

J. L. ZINK.
ARCH SUPPORT.
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Fig. 1.

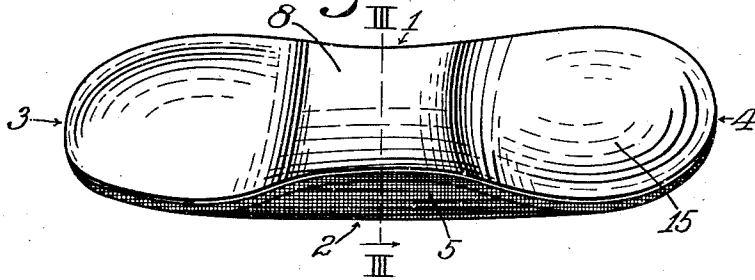


Fig. 2.

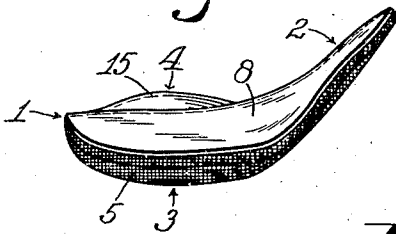


Fig. 3.

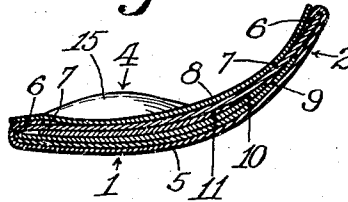


Fig. 4.

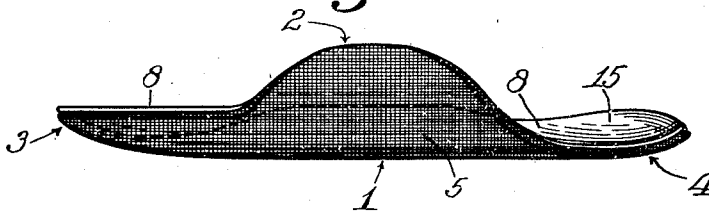
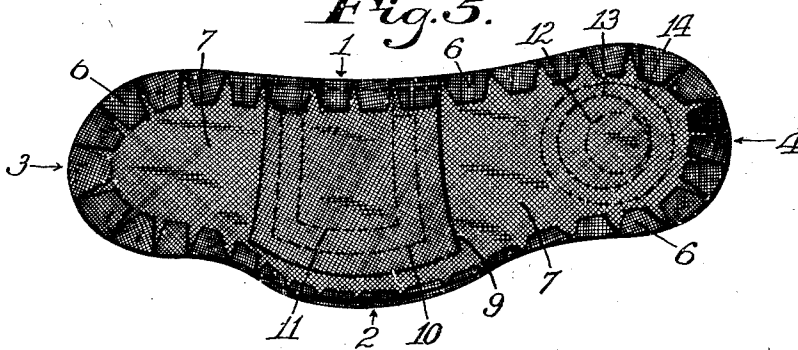


Fig. 5.



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ARCH-SUPPORT.

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To all whom it may concern:

Be it known that I, JAMES L. ZINK, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Arch-Support, of which the following is a specification, reference being had to the accompanying drawings and to the letters and figures of reference marked thereon.

This invention relates to the type of arch supporter that is designed to be used in a shoe to lift and hold the sagged or flattened portion of the human foot approximately to its normal alinement and proper anatomical position, and in lieu of the healthy and efficient ligament and muscle support and strength which may be lacking, to maintain and hold the foot-arch in proper position; the invention relating more particularly to a foot-arch supporter that is adapted to be removably inserted into a shoe and to be in a measure self-fitting to different shoes and to the foot of the user.

Arch supports are commonly made of metal, leather, fibroid, and composition, or of a combination of materials, and structurally are rigid or semi-rigid, and many are heavy, bulky and cumbersome, to such extent as to distort and damage the shoe or require a special or very large shoe to accommodate the supporter which is designed with a view to merely support or hold up the foot-arch, rather than to correct any defect or weakness in the foot mechanics or anatomical structures.

It is well known to medical men that the rigid or practically unyielding forms of arch-supports do not permit the muscles and ligaments of the foot to perform their functions, or not properly; that the long continued use of such forms cause the tissues sustaining and supporting the foot-arch to become so weakened from lack of use or from restricted use that the proper strength and function of the tissues can not be recovered, and that the user is thus made permanently dependent upon the arch-supports.

An object of the invention is to provide an improved foot-arch supporter which shall be so constructed as to be capable of supporting the foot-arch in its proper position and alinement, and permitting complete and unrestricted action of all the various foot movements, so as to not deprive the sustaining tissues and muscles of opportunity as they may gain or regain strength to per-

form their natural functions; to the end that the arch supporter shall be not a mere support or prop, but a corrective instrument conducive to the encouragement of natural effort in the tissues and muscles to perform their proper functions.

Another object is to provide a flexible arch support which shall be so constructed as to not only hold the foot-arch in its proper position and alinement, but shall be capable of being corrective by permitting complete and unrestricted action of all the tissues involved in the foot movements while affording firm support to the foot-arch, so that by the normal use of the involved tissues at the time the foot-arches are supported the full functions of the foot may be improved or lost functions restored, as the physiological effect of the exercise of function brings a return of the foot to normal activities.

A further object is to provide a flexible arch support of such construction that extra pressure upon corns and bunions is avoided, and so that its flexibility shall permit it to be conformable to the foot while in passive use, in order that the arch support may be comfortable in use to those who suffer with tissues which may be sensitive to pressure.

A still further object is to provide a flexible arch support which shall be so constructed as to be capable of retaining its flexibility, and in all directions, and not be liable to become hardened or stiff with age, and which will be durable and economical in use.

With the above-mentioned and other objects in view, the invention consists in an arch support constructed so as to be thoroughly flexible in all of its parts or portions and in all directions, being constructed so that it may readily conform to the lines and contours of different feet and different shoes; and, the invention consists also further in the parts and combinations of parts as hereinafter particularly described and further set forth in the accompanying claims.

Referring to the drawings,—Figure 1 is a perspective view showing principally the upper portion and the turned up side of a foot-arch supporter, for the left foot, constructed substantially in accordance with the invention; Fig. 2 is an end view looking at the heel or rearward end of the supporter; Fig. 3 is a transverse section on the

line III—III in Fig. 1; Fig. 4 is a side elevation of the improved supporter; and, Fig. 5 is a top plan of the supporter minus its top part or cover.

5 Similar reference characters in the various figures of the drawings indicate like parts or features of construction herein referred to in detail.

10 The improved supporter has a main portion 1 adapted to support the middle portion of the foot and provided with a flared side portion 2 adapted to support the inner side of the foot, in many cases the supporter having a heel or rearward portion 3, 15 and having also in some cases a forward or sole portion 4. The supporters may be of various shapes and proportions to best supply the needs of individual conditions.

20 The body or effective part of the improved supporter is composed of woven fabric having the character of canvas or similar material, and comprises a bottom layer 5 composed of woven fabric and preferably having 25 turned over tongues 6 on its edge portion, and a top layer 7 also composed of woven fabric arranged upon the bottom layer and extending under the turned over tongues. The fabric or cloth layers are 30 secured together by means of suitable adhesive substance of flexible character which shall be capable of retaining its flexibility, such as rubber or rubber composition. It is 35 preferred that the upper or inner face of the bottom layer and the upper face of the top layer be thoroughly coated with rubber and forced into the fabric and interstices thereof, so as to be intimately combined with the cloth and whereby the layers are secured together while in heated condition by a process similar to that practised 40 in vulcanizing. A cover 8 is arranged upon the top of the top layer 7 and secured thereto by means of the rubber or adhesive substance combined with the surface of the top layer, the cover being composed of suitable smooth material, preferably thin, flexible and soft leather, such as sheep-skin, to 45 permit the foot of the user to slide freely thereon in entering the shoe having the supporter therein. The threads of the fabric of the bottom layer when in contact with the sole of the shoe have a tendency to slightly adhere to the inside of the shoe sole and prevent the supporter from loosely 50 slipping about in the shoe, and in some cases is rendered less liable to slippage when very thoroughly combined with the rubber, which may in some cases or in portions of the fabric be forced between the threads to 55 the under side of the fabric.

60 As is the common practice, the improved supporter is properly padded or built up by the use of a suitable number of small pieces or layers of material in the regions where 65 the foot-arch requires more or less support;

70 but in the present case the padding or relative small layers, such as different sized overlapping layers 9, 10 and 11 arranged on the main portion of the supporter, are each composed of woven fabric, preferably 75 so that the threads thereof shall diagonally cross the threads of the adjacent layers, the padding layers being arranged upon the bottom layer 5 and under the top layer 7, or permissibly one or more upon the top of 80 the top layer 7, stability being desired so that the supporter shall retain its structural shape. In some cases the forward portion 4 of the supporter has padding layers 12, 13, 14, therein of different plan dimensions 85 so as to form a convex top portion 15 to support the forward portion of the foot as may be desired in some cases.

90 The improved supporter may be variously made so as to have the desired or required contour, in some cases a plaster cast of the foot being made, especially in particular cases, and a cast of the inside of a shoe may also be made on which to build the improved 95 supporter to obtain the most satisfactory results. The top of the heel portion 3 is more or less concave and the under side usually convex, such formation being adapted to prevent shifting of the supporter in the shoe. There being a considerable quantity of the rubber or adhesive substance incorporated in the structure, the whole supporter is rendered cushion-like or yielding 100 to some extent so as to be comfortable to the user, and yet permit of flexibility throughout the structure which permits free bending of the supporter to coincide with bending or changes of portions of the shoe and foot in use.

105 In practical use the flexible arch supporters are held in position as the foot is set at the beginning of a step, by the cupped heel formation, which approximates the lift in the transverse arch of the foot accurately to a line corresponding to that drawn transversely from the center of the navicular bone internally, to the base of the fifth metatarsal bone externally; as the weight of the body is carried forward and the muscles in the 110 foot relax, the lift thus placed elevates the navicular and inner side of the astragalus as well as supporting the anterior margin of the calcaneum bones and lessening the strain placed upon the ligaments holding these bones in position, thus preventing the tendency of the leg to slip downward and inward off the foot. As the weight of the body is carried forward on the foot in action, the properly adjusted lift not only holds the bones in the transverse arch of the foot up 115 in position, but also preserves the alinement of the foot in its correct relation to the swing of the leg; and with the carrying of the body weight still forward and the beginning of the completion of the step, the flexibility of 120 125 130

the supporter permits the foot muscles to tense and get their proper leverage upon the metatarsal bones for the completion of the step. As the weight is carried farther forward and thrown upon the "ball" or metatarsal of the foot, the flexibility of the arch permits a perfect action of the metatarsal-phalangeal joints, and the flare of the arch support automatically holds the metatarsal lift in its correct anatomical position. The normal functioning of the foot tissues thus assured tends to assist in the correction of mechanical defects of the foot arch, as well as to strengthen the tissues to a degree permitting all forms of arch supports to be eventually discarded.

Having thus described the invention, what is claimed as new is—

1. A flexible foot-arch supporter having a plurality of superimposed layers of fabricated flexible material, each layer having a resilient adhesive substance incorporated therein and extending to one surface of the layer and also to the next adjacent layer of the material.

2. A flexible foot-arch supporter having a plurality of superimposed layers of fabricated flexible material and also a cover layer composed of soft and pliable material, and layers of adhesive resilient material between and adhering to each of the two next adjacent layers of material.

3. A flexible foot-arch supporter comprising a bottom layer composed of flexible woven fabric and flexible substance com-

bined with the upper side thereof, a top layer composed of flexible woven fabric and flexible substance combined with the upper side thereof, a cover composed of flexible material and having adhering connection with the flexible substance of the top layer, and padding layers composed of flexible woven fabric and interposed between the bottom layer and the cover and secured in place by the flexible substance thereof.

4. A flexible foot-arch supporter comprising a bottom layer composed of flexible woven fabric and flexible substance combined with the upper side thereof, the bottom layer having tongues on its edge portion that are turned over the upper side of the layer, a top layer composed of flexible woven fabric and flexible substance combined with the upper side thereof, the top layer extending under the tongues and having adhering connection with the flexible substance of the bottom layer, a cover composed of flexible material and having adhering connection with the flexible substance of the top layer, the cover being secured upon the tongues, and padding layers composed of flexible woven fabric and interposed between the bottom layer and the cover and secured in place.

In testimony whereof, I affix my signature in presence of two witnesses.

JAMES L. ZINK.

Witnesses:

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