

FIG 1

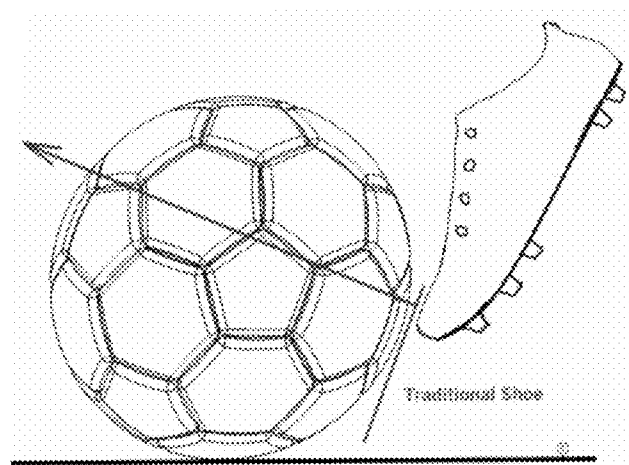


FIG 2

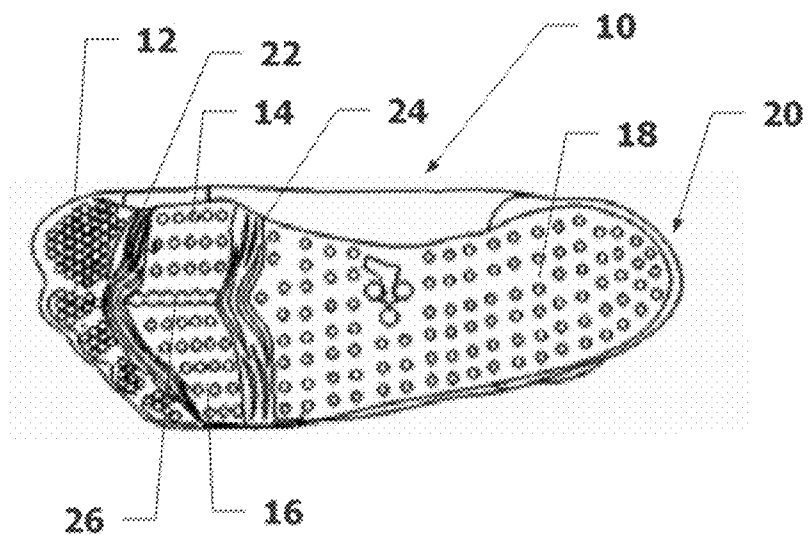


FIG 3

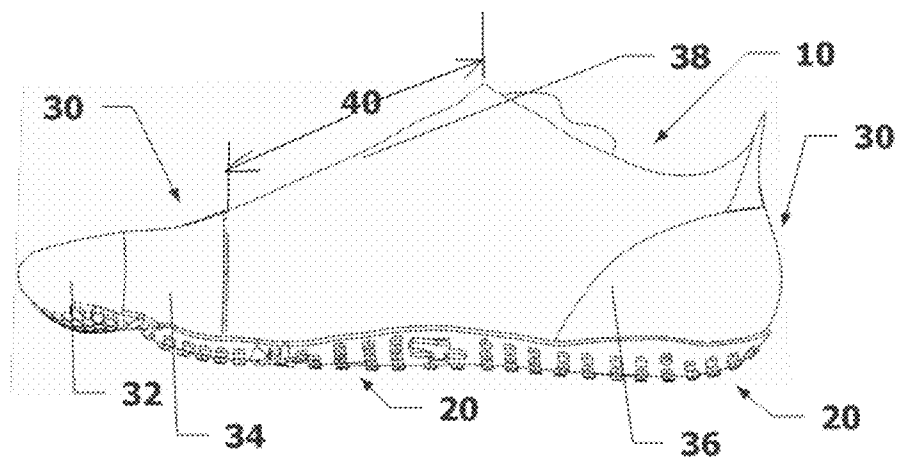


FIG 4

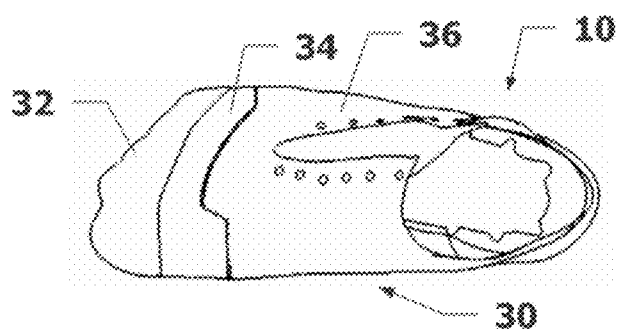


FIG 5

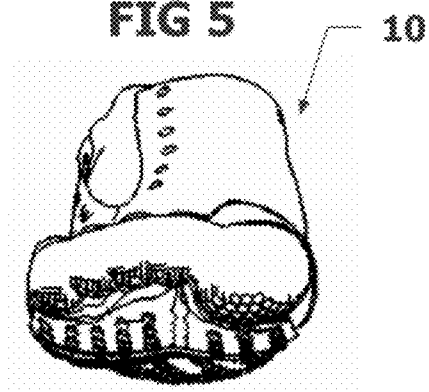


FIG 6

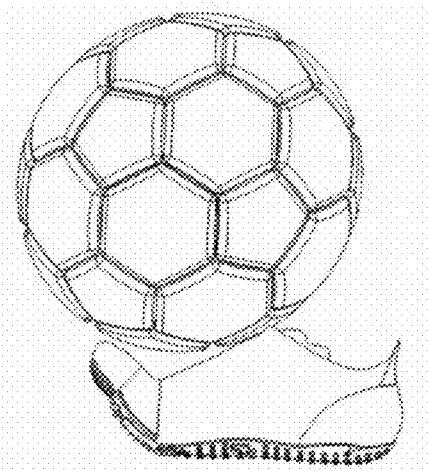


FIG 7

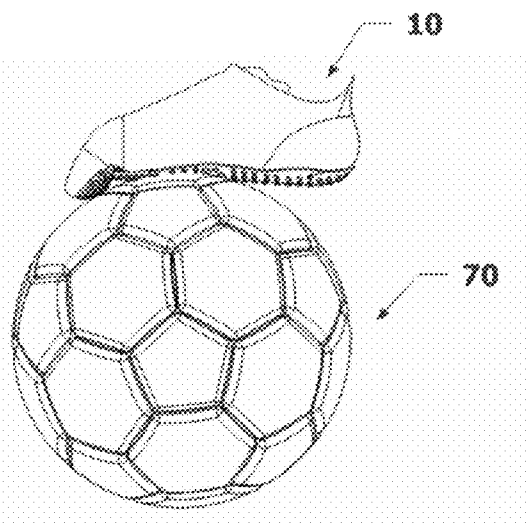


FIG 8

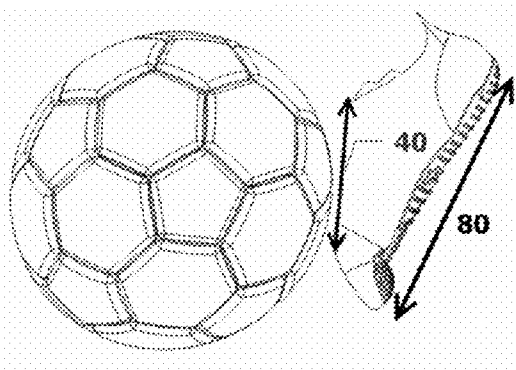


FIG 9

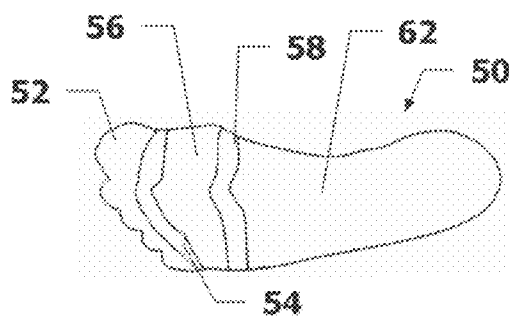


FIG 10

Variation in total length (80), upper vamp length (40), shape

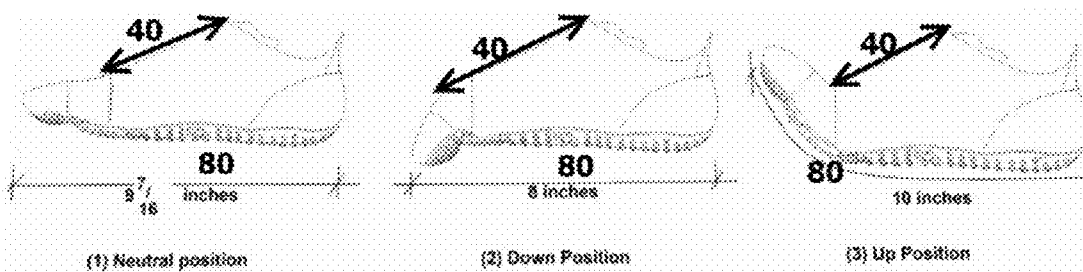


FIG 11

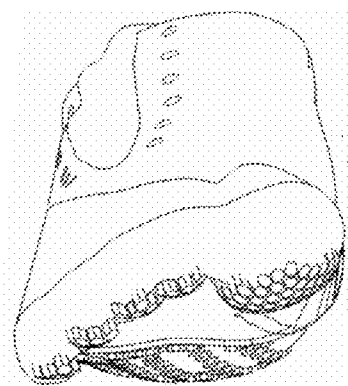


FIG 12

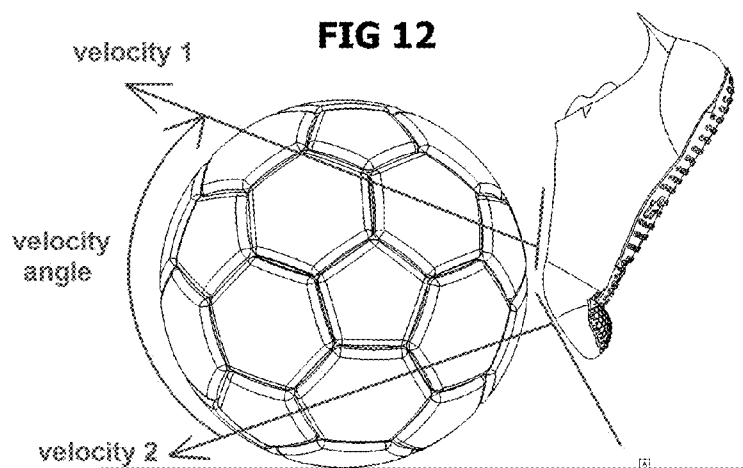
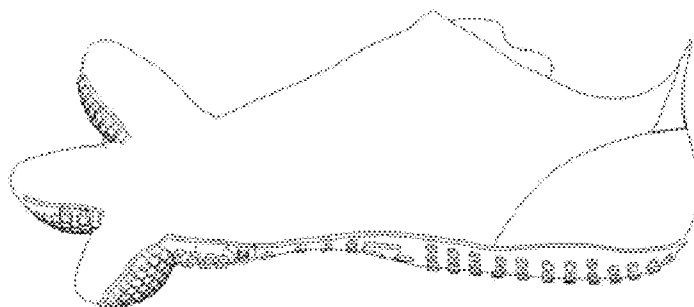


FIG 13



VARIABLE LENGTH AND FLEXIBLE FOREFOOT SHOE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to copending U.S. Provisional patent application No. 61,969,263 entitled "Precision Soccer Shoe with Customized Flexibility" filed on Sep. 3, 2012, which provisional application is incorporated herein by reference in its entirety; this application claims the benefit of the provisional's filing date under 35 U.S.C. 119(e).

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not applicable

REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISC APPENDIX

[0003] Not applicable

BACKGROUND OF THE INVENTION

[0004] This invention pertains to a shoe that has a variable total length, variable upper vamp length and variable forefoot shape realized because of a flexible sectional sole and a flexible upper corresponding to the forefoot section of the foot. These flexible portions of the shoe permit bending of the forefoot relative to the rest of the shoe to change the length and shape of the forefoot in order to allow a sports player to achieve maximum results in sports where shoes are the player's tools, aiding the user in finding and using the sweet spots of the shoe to improve precision, trapping, holding and velocity. The invention allows a user's foot and shoe to better approximate the natural flexibility of bare feet as opposed to rigid shoes that limit a player's ability to use the natural flexibility of their feet.

[0005] Traditional prior art shoes (FIG. 1) with inflexible soles and inflexible uppers limit a user's kicking velocity because the user's distal forefoot (or toe section) is the primary kicking surface which is limited in shape and hardness and therefore limited in the potential for precision, trapping and holding and velocity. Traditional shoes teach away from a variable length and flexible forefoot shoe and using the flexibility of feet.

BRIEF SUMMARY OF THE INVENTION

[0006] One embodiment of this invention and the best mode contemplated by the inventor at the time of application is a soccer shoe where the user can achieve competitive advantage unavailable in the prior art by changing the total length, upper vamp length, and shape of the forefoot part of the shoe using movement from the forefoot section of their foot. One configuration of the user's flexibility is by putting the forefoot of the shoe in a down position resulting in a shorter total shoe length but longer upper vamp length critical for precision shots at goal (FIG. 8). A second configuration of the same embodiment is by changing the total length of the shoe by putting the forefoot in an up position resulting in a longer foot length and more desirable shape for trapping or holding the soccer ball **70** firmly between the forefoot and the shin (FIG. 6). A third configuration of the same embodiment is a forefoot twisting motion changing the shape of the shoe

enabling a more precise sidekick on the soccer ball **70** (FIG. 11) and a fourth configuration of the same embodiment is by changing the shape of the shoe by putting the forefoot in an down position for trapping and holding the soccer ball **70** (FIG. 7).

[0007] The soccer shoe embodiment where the forefoot length (distal forefoot plus proximal forefoot sections) ranges between 30% and 47% of the total length of the shoe was found to be optimal for the maximum use of the shoe for precision kicks, trapping and holds, and to most closely use the flexibility of a foot for advantage and to approximate the advantages of bare foot. Other embodiments of this invention for other sports such as football and rugby may use different combinations of ratios between the forefoot and midfoot/hindfoot sections for achieving optimal results.

[0008] A sweet spot is a place where a combination of factors results in a maximum response for a given amount of effort. In soccer, a given kick will result in a more precise and/or powerful hit if the ball strikes the foot on the player's sweet spot, often the upper vamp, for a particular kick.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0009] FIG. 1 is a traditional prior art soccer shoe.

[0010] FIG. 2 is a bottom view of the Variable Length and Flexible Forefoot Shoe.

[0011] FIG. 3 is a side view of the Variable Length and Flexible Forefoot Shoe.

[0012] FIG. 4 is a top view of the Variable Length and Flexible Forefoot Shoe.

[0013] FIG. 5 is a front view of the Variable Length and Flexible Forefoot Shoe.

[0014] FIG. 6 is a side view of the Variable Length and Flexible Forefoot Shoe in forefoot up position with the shoe trapping a soccer ball.

[0015] FIG. 7 is a side view of the Variable Length and Flexible Forefoot Shoe in forefoot down position with the shoe trapping a soccer ball.

[0016] FIG. 8 is a side view of the Variable Length and Flexible Forefoot Shoe with minimum total length and maximum upper vamp length kicking a soccer ball from the sweet spot on the shoe.

[0017] FIG. 9 is a top view of the Variable Length and Flexible Forefoot Shoe insole.

[0018] FIG. 10 is three views showing the change in total length and upper vamp length of the Variable Length and Flexible Forefoot Shoe and the changes in shape as the forefoot bends up and down with a starting shoe length of 9 $\frac{7}{16}$ inches.

[0019] FIG. 11 is a front view of the Variable Length and Flexible Forefoot Shoe with the forefoot twisted inward for a sidekick.

[0020] FIG. 12 is a side view of the Variable Length and Flexible Forefoot Shoe being used to kick a soccer ball using the upper vamp to achieve velocity **1** and with the bent toe to achieve velocity **2**.

[0021] FIG. 13 is a side view showing the three different toe positions of the Variable Length and Flexible Forefoot Shoe.

DETAILED DESCRIPTION OF THE INVENTION

[0022] The invention is a Variable Length and Flexible Forefoot Shoe **10** with an outsole **20**, upper **30** and insole **50** that are divided into flexible elastic regions and inelastic

regions. The flexible forefoot region of the outsole (FIG. 2) is made up of the distal forefoot 12, the proximal inside forefoot 14, the proximal outside forefoot 16 plus the three elastic interfaces; the interface 22 between the distal forefoot 12 and the inside 14 and outside 16 proximal forefoot sections and the interface 24 between the proximal inside and outside forefoot sections and the midfoot/hindfoot 18 and the interface 26 between the inside proximal forefoot 14 and the outside proximal forefoot 16. The corresponding flexible upper 30 (FIG. 3) comprises the distal forefoot 32 and the proximal forefoot 34. The inelastic region of the upper 30 comprises the midfoot/hindfoot 36 and the upper vamp 40 which is part of the midfoot/hindfoot 36. FIG. 4 is a top view of the upper 30 and FIG. 5 is a front view.

[0023] The flexible shape and corresponding variable lengths (total length and upper vamp length) of the shoe depend on the position of a user's forefoot inside the shoe. The ideal kicking (FIG. 8), and holding and trapping (FIG. 6, FIG. 7) shoe surfaces for purposes of this embodiment and these claims is defined to be the conditions that most approximate barefoot playing. Other embodiments may use the Variable Length and Flexible Forefoot Shoe design to achieve other ideals.

[0024] The standard non-ball control forefoot position of the user is with the forefoot flexing as needed for maximum running stride generally to have the maximum surface of the shoe in contact with the ground as needed for maximum friction.

[0025] When the user wants to maximize control of the ball, the elastic regions of the shoe flex with the user's forefoot to bend up (FIG. 6), or bend down (FIG. 7) for control. The user can bend down to lengthen the upper vamp length 40 (FIG. 8) for a more precise kick or higher velocity (FIG. 12) or twist to change the angle of the shoe for a side kick (FIG. 11). The total length of the shoe 80, length of the upper vamp 40 and the shape of the shoe (FIG. 10) change with the shape of the user's foot in order to achieve results that approach that of bare feet and hit the ball from the sweet spots of the shoe. FIG. 13 shows the range of movement of the invention.

[0026] For example when the user's forefoot is bent down (FIG. 8), the shoe's total length 80 is at a minimum and the upper vamp length 40 at a maximum (FIG. 8, FIG. 10). With the shoe's distal forefoot bent out of the way, the upper vamp sweet spot is more exposed and has better clearance giving the user a competitive advantage by exposing more of the upper vamp length making the shoe's kicking ability more like bare foot kicking.

[0027] Another example when the user's forefoot is bent up (FIG. 6), the shoe's total length 80 is at a maximum and the upper vamp length 40 at a minimum. With the shoe's distal forefoot bent up, the shape of the shoe grasps, traps, and holds the ball in a manner that more approximates that of bare feet.

[0028] Another example is when the user's forefoot is bent down and the foot twisted inward (FIG. 11), the shape of the shoe improves the precision and power available for side kicking and more approximates that of bare feet. Prior art shoes with inflexible soles and inflexible uppers force the user to twist joints (ankles, knees, hips) to a greater degree in order to achieve the same angle.

[0029] The invention also includes an insole 62 made of inelastic and elastic materials such as silicone rubber or neoprene for the interfaces in the forefoot region to create an elastic forefoot region that can both compress and stretch and provides the necessary comfort. The insole 62 (FIG. 9) com-

prises an inelastic insole distal forefoot 52; an inelastic insole proximal forefoot 56; an inelastic insole midfoot/hindfoot 62; an interface 54 from the elastic distal forefoot to proximal forefoot 56, and an interface 58 from the inelastic proximal forefoot 56 to the inelastic midfoot/hindfoot 62. The interfaces of the insole make the insole distal forefoot 52 and insole proximal forefoot 56 into an elastic region that transmits the user's forefoot forces and shape changes to the flexible regions of the outsole and upper.

1. A shoe comprising:

- a variable total length of the shoe where changes in the total length correspond to a position of a user's forefoot;
- a variable upper vamp length where changes in the upper vamp length correspond to the position of the user's forefoot;
- an inelastic outsole distal forefoot;
- an inelastic outsole inside proximal forefoot;
- an inelastic outsole outside proximal forefoot;
- a inelastic midfoot/hindfoot;
- an elastic outsole interface between the inelastic outsole distal forefoot and the inelastic outsole inside and outside proximal forefoot;
- an elastic outsole interface between the inelastic outsole inside and outside proximal forefoot and the inelastic midfoot/hindfoot;
- an elastic upper distal forefoot;
- an elastic upper proximal forefoot;
- an upper midfoot/hindfoot.

2. The shoe from claim 1 with the total length at a maximum and the upper vamp length at a minimum when the user's forefoot is bent up.

3. The shoe from claim 1 with the total length at a minimum and the upper vamp length at a maximum when the user's forefoot is bent down.

4. The shoe from claim 1 wherein the upper distal forefoot is inelastic.

5. A shoe comprising:

- a changing shape for ball grasping depending on a position of a user's forefoot;
- an inelastic outsole distal forefoot;
- an inelastic outsole inside proximal forefoot;
- an inelastic outsole outside proximal forefoot;
- a inelastic midfoot/hindfoot;
- an elastic outsole interface between the inelastic outsole distal forefoot and the inelastic outsole inside and outside proximal forefoot;
- an elastic outsole interface between the inelastic outsole inside and outside proximal forefoot and the inelastic midfoot/hindfoot;
- an elastic upper distal forefoot;
- an elastic upper proximal forefoot;
- an upper midfoot/hindfoot.

6. The shoe from claim 5 with the changing shape for ball grasping shape upward when the forefoot is bent up.

7. The shoe from claim 5 with the changing shape for ball grasping shape downward when the forefoot is bent down.

8. The shoe from claim 5 with the changing shape for ball kicking shape downward and inward when the forefoot is bent down and the forefoot is twisted inward.

9. An insole comprising:

- a compressing and stretching of an insole elastic region corresponding to a force from a user's foot;
- a transmitting of the user's forefoot force and shape changes to the elastic region of the shoe;

an inelastic insole distal forefoot;
an inelastic insole proximal forefoot;
an inelastic insole midfoot/hindfoot;
an elastic distal forefoot to proximal forefoot interface;
an elastic proximal forefoot to midfoot/hindfoot interface.

* * * * *