

JOHN M. HUNTER.
Boots and Shoes.

No. 122,948.

Fig. 1,

Patented Jan. 23, 1872.

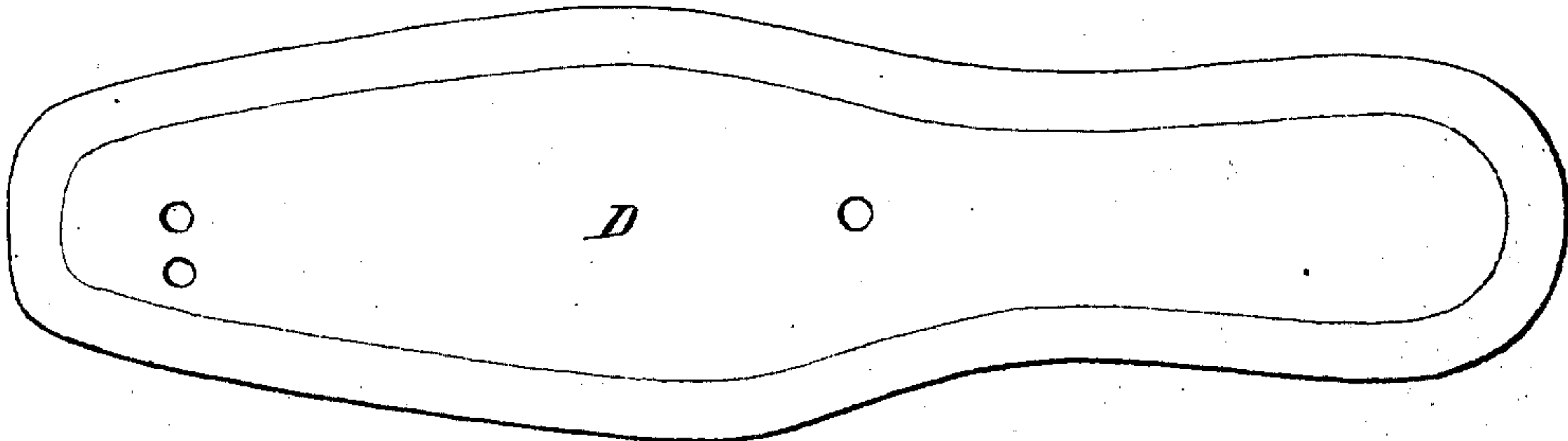


Fig. 2,



Fig. 3,

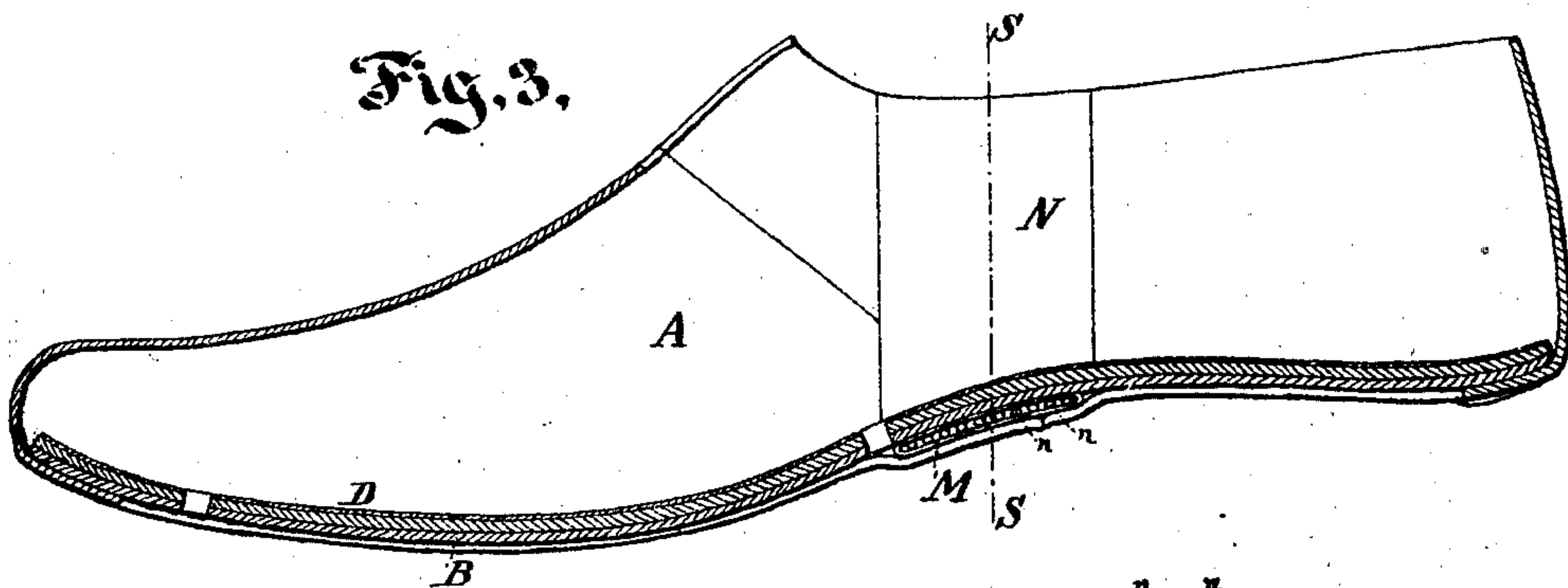


Fig. 4,

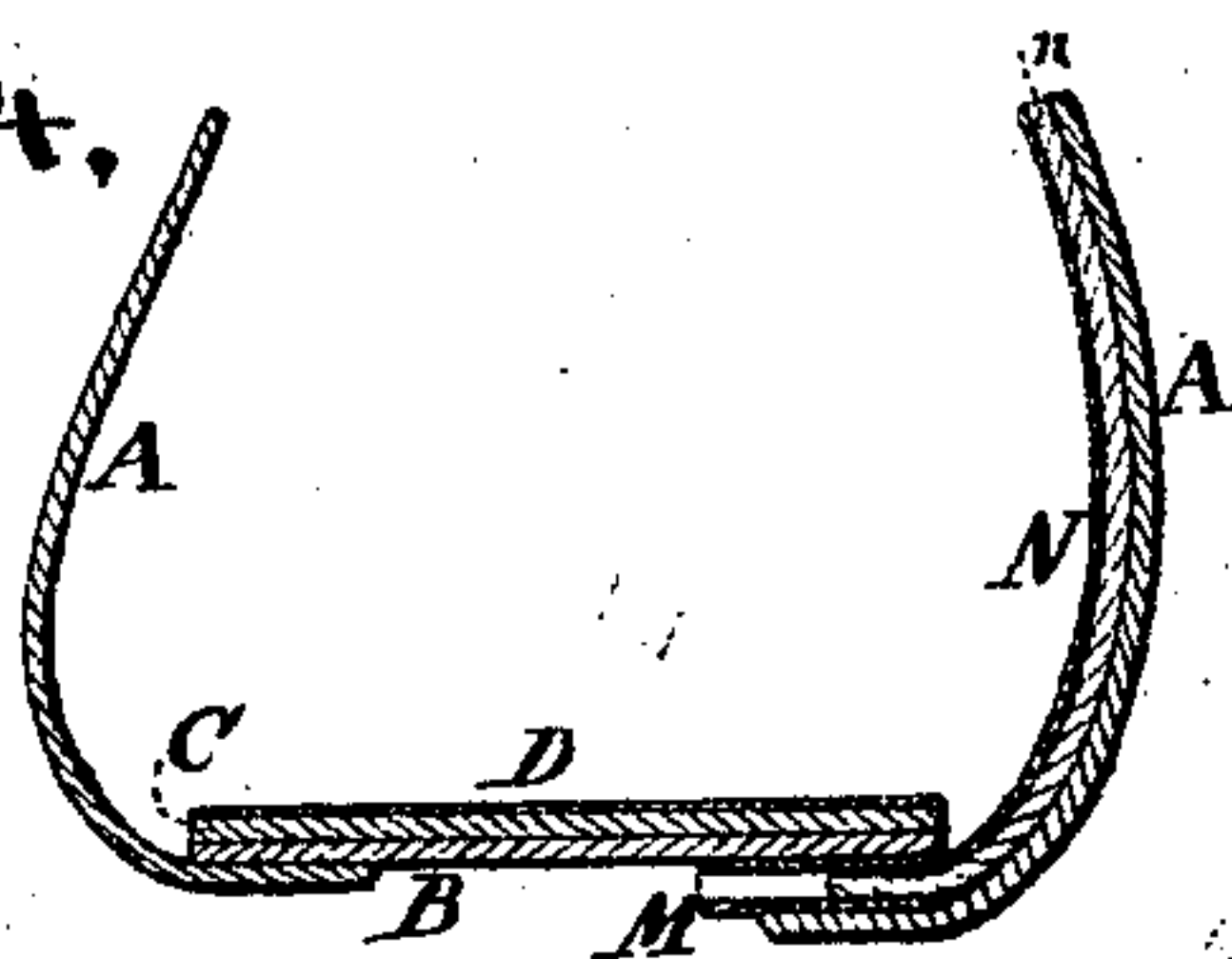


Fig. 5,

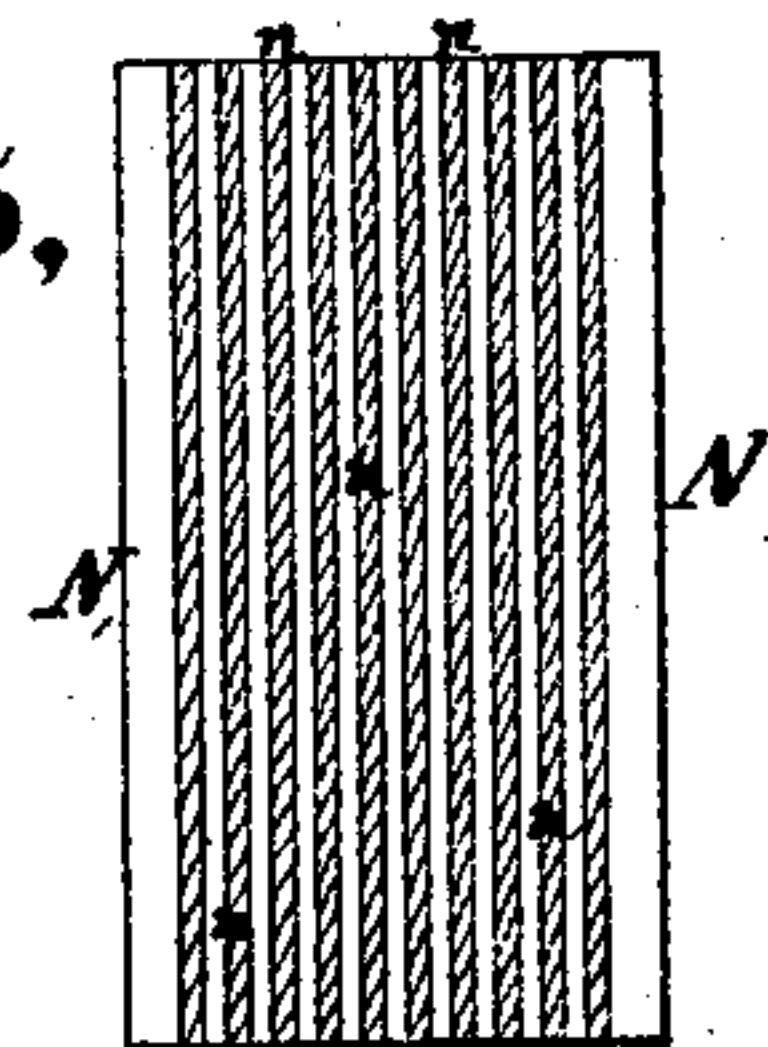


Fig. 6,

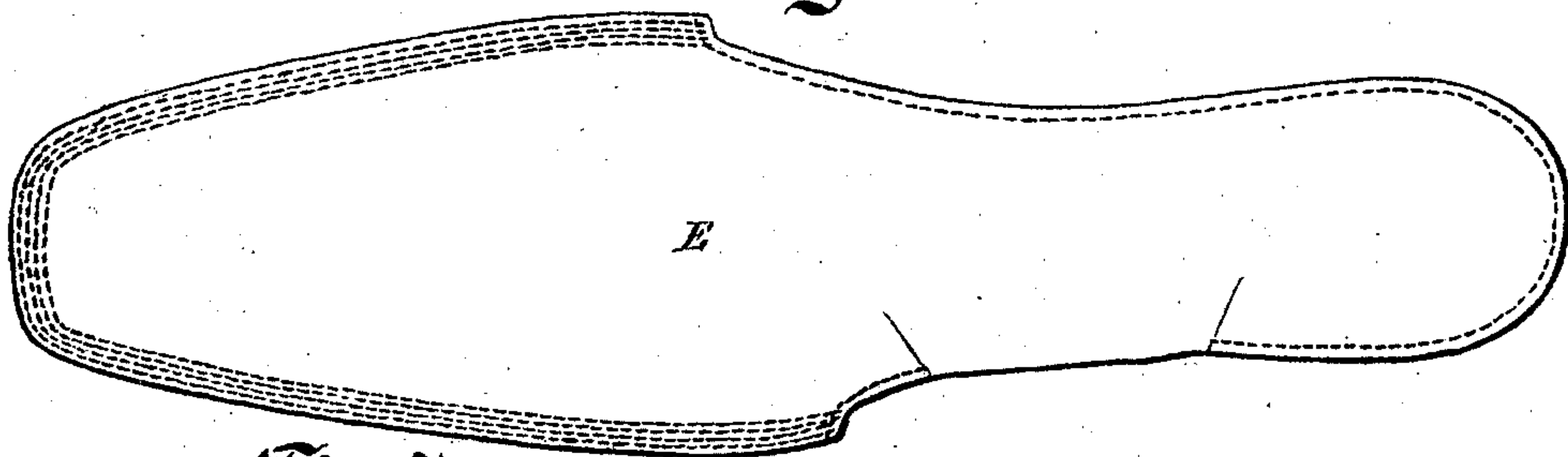
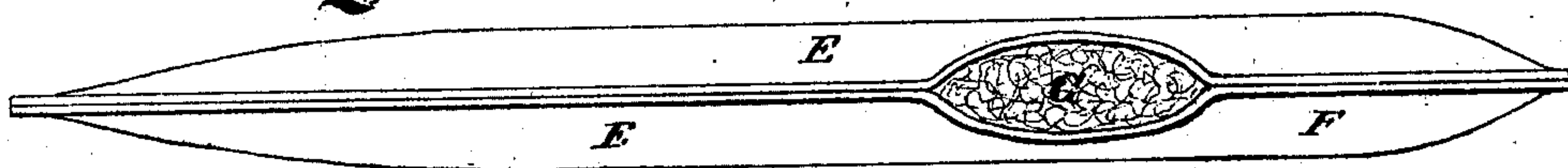


Fig. 7,



Witnesses,

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JOHN M. HUNTER.
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2 Sheets--Sheet 2.

No. 122,948.

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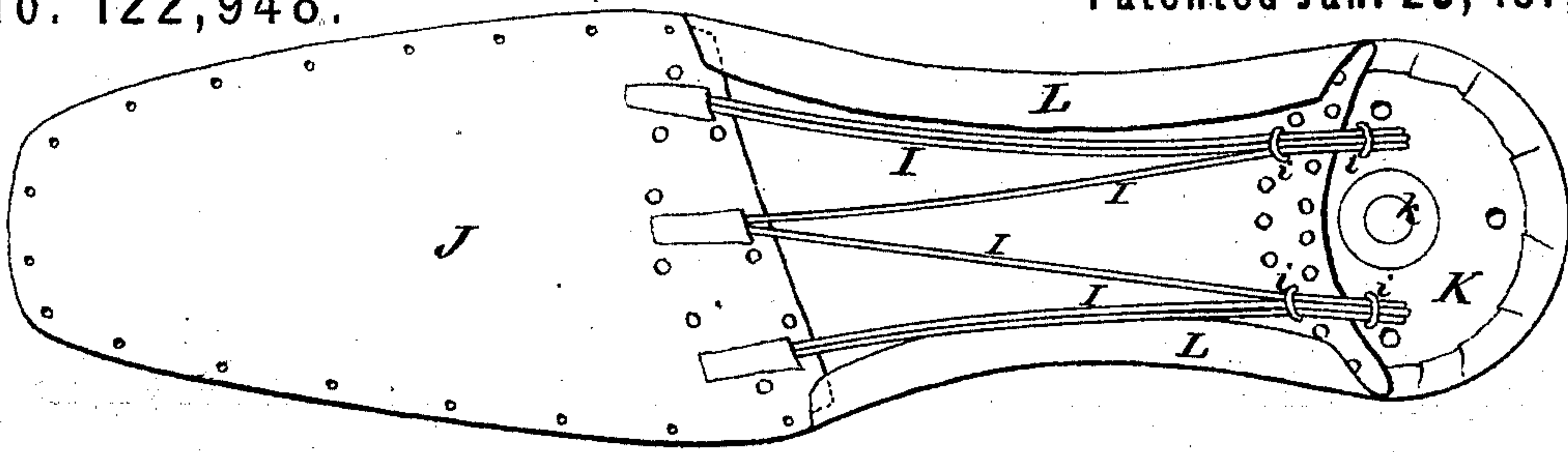


Fig. 9,

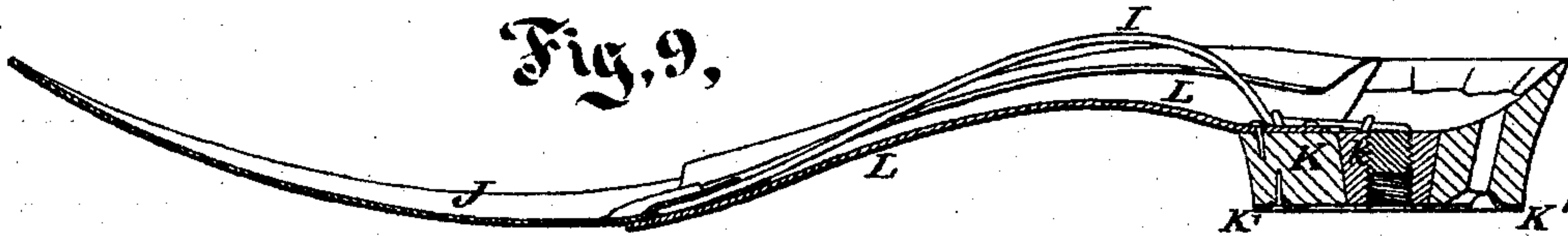


Fig. 10,

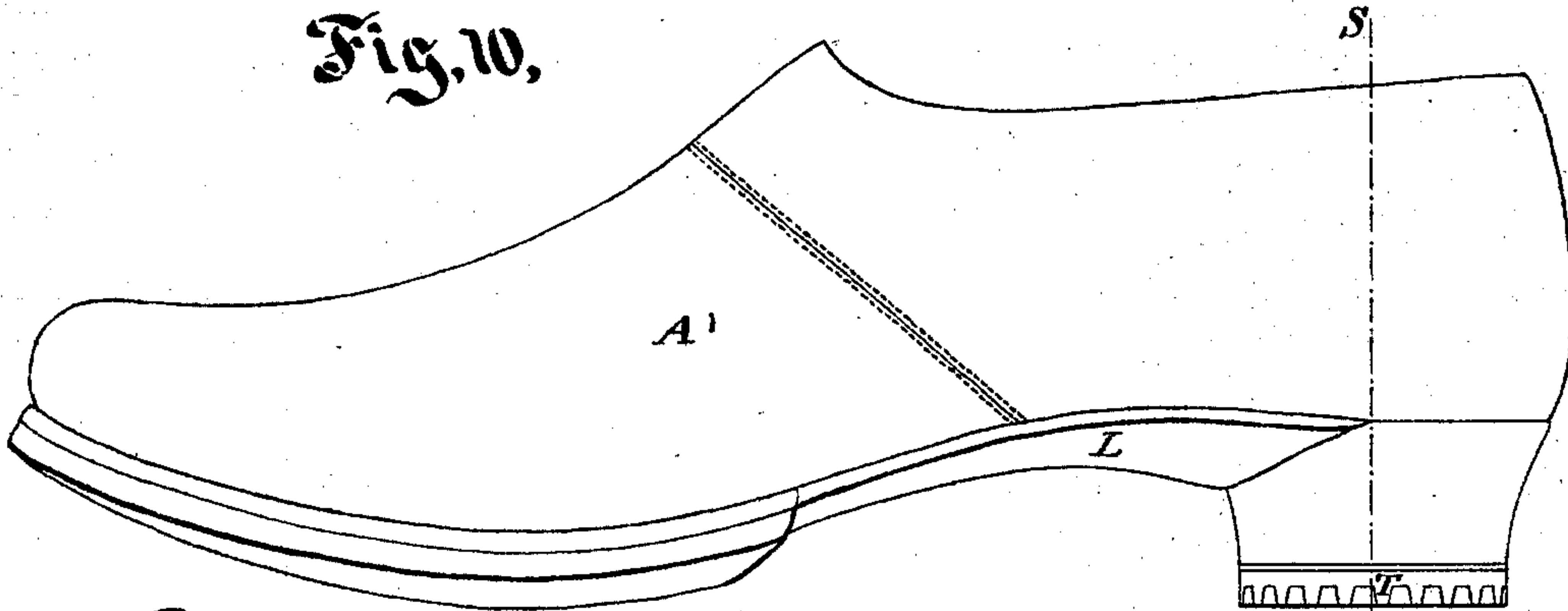


Fig. 11,

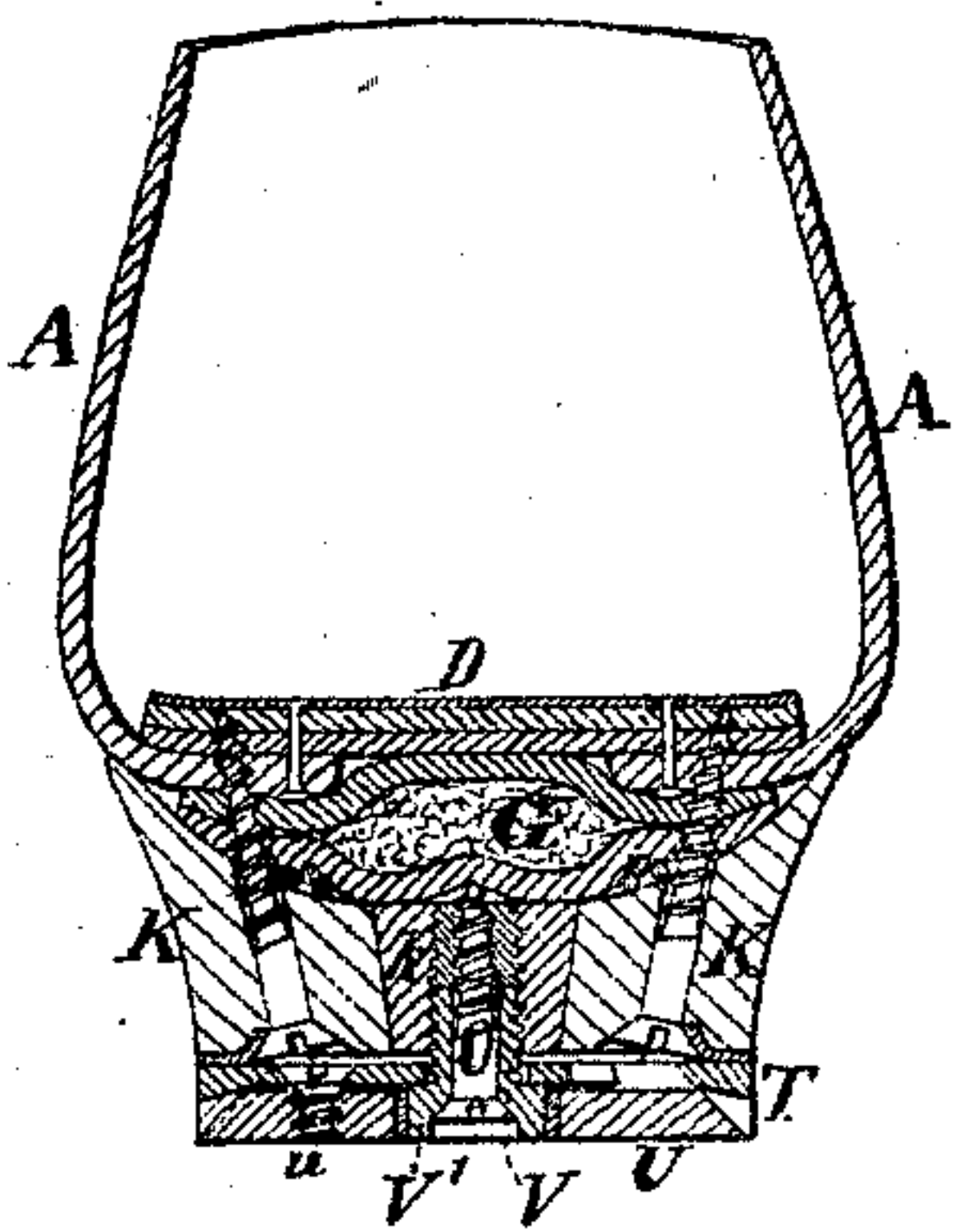


Fig. 12,

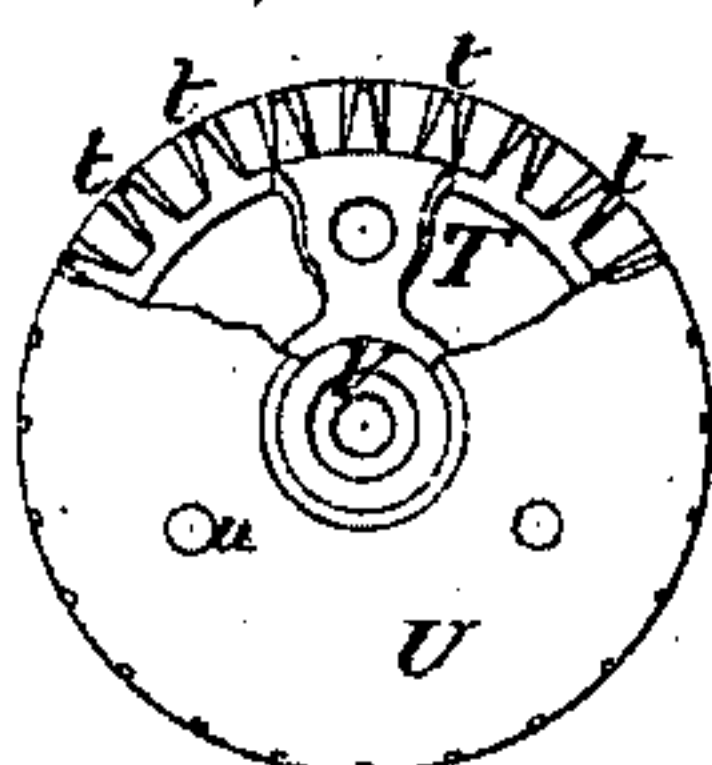


Fig. 13,

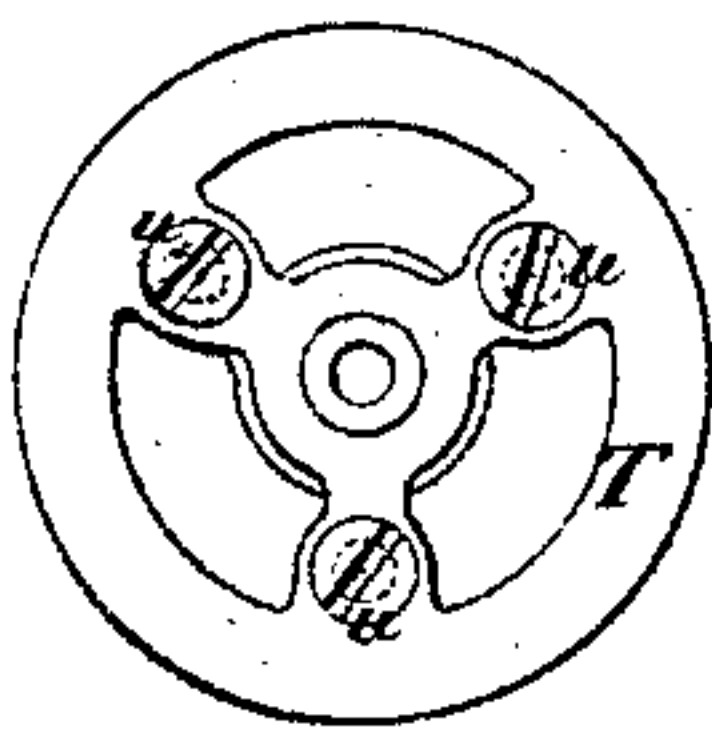


Fig. 14,

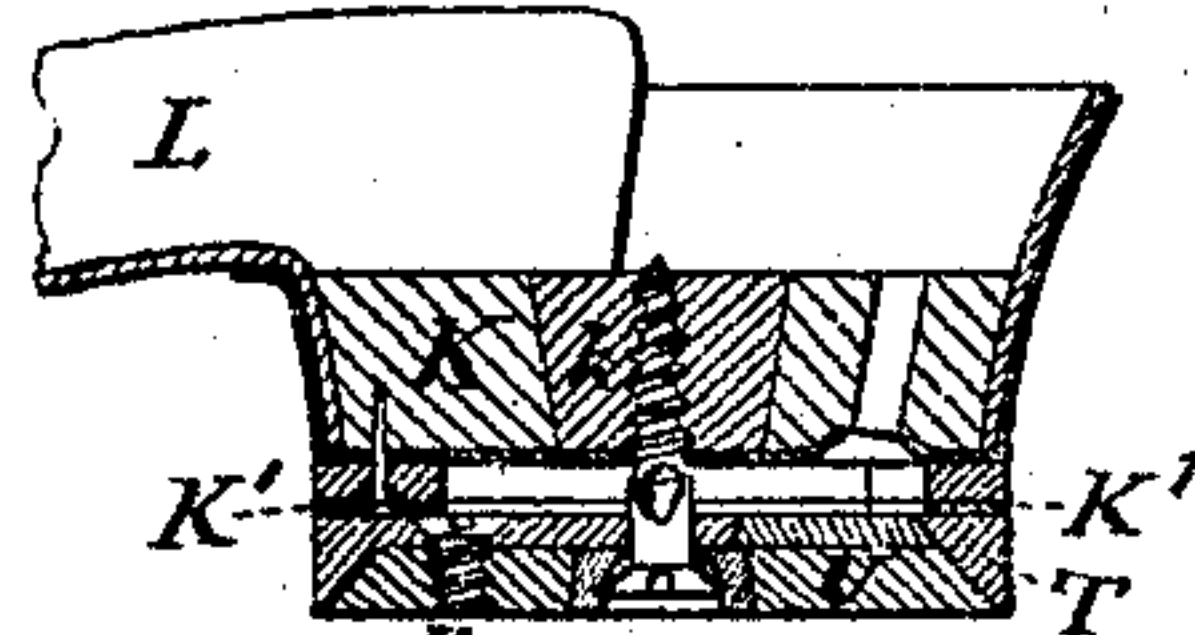
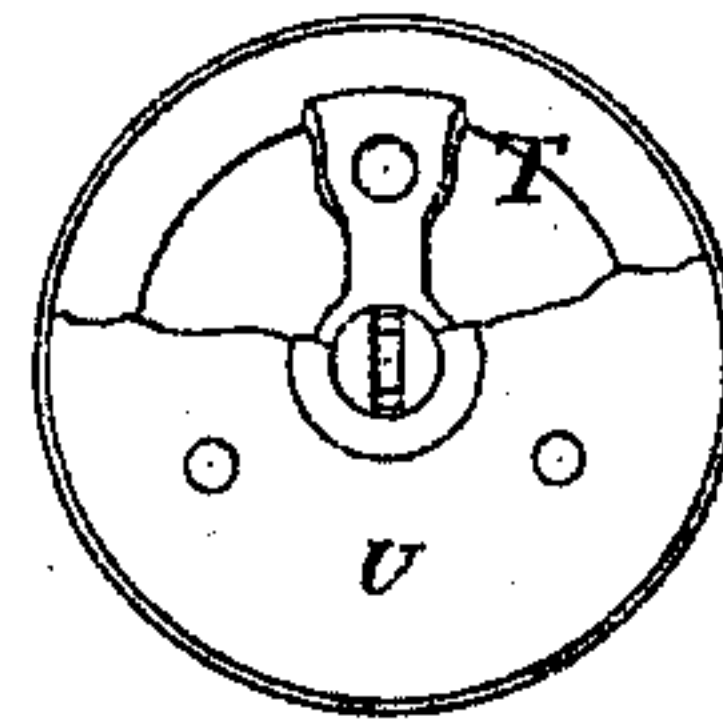


Fig. 15,



Witnesses,

A. Hoermann.
C. C. Livingston

Inventor,

John M. Hunter
By his attorney J. L. Linton

UNITED STATES PATENT OFFICE.

J. MORRISON HUNTER, OF NEW YORK, N. Y.

IMPROVEMENT IN BOOTS AND SHOES.

Specification forming part of Letters Patent No. 122,948, dated January 23, 1872; antedated January 13, 1872.

To all whom it may concern:

Be it known that I, JOHN M. HUNTER, of New York city, in the State of New York, have invented certain new and useful Improvements in the Construction of Boots and Shoes, of which the following is a specification:

The improvement relates to the bottom or sole. The sole is formed of several thicknesses of material with a view to warmth and elasticity without preventing the escape of perspiration. One important point attained is an unusually efficient ventilation of the space below the foot.

The following is a description of what I consider the best means of carrying out my invention. The accompanying drawing forms a part of this specification.

Figure 1 is a top view of the inner sole. Fig. 2 is an edge view of the same. Fig. 3 is a longitudinal section through the inner sole and upper. Fig. 4 is a cross-section of the same. Both Figs. 3 and 4 show my peculiar provisions for ventilating by means of a piece inserted in the upper and a flat tube in the sole. Fig. 5 is a face view of my piece inserted for ventilation in the upper or vamp. Fig. 6 is a top view of my middle sole. Fig. 7 is an edge view of the same. Fig. 8 is a top view of the shell which fits under the middle sole. Fig. 9 is a longitudinal section of the same. Fig. 10 is an elevation of a shoe complete. Fig. 11 is a cross-section on S S in Fig. 10. Fig. 12 is a bottom view of a revolving part which fits on the heel. Fig. 13 is a top view of the same part. Fig. 14 represents a modification; it is in longitudinal section. Fig. 15 is a bottom view of the revolving bearing piece of this modified construction. In both Figs. 12 and 15 a portion of the outer soft material is broken away to show the harder metallic frame.

Similar letters of reference indicate corresponding parts in all the figures.

The upper or vamp A may be of leather or any ordinary or suitable material. I will describe it as of leather. Some room for choice in the selection of materials may be assumed in regard to the several parts of the sole. I will describe only what I consider the best. The insole is strong, but permeable. Its lower surface is pasteboard, B; the next is drugget, C, and above is muslin, D. These are made up in sheets with rye-paste, and pressed or rolled

and then dried. The soles are to be cut out of it by stamp-cutters in the same manner as in cutting soles of leather. Then a considerable number of these soles are made up in a pile and pressed together, and the edge-surface of the whole mass saturated with varnish of shellac and alcohol. After allowing them to remain a brief period in this condition the pressure is relaxed, the press opened, and the several insoles are taken out of the pile and allowed to harden separately. This gives each sole a character permeable in the middle and water-proof at the edge, with a very desirable state of rigidity, elasticity, and non-conductivity of heat.

I form a peculiar middle sole of two thicknesses of drugget, E F, sewed together around a portion of its periphery, and afterward cemented with a solution of shellac containing lamp-black. A space at one side of the shank is left open or unsewn to allow access to the interior space G for the addition or removal of material. The whole interior space is occupied by a thick layer of coarse hair; as good a quality of such hair as is employed in stuffing mattresses will suffice. I prefer that it should be in a very curly condition, so as to give the highest elasticity possible. South African or other coarse wool may serve.

In applying the parts together I introduce a flattened tube of tinned iron or other rigid material in the position represented by M. This tube is open at both ends, and maintains an open communication under all conditions between the space above the middle sole and a considerable space along the interior of the upper. This flattened tube M and its connections are fixed in the inner edge of the shank of the boot or shoe, where its presence induces no inconvenience to the wearer. The portion of the upper or vamp immediately adjacent is lined with a piece of ribbed woven stuff, preferably woolen, N, with cords of hard twisted cotton, marked n, cemented therein in parallel positions with a rubber cement. The ventilating piece N n stands between the vamp and its lining, with the cords presented toward the leather, and the edges of the piece are cemented to the leather, so that the spaces between the cords n and between the body of the material N and the vamp form a series of tubes or channels always open at each end, through which

the air may pass up and down freely in the use of the boot or shoe.

It will be observed that the piece of ribbed stuff *N n* is of a width a little less than the width of the interior of the metallic tube *M*, and that it extends into said tube. The communication formed by the spaces between the cords *n* and the flattened tube *M* extends from the open air above into the space above the middle sole.

The body of the heel is of bass-wood, in the form represented. It is light and unchangeable, and is very tough to resist splitting, but is not sufficiently dense to afford a good hold for screw-threads; I therefore make a conical hole in its interior, and introduce therein a corresponding conical plug of lignum vitæ or other strong hard wood, with a hole through the latter, which is tapped at its lower end to receive a large screw and at the upper end to receive a smaller one. The light-wood body is marked *K* and the plug of hard wood is marked *k*.

I employ a shank of oiled and blackened canvas, *L*, with longitudinal and oblique springs of metal, *I*, and an outsole at the front or ball of metal, *J*. The part *L* is formed of cotton trunk-canvas saturated with oxidized linseed-oil, making a very tough and impermeable material, and is secured to the upper side of the heel-wood *K* by shellac varnish and by nailing.

The springs *I* may be of round piano-wire, preferably varnished to aid in withstanding oxidizing influences. These springs are secured to the heel-wood *K* by staples *i* and to the metallic sole *J* by soldering. It is important in joining the springs to the sole that the work be properly conducted to afford an even surface on the outer face. To effect this I introduce the springs through holes a little ways forward of the rear edge of the metal *J*, and thence extend them forward in grooves sunk by depressing upward the metal in a line extending forward from each hole. The channels thus made may be three-fourths of an inch in length, and it will be understood are in short corrugations, being ridges on the upper side and grooves on the lower side of the metallic sole. The springs being soldered in these grooves produce a nearly uniform surface on the lower side of the sole, and when the saturated-canvas shank *L* is applied it makes a completely smooth surface. The canvass is cemented to the metal by a solution of shellac or other suitable cement, and also attached to it by rivets. The edge of the metal sole *J* may be punctured to allow its being secured to the parts above by rivets or screws. The saturated-canvas shank should be made something wider than it is intended to be used, and the edge should be folded upward and over. The double edge thus formed may then be secured to the work above by screws or nails. The form and arrangement of the springs *I* should be particularly noted; secured, as they are, firmly to the heel, and bent at a sharp angle upward, they always hold the shank perfectly to the hollow of the foot, an object which has always been aimed at by man-

ufacturers of shoes, but not heretofore satisfactorily attained. If, however, the sharp angle upward be avoided, then a flattened shank is produced, more suited to the form of the feet of some persons.

The light-wood heel, being properly shaped on its edge and covered by cementing thereon thin muslin to be afterward properly blackened, may be secured to the work above by strong screws or nails and cement. Below this heel is first a friction-plate, *K'*, and then a revolving metallic frame, *T*, which contains the leather to form the wearing-surface. The leather, being first thoroughly soaked, is compressed upon the under surface of the metallic frame *T* so as to greatly compact its periphery in forcing it between the spurs or points which are arranged around the periphery of the frame. The spurs being made of a pointed form, as indicated by *t*, they puncture the leather with tolerable facility and wedge the particles of the leather together very densely.

In the subsequent use of the heel the hard leather and the metal divide the wear between them. A cement may be employed or not in joining the metal and the leather. The friction-plate *K'* may be secured immovably by screws, as shown. The frame *T t* and its attached leather should be free to revolve with slight resistance. I provide for this by securing it at the center. *V* is a large screw having a cylindrical head, *V'*, fitting in a corresponding hole in the leather *U* and bearing directly on the metallic frame *T*. The leather *U* is secured to the frame *T* by screws *u*. These serve to hold the leather with great force, and the leather *U* and the toothed frame *T t*, upon which it is compressed, serve together as a unit, whether they are cemented together or not. The large screw *V* is tapped strongly into the hard-wood plug *K*, as before remarked. It is hollow and receives an interior screw, *O*. This is longer than the screw *V* and takes in the smaller part of the hole in the hard-wood plug, as represented. The two screws, arranged as represented, secure the revolving part *T U* very efficiently. The part *T U* is adapted to endure severe usage. As the lower surface wears off the spurs *t* take more and more of the bearing. The frame *T t* is best made of malleable cast-iron, with the teeth *t*—and, if preferred, the entire lower face—case-hardened. The interior screw *O* acts as a set-screw to prevent the main screw *V* from revolving with the heel-disk or part *T U*, and so working loose.

Some of the advantages of some portions of the invention may be made available without the whole; but I prefer the whole in combination, as above represented. Among the various modifications of which certain portions are susceptible may be mentioned the casing of the outer surface of the heel *K* in sheet metal, as copper or brass, struck up into the proper form; the employment of India rubber, preferably vulcanized, between the friction-plate *K'* and the main wood heel *K*; or,

again, the employment of a false friction-plate a little below the main one, with rubber between the main and the false friction-plate. Rubber or other springs in either of these positions tend to reduce the concussion in walking, and especially to diminish wear of heel-disk by removing the rigidity of the metallic part acting upon its filling. Another modification is the turning the insole, formed as represented, in reverse position to that shown; in other words, to have the pasteboard at the top and the muslin at the bottom; or, again, there may be muslin and also drugget or other felt on both the upper and lower faces of the pasteboard. Instead of shellac any water-proof varnish or oxidized oil or a solution of India rubber may be applied to the edges of the insole and middle sole. Felt may be used instead of drugget. Either may be stiffened by a thin solution of plaster of Paris or other suitable material. Enameled cloth may be used in some cases. The edges of the insole may be sewed, in addition to the saturation with water-proof cement.

I esteem it important to observe, with regard to my provisions for ventilation, that, where a shoe is provided with an elastic gore, the ribbed strip *N n*, which forms the tubes for the ventilation, should be kept in position by inclosing it between two pieces of elastic; that is to say, there should be shirred rubber cloth both outside and inside of the ribbed piece. The inside may, if preferred, however, be strips of elastic band; that is to say, if it extends up the whole height of the elastic; but this is not a necessity. It may find its exit externally at the lower edge of the elastic; or it may rise inside the elastic gore to a point just below the projecting bone, known as the tuberosity of the lower end of the tibia, and be held in that position between the gore and an elastic band, the air finding its way by reason of the space formed in consequence of the projection of that bone. With either construction it will be warmed by the heat of the foot prior to its entrance into the elastic cavity of the middle sole.

I prefer to punch a few small holes in the body of the insole to insure a high degree of permeability and to serve to ventilate the shoe above the inner sole. The pasteboard may, for some kinds of shoes, be perforated over its entire surface with numerous small apertures. This may be considered almost absolutely essential. It tends to promote what I am aiming at, and which has received, heretofore, too little attention—the production of a protection for the foot which, while thick and non-conducting of heat, is light, permeable, elastic, and in the highest degree conducive to health. It is proof against external moisture and, at the same time, highly efficient to convey away the moisture of the feet in the form of vapor mingled with the air which escapes through the ventilating-channels, as explained.

The middle sole may be first applied to the upper and to the inner sole, in which case its solidified edge acts as a continuous welt about the shoe to afford additional attachment for the other parts of the sole.

Certain of the novel parts may be used without the rest to replace parts of ordinary shoes, as, for example, my peculiar compound inner sole, or my combined heel and heel-disk.

Some of the materials may admit of much variation, as, for example, the softer or yielding portion compressed upward into my revolving heel-frame *T t* may, instead of leather, be India rubber or any other suitable material or composition.

The saturated canvas of the shank may be secured by sewing or by water-proof cement, or by both of them, instead of the screws or nails named, or in addition thereto. In securing the outer sole, when rivets are employed, the rivets may make their own holes. If the sole is to be sewed to the upper, then the metal sole should be made a little narrower than the middle sole, thus leaving an edge overlapping the metal, through which edge of middle sole the stitches may be passed; but if the sole is to be riveted to the upper, then the metal and middle sole should be nearly of equal width. In the shank, instead of wire, a sheet-metal spring may be employed, or a shank of India rubber, leather, or other suitable material may be used. In part *L*, instead of oxidized oil, varnish or a solution of India rubber may be employed.

The same variety of saturating materials may be used for the edges of my insole and middle sole. In the latter situation, being water-proof, indurated, and elastic, it is also a durable attachment between the sole and upper.

The hard cords *n* may be cemented with any suitable cement in place of rubber cement, as, for example, suitable glue, shellac, varnish, or the like.

It will be understood that a wearing-sole, or half sole below the whole front portion, will usually or always be employed. It may be of leather or of any ordinary or suitable material.

I claim as my invention—

1. The within-described permeable insole, composed of pasteboard *B*, with open or unsaturated woolen and muslin on one or both sides thereof, the parts being compressed together and joined by a water-proof cement at the edges, as specified.

2. In combination with the ribbed piece *N n*, or its equivalent, the tube *M*, open at both ends and adapted to maintain communication under all circumstances across the seam at the edge of the sole, as specified.

3. The elastic middle sole *E F G*, having hair *G* inclosed between two woolen fabrics securely joined at the edges ready for application to a boot or shoe, with means for ventilating the space above, substantially as represented.

4. The double screw or two screws, O V, standing one within the other, to form a strong swiveling-center for the heel, as specified.

5. The arrangement of the bent wire springs I, having a fixed attachment to the heel, and also to the metallic sole, bending upward, as shown, whereby the shank is retained to the cavity of the foot, substantially as herein specified.

In testimony whereof I have hereunto set my name in the presence of two subscribing witnesses.

J. MORRISON HUNTER.

Witnesses:

THOMAS D. STETSON,

C. C. LIVINGS.