threads often become rusted and corroded, and thus locked in place. With such a spike, when heroic efforts are expended to try to loosen the spike by unscrewing it, the result is that the wrench breaks, or the fitting into which the spike is threadedly fastened comes loose from the shoe, necessitating nothing less than a rebuilding of the shoe to install a new fitting. Another problem with the screw threaded connections is that the screw threads frequently are stripped so that the spike will no longer stay in the associated fittings.

Accordingly, it is another important object of the present invention to provide an improved sport shoe with quickly removable and replaceable spikes which do not rely on screw threaded fastenings.

Other attempts have been made to devise a convenient and workable means for providing removable spikes without screw thread fastenings. For instance, the structures illustrated in U.S. Pat. No. 2,607,135 issued to A. A. Langer illustrate one approach to this problem. However, none of these attempts have achieved wide usage, presumably because of defects in the basic design conceptions. One defect of the Langer removable spike, for instance, is that it is not positively locked in place, and is thus subject to coming loose and getting lost. It is also free to rotate, which is not considered desirable by sportsmen.

Accordingly, it is important object of the present invention to provide an improved removable spike structure for a sport shoe in which the spike is easily and quickly removable and replaceable, and including the feature of positive locking of the spike when it is in the assembled position.

Another object of the invention is to provide such a structure in which the spike is not freely rotatable.

Another object of the invention is to provide a new sport shoe spike assembly in which the spikes are quickly removable and replaceable, and in which stub pins may be substituted for the spikes to adapt the shoe for street use.

Further objects and advantages of the invention will be apparent from the following description and the accompanying drawings.

In carrying out the invention there may be employed a shoe which is quickly convertible from a substantially flat bottom street shoe to a spiked bottom sport shoe comprising a shoe structure having lower surface members including a main sole and heel, at least one of said lower surface members including a plurality of tubular metal fittings attached in openings therein. Each of said tubular fittings include a bottom flange extending radially outwardly transverse to the axis of the tubular fitting and engaging the lower surface of said lower surface member. Each of said tubular fittings include a top flange extending radially outwardly transverse to the axis of said tubular fitting and tightly embracing the upper edge of the opening in said lower surface member so that said tubular fitting is firmly secured to said lower surface member by said bottom flange and said top flange. A quickly removable spike pin in provided for insertion and attachment in each of said tubular fittings and a quickly removable stub pin interchangeable with said spike pin is provided and arranged for insertion and attachment in each of said tubular fittings. Each of said pins include a radially outwardly extending flange arranged for engagement with the bottom flange of said tubular fitting to limit the axial insertion travel of said pin into said tubular fitting. Said spike pins each include an integral pointed spike extending downwardly from said radial flange and said stub pins each include a substantially flat bottom surface arranged in substantially the same plane as the bottom plane of said flange of said pin. Each of said tubular fittings include a substantially cylindrical inner portion extending upwardly from said bottom flange, and each of said pins include a cylindrical portion extending above said radially extending pin flange and arranged to fit into said cylindrical portion of said tubular fitting. Said cylindrical portion of each of said pins and the interfitting cylindrical portion of the associated tubular fitting including quick disconnect means, said quick disconnect means comprising at least one knob protruding from one of said interfitting cylindrical portions and at least one cam action shoulder for cooperation with said knob forming a part of the other one of said interfitting cylindrical portions. Said quick disconnect means is operable to establish a quick connection by insertion of said pin cylindrical portion into said tubular fitting cylindrical portion and rotation through a fraction of a turn to engage said knob with said cam action shoulder and being disconnectible by rotation through a fraction of a turn to disconnect said knob and

shoulder and by subsequent retraction of said pin. Said radial flange of each of said pins including means for engagement by a twisting tool for imparting the rotational movement to said pin necessary for the connecting and disconnecting operation thereof.

In the accompanying drawings:

FIG. 1 is a perspective view showing a sport shoe in accordance with the present invention with spikes (also referred to herein as "spike pins") installed.

FIG. 2 is a perspective view of the sport shoe of FIG. 1 with stub pins installed in place of the spikes to adapt the shoe for street use.

FIG. 3 is a cross sectional side view of a tubular metal fitting fully installed in the bottom layer of the sport shoe of FIG. 1 and adapted to receive the spikes.

FIG. 4 is a top detail view of a metal spring washer which serves as a device for securely engaging and holding the spike pin or the stub pin within the tubular metal fitting of FIG. 3.

FIG. 5 is a side view of the spike pin adapted for installation in the tubular metal fitting of FIG. 3.

FIG. 6 is a top view of the spike pin of FIG. 5.

FIG. 7 is a sectional side view of the installed tubular metal fitting of FIG. 3, and showing the spike pin of FIG. 5 fully installed therein. This combination is sometimes referred to hereinafter as the "spike assembly."

FIG. 8 is a side view, corresponding to FIG. 5, of a stub pin adapted to be installed alternatively in the tubular metal fitting of FIG. 3 for adapting the shoe for street use.

And FIG. 9 is a side view, partially in section, illustrating a special tool which may be used for installation of either the spike pin or the stub pin.

In accordance with the present invention, spike pins for sport use, or stub pins for street use are interchangeably insertable into tubular metal fittings permanently installed in the bottom surface members of the sport shoe, and locked in place by a quarter turn of rotation. Removal of the spike pins and the stub pins is accomplished by simply reversing these steps, imparting a quarter turn to the pin, and then freely sliding it out of the tubular metal fitting.

FIGS. 1 and 2 respectively illustrate how the same sport shoe, such as a golf shoe **10**, appears with spike pins **12** installed for sport use, and with stub pins **14** installed for street use. The different pins are installed in permanent tubular metal fittings **16** which are attached to the bottom layers of the shoe, including the bottom ply **18** of the heel, and the main sole **20**. The spike pin fittings are installed in any desired pattern, and the pattern will generally conform to patterns of spike installation which are currently used and preferred by sportsmen.

FIG. 3 illustrates a cross sectional side view of the tubular metal fitting **16** employed with the removable pins in the sport shoe illustrated in FIGS. **1** and **2**. The fitting is seen to include a bottom flange **22** extending radially outwardly over the lower surface of the bottom shoe layer **20** which may comprise the outer sole of the shoe, for instance. The fitting also includes a top flange **24** which is preferably swaged tightly over the upper edge of the opening in the shoe sole **20**. Thus, the tubular metal fitting **16** is tightly secured within the opening in the sole **20**, and is restrained from rotation therein. The engagement of the flanges **22** and **24** with the shoe sole, which is typically made of leather, may be so tight as to provide considerable compression, and some slight degree of compressive deformation of the leather. The fitting is initially fabricated with an upper straight cylindrical outside wall surface (exclusive of flange **22**), with thin walls at the upper edges. These thin walls are then swaged over to form the flanges **24** after insertion of the fitting into the sole **20**. The fitting will accommodate for various thicknesses in the sole **20**. If the sole is thin, then more of the length of the thin upper edge wall is swaged over. If the sole is thick, less of the upper edge of the wall is swaged over. To accommodate extremely thick soles, the fitting can be fabricated with an extended thin wall at the upper edge to accommodate the added thickness without changing the rest of the structure.

An insole **26** is fixed to the interior of the shoe so that it covers the otherwise open interior ends of the tubular metal fittings **16**. It will be understood that FIG. **3** is somewhat enlarged in dimensions, the diameter of the hole in the outer sole **20** in which the fitting is attached being only about one-half inch typically. Accordingly, the insole **26** very effectively bridges over the top of the opening so that the shoe is not uncomfortable because of the discontinuity in support within the sole.

The interior of the tubular metal fitting includes a main bore portion **28** which has a generally cylindrical shape, and a diameter which allows a sliding fit with a corresponding cylindrical portion of the body of the spike pin or the stub pin to be inserted therein. An outwardly extending slot **30** is also provided in the main bore **28** for permitting the entry of a connecting or locking knob which forms a part of each of the spike pins and stub pins. The upper portion of the interior walls of the tubular metal fitting **16** includes an enlarged diameter portion, as indicated at **32**, and the transition between the main bore portion **28** and the enlarged diameter portion **32** provides a radially extending shelf-like portion which engages and supports a spring steel washer device **34** which is shown in more detail in FIG. **4** and which comprises a part of the fitting, and may be characterized as a part of the cylindrical portion including the cylindrical bore **28**.

FIG. **4** is a top view of a spring steel washer device **34** which comprises a part of the tubular metal fitting **16** just described in FIG. **3**. The spring metal washer **34** is in the form of a shallow cone. At the inner diameter **36** of the washer, there are included die-cut slots **38** for accommodating the latching knobs of the spike pins **12**, permitting the latching knobs to pass through the washer. The diameter of the inner opening **36** of the washer, exclusive of the notches **38**, is substantially the same as the diameter of the main bore **28** of the fitting **16**, providing a sliding fit of the spike pin therethrough. At the outer circumference **40** of the washer there are provided radially protruding ears **42**. The diameter of the outer circumference **40** of the washer, exclusive of the ears **42**, is just a little smaller than the upper bore **32** of the tubular fitting **16** to permit a sliding fit for insertion of the washer from the top of the fitting.

Referring back again to FIG. **3**, slots are provided at **44** in the upper bore of the tubular fitting **16** to accommodate the ears **42**. However, the bottoms of the slots **44** are spaced apart by a constricted dimension such that there is an interference fit between the tips of the

ears 42 and the bottoms of the slots 44. Thus, considerable force is necessary to insert the washer into its bottomed position as indicated in FIG. 3. However, this interference fit is relieved by a slight undercut indicated at 46 at the bottom of each of the slots 44. This permits at least a partial relief of the stresses of the interference fit of the tips of the ears 42 and the bottoms of the slots 44, and serves to anchor the washer 34 in place within the fitting 16 so that it is constrained against upward, as well as downward axial movement therein. This is an important feature of the assembly, as will be more fully appreciated from the following description.

Referring again to FIG. 4, on the upper face of the spring washer 34, near the inner circumference thereof, there are preferably provided two oppositely disposed indentations at 48 which are substantially in alignment with the ears 42. These indentations 48 are for the purpose of positively positioning the knobs of the spike pins and the stub pins when in the completely assembled and locked position. Even in the absence of indentations 48, the pin is locked in position because of the very considerable tension force applied to the pin by spring 34.

FIG. 5 is a side view of the spike pin 12. It includes a cylindrical shank portion 50 which has a diameter such as to provide a sliding fit in the main bore 28 of the tubular fitting as illustrated in FIG. 3. At diametrically opposite sides, and near the top of the shank portion 50, there are provided locking knobs 52, which are radially outwardly extending knobs, which may be generally cylindrical in shape, and which are of a size limited so as to slide through the slots 30 in the side wall of the tubular fitting 16, and through the inner slots 38 in the washer 34. The spike pin 12 includes a lower flange 54 which extends radially outwardly to engage the lower surface of the tubular fitting 16 and to limit the depth of insertion of the pin into the fitting. Finally, the spike 56 is integral with the rest of the structure and extends downwardly therefrom, having essentially a conical shape, and being of conventional dimensions. The flange 54 is provided with oppositely disposed flats 58 which are formed on diametrically opposite sides thereof for engagement of the flange by a wrench for providing an adequate twisting force for locking and unlocking the pin.

FIG. 6 is a top view of the spike pin illustrated in FIG. 5, shown from the top of the shank portion 50, and illustrating fully the flats 58 and the locking knobs 52. As illustrated in this figure, the knobs 52 and the flats 58 are preferably lined up on substantially the same diameter of the pin. Thus, when the pin is rotated 90° into the locking position, the full diameter portions of the flange 54 are rotated into position to fully cover and seal the bottoms of the slots 30 in the tubular fitting 16 which accommodate the knobs 52.

FIG. 7 shows the spike pin 12 fully installed in the tubular fitting 16. For installation, the cylindrical shank portion 50 of the pin is inserted into the cylindrical bore portion 28 of the tubular fitting 16, the locking knobs 52 being in alignment with the slots 30. After the pin is fully inserted so that the bottom flange 54 of the pin engages the lower surface of the tubular fitting 16, the pin is then rotated for one-quarter turn in either direction. The dimensions of the spring washer 34, and the other parts, are such that the knobs 52 emerge substantially above spring washer 34 and there is a camming action of the knobs 52 upon the inner and upper peripheral edge of the spring washer 34, requiring that the spring washer must be deformed to a certain extent to permit rotation of the pin. Thus, the pin must be rotated with an appreciable force requiring the application of a wrench to the pin flange 54, and especially to the flats 58. After this rotation is continued for one quarter turn, the locking knobs 52 engage in the depressions 48 in the upper surface of the spring washer (as shown in FIG. 4), and this provides a noticeable detent indexing mechanical action such that the locking knobs 52 are latched or locked into the depressions or detents 48. Thus, it requires a considerable rotational force applied to the pin to rotate it out of this locked position to again align the locking knobs 52 with the slots 38 and 30. The washer 34 is preferably designed so that the pin may be rotated in either direction for the purpose of either locking or unlocking the pin. Thus, the structure is very convenient for changing spikes while the shoes are actually being worn. The spikes on the left shoe can be twisted by the right hand in a clockwise direction, both for locking and unlocking, while the spikes in the right shoe can be twisted counterclockwise by the left hand for both locking and unlocking.

Because of the camming action of the knobs 52 on the upper edge of the spring washer 34, this particular portion of the spring washer may be characterized as comprising a cam action shoulder, which may be considered as essentially forming an extension, or a part of, the cylindrical internal bore portion 28 of the fitting 16. While not illustrated in the drawings, it is obvious that other equivalent structures could be provided in which the cam shoulder structure and the spring structure which provides a retaining tension force upon the pin could be physically separated. Also, the positions of the slots 30 and the knobs 52 could be reversed, the knobs being provided in the cylindrical surface wall 28 of the fitting, and the slots being provided in the cylindrical portion 50 of the pin.

However, the specific structure disclosed, employing the spring metal washer 34 is the much preferred form of the invention.

In one preferred embodiment of the invention, the spring metal washer 34 has an outside diameter of one-half inch, and an inside diameter of approximately one-quarter inch. The thickness of the spring material is approximately twenty-five thousandths of an inch, and the cone angle is such as to provide an unsprung height of the spring from the bottom surface at the outside circumference to the top surface at the inside diameter in the order of forty thousandths of an inch. When the pin is locked in place, the downward deflection of the top of the spring by the knobs 52 may be such as to reduce the effective height of the spring by as much as four thousandths of an inch or more. This provides a very substantial tension force between the knobs 52 and the flange 54 of the pin to lock it in place. This tension force may be in excess of 50 pounds. The material of the spring is preferably a stainless spring steel, although other materials may be used.

FIG. 8 is a side view corresponding to FIG. 5, but showing the construction of the stub pin 14 instead of

the spike pin 12. The upper portion of the stub pin 14 is seen to be identical to the corresponding portions of the spike pin 12. The only true difference is that the spike portion 56 is omitted, and instead, a thin rubber pad 60 is preferably securely bonded to the bottom surface of the stub pin, which preferably lies in the plane of the bottom surface of the flange 54. Thus, the bottom surface of the flange 54 constitutes the bottom surface of the stub pin, except for the addition of the rubber pad 60. The rubber pad 60 preferably covers the entire bottom surface, with its outer outline substantially conforming to that of the flange 54, including the flats 58. The rubber pad 60 provides a degree of non-skid effect when the stub pins are installed in the shoes for street wear. It will be understood, of course, that the rubber pads may include a tread design, or they may be perfectly smooth, if preferred.

FIG. 9 illustrates, partially in section, a special socket wrench 62 which is preferably provided for the purpose of quickly and easily rotating the spike pins and stub pins for locking and unlocking them for removal and exchange or replacement. The end of the socket at 64, which is shown in section, is preferably formed with oppositely opposed flat sections, as illustrated at 66 so that it exactly fits the periphery of the bottom flange 54 of each of the pin members. The socket opening 64 is deep enough to accommodate the spike of the spike pin 12 so that there is no difficulty in engaging the flange 54 of the spike pin. The wrench 62 preferably includes a handle portion having separate wings 68 which are long enough to provide good twisting leverage for the user.

The fittings 16 are preferably installed in the shoe 10 so that all of the fittings are in the same rotational alignment with respect to the shoe. For instance, the slots 30 are preferably in a line which is parallel to the toe to heel line of the shoe. Thus, in the locked position, the flats 58 of the flanges 54 on the pins are all in fore and aft alignment with respect to the body of the shoe. One reason for the preference for the uniform alignment is that the user will always known the exact angle at which the wrench will engage the spikes for quick and easy removal, and the exact angle of the wrench corresponding to the locked and unlocked positions of the spike pins.

While the flanges on the spike and stub pins have been disclosed as being provided with flat, oppositely disposed edges for accommodation of the wrench of FIG. 9, it is obvious that other edge configurations may be employed with the flange. For instance, a hexagonal shape can be used to accommodate a conventional hexagonal socket wrench, without departing from the spirit of the present invention.

All of the parts of the spike assembly may be composed of steel, and preferably stainless steel, although the spike pin may preferably be of a particularly hard and wear-resisting steel. The preference for stainless steel applies to the tubular metal fitting 16, the spike pin 12, and the stub pin 14.

While not shown in the drawings, the main sole of the shoe forming one of the lower surface members may be comprised of a laminated structure including a high strength sole plate which may be composed of a thin flexible metal, with an outer sole of non-metallic material, such as rubber, firmly attached to the metal sole plate. In such an arrangement, the tubular metal fittings may be attached to the laminar main sole primarily by attachment to the metal sole plate portion thereof. The bottom flange 22 of the tubular metal fitting then engages the lower surface of the metal sole plate portion of the main sole rather than the outermost lower surface of the outer sole. A similar construction may be used for the heel lower surface member.

While this invention has been shown and described in connection with particular preferred embodiments, various alterations and modifications will occur to those skilled in the art. Accordingly, the following claims are intended to define the valid scope of this invention over the prior art, and to cover all changes and modifications falling within the true spirit and valid scope of this invention.

I claim:

1. A shoe which is quickly convertible from a substantially flat bottom street shoe to a spiked bottom sport shoe comprising:

a shoe structure having lower surface members including a main sole and heel,

at least one of said lower surface members including a plurality of tubular metal fittings attached in openings therein,

each of said tubular fittings including a bottom flange extending radially outwardly transverse to the axis of the tubular fitting and engaging a lower surface of said lower surface member,

each of said tubular fittings including a top flange extending radially outwardly transverse to the axis of said tubular fitting and tightly embracing the upper edge of the opening in said lower surface member so that said tubular fitting is firmly secured to said lower surface member by said bottom flange and said top flange,

a quickly removable spike pin for insertion and attachment in each of said tubular fittings,

a quickly removable stub pin interchangeable with said spike pin and arranged for insertion and attachment in each of said tubular fittings,

each of said pins including a radially outwardly extending flange arranged for engagement with the bottom flange of said tubular fitting to limit the axial insertion travel of said pin into said tubular fitting,

said spike pins each including an integral pointed spike extending downwardly from said radial flange,

said stub pins each having a substantially flat bottom surface arranged in substantially the same plane as the bottom plane of said bottom flange of said pin,

each of said tubular fittings including a substantially cylindrical inner portion extending upwardly from said bottom flange,

each of said pins including a cylindrical portion extending above said radially extending pin flange and arranged to fit into said cylindrical portion of said tubular fitting,

said cylindrical portion of each of said pins and the interfitting cylindrical portion of the associated tubular fitting including quick-disconnect means,

said quick-disconnect means comprising at least one knob protruding from one of said interfitting cylindrical portions and at least one cam action

shoulder for cooperation with said knob forming a part of the other one of said interfitting cylindrical portions,

said quick-disconnect means being operable to establish a quick connection by insertion of said pin cylindrical portion into said tubular fitting cylindrical portion and rotation through a fraction of a turn to engage said knob with said cam action shoulder and being disconnectable by rotation through a fraction of a turn to disconnect said knob and shoulder and by subsequent retraction of said pin,

and said radial flange of each of said pins including means for engagement by a twisting tool for imparting the rotational movement to said pin necessary for the connecting and disconnecting operation thereof.

2. A sport shoe comprising:

a shoe structure having lower surface members including a main sole and heel,

at least one of said lower surface members including a plurality of tubular metal fittings attached in openings therein,

each of said tubular fittings including a bottom flange extending radially outwardly and engaging a lower surface of said lower surface member,

each of said tubular fittings including a top flange extending radially outwardly and tightly embracing the upper edge of the opening in said lower surface member,

a quickly removable and replaceable spike pin for insertion and attachment in each of said tubular fittings,

each of said pins including a radially outwardly extending flange arranged for engagement with the bottom flange of said tubular fitting to limit the axial insertion travel of said pin into said tubular fitting,

said pins each including an integral pointed spike extending downwardly from said radial flange,

each of said tubular fittings including a substantially cylindrical inner portion extending upwardly from said bottom flange,

each of said pins including a cylindrical portion extending above said radially extending pin flange and arranged to fit into said cylindrical portion of said tubular fitting,

said cylindrical portion of each of said pins and said interfitting cylindrical portion of the associated tubular fitting including quick-disconnect means,

said quick-disconnect means comprising at least one knob protruding from one said interfitting cylindrical portions and at least one cam action shoulder for cooperation with said knob forming a part of the other one of said interfitting cylindrical portions,

said quick-disconnect means being operable to establish a quick connection by insertion of said pin cylindrical portion into said tubular fitting cylindrical portion and rotation through a fraction of a turn to engage said knob with said cam action shoulder and being disconnectable by rotation through a fraction of a turn to disconnect said knob and shoulder and by subsequent retraction of said pin.

3. A spike assembly for a sport shoe comprising:

a tubular metal fitting for attachment in an opening in a lower surface member of the sport shoe,

said tubular fitting including a bottom flange extending radially outwardly transverse to the axis of the tubular fitting for engaging a lower surface of the lower surface member,

said tubular fitting including a top bottom which can be flared out to form a top flange to embrace the upper edge of the opening in the lower surface member,

a quickly removable and replaceable spike pin for insertion and attachment in said tubular fitting,

said pin including a radially outwardly extending bottom flange arranged for engagement with the bottom flange of said tubular fitting to limit the axial insertion travel of said pin into said tubular fitting,

said pin including an integral pointed spike extending downwardly from said radial flange,

said tubular fitting including a substantially cylindrical inner portion extending upwardly from said bottom flange,

said pin including a cylindrical portion extending above said radially extending pin flange and arranged to fit into said cylindrical portion of said tubular fitting,

one of said interfitting cylindrical portions including at least one knob protruding therefrom,

the other one of said cylindrical portions including at least one cam action shoulder for cooperation with said knob,

said interfitting cylindrical portions being operable to establish a quick connection by insertion of said pin cylindrical portion into said tubular fitting cylindrical portion and rotation through a fraction of a turn to engage said knob with said cam action shoulder,

said interfitting cylindrical portions being quickly disconnectable by rotation through a fraction of a turn to disconnect said knob and shoulder and by subsequent retraction of said pin.

4. A spike assembly as claimed in claim 3 wherein there is provided a stub pin interchangeable with said spike pin to adapt the shoe for street use,

said stub pin having all of the structure corresponding to the structure of said spike pin except said stub pin being provided with a substantially smooth lower surface substantially coinciding with the lower surface of said pin flange.

5. A spike assembly as claimed in claim 3 wherein

two diametrically oppositely positioned knobs are included in said interfitting cylindrical portion having said knob,

and two diametrically oppositely disposed cam action shoulders are included in said cylindrical portion having said cam action shoulder for cooperation with said knobs.

6 A spike assembly as claimed in claim 3 wherein

there is included a resilient tension member for applying a locking tension to said pin in the assembled position.

7. A spike assembly as claimed in claim 6 wherein

said tension member is combined as a part of said cylindrical portion including said cam action shoulder,

said tension member comprising an axially deformable substantially flat spring member and serving to

provide and form said cam action shoulder in combination in said spring member,

the upper surface of said flat spring member serving to engage said knob.

8. A spike assembly as claimed in claim 7 wherein said spring member comprises a metal spring washer providing said cam action shoulder as part of said cylindrical portion of said tubular fitting,

said spring washer and said cylindrical portion of said tubular fitting including at least one radial slot cut therein to permit passage of said knob as said pin is inserted into said tubular fitting.

9. A spike assembly as claimed in claim 8 wherein said metal spring washer has a shallow cone shape and is deformable in a direction to flatten the cone to provide said tension.

10. A spike assembly as claimed in claim 9 wherein said metal spring washer includes an indentation at the upper inner edge thereof for seating of said knob in the locked position of said pin.

11. A spike assembly as claimed in claim 9 wherein said metal spring washer includes ears extending radially outwardly from the outer periphery of said washer,

said tubular metal fitting including slots in the upper inner surface thereof to accommodate said ears and to restrict rotation of said washer.

12. A spike assembly as claimed in claim 11 wherein the tips of said ears of said spring washer have an interference fit in said slots in said tubular fitting,

said slots in said tubular fitting including undercut portions at the lowermost portions of said slots to relieve said interference fit and to lock said ears and said spring washer in a position of maximum insertion into said tubular fitting.

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