May 28, 1935. J. T. RIDDELL 2,002,869

SOLE REENFORCING PLATE

Filed March 23, 1932

Fig. 1.

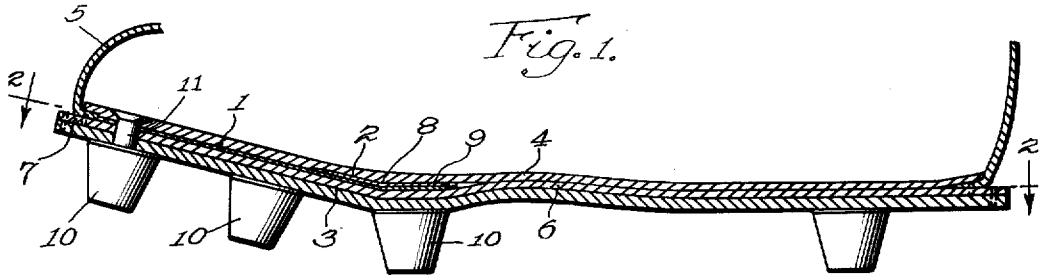


Fig. 2.

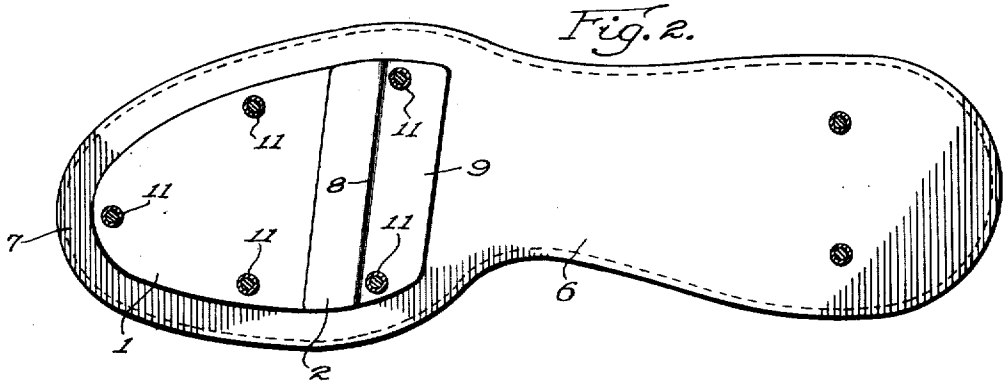
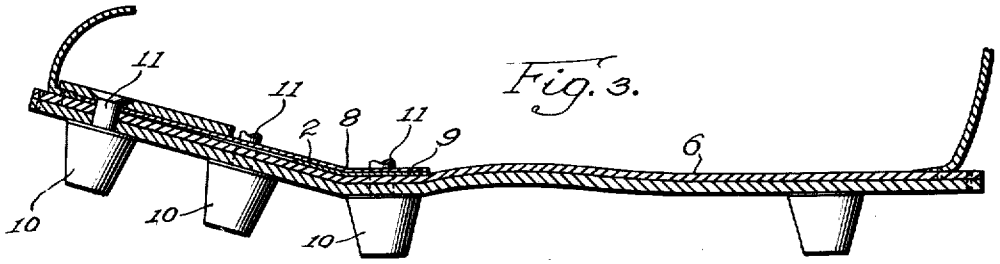


Fig. 3.



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SOLE REENFORCING PLATE

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Application March 23, 1932, Serial No. 600,762

3 Claims. (Cl. 36—2.5)

This invention relates to reenforced athletic shoe sole construction and particularly to improved sole reenforcing plates for football shoes and the like where the use of calks or cleats subjects the soles to severe stresses and distortion. This invention further relates to certain improvements on the subject of my copending patent application, Serial No. 569,439, filed October 17, 1931.

Experience has shown that the soles of athletic shoes employing calks or cleats frequently become badly distorted or broken under the strains and stresses of active usage, long before they have given an efficient and economical degree of service, unless some adequate means are provided whereby the soles are substantially reenforced. This is usually accomplished by providing a metallic plate between the inner and outer soles of the shoes to strengthen the soles and bridge the spaces between the respective cleats so as to absorb the lateral stresses that they are naturally subjected to. However, it is found that cleats positioned at the rear portion of the sole adjacent the ball of the wearer's foot receive the greatest strain and tend to break away the rear corners of the reenforcing plate, thus rendering the plate ineffective and causing the sole to crack and bend.

The reenforcing plate is generally made from tempered steel in order to provide suitable resiliency for the sole, at the same time sufficient support for the cleats, and is therefore somewhat brittle so that it is easily broken by the severe lateral stress which the rear sole cleats must support. When this happens the cleats become unstable and permanently distorted, and the spring action of the plate tending to strengthen the sole, to prevent its cracking, is destroyed so as to defeat the purpose for which the plate is designed.

Attempts to prevent breaking of the sole plate to preserve its spring action have heretofore been unsuccessful and the cost of replacing the plates and repairing the shoes has been, in many cases, prohibitive, thus forcing players to continue the use of equipment that is inefficient and dangerous.

The main objects of this invention are to provide an improved reenforced sole construction comprising a supplemental sole plate located to increase the support for the rear sole cleats; to provide sole reenforcing plates arranged to localize the bending of the sole while distributing the plate stresses over a larger area; to provide improved sole reenforcing plates formed and arranged to absorb the lateral shear and bending stresses exerted on the rear sole cleats without breaking and cracking; and to provide such plates arranged to substantially support the toe portion of the sole in a fixed upwardly extending position relative to the shank and heel portions.

A specific embodiment of this invention is shown in the accompanying drawing in which:

Figure 1 is a sectional side view of a football shoe showing the disposition of the sole reenforcing plates, the supplemental plate being arranged above the sole plate.

Fig. 2 is a plan view of the same showing the position of the plates on the sole and the location of the transverse line of localized bending.

Fig. 3 is a sectional side view similar to Fig. 1 but showing the supplemental plate arranged below the sole plates.

In the form shown in the drawing the improved sole reenforcing means comprises a sole plate covering substantially the whole of the sole forward of the sole shank, and a ball plate positioned transversely on the back portion of the sole plate to provide additional support for the rearward cleats and strengthen the structure at the portion subjected to the greatest bending and breaking stresses.

The sole plate 1 and the supplemental plate or ball plate 2, are disposed between the outer soles 3 and the insole 4 of the shoe 5, the sole plate 1 extending substantially from the forward end of the shank portion 6 to the toe portion 7 of the sole. As shown in Fig. 1, the supplemental plate or the ball plate 2 is placed above the sole plate 1 and extends transversely across the rearward or back end portion of the same to cover the area supporting the ball of the wearer's foot where the greatest bending and breaking stresses occur.

The natural and normal line of bending of the sole is located slightly forward of a transverse line through the position of the ball of the wearer's foot and in order to localize substantially all of the bending of the sole to this normal bending line, a transverse crease or bend 8 is formed in each plate 1 and 2 along the desired bending line and the rearward portion 9 of each plate is set up or offset to extend upwardly relative to the remaining portion. The crease or bend 8, through localizing the bending action on the sole plate, permits the plate to be made more rigid to provide a more substantial support for the sole and any cleats mounted thereon. The plates 1 and 2 are therefore preferably made from spring steel and tempered to provide a spring support for the sole of the shoe.

In the form shown in the drawing a plurality

of cleats 10 are secured to the shoe sole, and it is apparent that the plate 1, in order to prevent the sole 3 from breaking, must absorb practically all of the lateral bending and twisting forces that are exerted on the cleats. The greatest plate stresses are found in the area around the rearward cleats, and in order to prevent breaking of the backward corners of the plate 1, which carry the rear cleats, the ball plate 2 is provided to absorb the extraordinary forces which are applied to these cleats. The cleat fasteners 11, which pass through the sole and the plates, serve to clamp the sole plate and the ball plate together and against the sole and to transmit the cleat bending forces to the plates.

In the form shown, the rearward pair of cleat fasteners are located in the setup portion 9 of the plates 1 and 2 and are arranged in substantially parallel alignment with the crease or bend 8. Thus a leaf spring structure is formed adjacent the line of localized bending, which effectively distributes the bending stresses in the plates over a relatively wide area, and serves to prevent permanent straightening or flattening of the plates at the line of bending.

In football shoes and track shoes the greatest amount of use and service is demanded of the sole portion of the shoe, the heel being lifted as when the player-wearer is running or crouching, and in such conditions the additional support and leaf spring action, effected by use of the ball plate 2 is of considerable importance in providing a support for the heel of the foot. Thus when running or crouching the heel is kept in an elevated position without undue or tiring muscular exertion on the part of the wearer.

In such applications the shoe upper is fabricated so as to help keep the sole of the shoe in a setup position relative to the shank and heel portions, thus permitting sufficient flexibility and localized bending in the leaf spring structure of the plates and the creases 8, by carrying a portion of the load sustained by the sole.

Although but one specific embodiment of this invention is herein shown and described, it will be understood that details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. The combination with a shoe of a sole reenforcing means comprising a pair of plates arranged one above the other on the inner side of the shoe sole, one of said plates originating at a point back of and adjacent the position of the ball of the wearer's foot and extending to the toe portion of said sole, the other of said plates being shorter than the first plate and arranged to include the back portion of said first plate adjacent the ball of the wearer's foot, and a transverse crease in each of said plates adjacent the ball of the wearer's foot to substantially confine the bending of said sole to that location.

2. The combination with a shoe of a sole reenforcing means comprising a pair of plates arranged one above the other on the inner side of the shoe sole, one of said plates originating at a point back of the position of the ball of the wearer's foot and extending to the toe portion of said sole, the other of said plates being shorter than the first plate and arranged to include only the back portion of said first plate adjacent the ball of the wearer's foot, and a transverse crease in each of said plates adjacent the ball of the wearer's foot to substantially confine the bending of said sole to that location, said plates being arranged with said transverse creases in mutual registry.

3. In an athletic shoe having an insole and an outsole and a plurality of cleats secured thereto, a sole plate disposed between said soles and extending from the ball of the wearer's foot to the toe portion of said soles, a ball plate disposed against the backward portion of said sole plate, said plates having their backward end portions set up on a transverse line adjacent the ball of the wearer's foot, cleat fastening means disposed back of said transverse line and arranged to clamp the backward end portion of said plates together to one of said soles, and cleat fastening means disposed forward of said transverse line to clamp the forward portion of said sole plate to one of said soles, whereby permanent distortion and fracture of said sole plate in the portion adjacent the ball of the wearer's foot is prevented.

JOHN T. RIDDELL.