March 8, 1949. G. B. CARSON 2,464,023

ARCH SUPPORT

Filed Sept. 24, 1946

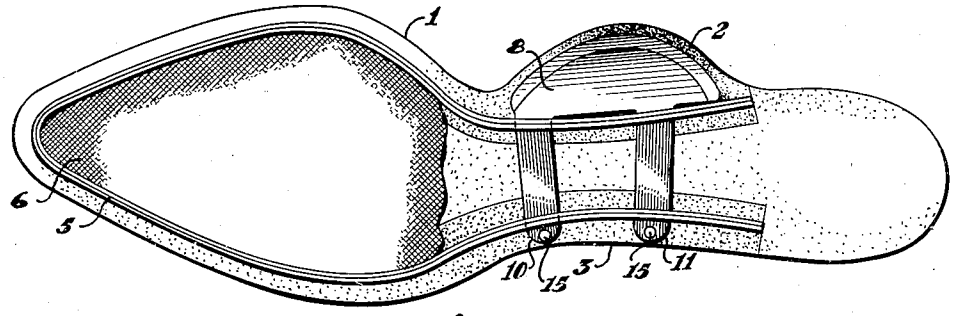


Fig. 1

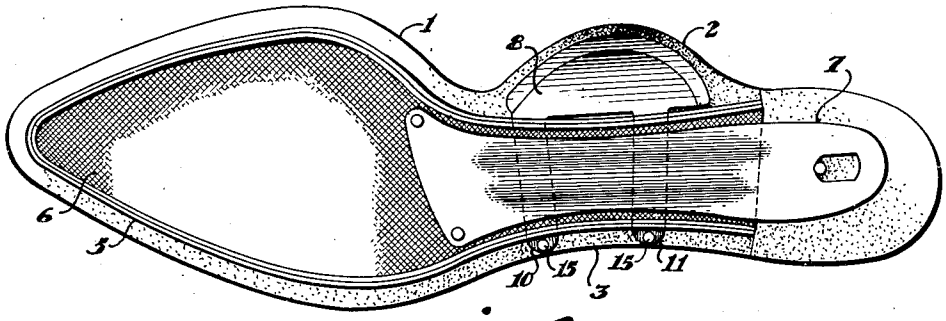


Fig. 2

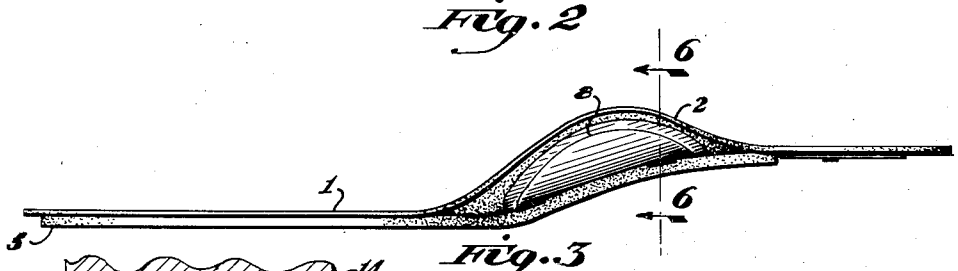


Fig. 3

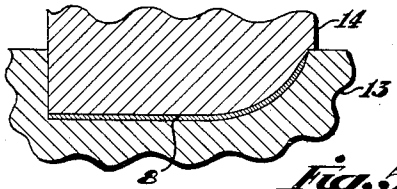


Fig. 5

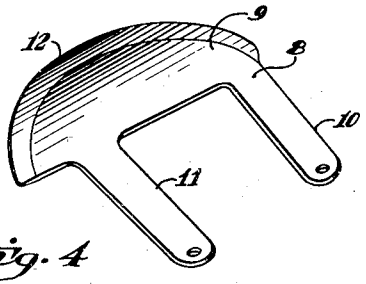


Fig. 4

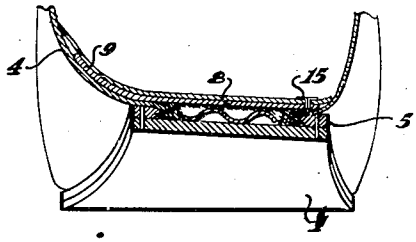


Fig. 6

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ARCH SUPPORT

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1 Claim. (Cl. 36—71)

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This invention relates to improvements in shoes and to improvements in the construction of the inner or shank portion of the insole which effectively supports the inner side of the arch of the foot in shoes of the orthopedic or corrective type. More particularly, this invention relates to improvements in an arch support of the type disclosed generally in U. S. Patent No. 2,147,913 to William D. Moore, granted February 21, 1939.

It has been conventional in the past to provide the shank portion of an insole with an integral wing extension which curves upwardly to overlap the inner side of the arch of the foot and give support thereto. Moreover it has been usual to form the insole from pliable or thin material such as is obtained by splitting a piece of stock. The reason for this is to provide an insole which is not rigid enough to tend to stiffen and render inflexible the forepart of the shoe.

In this class of insole the wing extension of necessity is comparatively limp and requires some form of reinforcement to give it sufficient rigidity to enable it to act as an arch support. Unless reinforced the wing serves only as a wedge like filler or pad.

Moore provided this reinforcement by means of a steel plate underlying and supporting the wing. The Moore arch support was provided with a pair of attaching prongs extending from either end of the plate through both sides of an inseam lip. It has been found that the Moore arch support adds too much weight to a shoe and in addition is bulky and causes a ridge in the completed shoe. In addition, the steel used in forming the Moore support has so high a modulus of elasticity that too much springing action against the wearer's foot is produced.

Briefly, it has been the objective of this inventor to provide a metal plate for underlying and supporting the wing which plate has a coined or die-formed edge of tapering cross-section to eliminate any appearances of a line in the finished shoe along the outer edge of the plate.

A further object has been the provision of a plate which is provided with attaching prongs, one of which extends from the forward corner of the plate across the insole while the other prong extends from a point spaced between the front and back ends of the plate, thus leaving the heel section of the shoe free from transverse prongs and open for assembly of the various parts of the completed heel portion of the shoe.

A still further object has been the provision of a metal plate manufactured from a light metal aircraft alloy of aluminum or magnesium base to

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provide a light weight plate having a modulus of elasticity approximately one-third that of steel so that the plate will tend to yield to pressures moving along the foot as a wearer of the shoe walks, but will spring back immediately against the foot as soon as pressure is relieved, thus tending to assist and support the foot structure without causing callouses or soreness due to extreme rigidity.

Other objects and further advantages of the invention will be more fully apparent from a description of the accompanying drawings in which:

Figure 1 is a plan view of the outer or bottom side of an insole embodying the improvements.

Figure 2 is a plan view similar to Figure 1 but with a shank stiffener included.

Figure 3 is a side view of the insole illustrated in Figure 2.

Figure 4 is a perspective view showing the arch supporting plate before attachment to a shoe.

Figure 5 shows schematically the dies used in forming and coining the plate and the plate is formed.

Figure 6 is a sectional view taken along line 6—6, Figure 3 including in section a portion of an upper for a welt shoe and an outer sole stitched together and to the insole.

Referring to the drawing 1 indicates an insole of conventional construction and pattern outline embodying a wing or lateral extension 2 projecting from the inner side of the shank or intermediate portion 3 thereof. This wing is generally designated by the trade as a cookie and is added to the insole to form a support for the portion of the arch of the foot which it underlies in the shoe. It usually is of a length substantially equal to that of the shank portion of the insole and has a curved outer edge.

In the finished shoe the wing bends upwardly in a curve to overlap the inside of the upper 4 and embrace a determined area of the inner arch of the foot. It is usually tapered by skiving its under side from a base line in radiating directions in order to provide a feathered outer edge which prevents uneven surfaces which might cause discomfort or even injury to the foot.

The insole is of the conventional type of structure now employed in shoes in which the upper, or upper and welt, are secured together by stitching to a continuous marginal lip 5. The surface of the insole encompassed by the lip, is usually reinforced or covered with a duck or fabric layer 6, secured to the undersurface of the insole to provide a laminated or multiple ply structure. Since it is considered desirable to make the fore-

part of the shoe as flexible as possible, particularly in women's shoes, there has been a tendency to skeletonize the forepart of the insole so that heavy grades of material can be employed for increasing the rigidity of the shank of the shoe. These heavy grades, however, cause complications in the manufacture of the shoe and generally have been found impractical. For this reason it is considered preferable to use for the insole a thin stock having sufficient body to permit marginal channeling and provide a solid but pliable forepart. Use of such thin stock however produces a relatively limp insole which must be reinforced at the shank by a metal stiffener 7.

The use of a shank stiffener is a common practice in the manufacture of shoes and shank stiffeners having wing extensions or projections for underlying and supporting the wing of the insole have been employed, but require material modification of the conventional insole structure. Reinforcement for the wing is provided by means of a plate 8, which plate is separate from the shank stiffener 7.

Details of the construction of the plate 8 are shown in Figure 4. The plate 8 consists of a rounded body portion 9 and two prongs a front prong 10 and a rearward prong 11 extended from a point between the ends of the plate. These prongs 10 and 11 are used to attach the plate to the insole. The body portion of the plate 8 has a rounded peripherical edge 12 having the same general configuration as the wing 2. The edge 12 is tapered a sufficient amount to destroy all tendency of the plate to look bulky when installed in the shoe. In addition, as shown in Figures 3 and 6 the plate is provided with a curving cross-section to conform to and support the arch of a foot.

The forming and tapering is accomplished in apparatus of the type shown in Figure 5. A metal plate of approximate shape is cut from a sheet of pre-heat treated aluminum base or magnesium base aircraft-type alloy. The plate is heated to a suitable temperature to reduce its yield point but not sufficiently to destroy the heat treatment. The plate is then placed in a female die 13 and a male die 14 is lowered toward the female die 13. In this operation the plate is formed to have a rounded shape conforming to the arch of a foot; and, at the same time, the peripheral edge 12 is compressed or coined to produce a tapered or feathered edge. Thus, in a single operation the plate is both rounded and given a tapered edge. In addition, the combined coining process and forming process results in sufficient work-hardening of the edge of the plate to make it firm and prevent the plate backing away slowly under the weight of the foot.

The metal plate 8 is attached to the shoe by means of the prongs 10 and 11. The prongs extend transversely across the width of the insole traversing the base of the inseam lip through slits cut for this purpose. The free ends of the prongs are fixed to the insole by rivets 15 or other means of fastening.

The slitting of the lip for insertion of the prongs causes no appreciable weakening of the lip, particularly when the fore and the shank portion of the insole are of laminated construction in which case, as shown in the illustrations, the prongs lie or are embedded between the plies and

do not penetrate the fabric layer 6, which has its margins overlapping the inner side of the lip to which it is secured adhesively. The flexing of the plate presses the wing 2 snugly against the last. The plate is formed of thin metal and the attaching prongs are located in the shank portion of the shoe and away from the heel and toe areas. Thus, the plate does not interfere with the lasting and stitching operations. Attaching the plate to the insole is a simple and inexpensive operation requiring no modication of the conventional construction of the insole. The prongs 10 and 11 cross the insole at points where none of the operations of assembling the shoe take place. The front prong 10 crosses the insole in the forward area of the shank portion while the other prong 11 crosses the central area of the shank portion of the shoe and is well forward of the area in which the heel is attached to the shoe. Thus both prongs are conveniently located where they do not interfere with the assembly of the shoe.

As a result of the use of the arch support of this invention a single line of shoes can be made with or without the orthopedic feature by inserting or omitting the wing reinforcing plate. When the plate is omitted the wing is limp and is functionless merely adding a lining section to the upper, adjacent to it.

Having described my invention, I claim:

In a shoe, an insole having a wing extending from the inner side of the shank portion thereof and substantially coextensive in length with said shank portion to provide support for the arch of the foot, said wing having a rounded peripheral edge and an integral aircraft-type alloy metal plate underlying and supporting the wing, said plate comprising a body portion substantially coextensive in area with the wing and a pair of attaching prongs extending therefrom in a direction transverse of the insole, said prongs passing through the inseam lips of the insole at the under side thereof and having their free ends secured to the insole at points adjacent to the edge opposite to the edge on which the plate is positioned, one of said prongs extending from the plate at the extreme forward end thereof and the other of said prongs extending from a point substantially forward of the rear end of the plate thereby leaving unobstructed the entire heel area of the insole and a portion of the shank area directly forward of said heel area, the outer edge of the body portion of the plate having a work hardened edge to compensate for the loss of rigidity resulting from the forward positioning of the rearward prong.

GORDON B. CARSON.

REFERENCES CITED

The following references are of record in the file of this patent:

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118,660	Whidden	Aug. 29, 1871
996,989	Lengemann	July 4, 1911
2,147,913	Moore	Feb. 21, 1939

FOREIGN PATENTS

Number	Country	Date
495,855	Germany	Apr. 11, 1930