

Feb. 21, 1933.

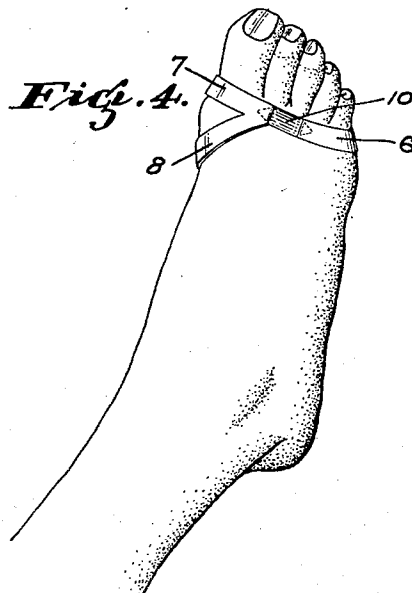
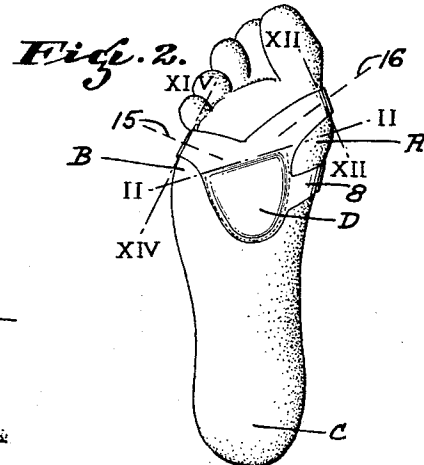
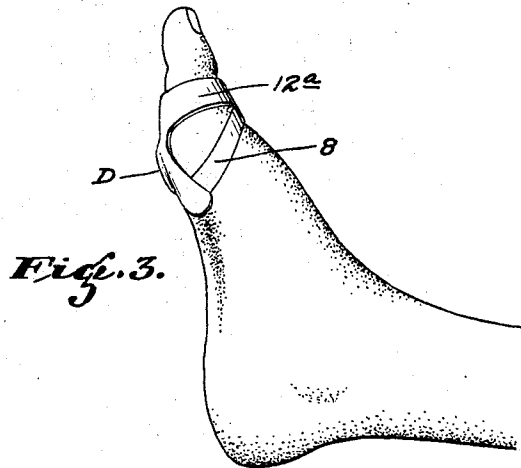
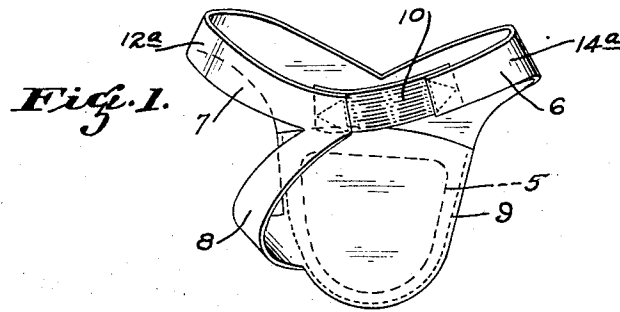
L. M. McCORMICK

1,898,092

ARCH SUPPORT RETAINER

Filed Nov. 5, 1928

2 Sheets-Sheet 1



INVENTOR.
Lewis M. McCormick
BY
Townsend, Loftus & Abbott
ATTORNEYS.

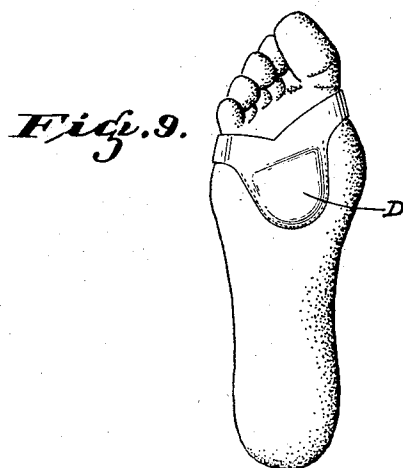
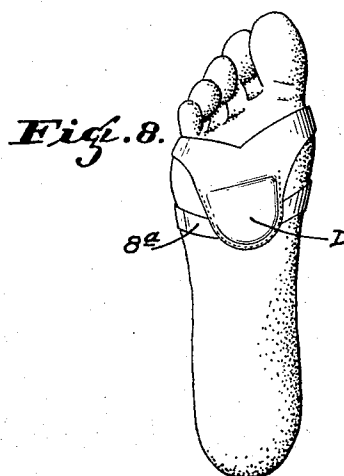
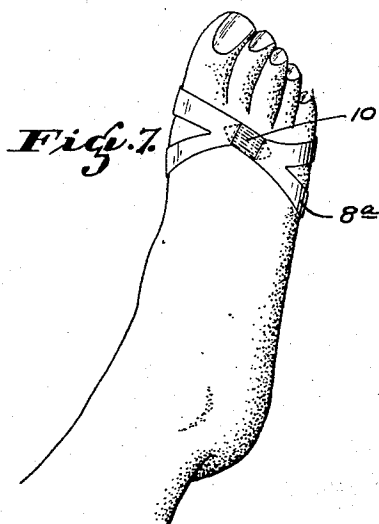
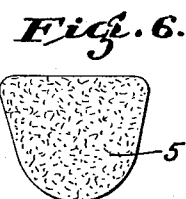
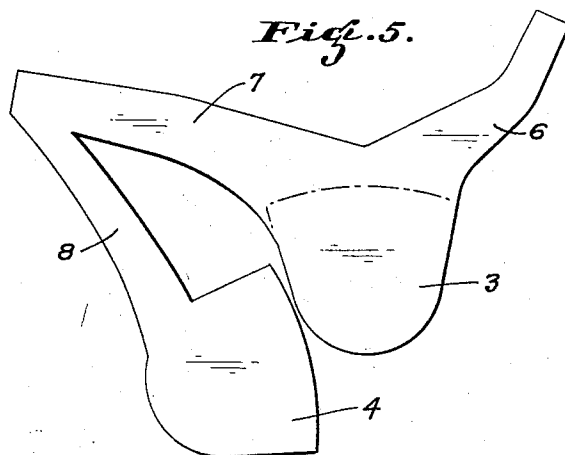
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INVENTOR.
Lewis M. McCormick
BY
Townsend, Loftis & Abbott
ATTORNEYS.

UNITED STATES PATENT OFFICE

LEWIS M. McCORMICK, OF PALO ALTO, CALIFORNIA

ARCH SUPPORT RETAINER

Application filed November 5, 1928. Serial No. 317,217.

This invention relates to an arch support and retainer, and more particularly to a retainer adapted to hold a flexible pad or the like in proper position with respect to the
5 metatarsal arch of the foot.

The object of the present invention is to generally improve and simplify the construction and operation of devices of the character described; to provide a retainer
10 for arch supporting pads which will firmly retain the pad in a predetermined position beneath the foot of the wearer under all conditions without creating any physical discomfort to the wearer; to provide a re-
15 tainer and pad which will have no metallic parts and which will prevent injury to the stockings and shoes and which will not slip nor become readily displaced; to provide a
20 retainer which will be light and cheap; which will not bind or impair the natural circulation of the foot; and which will be completely concealed by the shoe when worn; and further to provide a retainer in
25 the form of a loop or girdle which may be constructed of a flexible material, such as leather or the like, and which is cut and shaped so as to overlie the dorsal surface rearwardly of the toes, then extends down-
30 wardly and forwardly of the first and fifth metatarso phalangeal joints, and finally extends angularly and rearwardly under the plantar surface of the foot so as to retain the forward edge of the pad relatively paral-
35 lel with the metatarsal heads of the arch.

The arch support and retainer is shown by way of illustration in the accompanying drawings in which:

Fig. 1 is a perspective view of the arch support and retainer,

40 Figs. 2, 3 and 4 are perspective views of a foot, showing the application of the arch support and retainer,

Fig. 5 is a plan view of the pattern from which the retainer and pad covering are cut,

45 Fig. 6 is a plan view of the pad.

Figs. 7 and 8 are perspective views of a foot showing a slightly modified form of the arch support and retainer,

50 Fig. 9 is a similar view of another modification thereof.

Referring to the drawings in detail, particularly to Fig. 2 it might be stated that a foot might be likened unto a tripod, as the bottom or plantar surface of the foot presents three points of support, generally
55 indicated at A, B and C. The point A is formed by the first metatarsal head on the medial side of the foot. The support B is formed by the fifth metatarsal head on the lateral side of the foot and the support C
60 is formed by the heel bone known as the tuber calcanei. It might also be stated that the foot presents two arches—the main or longitudinal arch extending longitudinally
65 of the foot, and the metatarsal arch formed by the five metatarsal bones, the heads of which articulating with the first phalangeal bones of the toes thus forming the five metatarso-phalangeal joints. The first and fifth
70 being termed the external and the second, third, and fourth the internal metatarso-phalangeal joints. These elongated metatarsal bones extend rearwardly to the tarsal bones of the foot, and form an arch across
75 the foot, extending longitudinally to the foot for the full length of the bones. The five metatarsal heads form the distal transverse portion of the metatarsal arch. These heads are relatively parallel to the dotted
80 line II—II passing through the points A and B.

Under certain conditions one or more of the internal metatarsal heads tend to drop down and it is in instances of this character that an artificial support in the form of a
85 pad is required. To retain the pad in the proper position has always been a problem and usually so many straps have been employed that binding of the foot, and impairment of the circulation takes place. The
90 pad or arch support and retainer shown in the present application is designed to maintain the pad or arch support generally indicated at D in a position as shown in Fig. 2, that is, with the pad beneath the metatarsal
95 arch and the forward edge of the pad on a line relatively parallel with the metatarsal heads.

The retainer is preferably constructed of
100 leather or a like flexible material, and it is

cut to the pattern shown in Fig. 5. The portions indicated at 3 and 4 form a covering for the pad 5 while the portions or extensions 6 and 7 form a loop or girdle, the function of which will hereinafter be described. The portion or extension shown at 8 forms an auxiliary loop and its function will also be described.

In actual practice, after the material has been cut to the shape shown in Fig. 5, the portion 4 is swung around over the portion 3 and they are then stitched around the edge, as indicated by dotted lines at 9, see Fig. 1. This manner of stitching forms a pocket open at the front, and a pad, such as shown at 5 in Fig. 6 may then be inserted thus forming a pad to support the metatarsal arch of the foot. Therefore, it is to be clearly understood that the pocket forms part of the pad to support the metatarsal arch due to the thickness thereof, and may be referred to as the pad. In fact, pads of different thicknesses may be inserted to suit varying conditions. The ends of the portions 6 and 7 are connected and sewed to a short section of elastic, such as indicated at 10, and the operation of manufacture is then completed.

The pad and retainer shown in Fig. 1 is applied to the foot as shown in Figs. 2, 3 and 4. The sections 6 and 7, together with the elastic 10 overlie the dorsum surface of the foot at a point just rearwardly of the web of the toes, as plainly shown in Fig. 4. The sections 6 and 7 then extend downwardly and forwardly of the first and fifth metatarso-phalangeal joints and they then extend angularly and rearwardly under the plantar surface of the foot to the pad and thereby serve the function of retaining the pad beneath the metatarsal arch with the forward edge of the pad relatively parallel with the metatarsal heads of the metatarsal arch.

The cutting and shaping of the sections 6 and 7 forming the main loop or girdle to which the pad is attached is accordingly important. By referring to Figs. 2 and 4 it will be noted that the medial surface just forwardly of the first metatarso phalangeal joint is disposed on an angle represented by the dotted line 12—12, and similarly that the lateral surface just forwardly of the fifth metatarso phalangeal joint is disposed on an angle indicated by the dotted line XIV—XIV.

By cutting and shaping the portions 6 and 7 of the main loop or girdle as shown in Figs. 1 and 5 it will be seen that when the portions are connected by means of the elastic that the sides of the loop or girdle form angular surfaces, such as indicated at 12a and 14a, which exactly conform to the angular surfaces forwardly of the metatarso-phalangeal joints just described. They thus engage these surfaces without binding or

cramping the foot and they are furthermore retained by these surfaces due to their angular position.

Again it should be noted that the portions 6 and 7 which extend under the plantar surface of the foot are disposed on angles such as indicated by the dotted lines 15 and 16. This is also important as a straight pull is exerted at these points whenever there is any tendency to shift the pad D rearwardly. The elastic section in the loop stretches to accommodate the increase in width of the metatarso-phalangeal portion of the foot to prevent a binding of the same when the body weight is placed upon the ball of the foot.

The loop portion indicated at 8 is merely an auxiliary loop and it may or may not be employed as desired. In Fig. 9 this auxiliary loop has been entirely dispensed with and actual practice has proven that the pad is satisfactorily retained.

Similarly, as shown in Figs. 7 and 8, a second auxiliary loop is employed, as indicated at 8a. Such a loop may be advantageous, particularly where the feet are slightly deformed, or the arches are badly broken.

In actual practice it has been found that the arch support or pad D is maintained in perfect position at a point beneath the metatarsal arch by the retainer here shown. Circulation is not interfered with as the loop or girdle snugly fits the forward portion of the foot without binding. No discomfort is encountered as the loop of the girdle is cut to exactly fit the shape of the foot. No metal parts are required, so that injury to the stockings or shoes is entirely eliminated. As the retainer merely embraces the forward portion of the foot it is obvious that it is completely hidden by the shoes, even when low cut shoes are worn.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. The combination with a pad adapted to support the metatarsal arch of the foot, and means to retain the pad beneath the arch, said means comprising a loop secured to the pad positioned beneath the arch and extending angularly to points on opposite sides of the foot, then upwardly and forwardly of the first and fifth metatarso-phalangeal joints, and then over the dorsal surface of the foot rearwardly of the web of the toes.

2. The combination with a pad adapted to support the metatarsal arch of the foot, and means to retain the pad beneath the arch, said means comprising a loop secured to the pad positioned beneath the arch and extending angularly to points on opposite sides of the foot, then upwardly and forwardly of the first and fifth metatarso-phalangeal joints, and then over the dorsal surface of the foot rearwardly of the web of

the toes, an auxiliary loop connected at one end to the medial side of the pad and at its opposite end to the dorsal portion of the first-named loop, said auxiliary loop engaging the medial side surface of the foot posterior to the first metatarso-phalangeal joint.

3. The combination with a pad adapted to support the metatarsal arch of the foot, and means to retain the pad beneath the arch, said means comprising a loop secured to the pad positioned beneath the arch and extending angularly to points on opposite sides of the foot, then upwardly and forwardly of the first and fifth metatarso-phalangeal joints, and then over the dorsal surface of the foot rearwardly of the web of the toes, an auxiliary loop connected at one end to a side portion of the pad and at its opposite end of the dorsal portion of the first-named loop, said auxiliary loop engaging a surface of the foot posterior to an external metatarso-phalangeal joint.

4. The combination with a pad adapted to support the metatarsal arch of the foot, and means to retain the pad beneath the arch, said means comprising a loop secured to the pad positioned beneath the arch and extending angularly to points on opposite sides of the foot, then upwardly and forwardly of the first and fifth metatarsal-phalangeal joints, and then over the dorsal surface of the foot rearwardly of the web of the toes, a pair of auxiliary loops connected at one end to opposite portions of the pad and extending upwardly and rearwardly of the first and fifth metatarso-phalangeal joints, and then joining with the dorsal portion of the first-named loop.

5. The combination with a pad adapted to support the metatarsal arch of the foot, and means to retain the pad beneath the arch, said means comprising a loop secured to the pad positioned beneath the arch and extending at an angle to the longitudinal axis of the foot to points on opposite sides thereof, then upwardly and forwardly of the first and fifth metatarso-phalangeal joints, and then over the dorsal surface of the foot rearwardly of the web of the toes, the side portions of said loop being angularly disposed to fit the angular surfaces presented by the opposite sides of the foot forwardly of the first and fifth metatarso-phalangeal joints, and an elastic section in the loop.

6. The combination with a pad adapted to support the metatarsal arch of the foot, of means for retaining the pad beneath the arch, said means comprising a loop secured to the pad and encircling the foot rearwardly of the web of the toes, and forwardly of the first and fifth metatarso-phalangeal joints on the opposite side portions of the foot, said loop adapted to secure the pad

in position to support the metatarsal arch of the foot.

7. The combination with a pad adapted to support the metatarsal arch of the foot, of means for retaining the pad beneath the arch, said means comprising a loop secured to the pad and encircling the foot rearwardly of the web of the toes, and forwardly of the first and fifth metatarso-phalangeal joints on the opposite side portions of the foot, said loop adapted to secure the pad in position rearwardly extended thereof to support the metatarsal arch of the foot, and means passing rearwardly of the first metatarso-phalangeal joint and adapted to cooperate with the loop to retain the pad beneath the metatarsal arch of the foot.

8. The combination with a pad adapted to support the metatarsal arch of the foot, of means for retaining the pad beneath the arch, said means comprising a loop secured to the pad and encircling the foot rearwardly of the web of the toes, and forwardly of the first and fifth metatarso-phalangeal joints on the opposite side portions of the foot, said loop adapted to secure the pad in position rearwardly extended thereof to support the metatarsal arch of the foot, and means passing rearwardly of an external metatarso-phalangeal joint and adapted to cooperate with the loop to retain the pad beneath the metatarsal arch of the foot.

9. The combination with a pad adapted to support the metatarsal arch of the foot, of means for retaining the pad beneath the arch, said means comprising a loop secured to the pad and encircling the foot rearwardly of the web of the toes, and forwardly of the first and fifth metatarso-phalangeal joints on the opposite side portions of the foot, said loop adapted to secure the pad in position rearwardly extended thereof to support the metatarsal arch of the foot, and means passing rearwardly of the first and fifth metatarso-phalangeal joints and adapted to cooperate with the loop to retain the pad beneath the metatarsal arch of the foot.

10. The combination with a pad adapted to support the metatarsal arch of the foot, of means for retaining the pad beneath the arch, said means comprising a loop secured to the pad and encircling the foot rearwardly of the web of the toes, said loop adapted to secure the pad in position to support the metatarsal arch of the foot, and said loop having side portions angularly disposed to fit the angular surfaces presented by the opposite sides of the foot forwardly of the first and fifth metatarso-phalangeal joints, and the longitudinal axis of the pad being disposed relatively parallel to the plane of the loop encircling the foot and to a line passing through points overlying the first and fifth metatarsal heads of the metatarsal arch of the foot.

11. The combination with a pad adapted to support the metatarsal arch of the foot, and means to retain the pad beneath the arch, said means comprising a loop encircling the forward portion of the foot rearwardly of the web of the toes, said loop secured to the pad positioned beneath the metatarsal arch of the foot, and said loop comprising angularly disposed extending portions relative to the pad and cut in such a manner that when the ends of the same are connected together the loop is formed with its opposite side portions thereof being angularly disposed to fit the angular surfaces presented by the opposite sides of the foot forwardly of the first and fifth metatarso-phalangeal joints.

12. The combination with a pad adapted to support the metatarsal arch of the foot, of means for retaining the pad beneath the arch, said means comprising a loop, encircling the forward portion of the foot rearwardly of the web of the toes, said loop having a rearwardly extending bottom section, a top section, the top and bottom sections sewed together along the rear and end edges thereof, thereby forming a pocket structure open towards the front, said pocket structure extending rearwardly of the loop and adapted to receive a pad, said pad and pocket structure adapted to support the metatarsal arch of the foot, said loop comprising angularly disposed extending portions relative to the pad and cut in such a manner that when the ends of the same are connected together the loop is formed, with its opposite side portions being angularly disposed to fit the angular surfaces presented by the opposite sides of the foot forwardly of the first and fifth metatarso-phalangeal joints.

LEWIS M. McCORMICK.

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