M. L. SEVERY.

ORTHOPEDIC DEVICE.

APPLICATION FILED AUG. 2, 1916.

1,350,944.

Patented Aug. 24, 1920.

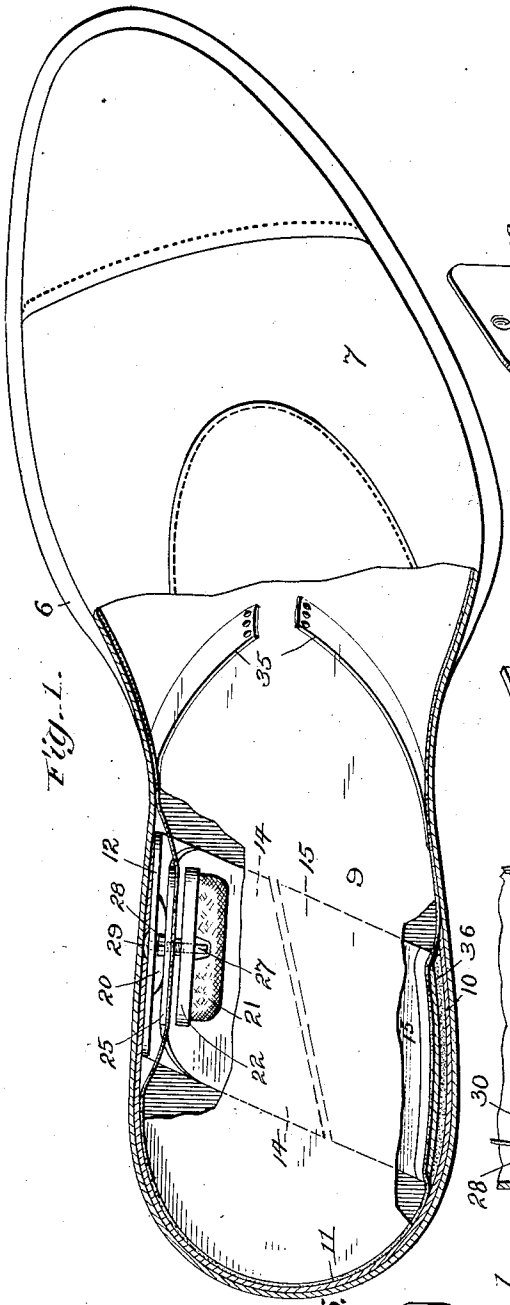


Fig. 1.

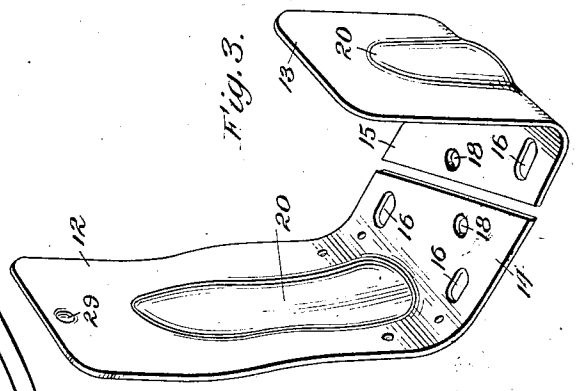


Fig. 3.

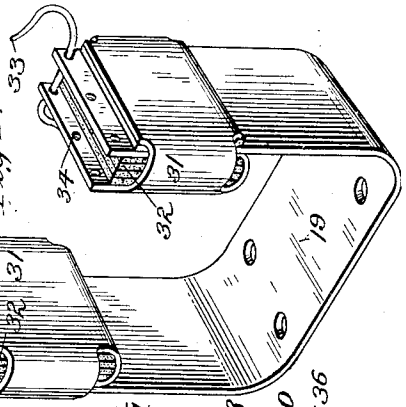


Fig. 4.

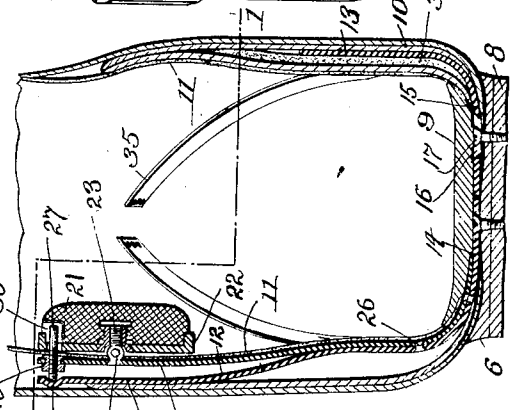


Fig. 2.

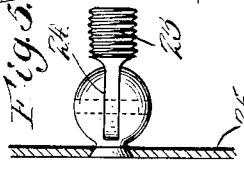


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

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ORTHOPEDIC DEVICE.

1,350,944. Specification of Letters Patent. Patented Aug. 24, 1920.

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To all whom it may concern:

Be it known that I, MELVIN L. SEVERY, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Orthopedic Devices, of which the following is a specification.

This invention relates to orthopedic devices and particularly to devices of this character for treating cases of ankle weakness, fallen arch and similar foot troubles.

Many foot troubles, and particularly fallen arch and flat foot have their beginning in a wrong placing of the foot upon the ground and this is commonly caused by a weakness of the ankle which allows the foot to roll inward or outward, usually inward, under the patient's weight. Such lateral rolling or turning of the foot displaces the bones of the arch laterally, throws the arch out of a vertical plane, and subjects the foot muscles to stresses which gradually strain and distort them and thus produce an increasing tendency toward flat foot.

Any remedial treatment, as contradistinguished from the alleviative expedient of "arch support", should involve the restoring of the arch to its normal vertical plane, and sufficient exercise while held in this position to strengthen the foot muscles until they again perform their normal functions.

In my prior Patent No. 1,129,525 granted February 23, 1915, I describe and claim a device involving this broad principle of treatment. This device, which is worn within the patient's shoe operates by an opposed tipping action as the patient places his foot on the ground to neutralize the characteristic tipping tendency and insure the proper positioning of the foot before the arch is subjected to load. My present invention goes further, and provides adjustable means for always holding the patient's foot in the proper position within the shoe. The structure of the present invention also is preferably mounted permanently within the shoe, and by forming a part of the shoe structure may be made very light and inconspicuous. Other features of invention reside in the particular mode of mounting the device in the shoe, and in the arrangements for adjusting its various parts.

Preferred embodiments of the invention are illustrated in the accompanying drawings, in which:—

Figure 1 is a plan view of a shoe with the invention applied, parts being broken away on the line 1—1 of Fig. 2 to show the construction;

Fig. 2 is a transverse vertical section;

Fig. 3 is a perspective view showing the frame members removed from the shoe;

Fig. 4 is a perspective view of a modified form of frame member and adjustable pad, removed from the shoe. This view also illustrates the possible use of two pads, one at either side of the foot;

Fig. 5 is a top plan view of the hinge connecting the pad with its upright support.

In the drawings, 6 represents the sole, 7 the upper, and 8 the heel of an ordinary shoe. The insole is shown at 9, the counter stiffener at 10 and the lining at 11. All these parts are of usual form and arrangement, except that the insole is preferably recessed on its under side to receive between it and the sole the heel-plate or plates by which the supporting frames are attached to the shoe. The lining is so proportioned and arranged as to cover the frames, but preferably not the adjustable pads hereinafter described.

Mounted inside the shoe are two upstanding metal frames 12 and 13, the frame 12 at the inside of the foot being taller and set slightly farther forward than the frame 13 at the outside of the foot (Figs. 1, 2 and 3.) The frames 12 and 13 terminate at their lower ends in attaching plates 14 and 15 respectively, which lie between the sole and the insole, the insole preferably being recessed to receive them, as has been suggested. The plates 14 and 15 are provided with countersunk slots 16 which receive screws 17 passing down through the sole 6 and heel 8. The slots permit the adjustment of the frames toward and from each other and when this adjustment has been made other screws are inserted through the holes 18 to maintain the adjustment.

The feature of adjustability avoids the necessity which would otherwise exist of providing a large number of sizes of frame, but the two frames might, if preferred, be made in one piece with a connecting plate 19 as suggested in Fig. 4.

The frames 12 and 13 are rendered quite stiff by providing them with lobes or ribs 20 as best shown in Fig. 3, and either or both may carry adjustable pads for positioning the ankle joint to hold the ankle and consequently the arch in normal position.

As the most common trouble is flat foot due to an inwardly turning ankle, I show in Figs. 1 and 2 the device as constructed to correct this condition. Here the inner frame 12 carries at its upper end an adjustable ankle-holding pad, the outer frame 13 serving as a reliable means for holding the foot against lateral displacement, so that the foot must maintain a definite position with reference to the device so far as inward turning of the ankle is involved. More or less freedom of movement in any except an undesirable direction may and very commonly should be permitted.

This pad is shown at 21 and may be of felt or the like, mounted in a metal cup 22. The cup 22 is tapped and screwed upon a threaded stud 23 having a hinged connection 24 with an upstanding resilient plate 25, whereby it is permitted to rock or tip relatively to the upstanding member. The plate 25 is secured near its lower end to the lower part of frame 12 by rivets 26, and serves greatly to stiffen said frame at the bend or angle. It may be sprung inward from the frame to adjust the pad 21 laterally. To make such adjustment I use a thrust screw 27, which is threaded through a boss 28 carried by plate 25, and bears in a recess 29 formed to receive it at the top of frame 12. The slotted end of screw 27 is housed in a pocket 30 in pad 21, and access may be had by forcing down the felt so as to expose the end of the screw, or in any other suitable manner.

As clearly indicated in Fig. 2, the lining 11 covers the plate 25 and lies between the same and the cup 22.

A similar adjustment may be secured by adjusting the thickness of the pad, and this idea is illustrated in Fig. 4. Here a cross-shaped piece of leather is folded, as clearly indicated in the drawing, to form a one-piece leather pocket 31 into which any desired number of slips 32, of felt or the like, may be inserted to adjust the thickness of the resulting pad. These slips may be retained in the pocket by a lacing 33 passed through the eyes 34, or in any other suitable manner.

Fig. 4 shows the use of two pads which is commonly desirable in cases of extreme ankle weakness. Ordinarily the pad at the inner side of the foot is set higher and farther forward than that at the outer side of the foot, to correspond with the angular disposition of the ankle joint.

With any of the various arrangements suggested, it will sometimes be found desirable to make use of the straps 35 which are attached to the upper of the shoe and are provided at their ends with lacing holes by means of which they may be laced together over the instep. These straps serve as a secondary means for holding the wearer's heel tightly into the heel of the shoe and in proper relation with the frames and pads already described. Ordinarily the shoe itself will perform this function but in the case of relatively loose shoes or shoes that do not lace, this secondary means of attachment is desirable.

I also contemplate the use of sufficient felt padding to surround the frame members and render the interior of the shoe smooth and comfortable. Such felt padding is shown at 36 but has been omitted from the drawing where to illustrate it would require the obscuring of the frame members. The idea of so finishing the interior of the shoe is obvious and I have not attempted to illustrate it in detail but have shown just enough to indicate its presence.

Obviously the invention is capable of various embodiments, although the feature of adjustability renders the device applicable without radical change to a considerable variety of abnormal foot conditions. In its various applications and embodiments it acts by holding the ankle joint in proper alinement to hold the foot in proper position to bear the weight which it must carry. This action is secured without constraint upon the foot muscles and without the interposition of any direct foot support. The fundamental necessity is to hold the ankle in normal position without impairing its normal freedom of action, such freedom of action resulting in curative exercise of the foot in walking.

Having thus described my invention, what I claim is:—

1. The combination with a shoe of an upstanding frame rigidly mounted wholly within said shoe at one side and projecting upward from the heel thereof, and a laterally adjustable member carried by the upper end of said frame and adapted to bear against the wearer's foot near the ankle to offer lateral support to the latter.

2. The combination with a shoe of an upstanding frame rigidly mounted wholly within said shoe at one side and projecting upward from the heel thereof, a laterally adjustable member carried by the upper end of said frame and adapted to bear against the wearer's foot near the ankle to offer lateral support to the latter, and a lower, foot-confining means rigidly mounted in said shoe at the opposite side of the heel thereof for holding the foot and ankle in the desired relation to said pad.

3. The combination with a shoe of a pair of upstanding frame members rigidly mounted wholly within said shoe at oppo-

site sides thereof and projecting upward from the heel; and a laterally adjustable pad carried by one of said frame members adapted to engage the wearer's foot near the ankle to offer lateral support to the latter.

4. The combination with a shoe of a pair of upstanding frame members rigidly mounted wholly within said shoe at opposite sides thereof and projecting upward from the heel, the member at the inner side of the foot being the taller and farther forward, and a laterally adjustable pad carried by one of said members and adapted to engage the wearer's foot near the ankle to offer lateral support to the latter.

5. The combination with a shoe of a pair of upstanding frame members rigidly mounted wholly within said shoe at opposite sides thereof and projecting upward from the heel, the member at the inner side of the foot being the taller and farther forward, and a laterally adjustable pad carried by the member at the inner side of the foot, adapted to engage the wearer's foot at or near the ankle to offer lateral support thereto.

6. The combination with a shoe of an upstanding frame member rigidly mounted within said shoe; a resilient plate attached at one end to said frame member; a pad carried by said plate and laterally adjustable with reference to said frame member by the flexure of said plate; and means interposed between said member and plate for flexing the latter to adjust said pad.

7. The combination with a shoe of an upstanding frame member rigidly mounted within said shoe; a resilient plate attached at one end to said frame member; a pad carried by said plate and laterally adjustable with reference to said frame member by the flexure of said plate; and a thrust screw interposed between said member and said plate for flexing the latter to adjust said pad.

8. The combination with a shoe, of a rigid upstanding frame member mounted within said shoe at one side thereof and made fast to the shoe; and a pad pivotally attached to said frame member and free to rock upon its pivot, said pad serving to engage the side of the wearer's foot at or near the ankle and to tip the foot about a horizontal axis.

9. The combination with a shoe, of a rigid upstanding frame member mounted within said shoe at one side thereof and made fast to the shoe; a pad jointed to said frame member, capable of rocking relatively thereto, and adapted to engage the side of the wearer's foot at or near the ankle to offer lateral support thereto; and means for adjusting said pad.

10. The combination with a shoe of an upstanding frame member rigidly mounted within said shoe; a resilient plate attached at one end to said frame member; a pad carried by said plate and laterally adjustable with reference to said frame member by the flexure of said plate; means interposed between said member and plate for flexing the latter to adjust said pad; and a lining for said shoe covering said frame member and plate and extending behind said pad.

11. The combination with a shoe of an upstanding frame rigidly mounted wholly within said shoe at one side and projecting upward from the heel thereof; a laterally adjustable member carried by the upper end of said frame and adapted to bear against the wearer's foot near the ankle to offer lateral support to the latter; and a flexible retaining member adapted to pass over the instep to retain said frame in proper relation to the foot.

12. The combination with a shoe of an upstanding frame rigidly mounted wholly within said shoe at one side and projecting upward from the heel thereof; a laterally adjustable member carried by the upper end of said frame and adapted to bear against the wearer's foot near the ankle to offer lateral support to the latter; a lower, foot-confining means rigidly mounted in said shoe at the opposite side of the heel thereof for holding the foot and ankle in the desired relation to said pad; and a flexible retaining member adapted to pass over the instep to retain said frame in proper relation to the foot.

13. The combination with a shoe of a pair of upstanding frame members rigidly mounted wholly within said shoe at opposite sides thereof and projecting upward from the heel, the member at the inner side of the foot being the taller and farther forward; a laterally adjustable pad carried by the member at the inner side of the foot, adapted to engage the wearer's foot at or near the ankle to offer lateral support thereto; and a flexible retaining member adapted to pass over the instep to retain the frame in proper relation to the foot.

14. The combination with a shoe of an upstanding frame member rigidly mounted within said shoe; a resilient plate attached at one end to said frame member; a pad carried by said plate and laterally adjustable with reference to said frame member by the flexure of said plate; means interposed between said member and plate for flexing the latter to adjust said pad; and a flexible retaining member adapted to pass over the instep to retain the frame in proper relation to the foot.

15. The combination with a shoe of an upstanding frame member rigidly mounted within said shoe; a resilient plate attached

at one end to said frame member; a pad carried by said plate and laterally adjustable with reference to said frame member by the flexure of said plate; means interposed between said member and plate for flexing the latter to adjust said pad; a lining for said shoe covering said frame member and plate and extending behind said pad; and a flexible retaining member adapted to pass over the instep to retain the frame in proper relation to the foot.

In testimony whereof I have signed my name to this specification.

MELVIN L. SEVERY.