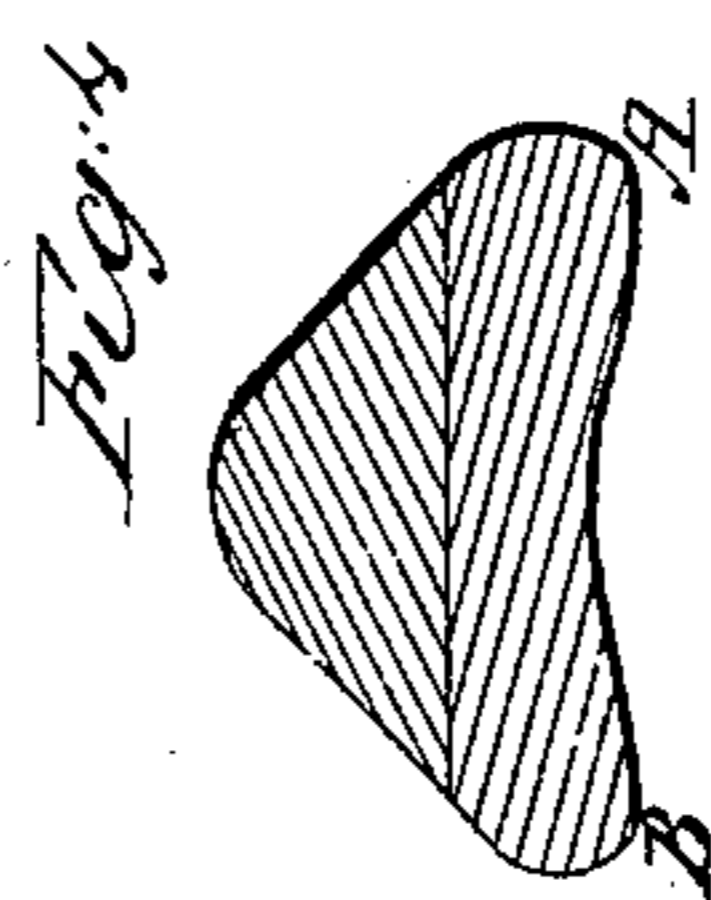
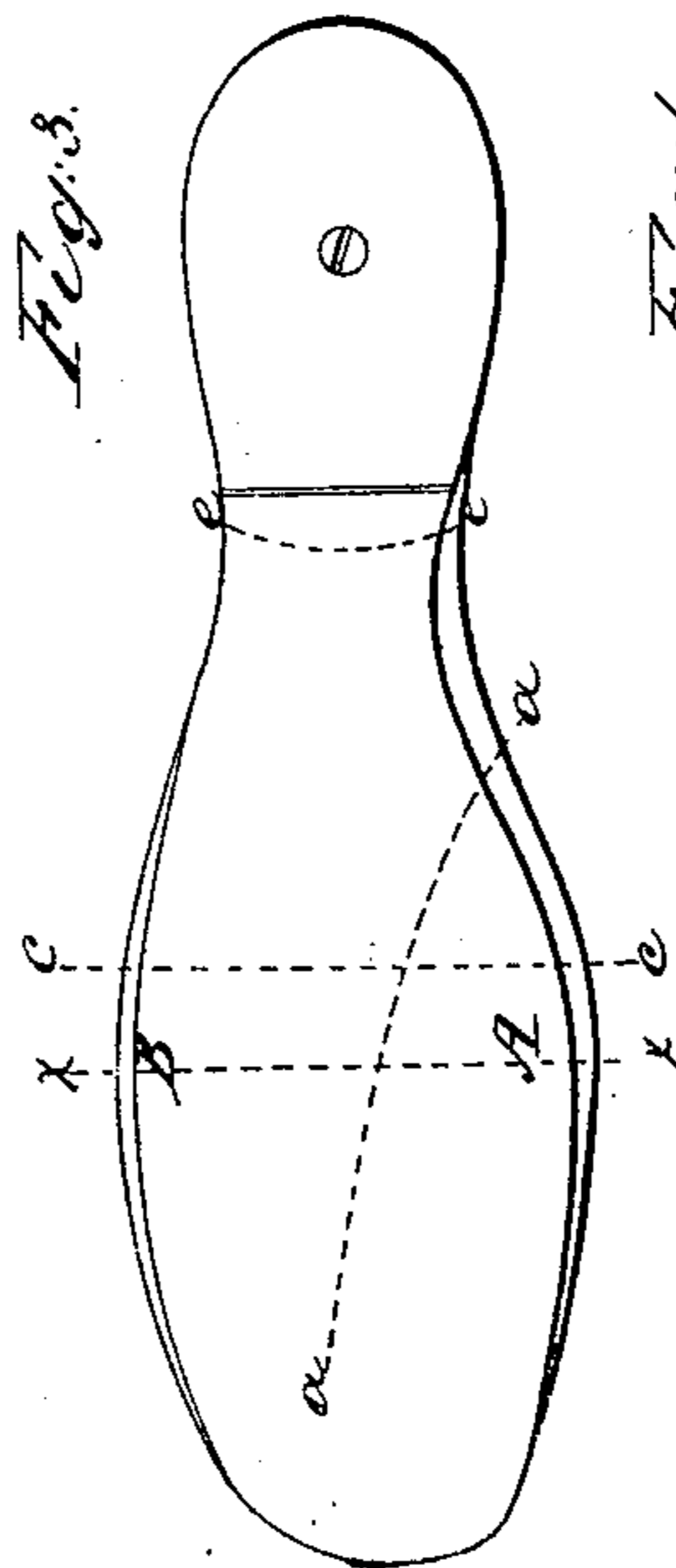
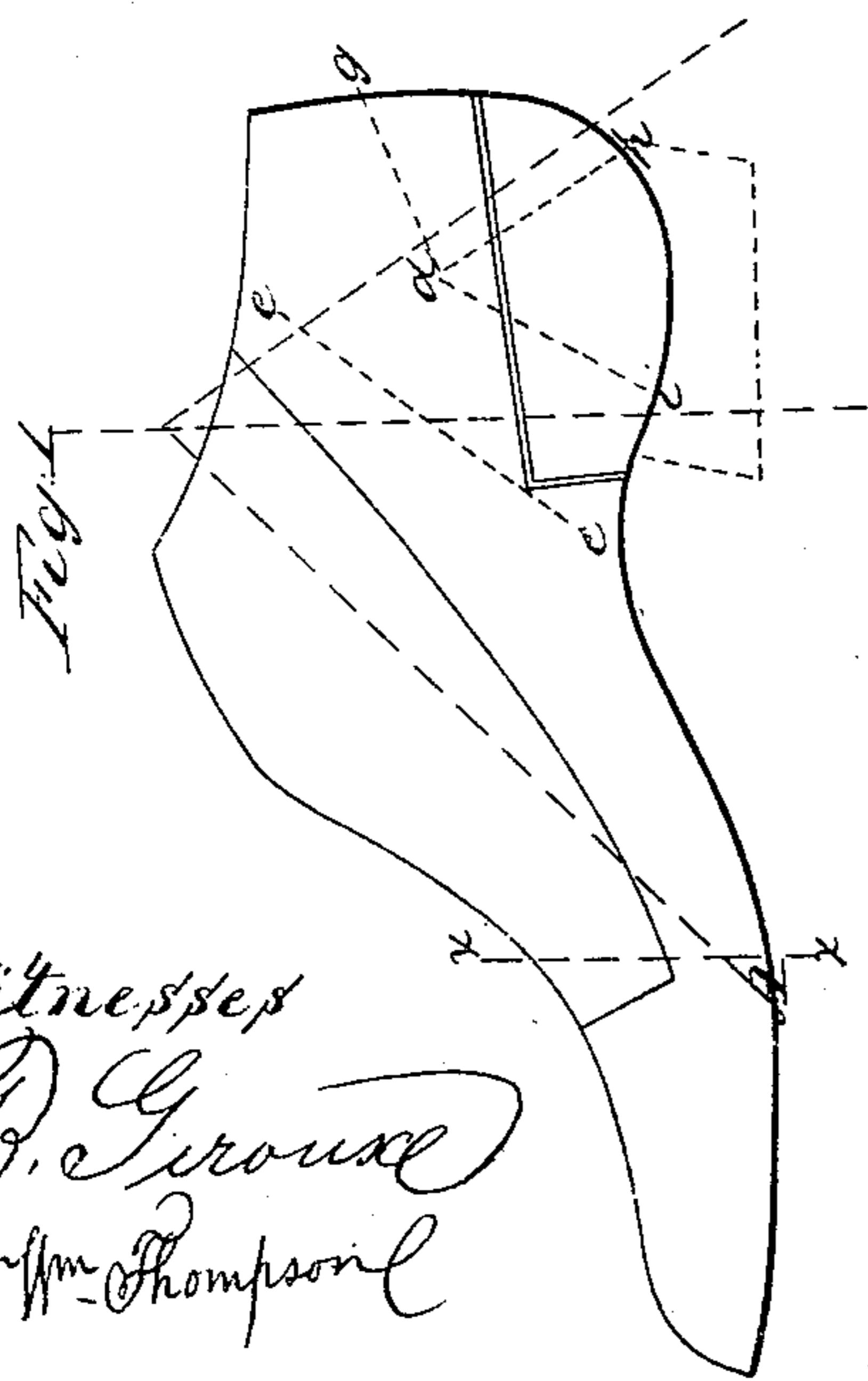
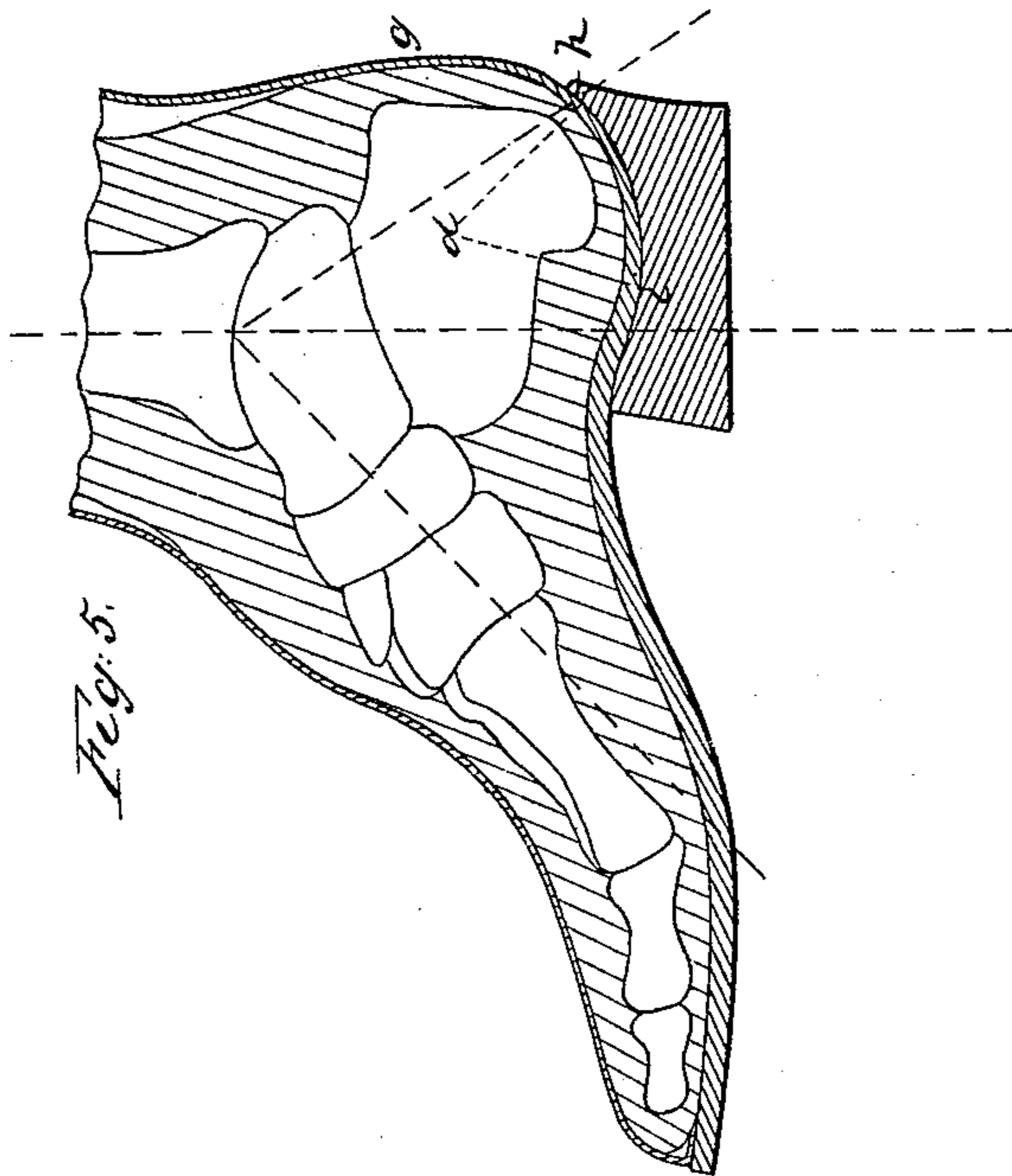
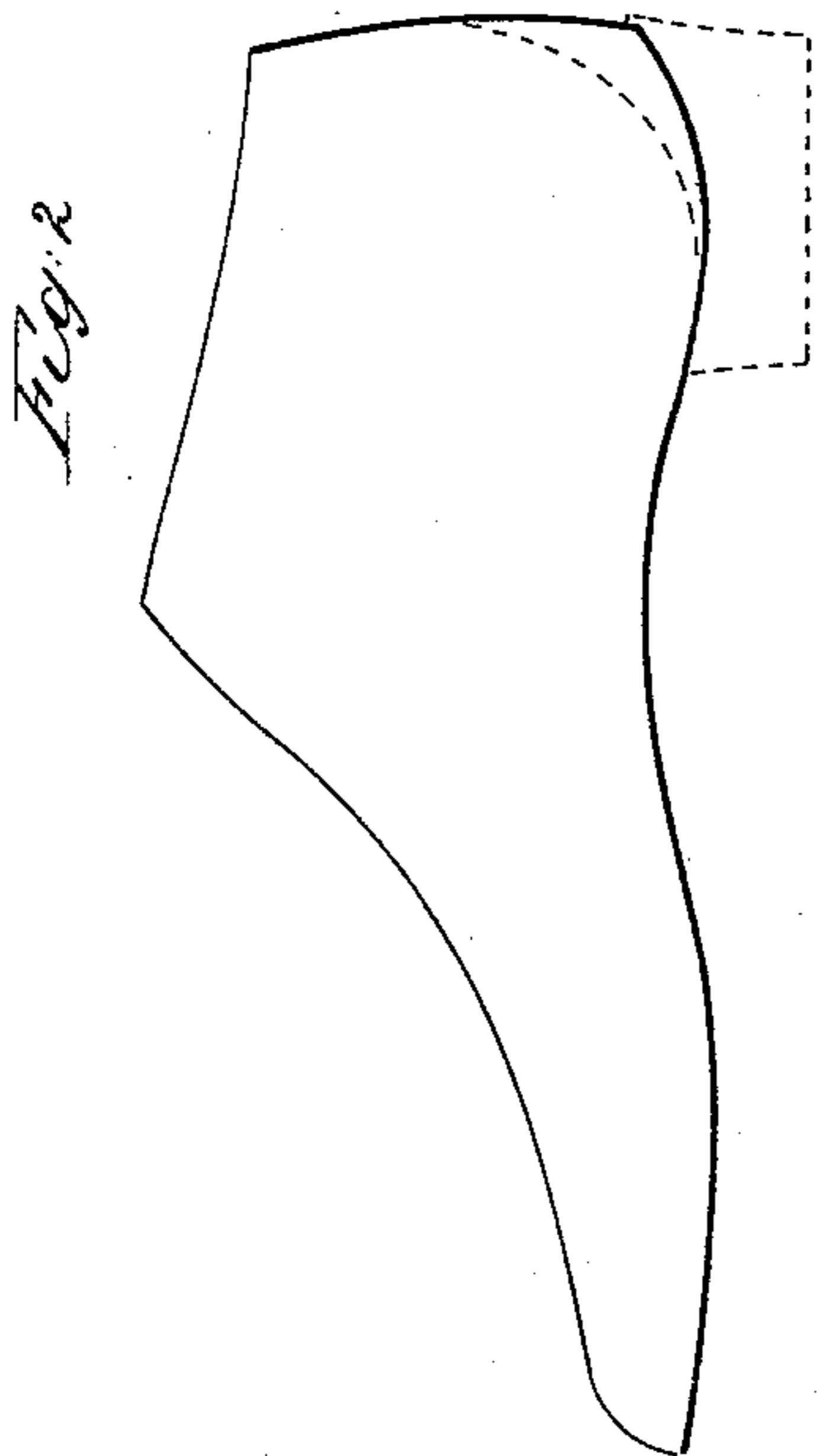


J. C. PLUMER.
LAST FOR BOOTS AND SHOES.

No 29,225.

Patented July 17, 1860.



Witnesses
J. C. Grouse
Wm. Thompson

Inventor
John C. Plumer

UNITED STATES PATENT OFFICE.

JOHN C. PLUMER, OF PORTLAND, MAINE, ASSIGNOR TO HIMSELF AND
DAVID ROBINSON, JR., OF SAME PLACE.

IMPROVED SHOE-MAKER'S LAST.

Specification forming part of Letters Patent No. 29,225, dated July 17, 1860.

To all whom it may concern:

Be it known that I, JOHN C. PLUMER, of Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Lasts for Boots or Shoes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a longitudinal view of my improved last, showing the heel-curvature and the general outline of the last as seen from the outside view. In this figure the heel of the last is shown in its natural elevated state above a plane touching the ball of the last. Fig. 2 shows an outside view of a last of the present construction, the heel of which is elevated, as in Fig. 1, to exhibit the distinction between the old and new lasts. Fig. 3 is a bottom view of the last of Fig. 1. Fig. 4 is a transverse vertical section taken through Figs. 1 and 3, as indicated by the red line xx , marked thereon. Fig. 5 represents a longitudinal vertical section taken through a boot shaped according to the last of Figs. 1, 3, and 4, in which is shown a section of a foot with the bones in their proper position for a well-formed foot with the heel elevated.

Similar letters of reference indicate corresponding parts in Figs. 1, 3, and 4.

This invention has for its object the construction of lasts for boots or shoes in a novel manner and in such a way that the entire bottom of the last will correspond to the bony and ligamentous structure and conformation of the sole, back, and heel of the natural or normal foot, so that a shoe produced by such a last will prevent distortions and deformities of the foot or joints of the foot, calluses upon the toes, and relieve and correct them where they already exist.

The invention provides for pressing the plantar tissues or cushion of the hollow portion or groove in the arch of the foot against the metatarsus, causing a separating or spreading effect laterally upon it, thereby preventing compression of the anterior tarsal, metatarsal, or phalangeal bones. It also provides for affording a constringing support around and longitudinally to the arc and sides of the foot at or under the astragalo and

calcaneo-tarsal articulation. It also provides, by the curved form of the bottom and back part of the heel of the last, for an advanced position of the heel of the last or heel-seat of the last, whereby the position of the boot-heel is advanced nearer to the front part of the foot. The shank of the boot is shortened, and the point of support brought more directly under the line of the tibia or bone of the leg, rendering a stiff uncomfortable shank unnecessary.

The shape of the lasts that are at present made produces in the boots or shoes made on them curves, elevations, and depressions that are contrary or antagonistic to the natural conformation of the bony and ligamentous structure of the sole of the foot, which have a decided tendency to deform the foot, and the results are manifested by the deformities, distortions, calluses, &c., that result from this malformation of the soles of boots or shoes that are at present worn. The surface of the insole is made concave where it should be convex, the heel-seat, if there be any, is thrown back too far from the ball portion of the sole, and consequently the axis of the body is brought nearer to the articulation or joint of the anterior, with posterior portions of the tarsal bones, and the weight of the body over this point dislocates or stretches the bony and ligamentous structure of the arch of the foot, and the chord of the arch is distended and the foot necessarily flattened and its natural shape and functions seriously injured. The lasts, which are casts or fashioned from them of individual feet, are merely fac-similes of such feet, usually deformed, (especially in the transverse or metatarsophalangeal arch or joints thereof,) produce shoes or boots which are only accommodations to distortions already existing, without any tendency to the correction of them. This advantage even is not attained from the casts as usually made with foot flat, since the elevation produced by the boot-heel produces an entire change in the relative position of the solid and fleshy structure of the foot.

My invention is intended to obviate these objections; and it consists, first, in making the under surface or sole of the last laterally concave from the front of the heel to the toe of the last.

It further consists in curving the heel portion of the last in such a manner that a roundness will be formed corresponding to the bottom and posterior extremity of the os calcis or heel-bone with its ligamentous attachments, which will give the heel of the boot or shoe an advanced position, diminish the length of the shank, and bring the point of support nearer to the line with the axis of the tibia and fibula or leg-bones, thus affording ease and giving antero-posterior support to the heel of the foot, and supporting the foot to a great extent at the astragalo and calcaneo tarsal articulation, as will be hereinafter described and represented.

It further consists, in combination with the advanced heel-seat, in constringing laterally that portion of the last in the middle of the arch corresponding to the fleshy portions surrounding the astragalo and calcaneo-tarsal articulation, making it conform and adapting it to this part, so as to give a uniform pressure upward and bilaterally, as will be hereinafter described and represented.

To enable those skilled in the art to fully understand and construct my invention, I will proceed to describe its construction and operation.

The bottom or the sole of the last from the point *c* to *c*, Fig. 3, is concave, and at the point of intersection of the line *c c* with the oblique curved line *a a* the greatest concavity is produced, and at the point *a* nearest the toe extremity of the last the concavity is very slight, or the surface may be plain. The portion *A* is laterally and longitudinally convex and produces a corresponding depression in the insole of the shoe conforming to the first metatarsal joint, or that of the great toe, the same with the opposite portion *B*, which forms a depression in the insole for receiving the last metatarsal bone, or that of the little toe, with its digital extremities. The intermediate joints are then supported uniformly by the convex surface of the insole corresponding to the concavity between these two prominences *A B*. This lateral and longitudinal concavo-convex surface produces corresponding depressed and raised portions on the insole of the boot or shoe that conform to the solid structure of the natural well-formed foot and cause a spreading or separating effect laterally upon the under part of the hollow of the foot, and thus place the plantar tissues or cushion of the hollow portion of the foot uniformly against the under surface of the metatarsus and prevents and corrects deformities and distortions of the joints of the foot. The points from *e* to *e*, Figs. 1 and 3, are very much constricted, and a constringing ef-

fect is produced by this part of the shoe which supports the crown of the arch in a natural state. Now, having obtained this result, it is necessary to sustain the os calcis in its normal position by giving a support to its posterior extremity that will press it forward and upward and keep it in close contact with the os naviculare, cuneiform, and cuboides, and thus prevent a distention of the lower tarsal ligaments. In order to produce this result, the heel of the last should be elevated above the plane of the ball any desirable distance, as represented in the drawings by the relative positions of the two figures 1 and 2. The longitudinal curve of the heel is now produced by describing a curve from the point lettered *d* in Figs. 1 and 5, touching the points *g h i*. The curve from the point *i* is continued forward and forms the arch above described. While the curve above the point *g* is unimportant, it may be gentle or abrupt; but the natural curvature above this point *g* would be much less abrupt in order to have the boot or shoe fit closely to the tendo-achillis than in shoes of the present construction, in consequence of the advanced position of the heel-seat, or, speaking anatomically, in consequence of bringing the posterior extremity of the os calcis more under the astragalus and lower bones of the leg. In short, the last is so constructed that the entire bony and ligamentous structure of the foot will be preserved in its natural well-formed state by the boot or shoe produced thereon, or so that distortions and deformities already existing may be corrected by a perfectly-formed boot or shoe produced on such a last without using metal stiffening-plates, or making any other provision than that obtained from the last itself.

I do not claim the elevated and rounded heel-seat as such; nor do I claim the so-called "spring" of the front part of the last as such; nor do I claim a cast of any material, or a last fashioned from such a cast for individual feet entire, fleshy form and all; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The longitudinal hollow or depression on the bottom of the last.
2. The combination of the longitudinal hollow with the advanced position of the heel-seat.
3. The constricted portion of the last *c c* in combination with the longitudinal hollow.

JOHN C. PLUMER.

Witnesses:

J. W. COOMBS,
R. T. CAMPBELL.