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ARCH SUPPORTER.

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Fig. 1.

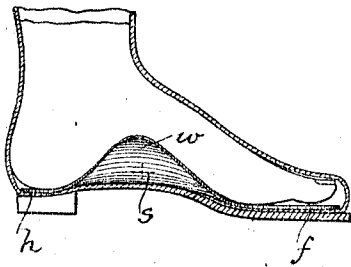


Fig. 3.

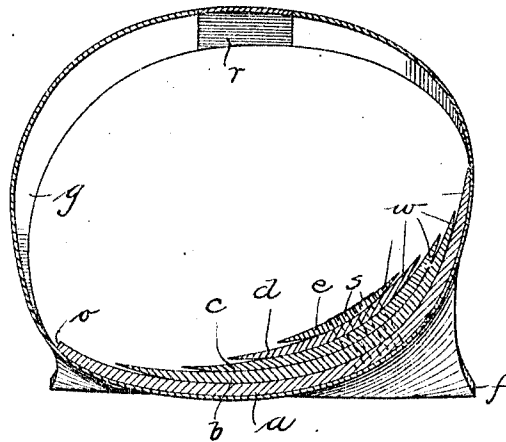
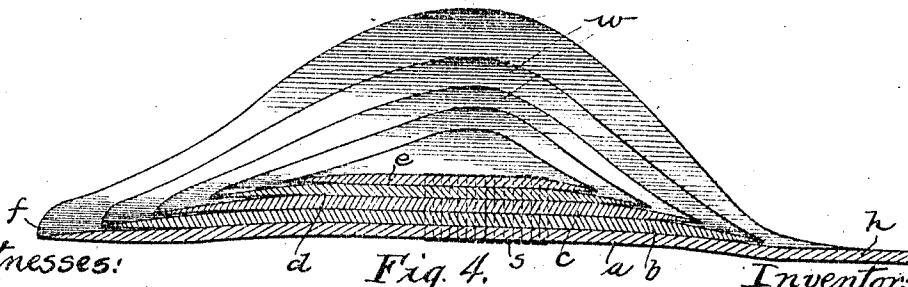
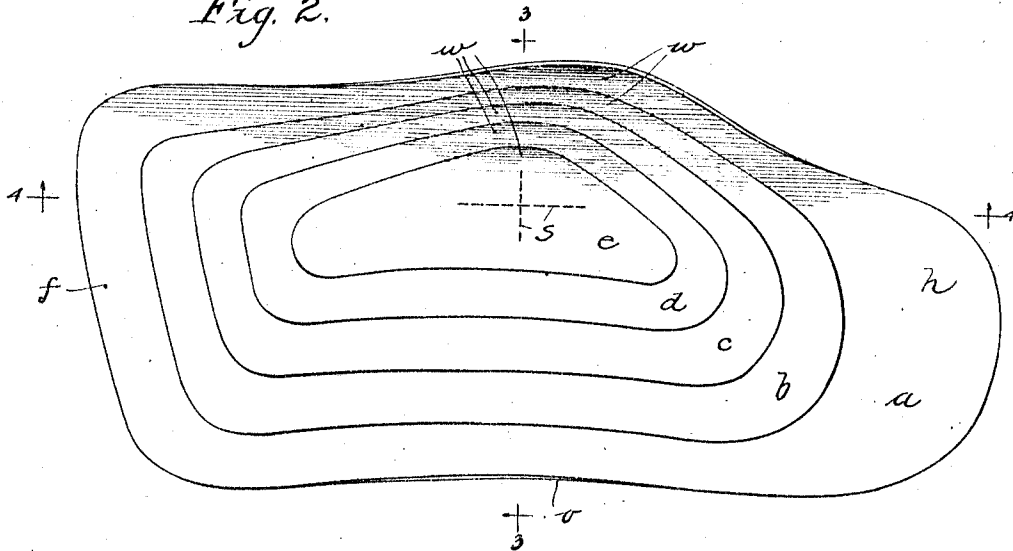


Fig. 2.



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Fig. 4.

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UNITED STATES PATENT OFFICE.

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ARCH-SUPPORTER.

988,942.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, FREDERICK W. KRECH and RENE C. HANSEN, residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Arch-Supporters, of which the following is a full, clear, and precise specification.

Our invention relates to arch supporters to be worn inside of a shoe to maintain the arch conditions for proper walking.

Among the salient objects of our invention are to provide a more yielding and pliable structure comprising a tier of laminations or layers of decreasing area upwardly and the periphery of each within that of the one below, the lowermost layer forming a sort of insole for engaging with the shoe to hold the structure in place and to extend upwardly a distance at the inner side of the foot adjacent the bones and ligaments to be supported; to so skive or pare off the ends of the layers that the structure forms a smooth engaging surface for the foot; to so arrange the layers that the uppermost and smallest layer thereof will be below and partly at the side of the principal or what may be called the key bone of the arch to be supported, the other layers extending gradually toward the outside of the lowermost member and gradually upwardly toward the inner edge of the lowermost member to thus form a top smooth arch surface which when engaged by the foot will cause the bones to assume their correct positions to maintain the foot arch; to yieldingly secure the layers together along only a small area slightly to the inside of the centers of the layers so that the securing fastening area will be substantially adjacent the main bone to be supported and so that the layers will be free for relative rotational play to be able to follow the muscular movement of the foot and the various positions thereof thus eliminating friction on the foot and allowing the supporter to be worn with greater ease and comfort; and in general to provide an improved arch supporter which will hold the foot parts in place without harmful pressure to maintain proper arch conditions and which will adapt itself to the foot immediately upon insertion in the shoe.

The various features of construction and arrangement in our invention are clearly brought out in the following specification

and accompanying drawing, in which drawing—Figure 1 is a sectional view of a shoe, showing a foot therein and our improved arch supporter applied thereto, Fig. 2 is a plan view of the arch supporter, Fig. 3 is a sectional view on plane 3—3, Fig. 2, and Fig. 4 is a sectional view on plane 4—4, Fig. 2.

The structure comprises a plurality of oblong laminations or layers, *a, b, c, d, e*, etc. of any number. The lowermost or main layer *a* has the heel part *h* for fitting in the heel of the shoe, its outer edge *o* conforming with the outer wall of the shoe, and its inner edge curving gradually upwardly to form a wing *w* for engaging the inner wall of the shoe. The other layers *b, c, d, e*, and so on, are of decreasing area, the periphery of each layer being within that of the preceding layer, as shown. Each of these layers has also a wing *w* curving upwardly from its inner edge, the center of the tier of layers being preferably at a point directly adjacent the main bone of the arch to be supported, as best shown in Figs. 2 and 3. At this center the various layers are yieldingly connected together along only a small area so that they will be free for relative rotational play to follow the various movements of the foot. The layers can be secured together in any suitable manner, a preferable way being by sewing, as by cross stitches *s*. The layers are cut from any resilient and pliable material and preferably of leather, and are arranged with their smooth faces up, and their lower edges are skived, as best illustrated in Figs. 3 and 4, so that the peripheral edges of each layer will lie close to the other layer to form an unbroken smooth top surface when the foot is applied thereto.

The exact location of the axis of rotation of the members is very important. The axis preferably extends diagonally and through the layers approximately at the bases of the wings *w* thereof and approximately centrally of their length. The various layers will then be substantially at right angles to their rotational axis, as best shown in Fig. 3, so that the axial center of the uppermost layer will be adjacent that bone of the arch which has a tendency to fall downwardly and toward the inner side of the foot.

The layers arranged as described and hav-

ing their edges skived will give the proper arch surface whose transverse direction is shown in Fig. 3 and whose longitudinal direction is best shown in Fig. 4. This entire freedom of the layers enables the supporter to flex and to have relative rotational play to adapt itself to all the movements of the foot without causing any friction against the foot, the entire friction taking place between the various layers, and this friction can be practically eliminated by the application of talcum powder or other material between the layers. The great pliability and freedom for relative movement of the layers enables the supporter to be worn with perfect ease and comfort almost immediately after insertion in the shoe, and it will adapt itself intimately to the foot and to the shoe. At the same time the supporter is indestructible and will support the weight of the heaviest person indefinitely.

In the form shown in Figs. 2 and 4 the front part of the main layer *a* extends only to the ball of the foot, but this end can be lengthened to extend to the front of the shoe, as shown in Fig. 1, the supporter then forming a sort of insole for the shoe with the arch supporting attachment thereon. Fig. 1 also shows the location of the rotational center of the layers with reference to the foot.

As shown in Fig. 3, a band *g* can be provided for holding the supporter in proper position on the foot, and this band can be a separate affair, as shown, to be applied at will to the supporter, or it can be permanently secured thereto. The band preferably has inserted therein a section *r* of elastic material.

We do not desire to be limited to the precise construction, arrangement and material which we have described, as other constructions and arrangements are possible and other materials could be used which would still come within the scope of our invention.

We, therefore, desire to secure the following claims by Letters Patent:

1. An arch supporter comprising a plurality of layers of flexible and pliable non-metallic material and of graduating size with the smallest on top, and means yieldingly connecting said layers together and along only a small area near the centers thereof without disturbing the individual pliability of the layers and to allow relative rotational play of the layers.

2. An arch supporter comprising a plurality of flexible and pliable non-metallic layers of graduating size with the smallest on top and the periphery of each layer being entirely within the periphery of the next lower layer, and means yieldingly connecting the layers together and along only a small area positioned to engage the pivotal

center of the foot arch when the supporter is applied in a shoe, such yielding connection in no way disturbing the individual pliability of the layers and allowing relative rotational play of the layers over each other.

3. An arch supporter built up of a tier of flexible and pliable non-metallic layers of similar form but of graduating size with the smallest on top and each concaved transversely, said layers being yieldingly connected together and along only a small area to allow relative rotational play thereof, said area being in position to engage at the center and side of the foot arch when the supporter is applied to the shoe, and the outer ends of the layers being skived whereby said layers engage to form an unbroken smooth arched engaging surface of concave transverse curvature and convex longitudinal curvature.

4. An arch supporter comprising a main integral flexible and pliable non-metallic layer having a body part for engaging the sole of the shoe and a wing part curving upwardly from the inside of the body part to engage the side of the shoe adjacent the foot arch, and a plurality of flexible and pliable auxiliary non-metallic layers arranged on said main layer one above the other and decreasing in size with the smallest on top, each auxiliary layer having a base part and a wing part disposed respectively above the base part and the wing part of the main layer, all said layers being yieldingly connected together and along only a single small area at substantially the junctions between the base parts and the wing parts to assume a position adjacent the main bone of the foot arch when the foot is applied to the supporter, said connection allowing relative rotational play of the layers to follow the movements of the foot.

5. An arch supporter comprising a main integral flexible and pliable non-metallic layer having a body part for engaging the sole of the shoe and a wing part curving upwardly from the inside of the body part to engage the side of the shoe adjacent the foot arch, and a plurality of flexible and pliable auxiliary non-metallic layers arranged on said main layer one above the other and decreasing in size with the smallest on top, each auxiliary layer having a base part and a wing part disposed respectively above the base part and the wing part of the main layer, all said layers being yieldingly connected together and along only a single small area at substantially the junctions between the base parts and the wing parts to assume a position adjacent the main bone of the foot arch when the foot is applied to the supporter, said connection allowing relative rotational play of the layers to follow the movements of the foot, the periphery of each layer being entirely within the periphery of the next lower

layer and the edges of the layers being skived whereby said layers may engage closely together to form a smooth arched engaging surface of concave transverse curvature and convex longitudinal curvature.

6. An arch supporter comprising a plurality of integral layers of pliable non-metallic material bent at one side along a common longitudinal line and curved upwardly to form side and base parts and connected yieldingly together at an approximately longitudinally central single small area and in the plane of the bending line, said single yielding connection allowing free relative rotational play of the layers.

7. An arch supporter comprising a plurality of integral layers of pliable non-metallic material bent at one side along a common longitudinal line and curved upwardly to form side and base parts and connected yieldingly together at an approximately longitudinally central single small area and in the plane of the bending line, said single yielding connection allowing free relative rotational play of the layers, said layers being of the same general form but of graduated size, the periphery of each layer being entirely within the periphery of the next lower layer.

8. An arch supporter comprising a plurality of integral layers of pliable non-metallic material bent at one side along a common longitudinal line and curved upwardly to form side and base parts and connected yieldingly together at an approximately longitudinally central single small area and in

the plane of the bending line, said single yielding connection allowing free relative rotational play of the layers, said layers being of the same general form but of graduated size, the periphery of each layer being entirely within the periphery of the next lower layer, and the ends of the layers being skived so that the peripheral edge of one layer may engage intimately with the surface of the next layer to form a smooth unbroken engaging surface for the foot.

9. An arch supporter comprising a plurality of integral layers of pliable non-metallic material bent at one side along a common longitudinal line and curved upwardly to form base and side parts, a short longitudinal line of stitching through the layers at the bends thereof, and a short line of stitching through the layers approximately midway between the longitudinal ends, said stitchings crossing each other and being the sole means connecting said layers together, said stitching having sufficient give to allow free relative rotational play of the layers to follow the movements of the foot.

In witness hereof, we hereunto subscribe our names this 27th day of December, A. D., 1909.

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Witnesses:

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