May 11, 1954

E. R. DYE

2,677,905

TRACTION CLEAT FOR ATHLETIC SHOES

Filed March 22, 1951

2 Sheets-Sheet 1

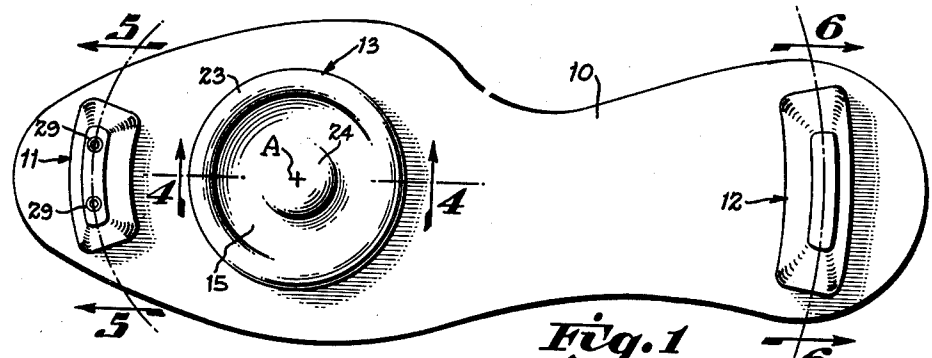


Fig. 1

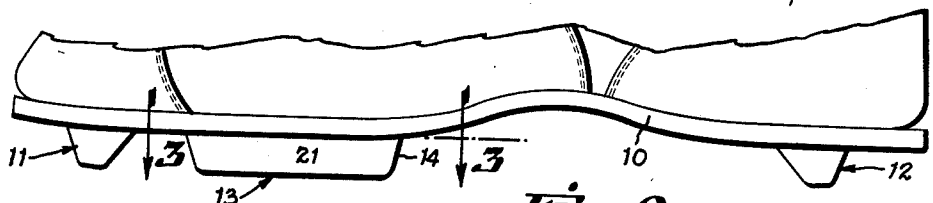


Fig. 2

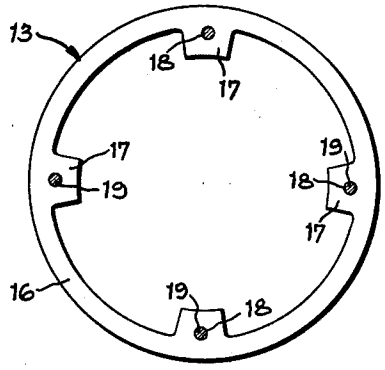


Fig. 3

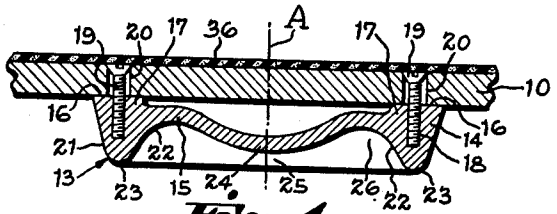


Fig. 4

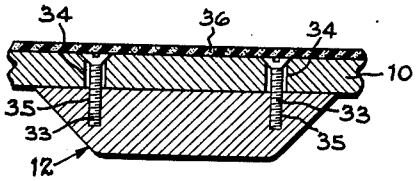


Fig. 6

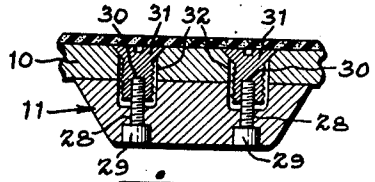


Fig. 5

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2 Sheets-Sheet 2

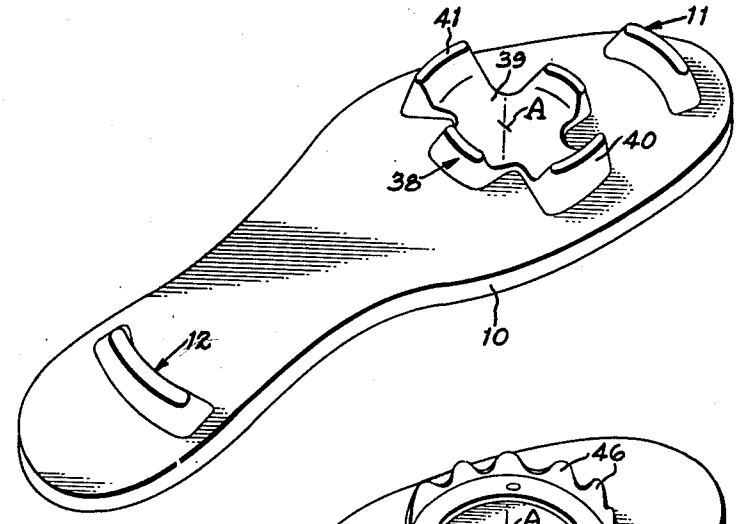


Fig. 7

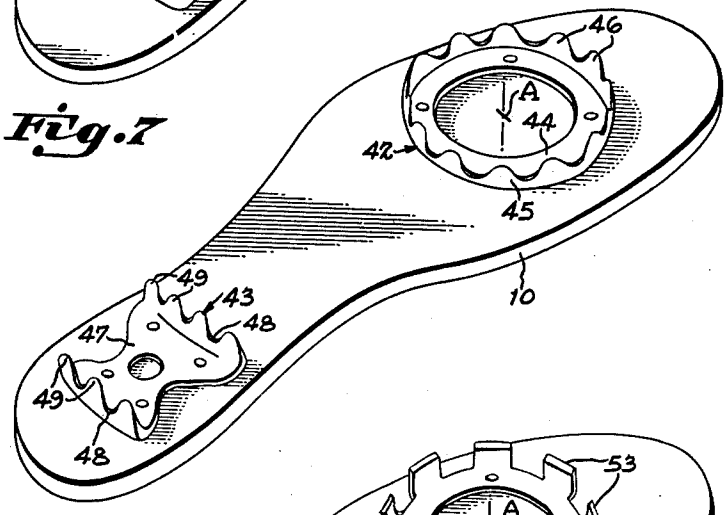


Fig. 8

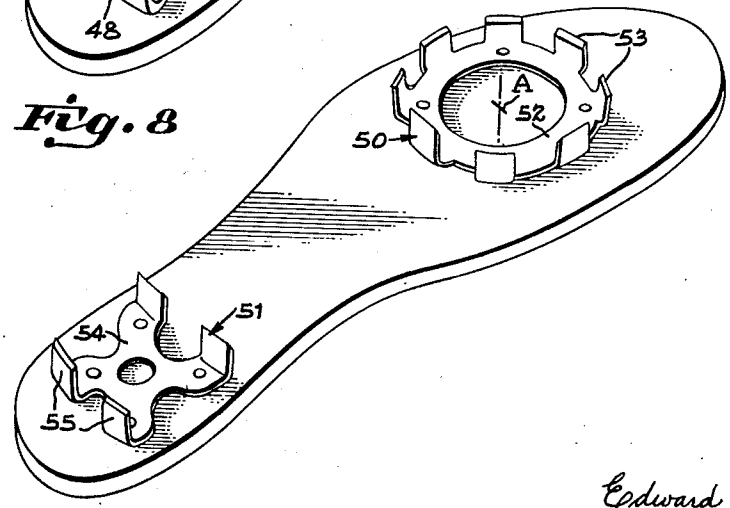


Fig. 9

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UNITED STATES PATENT OFFICE

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TRACTION CLEAT FOR ATHLETIC SHOES

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8 Claims. (Cl. 36—59)

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This invention relates to athletic shoes and is particularly directed to novel cleats of the type provided on the soles of such shoes to furnish the traction required by the wearer for proper maneuvering. The invention is disclosed particularly with relation to a football shoe but the same principles may be utilized in foot gear adapted to be used in other sports, such as soccer, lacrosse, baseball, golf and the like.

The present application is a continuation of an earlier application filed September 30, 1950, Serial No. 187,713, entitled "Traction Devices for Athletic Shoes" now abandoned. Subsequent to the preparation of this earlier application, extensive commercial use of its subject matter, under widely varying conditions, has led to a more accurate appraisal of the relative importance of various novel aspects of this device. The present specification has been prepared in an attempt to clarify the contribution made toward the total effectiveness of the device by each of its novel features.

A principal objective of this invention has been to provide a cleat for athletic shoes which will provide the wearer with suitable traction under widely varying field conditions while permitting him to pivot or turn freely, thereby reducing the likelihood of injury. However, in order that the significance of this objective may be fully appreciated, it is in order briefly to describe the problems which have previously been encountered in providing satisfactory traction devices for football shoes and the like.

Football, as it is presently played, requires that a participating player be able to start and stop quickly and surely. Furthermore, it is exceedingly important that a player be able to keep his footing while running and attempting to dodge, tackle or block an opposing player. These requirements make it desirable to provide some means on the sole of football shoes for furnishing the necessary traction so that a player can properly maneuver without slipping or falling. Heretofore, this traction has been provided by a plurality of cleats which are secured to the sole of the shoe. These cleats are generally frustoconical in shape and usually seven in number. They are secured at spaced intervals inwardly of the periphery of the sole. In order to provide suitable traction, present day cleats are made relatively long, about ¾ of an inch, or even longer. Even under ideal conditions, that is, when the field is soft enough so that the cleats at least partially penetrate the ground but yet not so soggy that they become clogged with

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mud, the conventional cleats represent a less than satisfactory solution to the problem of providing the necessary traction for a football player.

One of the principal difficulties with the present conventional construction, even under ideal field conditions, is that the cleats lock in the ground at each step, thus preventing the player from freely twisting or pivoting his foot. Many injuries are caused by the fact that a player cannot release his cleats from the soil in order to pivot, twist or maneuver suddenly. If the wearer is struck by an opposing player while his own foot is unable to turn in a rotary or circular motion to give with the blow, a player's knees, ankles and hips are subjected to great strains and are often injured. It has been shown that almost half of the injuries which force players to remain out of action are due to such injuries.

The difficulties present even under ideal conditions are greatly magnified by the varying conditions actually encountered. For example, when playing on a frozen or an exceptionally dry and hard field, the conventional cleats employed do not penetrate the hard surface. As a result, the player is in effect playing upon stilts which raise his ankle joint abnormally high above the ground increasing the lever arm of the forces involved in maneuvering and more importantly in being tackled or blocked. Consequently, ankle injuries have always been quite prevalent when games are played on hard or frozen surfaces.

Conditions are equally unsatisfactory, however, if the game is played on a muddy or unusually soft field, in which case the conventional cleats function similarly to a cookie cutter in that clods of hard, slick soil are picked up by the cleats and held between them. These clods substantially reduce the traction afforded by the cleats and are often responsible for a player slipping and falling which again represents the cause of many injuries.

The present invention is predicated upon the concept of providing a relatively low broad platform under the ball of the foot which while furnishing adequate traction wil permit the foot to be rotated or pivoted with a minimum of resistance. The broad platform or pivot cleat of the present invention is in the form of a substantially circular ring which is placed on the sole of the shoe directly under the ball of the foot. The ring which is preferably about ½ of an inch high is appreciably lower than the ordinary conical cleats now in use and extends a

considerable portion of the distance across the sole of the shoe. The ground contacting portion of the ring is in the shape of a continuous or substantially continuous annular band, the center of the pivot cleat being hollowed out to increase tractive efficiency. The ring walls are preferably tapered from the shoe sole toward the ground contacting portion to assist in inhibiting the accumulation of mud and clods.

The pivot cleat of the present invention is intended to provide a stable platform having a high resistance to transverse movement and a minimum resistance to pivotal movement and is constructed of a rigid material to provide a firm footing. For adequate traction, it is not desirable that the pivot ring should create a suction when engaging the ground and the rigid walled construction tends to negative such a result. Suction cleats, of course, tend to reduce the freedom of movement, which is essential to a participant in an athletic contest, and due to the unevenness of the playing surface, cannot provide the same amount of traction for each step.

I have found it preferable to provide a separate toe cleat and heel cleat to cooperate with the pivot cleat to aid in starting and stopping and to give additional traction when driving straight ahead. The toe cleat and heel cleat are preferably single tapered projections extending transversely of the axis of the foot adjacent the toe and heel portions of the shoe. The principal function of these cleats is to provide additional traction during the initial forward lunge when the player's weight is largely carried by the toe and in an abrupt stopping maneuver when the heel bears a proportionately large share of the player's weight. It is apparent that while the toe and heel cleats provide a relatively large surface resisting forward or backward sliding movement, they present only a relatively narrow face to pivotal rotation about an axis passing through the center of the ring cleat. Consequently, this cooperative arrangement of the three cleats provides a maximum traction during forward and back movement while providing a minimum resistance to pivotal or turning movement on the pivot cleat.

An additional object of the present invention has been to provide a traction cleat which will inhibit the tendency of mud to become clogged on the bottom of the shoe sole, thereby reducing the tractive effect of the cleats provided. The resistance offered by the shoe to dirt accumulation is due to the fact that the pivot cleat is formed from continuously curving surfaces and presents no corners or curves for the accumulation of dirt. Additionally, both the inner and outer peripheral surfaces of the pivot cleat are tapered outwardly and in the preferred embodiment, a clod breaker or central bulge is provided in the center section of the cleat to break up any lumps of dirt caught under the ring. Furthermore, in the preferred arrangement of the ring cleat with the unitary toe and heel cleats, the distance between each of the three cleats is great enough that there is no possibility of mud caking between them.

A further object of this invention has been to provide a traction device having the ground contacting portions of the pivot cleat and auxiliary cleats provided on the toe and heel concentrically disposed relative to the pivot axis to facilitate the rotation of the foot.

These and other objects and advantages of my invention will be apparent from the consideration of the specification taken in conjunction with the drawings in which:

Figure 1 is a bottom view of the sole of an athletic shoe showing the preferred arrangement of a pivot, toe and heel cleat constructed in accordance with the present invention.

Figure 2 is a fragmentary side elevational view thereof.

Figure 3 is an enlarged sectional view taken on line 3—3, of Figure 2, showing the upper or inner surface of the pivot cleat.

Figure 4 is a vertical transverse sectional view taken on line 4—4, of Figure 1.

Figure 5 is an enlarged sectional view of the toe cleat taken along line 5—5, of Figure 1.

Figure 6 is an enlarged sectional view of the heel cleat taken along line 6—6, of Figure 1.

Figure 7 is a perspective elevational view of a modification of the pivot cleat in which the ground contacting surface is composed of a plurality of circular ring segments rather than a completely continuous ring.

Figure 8 is a perspective elevational view of a modification embodying some of the principles of the invention.

Figure 9 is a perspective elevational view of a modification particularly adapted for use with baseball shoes, which modification also embodies some of the principles of the invention.

In the embodiment shown in Figure 1, the pivot cleat is secured to the sole of an athletic shoe of the type worn by football players. The sole of the shoe 10 carries a toe cleat 11, a heel cleat 12 and a pivot cleat 13, disposed intermediate the toe and heel cleats, under the ball of the foot.

The pivot cleat 13 is shown as a large circular plate secured to the sole near the front part thereof, in such a location that the vertical central axis of the cleat is coincidental with the normal vertical pivotal axis about which the foot turns when the player's weight is resting on the ball of the foot as in running. This pivotal axis is substantially at the center of the foot under the ball thereof and is indicated at A in Figure 1.

The toe and heel cleats 11 and 12 respectively, are shown as arcuate bars or lugs having a curvature such that when mounted on the sole 10, adjacent the toe and heel thereof, these cleats will be substantially concentric with the pivotal axis A as shown in Figure 1. All of the cleats 11, 12 and 13 are preferably cast of a light metal such as a suitable aluminum alloy, although they may be formed of any suitable metallic or non-metallic material such as leather, hard rubber or fiber. The material from which the cleats are formed should be hard surfaced and rigid so as not to deform under a player's weight, and additionally it is preferable that the material display good wear resistant qualities so that the necessity of cleat replacement is kept at a minimum.

The preferred form of the pivot cleat plate 13, as shown in Figures 1–4, comprises a tapered ring or rib 14 to which a centrally recessed web 15 is integrally connected. The top surface 16 of the ring portion 14 is substantially flat and adapted to fit against the under surface of the sole 10. To secure the pivot cleat to the sole, a series of integral lugs 17 project inwardly from the ring portion 14 at circumferentially spaced equidistant intervals above the web 15 as shown in Figure 3. Four such lugs 17 are shown and each is provided with a vertically extending threaded recess 18 which receives the threaded end of a screw 19. The screws 19, which extend

through vertical holes 20 in the sole 10, are countersunk into the sole 10 so as to be flush with the upper surface thereof as shown in Figure 4. In this manner the pivot cleat plate 13 is fixedly secured to the shoe sole, although any other suitable mode of attaching the plate to the sole can be employed if desired.

The outer peripheral surface 21 of the ring portion 14 of the pivot cleat 13 tapers downwardly and inwardly from the sole 10 and the inner peripheral surface of the cleat tapers upwardly and inwardly gradually rounding off into mergence with the lower surface of the web 15 as indicated at 22. Thus, the wall of the ring is generally frusto-conical in cross section. The lower annular edge or rim of the ring portion 14 constitutes the ground engaging portion of the cleat and is preferably rounded slightly as shown at 23. The central portion of the web 15 bulges downwardly as indicated at 24 but the lowest part or crest of this downward bulge is preferably slightly above the level of the lower rounded rim 15 of the ring portion 14 as shown in Figure 4. Thus, the inner surface of the pivot cleat 13 is formed with a central shallow recess 25 which gradually deepens laterally outwardly in all directions into a deeper annular rounded channel or trough shaped recess 26, the outer contour of this recess 26 being defined by the rounded outwardly and downwardly flaring surface 22.

Such a construction provides a highly efficient cleat design which will afford excellent traction while permitting easy turning or pivotal movement. The total traction, or resistance to slipping of the pivot cleat 13 is produced by the compression of dirt against the outer peripheral wall 21 of the ring portion and shear between the body of dirt in the recess 25, 26 and the dirt lying below the level or plane of the lower rim 23 of the ring portion.

The tapered peripheral surface 21 and inner surface 22 of the cleat inhibit the accumulation of mud on the surface of the cleat. The accumulation of clods of dirt is further prevented by the bulge 24 disposed centrally of the ground contacting portion 23 which functions to break up any dirt lumps caught under the cleat, thus preventing a compression and wedging of dirt within the ring. Moreover, should a body of dirt remain in the recess 25, 26 when the pivot cleat is partially lifted from the ground, the contour of the recess is such that the retained dirt will be forced out before the step is completed by the wearer. Thus, as the step is completed, the rear part of the shoe is lifted first and more pressure is exerted on the forepart of the ring cleat. The earth pressure over this area forces the deep part of the clod to slide inwardly over the inner peripheral surface 22 and web 15 of the cleat toward the central bulge 24. Inasmuch as the portion of retained dirt occupying the central shallow recess 25 is thinner, the same will yield or crumble due to the radially convergent forces applied thereon by the surrounding dirt moving toward the center and consequently the entire clod of dirt will tend to crumble and fall free of the cleat.

Each of the toe and heel cleats 11 and 12 respectively has downwardly and inwardly tapering side surfaces and preferably flat upper and lower substantially parallel surfaces, the vertical distance between which is preferably about the same as the vertical height of the pivot cleat 13. In the preferred embodiment as shown in Figure 1, the toe and heel cleats are slightly arcuate so that when they are secured to the end portions of the sole, their ground contacting portions are generally concentric with the axis of rotation A through the pivot cleat 13. While this preferred embodiment provides the greatest traction during forward and back movement coupled with a minimum pivotal resistance, the use of toe and heel cleats having generally rectangular ground contacting portions disposed transversely of the shoe sole is also contemplated and will operate to give satisfactory results.

Any suitable means can be employed for securing the cleats 11 and 12 to the sole 10. Referring to Figure 5, the toe cleat 11 is shown as provided with a pair of vertical bores 28, each of which is counterbored or enlarged at its opposite ends. A screw 29 is arranged in each bore 28 and has an enlarged head at its lower end arranged in the lower counterbore, the threaded stem of the screw engaging an internally threaded recess 30 provided in a nut member 31. The nut members 31 are shown as machine screws arranged in vertical bores 32 in the sole 10 which register with the upper counterbores of the bores 28. The lower ends of the nut members 32 project into these upper counterbores and the upper flat surfaces of the nut members are flush with the upper or inner surface of the sole 10. The heads of the screws 29 are provided with suitable receseses which open to the lower face thereof and are adapted to receive tools for turning the screws 29. A fastening of this type is preferable since the toe cleat 11 can be secured in place from the exterior of the shoe, thus obviating the necessity of manipulating a tool within the small space available on the inside of the shoe at the toe portion thereof.

Similarly, any suitable means can be employed for securing the heel cleat 12 to the sole 10. Referring to Figure 6, for example, a pair of screws 33 extend downwardly through vertical bores 34 in the sole 10 and screw into threaded recesses 35 in the heel cleat 12. The heads of the screws are countersunk as shown.

To protect the wearer's foot from direct contact with the various screws 19, 31 and 33, a fabric layer 36 is preferably cemented to the upper or inner surface of the sole 10 and thereby covers the heads of these screws.

The modification shown in Figure 7 is also intended primarily for football shoes but is equally applicable for use in such games as soccer or lacrosse. The heel and toe cleat members 11 and 12 may be similar to those shown in Figures 1 to 6 but a modified form of pivot cleat 35 is placed under the ball of the foot. The pivot cleat 38 is shown as comprising a base plate 39 suitably attached to the sole 10 and a plurality of arcuate lugs 40 projecting outwardly from the base plate. Four such arcuate lugs 40 are shown but a greater or lesser number may be provided. The lugs 40 terminate in ground contacting segments 41—41. The segments 41 are disposed concentrically about the axis of rotation A. As in the preferred embodiment, the inner and outer peripheral surfaces of the cleat taper from the relatively narrow ground contacting segments 41 outwardly toward the base 39. The function of the tapering sides again is to inhibit the accumulation of dirt on the surfaces of the cleat.

From the foregoing it will be seen that the present invention provides a traction device for athletic shoes which furnishes effective resistance to forward and back movement of the feet while providing freedom for the wearer to pivot his

feet in a natural manner, thereby reducing likelihood of injury due to locking of the shoe against rotation. Furthermore, the broad relatively low platform provided by the pivot cleat lowers the player with respect to the ground, further reducing the possibility of injury without sacrificing tractive efficiency. The ring cleat in combination with the toe and heel cleats provides sufficient traction to enable a player to maintain his footing under all types of playing surface conditions and during all nature of maneuvers, including stopping, starting and pivoting.

The modified traction devices as shown in Figures 8 and 9 are particularly adapted for use with baseball shoes. The modification shown in Figure 8 includes a pivot cleat 42 and a heel cleat 43. The pivot cleat 42 is shown as having a base plate 44 in the form of a flat ring which is suitably attached to the sole 10. A circular flange 45 extends downwardly from the outer edge of this base plate 44 and is provided with projecting teeth or spikes 46. The heel cleat 43 is shown as comprising a base plate 47 having integral flanges 48 which project downwardly along its forward and rearward edges. The flanges 48 are shaped to form teeth or spikes 49. The base plate 46 can be fastened to the sole 10 in any suitable manner. The cleats shown in this modification are intended to cut through the soil rather than be supported on its surface. Therefore, the spikes 46 and 49 are formed of a relatively thin plate and may be sharpened at their ends. It will be noted, however, that the spikes 49 provided on the heel plate 47 as well as the spikes 46 fastened on the pivot cleat 42 are disposed in generally concentric arrangement with the pivot axis A to provide for a minimum resistance to pivotal movement.

The modification shown in Figure 9 is generally similar to that shown in Figure 8 and includes a pivot cleat 50 and a heel cleat 51. The pivot cleat 50 is shown as including a ring shaped base plate 52 from which a plurality of teeth or spikes project downwardly at circumferentially spaced intervals. The heel cleat 51 is shown as comprising a base plate 54 having a central portion from which a plurality of arms extend outwardly along the sole of the shoe. The extremities of these arms are turned to project outwardly from the base plate to form teeth or spikes 55. Again, the spikes 55 associated with the heel plate and the spikes 53 formed on the pivot plate are disposed concentrically about the pivot axis A to provide a minimum resistance to rotation of the foot.

While the invention has been disclosed with specific reference to athletic shoes, it will be understood, of course, that this term is used broadly and that other types of outdoor footwear including specifically but without limitation military and service shoes of various kinds are intended to be embraced.

Having described my invention, I claim:

1. In combination with an athletic shoe, a traction device positioned centrally on the fore part of the shoe sole and comprising a rigid substantially continuous annular ground engaging protuberance having an annular ground engaging surface surrounding a central recess, and a single toe cleat positioned between the traction device and the front edge of the shoe sole, said toe cleat having a ground contacting surface of generally rectangular configuration which is substantially wider than its length, said toe cleat extending transversely of the shoe whereby the narrow or length dimension is presented in resistance to rotative movement of the shoe.

2. In combination with an athletic shoe having a sole, a pivot cleat positioned centrally on the fore part of the sole and comprising a rigid substantially continuous ring and an arcuate toe cleat positioned on said sole adjacent the front end thereof, the central axis of said ring being coincident with the normal pivotal axis of the shoe, said toe cleat having a ground engaging surface generally concentric with the said coincident axis.

3. In combination with an athletic shoe having a sole, a pivot cleat positioned centrally on the fore part of the sole and comprising a plurality of ground contacting surfaces disposed concentrically of the axis of the pivot cleat and an arcuate heel cleat positioned on said sole adjacent the heel thereof, said heel cleat being provided with ground engaging surfaces arranged generally concentric with the axis of the pivot cleat.

4. In combination with an athletic shoe having a sole, a pivot cleat positioned centrally on the fore part of the sole and comprising a base plate adapted to abut the sole facially and a plurality of spikes projecting outwardly from the periphery of said base plate in concentric alignment with the axis of the pivot cleat, and an arcuate heel cleat positioned on said sole at the heel thereof, said heel sleat comprising a plate adapted to reside against the shoe sole and a plurality of spikes projecting outwardly from said plate in generally concentric arrangement with the axis of the pivot cleat.

5. In combination with an athletic shoe having a sole, a pivot cleat positioned centrally on the fore part of the sole and comprising a base plate adapted to abut the sole and an outwardly turned flange on the base plate, said flange terminating in a plurality of ground engaging teeth disposed in concentric alignment with the axis of the pivot cleat, and an arcuate heel cleat positioned on said sole adjacent the heel thereof, said heel cleat having a sole engaging plate and an upwardly turned flange terminating in a plurality of teeth, the teeth being disposed generally concentric with the axis of the pivot cleat.

6. In combination with an athletic shoe having a sole, a pivot cleat positioned centrally on the fore part of the sole and comprising a rigid substantially continuous annular ground engaging protuberance, an arcuate toe cleat positioned on said sole adjacent the front end thereof, said toe cleat having a ground engaging surface generally concentric with the axis of the pivot cleat, and a heel cleat positioned on said sole adjacent the heel thereof, said heel cleat having a ground engaging surface also generally concentric of the axis of the pivot cleat.

7. In combination with an athletic shoe having a sole, comprising a pivot cleat arranged on said sole near the front part thereof and having an annular ground engaging protuberance, the central vertical axis of said annular protuberance being coincident with the normal vertical pivotal axis of the shoe, and a heel cleat arranged on said sole near the rear part thereof and having a protuberance arranged arcuately and concentric with said coincident axes.

8. In combination with an athletic shoe having a sole, a traction device comprising a disk shaped pivot cleat having an outwardly projecting ring surrounding a circular recess which is shallower in its center portion and gradually deepens toward its outer marginal portion, said pivot cleat

being fixedly arranged on said sole near the front part thereof and with its pivot axis coincidental with the normal vertical pivotal axis of the shoe, an arcuate bar like toe cleat fixedly arranged on the toe portion of said sole, and an arcuate bar like heel cleat fixedly arranged on the heel portion of said sole, said toe and heel cleats being arranged concentric with said coincidental axes.

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