

(No Model.)

J. McCOMBER.

BOOT OR SHOE.

No. 371,339.

Patented Oct. 11, 1887.

Fig. 1,

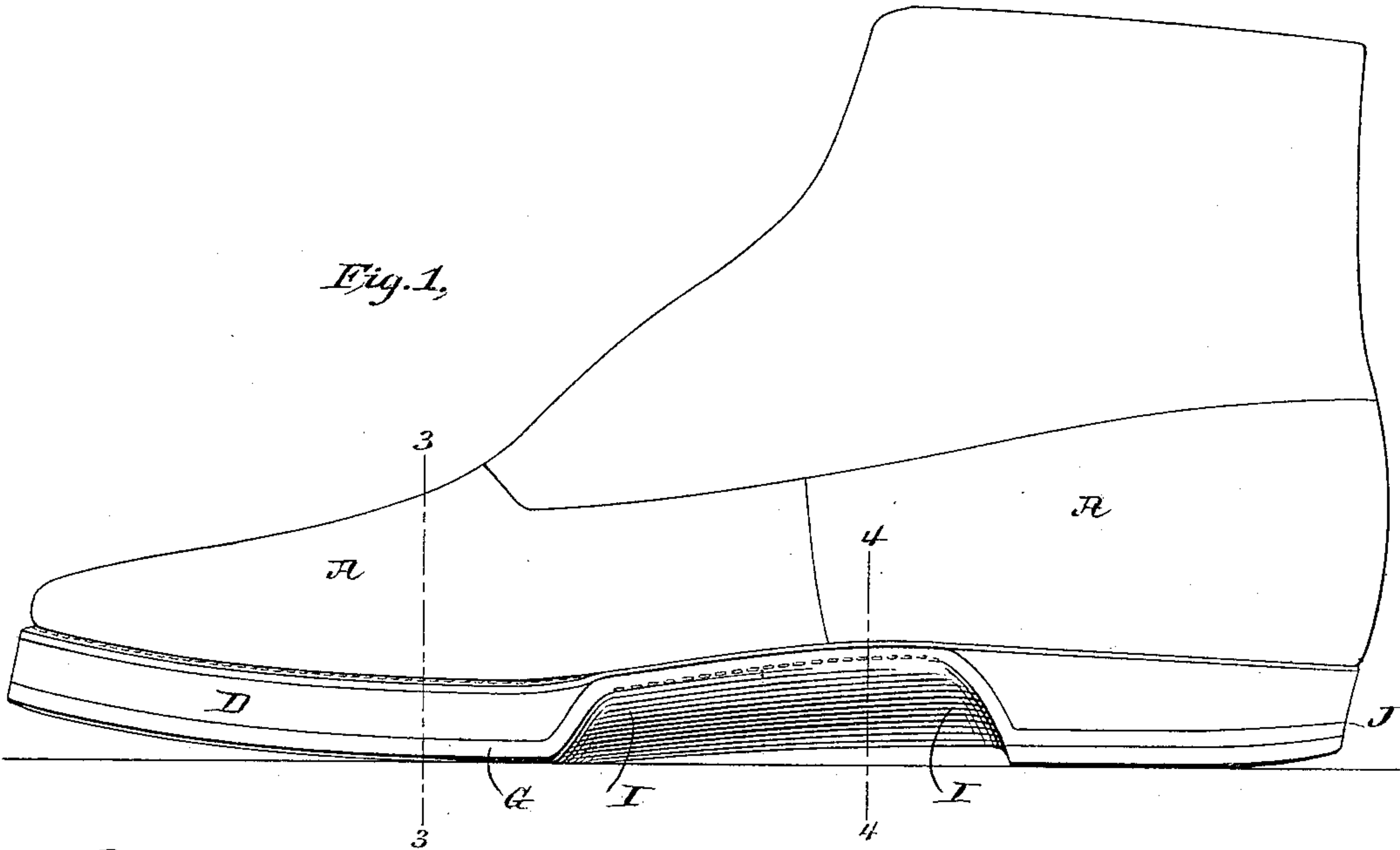


Fig. 2.

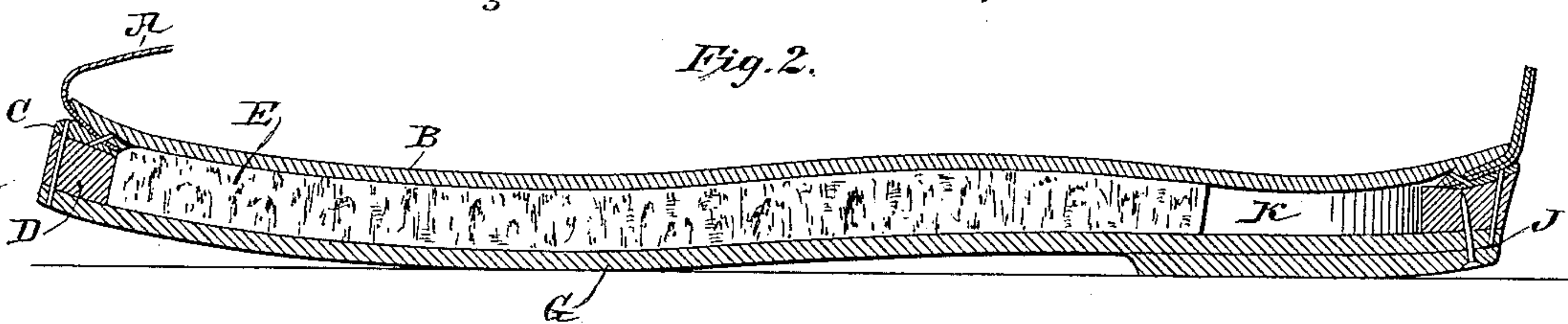


Fig. 3.

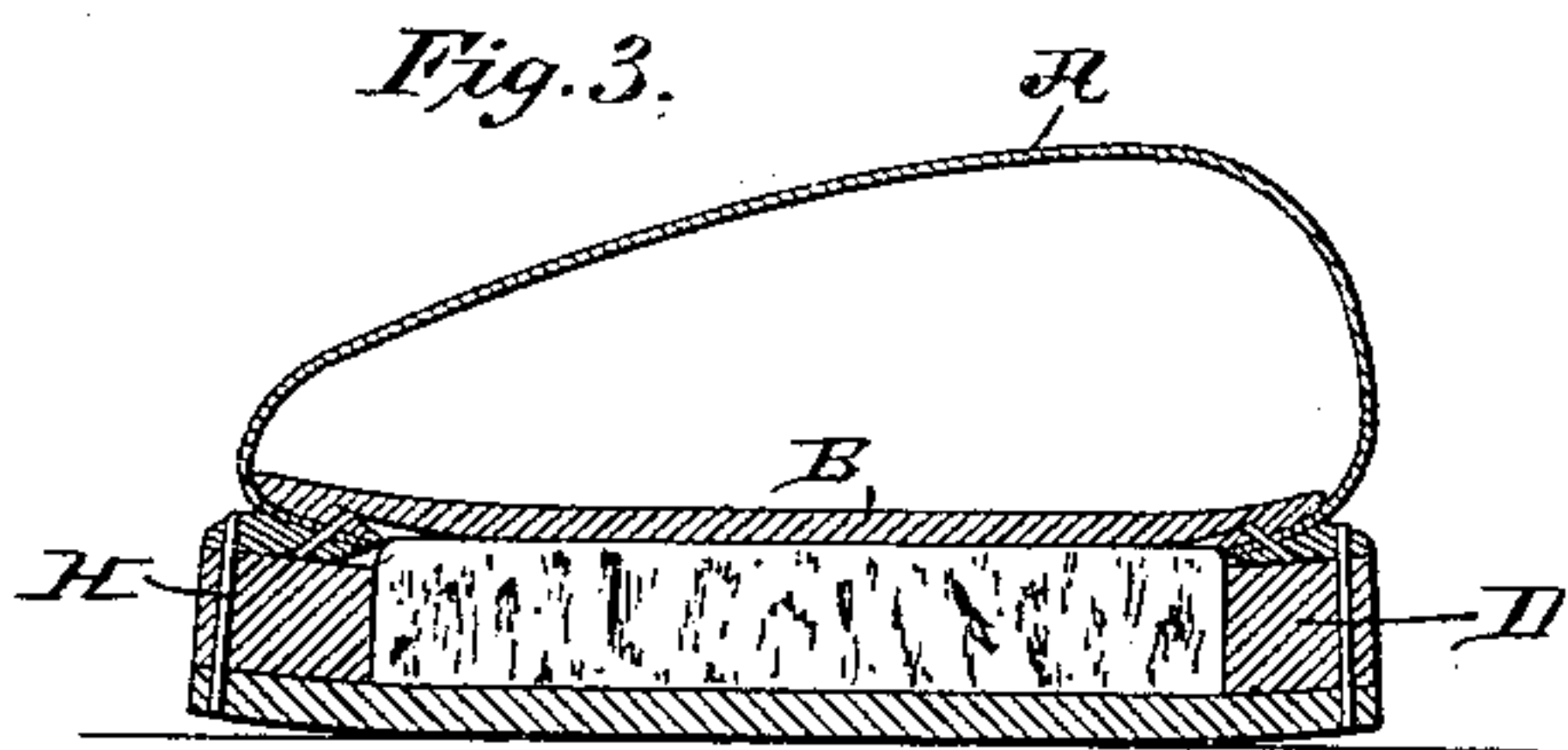


Fig. 4,

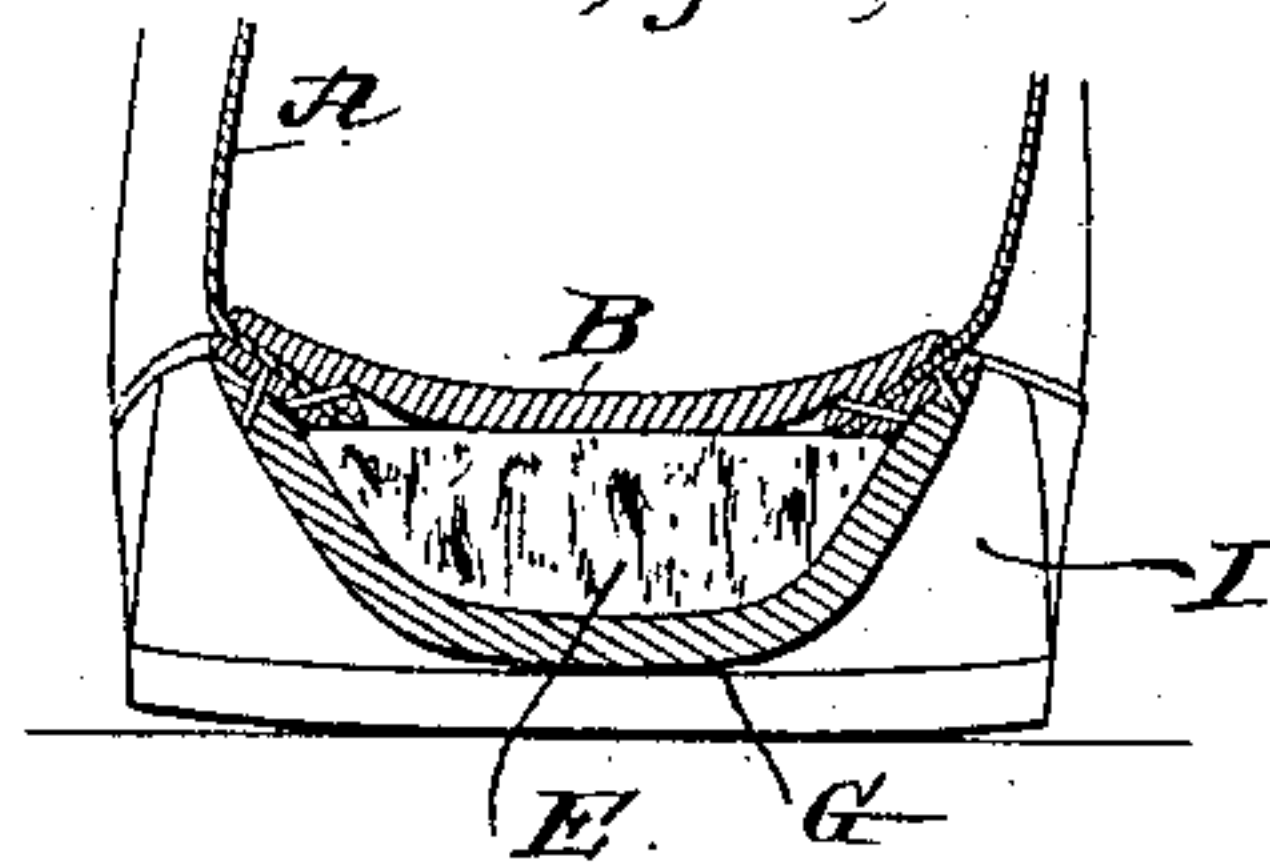
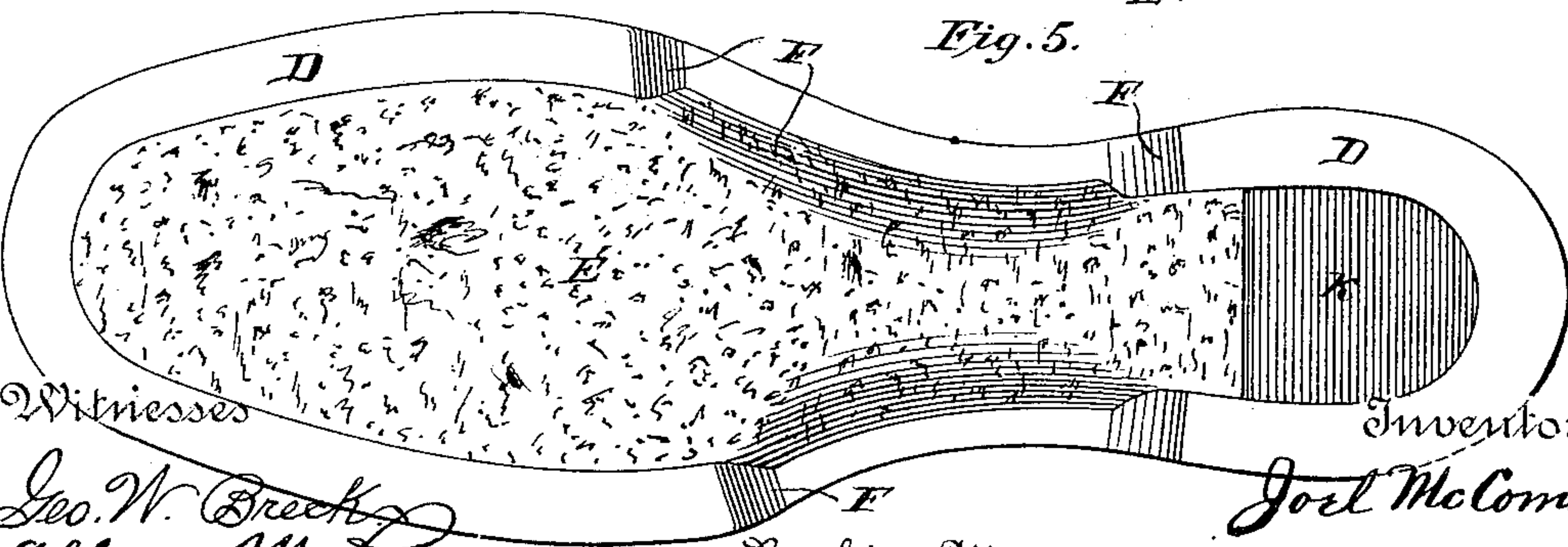


Fig. 5.



Witnesses

Geo. W. Breck
Allan W. Puig

Inventor

Joel McComber,

By his Attorney,

Robt F Gaylord

UNITED STATES PATENT OFFICE.

JOEL McCOMBER, OF NEW YORK, N. Y.

BOOT OR SHOE.

SPECIFICATION forming part of Letters Patent No. 371,339, dated October 11, 1887.

Application filed May 23, 1887. Serial No. 239,054. (No model.)

To all whom it may concern:

Be it known that I, JOEL McCOMBER, of the city, county, and State of New York, have invented certain new and useful Improvements in the Method of Making Boots and Shoes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of the same.

The present invention relates to improvements in the method of producing or manufacturing boots and shoes; and it relates particularly to improvements in the method described and patented to me in Letters Patent of the United States No. 109,438, and dated November 22, 1870. As the methods set forth in said patent have not been practiced by others and are not generally understood, I will first explain the invention of said patent preliminarily to describing the present improvements thereon.

An examination of the human foot, when the same is not deformed, will show that the instep is located over a line (called the "instep-line" or "axial line") drawn from the center of the heel through the ball of the great toe and overhangs the sole of the foot; that a line drawn from the inside of the heel to the inside of the ball of the great toe (the "base-line") will be substantially in the same direction of that toe when not pressed in, while a line parallel to this base-line and in contact with the outside of the heel (the "sole-line") will pass centrally through the third toe, leaving about one-third of the foot lying outside of the same. It should next be understood that the bones of the foot (and particularly the heel-bone and the tarsal and metatarsal bones) are so articulated and held in place as to form a compound arch of mechanical as well as anatomical perfectness for supporting the weight of the body and limbs. One member of this arch is the instep part thereof, which curves from the lower end of the heel-bone up to the instep and down to the ball of the great toe. The other member of the arch is formed by the other metatarsal bones radiating to the balls of the small toes, and, with the bones of these toes, forming an arch curving transversely from the instep-arch down to the ground and from the end of the great toe around toward the shank, within which arch, and designedly protected by the

same, are located the important nerve-channels and nutritive organs. This transverse arch has a contractile power, the function of which is expressed in the action of walking, when it will be found in a natural and healthful foot that as the weight is thrown upon the forward end of the foot this transverse arch will contract upwardly and the toes will be flexed down, as if to grasp or cling to the ground. This action gives elasticity to the walk, and thereby prevents the jarring and shocks that the head and the other superior members of the body would otherwise sustain.

It must be plain that any covering for the foot that in any way impedes or interferes with its natural operations must, in time at least, do injury thereto; and it should therefore be explained that the essential defects in the common form of foot-coverings consist in forming a shoe with its instep at the center thereof and with its outer line of sole oftentimes too much curved, and usually with the toe improperly inclined. The result is that the instep and inner ball portions of the foot are thrown over laterally, thus tipping the longitudinal arch over to one side, while the small toes are drawn in and so rolled under or bunched together that the transverse arch is incapable of fulfilling its purpose, while its muscles lose their tone by non-action, and finally it is flattened out and the toes bent upward and back, the flexor muscles having become weaker than the extensor muscles, when normally they should be stronger. The weight of the person is thus thrown to one side of the instep-line and over toward the sole-line, and the outer portions of the foot, designed to support but a small fraction of the weight, receive practically the greater portion thereof, and while bound up in a manner that would prevent their proper action even under their natural load; and, further, the toes and transverse arch having lost their contractile power, the weight they should sustain is abruptly thrown upon the proximal ends of the metacarpal bones and upon the underlying nerves and other organs, resulting in the various prevalent diseases and deformities of the feet, and especially of the balls thereof. The common shoes also include the grave fault of propping up the heel part of the great arch of the foot, so that its true mechanical as well as

physiological action is very largely interfered with. With the heel of the common boot or shoe the great arch of the foot is tilted over and forward, and the center of gravity of the person is not only unnaturally changed, but still more weight is thrown upon the ends of the metacarpal bones or ball of the foot, while the natural and requisite tension on the muscles at the back of the body and legs is greatly reduced, thus causing the legs to bend or bow forward at the knees and the chest and shoulders to cave in and droop. The true object, therefore, in constructing a boot or shoe for the human foot should be to produce a shoe that shall in no way interfere with the natural working of the foot, and that, if the foot be deformed, may be constructed so as to gradually bring the parts of the foot into their normal condition. This object has been partially accomplished by the method explained in the said patent, which, briefly, consists in constructing a shoe or boot upon a last having its outside ball and shank projecting laterally more than is the case with other kinds of lasts, and having the instep and inner ball located upon or over the instep-line before described, and overhanging the sole, as in the natural foot, the inside shank portion, of course, also conforming to this natural position of these parts. By these means a shoe is produced that permits the foot to occupy its natural and designed position and that preserves the shape of the arches of the foot. The said patent does not, however, present the best method of making the sole, shank, and heel portions of the shoe, and it is to these parts of the shoe that the invention directly relates.

The present object is to produce a shoe in which the foot will be in its natural position—that is, with the heel and balls of the foot balanced or on a level—at the same time constructing the shoe with a heel that will appear of such height as is requisite to the general symmetry of the shoe, but which shall not unnaturally elevate the heel of the foot; also, to construct the shank of the same so as to secure in that part greater stiffness and lightness in weight than is the case with other shoes, such greater stiffness being required, essentially, in shoes for weakened or deformed feet; also, to construct the heel so that it will be yielding to pressure, and thereby preserve the natural cushion-like action of the untrammelled foot.

The drawings show a shoe in which my improvements have been embodied, Figure 1 being an elevation view of the same; Fig. 2, a central longitudinal section of the same; Fig. 3, a cross-section, on plane 3 3, of the same, looking from the left of Fig. 1; Fig. 4, a similar cross-section on plane 4 4, and Fig. 5 a plan view of the sole parts with the outer sole removed.

Referring to these views in detail, A represents the upper of the shoe, which may be of any desired size, material, or construction,

though I of course prefer that such upper be lasted upon a last made in conformity with the principles of my said patent.

B indicates the inner sole, and C the welt, both of which are secured to the upper A in the well-known way.

D is a box for containing and protecting the insole of cork, E. This box consists of a continuous piece of leather extending around the bottom of the shoe, and it is produced by cutting it in the form required from a piece of sole-leather, as many such forms being superposed as are required by the thickness of the cork sole, and the whole secured to the welt in any proper manner without special shaping or molding. At the shank of the shoe this box is cut away or lowered, as shown at F. The insole of cork, E, is of a single continuous piece, cut out to correspond with the inner shape of the box, and is placed in the cavity formed thereby, being also rounded and trimmed at the shank portions thereof, so as to curve on both sides from the heel upwardly toward the upper of the shoe, and then downwardly toward the lower surface at or near the widest portion of the sole. This results in giving to the underneath part of the shank of the sole a compound arch shape.

Upon the box and cork sole thus made and arranged is placed the outer sole, G, this being secured to the welt of the shoe in any proper way, but ordinarily by a row of stitching, H, passing through the box and following a groove in the sole after the well-known manner, and being worked up and molded so that its shank parts I I will be in shape substantially the same as the curved shank parts F F, formed by the box and inclosed cork sole. Securing this outer sole in place binds the parts composing the entire sole firmly together, and practically completes this part of the shoe. The shape of this shank is important, as the lateral and downwardly convexing curve and the longitudinal upwardly-concaving side curves combine to make the stiffest form of shank, and a shank stiffer and stronger, as well as lighter, than the common form of flat shank, even though the latter is re-enforced by metallic springs, as ordinarily employed. Furthermore, the concaved side portions of the shank give to the shoe the appearance of being constructed with a heel of symmetrical and proper height, but which does not disturb the proper level or balance of the foot.

The extreme end of the heel portions of the box are preferably beveled off, as seen at J, so that when the outer sole is secured thereto there will be at this point a rounding off of the heel approximating to the natural contour of this part of the heel of the foot.

It is to be noticed that the cork sole does not extend entirely through the heel, but that it is cut off, so as to leave a cavity, K, in the center of the heel that will come just under the heel-bone of the foot. The presence of this inner hollow space permits the inner sole to slightly yield under the weight of the person

and produces a spring or cushion like action, that protects the wearer's foot against jars and blows. This hollow elastic and yielding heel structure is an important feature of my improved shoe, as it is greatly conducive to ease and elasticity in walking and preserves the natural action and functions of this part of the foot, and particularly prevents jarring the head and body, as is often experienced with the common solid heel. Furthermore, it materially lightens the shoe, thus aiding in producing a strong but light covering for the foot. It also permits the heel of the foot to be let down into the heel portions of the shoe, so as to bring the foot to its natural level.

These various features, together with those before patented to me, combine to produce a shoe in every way conforming in shape and balance, strength and lightness, to what is requisite in a covering for the human foot—one at the same time that is best adapted to the correction of distorted and unhealthful feet. The features may, of course, be variously modified and changed without departing from the spirit of the invention. Thus, when desired, the cork may be substituted by a leather sole, or such sole may be entirely omitted, as in the case of a single-sole shoe. In the latter case a filling-piece for the shank would be employed and the shank would be constructed substantially as herein described. The heel also may be more or less hollow, as is demanded by special cases, to bring the heel

of the foot to the desired level, and thereby balance the foot. Furthermore, the hollow in the heel may be formed by recessing the inner cork sole instead of cutting it off, as here shown, in which case a thin layer of the cork would extend to the rearmost part of the heel.

I have shown an extra lift on the heel. This may or may not be used. It can be applied without disturbing the true level of the foot, and it is useful to receive the brunt of the wear that the heel must sustain, and which is usually at least twice that of the sole. This lift can therefore be readily removed and renewed if it becomes more worn than the sole.

What is claimed as new is—

1. In a boot or shoe, the combination, with the intermediate sole, E, and the box D, having their shank portions cut away and rounded, as shown at F F', of the outer sole, G, bent upward at the shank to fit the cut-away and rounded shank portions of the sole, and secured thereto, as and for the purposes hereinbefore set forth.

2. The combination of the inner sole, B, the box D, the intermediate sole, E, terminating at or about the inner end of the heel, whereby the recess K is produced, and the outer sole, G, substantially as and for the purposes hereinbefore set forth.

JOEL McCOMBER.

Witnesses:

JANDINE LYNG,
ROBT. F. GAYLORD.