

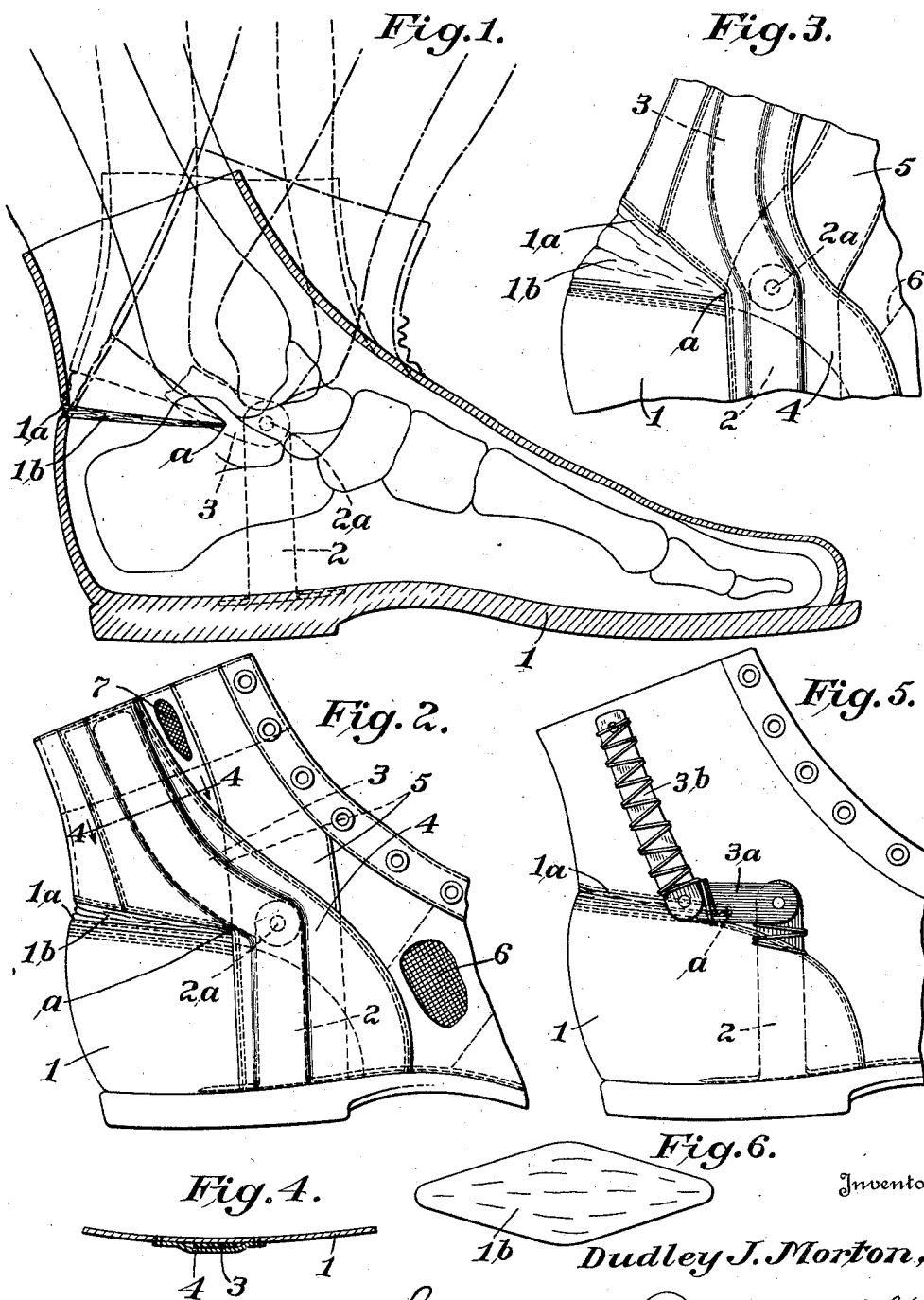
Dec. 14, 1926.

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1,610,700

ATHLETIC SHOE

Filed Oct. 26, 1925



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UNITED STATES PATENT OFFICE.

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ATHLETIC SHOE.

Application filed October 26, 1925. Serial No. 64,969.

Any foot covering which extends above the ankle joint tends to restrict the movement of that joint and reduces the speed and power of the wearer. The restriction corresponds in degree to the interference in range of joint motion, and to the resistance to muscle action, offered by the shoe upper.

Freedom of foot action, especially in movement of the ankle joint, is one of the prime essentials to the most efficient performance of the athlete, and in certain games and sports, protection against injury in this part is of equal importance.

Certain types of athletic shoes now include a brace or braces intended to protect the ankle and foot from injurious lateral bends and twists (which frequently result in strains or fractures) but at the same time are supposed to permit freedom of ankle motion. The present forms of braces fail to fulfill both of these conditions. They only furnish partial protection, and in conjunction with the customary design of shoe upper, they obstruct free ankle motion to a very notable degree. The reasons for the restriction of motion are:

The shoe upper is so designed that the normal position of the sole or the plane of ground contact of sole and heel relative to the portion of the upper which extends above the ankle, is a right angle; hence, owing to the relative non-yielding property of leather and other material employed for shoe uppers, the design of the customary shoe tends to bind the foot to this right angle position and restrict the foot from becoming extended into plantar flexion, under even the strongest muscular effort. This binding follows the line through the upper from the ball of the foot, obliquely backward to behind the ankle; extension of the foot requires a lengthening of that line and the present form of upper does not allow for such lengthening.

Basing the design of shoe (1) upon a careful study of the position and range of action of the various joints of the foot and ankle, (2) upon the altered relationships of the different bones in normal and injurious movements, and (3) upon the practical requirements of the shoe manufacturers, the following description pertains to a shoe which will yield maximum protection against injury with a minimum interference with

the normal freedom of joint movements. The various features described below apply to a shoe for "sprinting" purposes, but this is given by way of example only and it will be understood that various modifications may be made to adapt the shoe for particular athletic requirements.

In order that the invention may be better understood I have appended hereto illustrative drawings in which:—

Figure 1 is a diagrammatic view illustrating my improved shoe in outline and also the foot and ankle bones, the sole and heel being shown in full lines in ground contact position and the upper in full lines in the lasted position, or the position assumed when not on the foot of the wearer, while the dotted lines show the upper and leg in the standing or vertical position (this being the natural or lasted position of the upper of the ordinary shoe), and the dot and dash lines showing the position of maximum forward deflection of the upper.

Fig. 2 is a side elevation of the shoe partly broken away, with the upper in position corresponding to the full lines of Fig. 1 and showing the bracing means.

Fig. 3 is a fragmentary detail view similar to Fig. 2 with the upper deflected forward to the maximum extent.

Fig. 4 is a section on line 4—4 of Fig. 2, and

Fig. 5 is a view of a modification.

Fig. 6 is a view of the gusset.

Referring by reference characters to these drawings, the numeral 1 designates a shoe, which, for example, is shown as one designed more especially for running or sprinting purposes.

This is so constructed (by the use of a properly shaped last) that when the sole and heel are resting upon the ground the leg embracing portion of the upper inclines rearwardly instead of being perpendicular to the sole, as shown in full lines, Fig. 1, and in Fig. 2. When the shoe is on the foot of the wearer, who is standing naturally with his foot flat on the ground, and with the leg upright, the leg embracing portion of the upper is deflected forwardly from its lasted position, shown in full lines, to the position as shown in dotted lines, Fig. 1. The result of this is that when the athlete depresses the ball of the foot, or elevates the

heel in the act of running, etc., the upper, instead of being deflected rearward from its natural position against the resistance of the upper, is simply moved to its natural position, and there being no resistance to overcome, free flexing of the joint is permitted and no restriction of movement is encountered.

It will be understood that in practice the amount of rearward inclination of the upper would depend on the maximum amount of downward toe deflection to be performed, according to the particular athletic uses for which the shoe is intended, and some types of athletic shoes would be therefore formed with a greater rearward inclination than others.

In order to prevent any cramping or binding of the upper on the foot and to permit the leg embracing portion to more readily assume the vertical position shown by dotted lines, and also the more forward position shown by the dot and dash lines, I provide the rear of the shoe just above the counter with a slit 1^a, the end *a* of which approaches closely the pivotal axis of the ankle joint, the upper edge of which slit when the upper is tipped forward as in dotted lines, Fig. 1, departs freely from the lower edge, which may be located approximately at the upper edge of the counter. The upper and lower edges of the slit are connected by a closure piece 1^b having sufficient fullness to allow the maximum movement of the upper edge of the slit in relation to the lower edge thereof. This gusset is stitched in place. It is formed of comparatively thin material which will flex and fold readily without adding any resistance to the free relative movement of the edges defining the slit. This insert may be elastic. The gusset viewed from the rear and extended is substantially diamond shape. The slit may be located at the upper edge of the counter or at slight distance above the same.

An important feature in athletic shoes is to protect the joint from dislocation and fracture, and I therefore incorporate in the shoe a pivoted brace, the pivot of which coincides with the axis of pivotal movement of the ankle joint. It is customary in athletic shoes to embody a metal shank in the sole of the shoe to maintain proper arching and prevent mis-shaping under conditions of moisture and hard usage and this shank stiffener I preferably utilize as a brace support by providing it with an upstanding rigid brace member 2, to the upper end of which is pivotally connected the lower forwardly extended end of a brace member 3, the pivot point 2^a of which coincides approximately with the pivotal axis of the ankle joint. This pivotal axis is located about one inch below the most prominent point of the internal malleolus, commonly

called the "inner ankle bone". The rigid brace members 2 and 3 are housed in a pocket 4 stitched to the outer face of the upper.

The uppers of athletic shoes require material reinforcement, but here again in shoes as heretofore constructed restriction of movement has resulted, and this objection the present invention overcomes by the following described arrangement. On each side of the shoe I provide a pair of inextensible reinforcing straps or members 5 and 6 which start from the same point, to wit, at the sole approximately beneath the ankle joint, and diverge upwardly, one, 5 extending upwardly and terminating at the upper corners of the upper or upper edges of the closure portion, and the other, 6 extending approximately to the instep portion of the edges of the closure portion. Cooperating with the upper ends of the reinforcements 5 is an inextensible reinforcement band or collar 7, encircling the upper end of the leg portion. The reinforcements 5, 6 and 7 may be incorporated in the shoe during the manufacture thereof in any desired manner. When these reinforcements are located inside the shoe they may be of fabric. If either is located outside the shoe it may be of leather.

Instead of using a brace having a single pivoted joint, I may use that shown in Fig. 5, comprising two members 3^a and 3^b, the latter being secured to the upper by stitching or in any desired manner, instead of being housed in a pocket.

Having thus described my invention, what I claim is:

1. An athletic shoe having an upper with the leg portion thereof normally inclined backwardly relatively to the ground contact plane of the sole and heel, said shoe having a slit extending around the back and along the sides above the counter, said shoe being thereby rendered openable and closable at said slit.

2. An athletic shoe having an upper with the leg portion thereof normally inclined backwardly relatively to the ground contact plane of the sole and heel, said shoe having a slit extending around the back and along the sides above the counter with the ends of said slit adjacent the point of pivotal movement of the ankle bones, said shoe being thereby rendered openable and closable at said slit.

3. An athletic shoe having an upper with the leg portion thereof normally inclined backwardly relatively to the ground contact plane of the sole and heel, said shoe having a slit extending around the back and along the sides above the counter with the ends of said slit adjacent the point of pivotal movement of the ankle bones, whereby the shoe may be readily opened and closed at the slit, and an extensible closure piece of soft pliable material connecting the upper

and lower edges of said slit, whereby to prevent the entry of foreign matter.

4. An athletic shoe having an upper provided with a slit extending around the back and along the sides just above the counter and substantially parallel thereto with the ends of said slit adjacent the ankle bones, a brace comprising a rigid member having its upper end located approximately at the axis of pivotal movement of the ankle joint, and a supplemental member pivoted to said upper end and extending rearwardly adjacent the forward end of the slit and upwardly therefrom and suitably connected to the leg portion of the upper.

5. An athletic shoe having an upper with the leg portion thereof normally inclined backward relative to the ground contact plane of the sole and heel and provided with a slit extending across the back and along the sides just above the counter and substantially parallel thereto, with the ends of said slit adjacent the ankle bones, and a brace comprising a rigid member having its upper end located approximately at the axis of the pivotal movement of the ankle joint, and a supplemental member pivoted to said upper end and extending rearwardly adjacent the apex of said slit and upwardly therefrom, and suitably connected to the leg portion of the upper.

6. An athletic shoe having its upper provided with an inextensible reinforcing collar at the upper edge thereof, and inextensible reinforcing strips, one on each side of the foot, said strips being secured to the forward end of said band and extending downward from said band to overlie the head of the

astragalus to prevent undue lateral movement thereof in either direction and having its lower end secured to the sole margin.

7. An athletic shoe having its upper provided with an inextensible reinforcing collar at the upper edge thereof, and an inextensible reinforcing strip on the outer side of the foot, said strip being secured to the forward end of said band and extending downward from said band to overlie the head of the astragalus to prevent its initial outward movement and having its lower end secured to the sole margin on the outer side of the foot.

8. An athletic shoe having a rigid brace member extending up from the sole on one side and a supplemental brace member pivoted to the upper end thereof with the pivotal axis thereof approximately in line with the pivotal line of the ankle joint, said supplemental brace member being curved so as to extend rearwardly and upwardly and adapted to substantially conform to the natural curvature of the lower and posterior contour of the tibia bone and to lie behind the same.

9. An athletic shoe being provided with an inextensible reinforcing collar to encircle the leg above the ankle, and an inextensible reinforcing strip being secured to said band and extending downward on the outer side of the foot from the said band to overlie the head of the astragalus, and having its lower end secured to the lower portion of the shoe.

In testimony whereof, I affix my signature.

DUDLEY JOY MORTON.