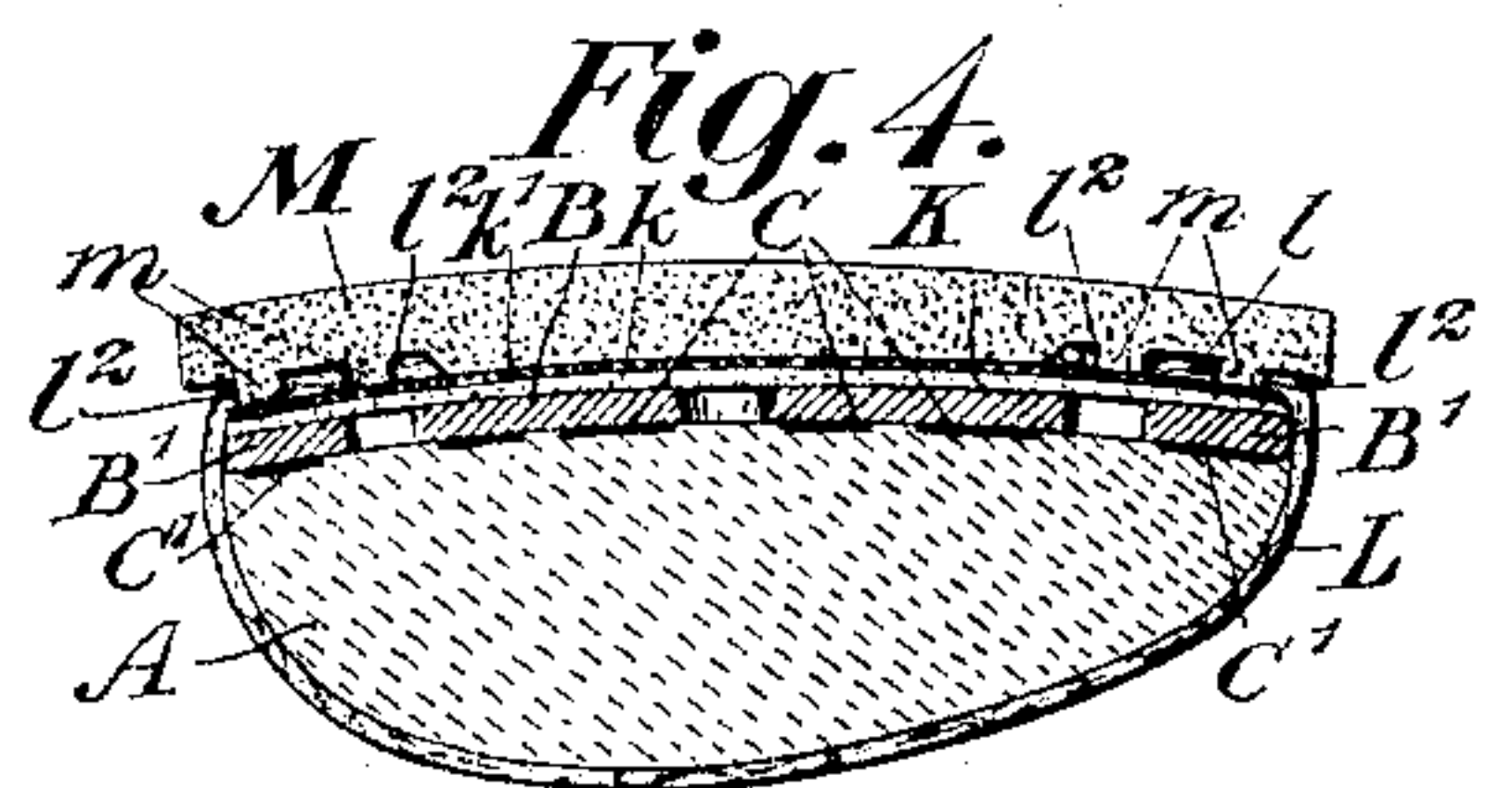
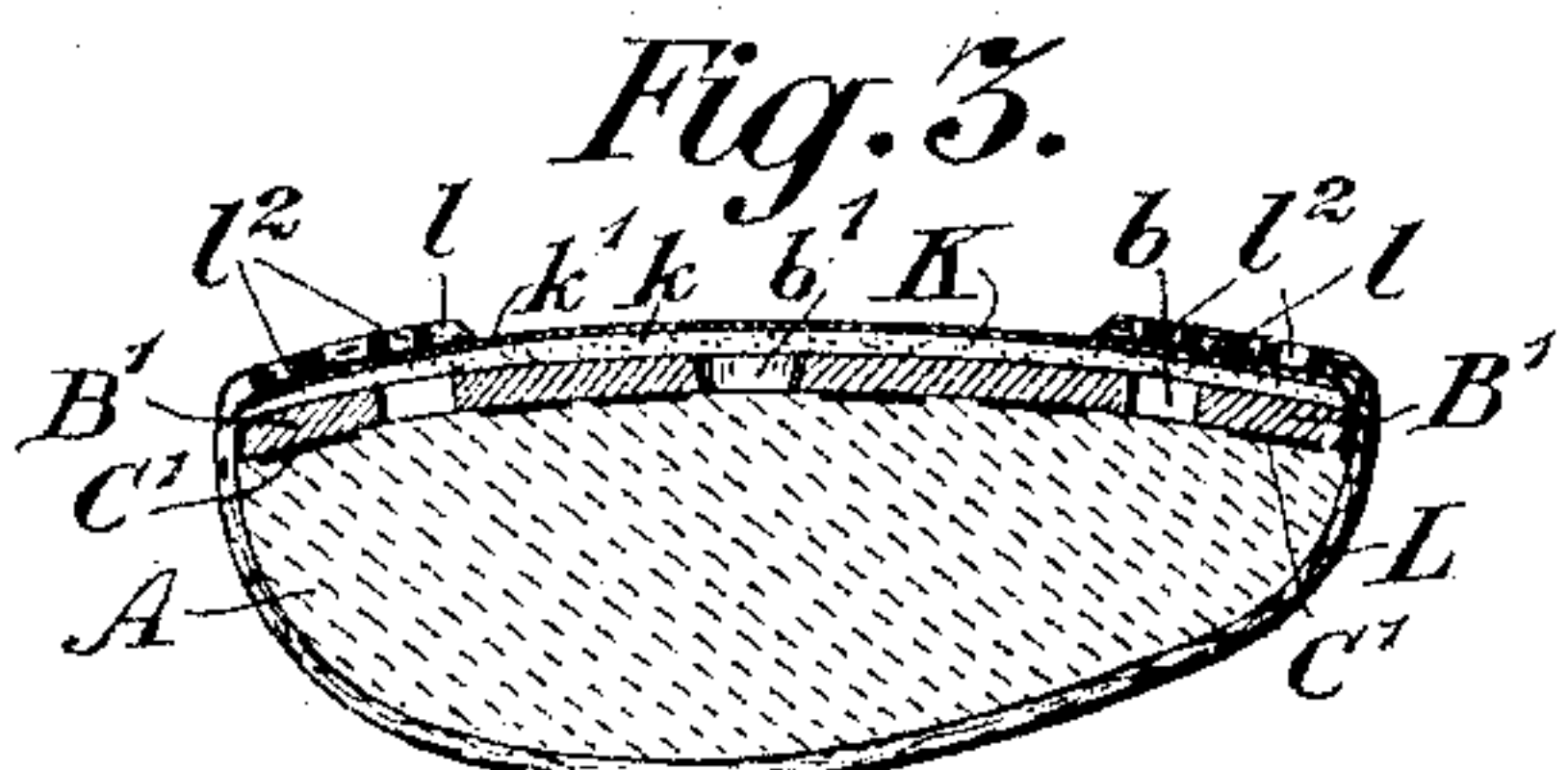
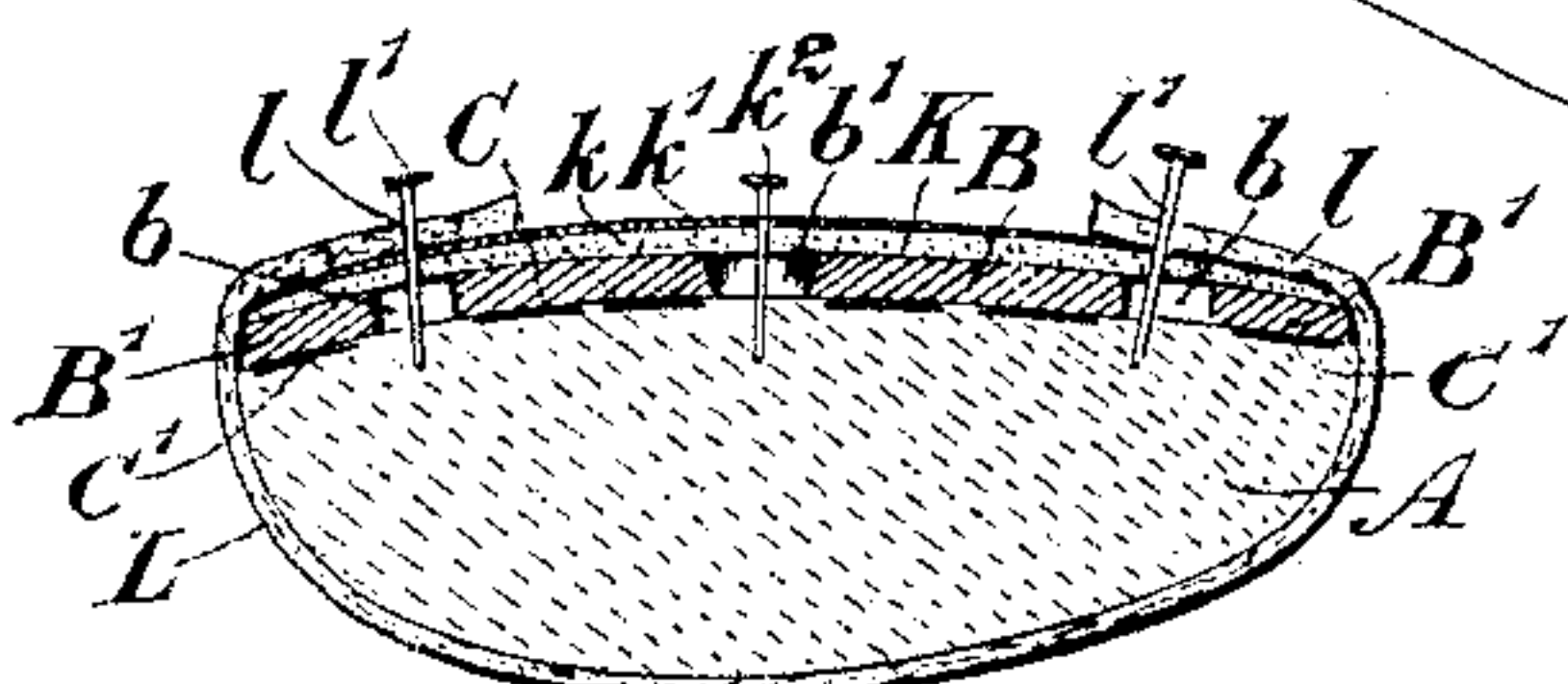
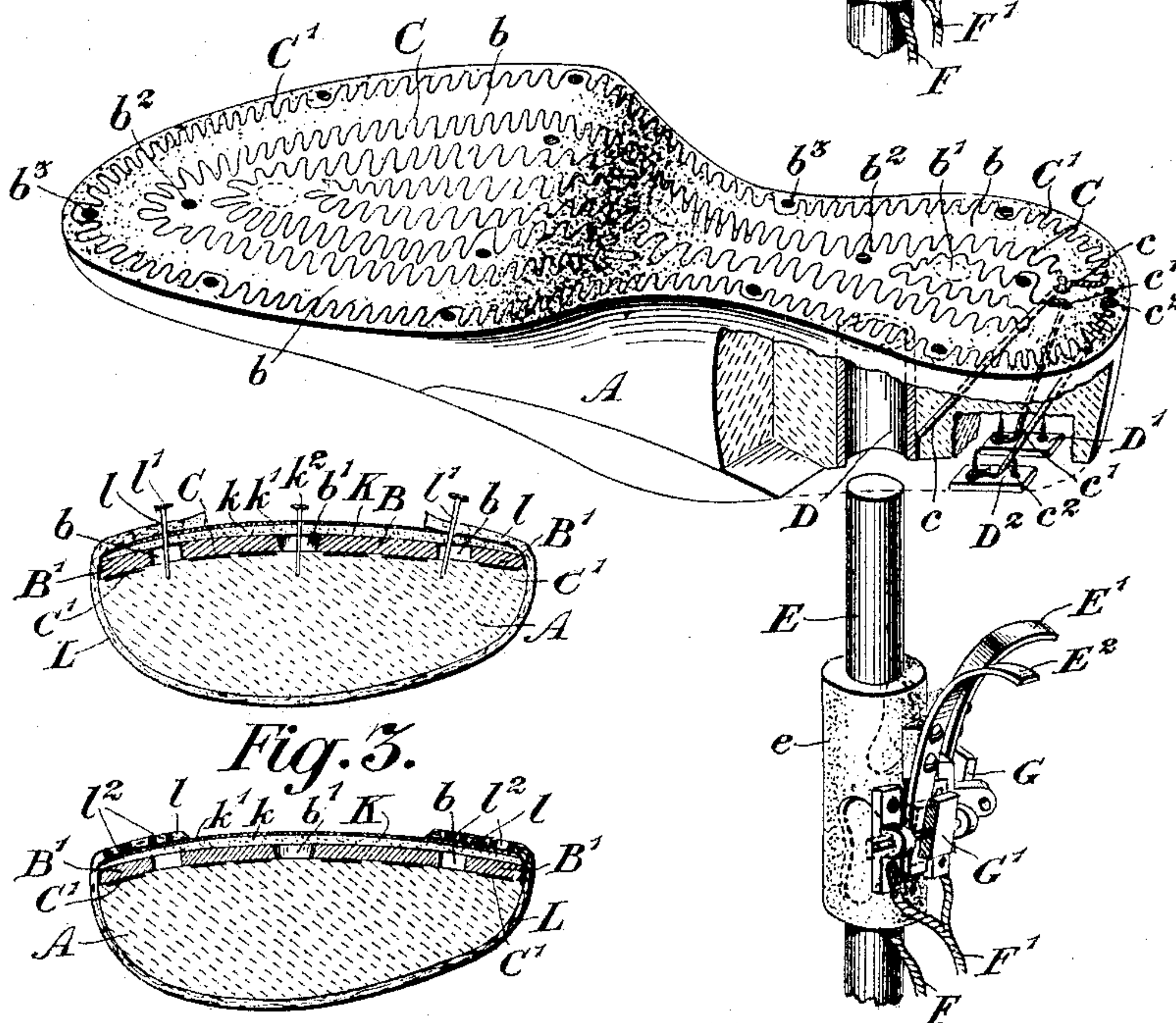
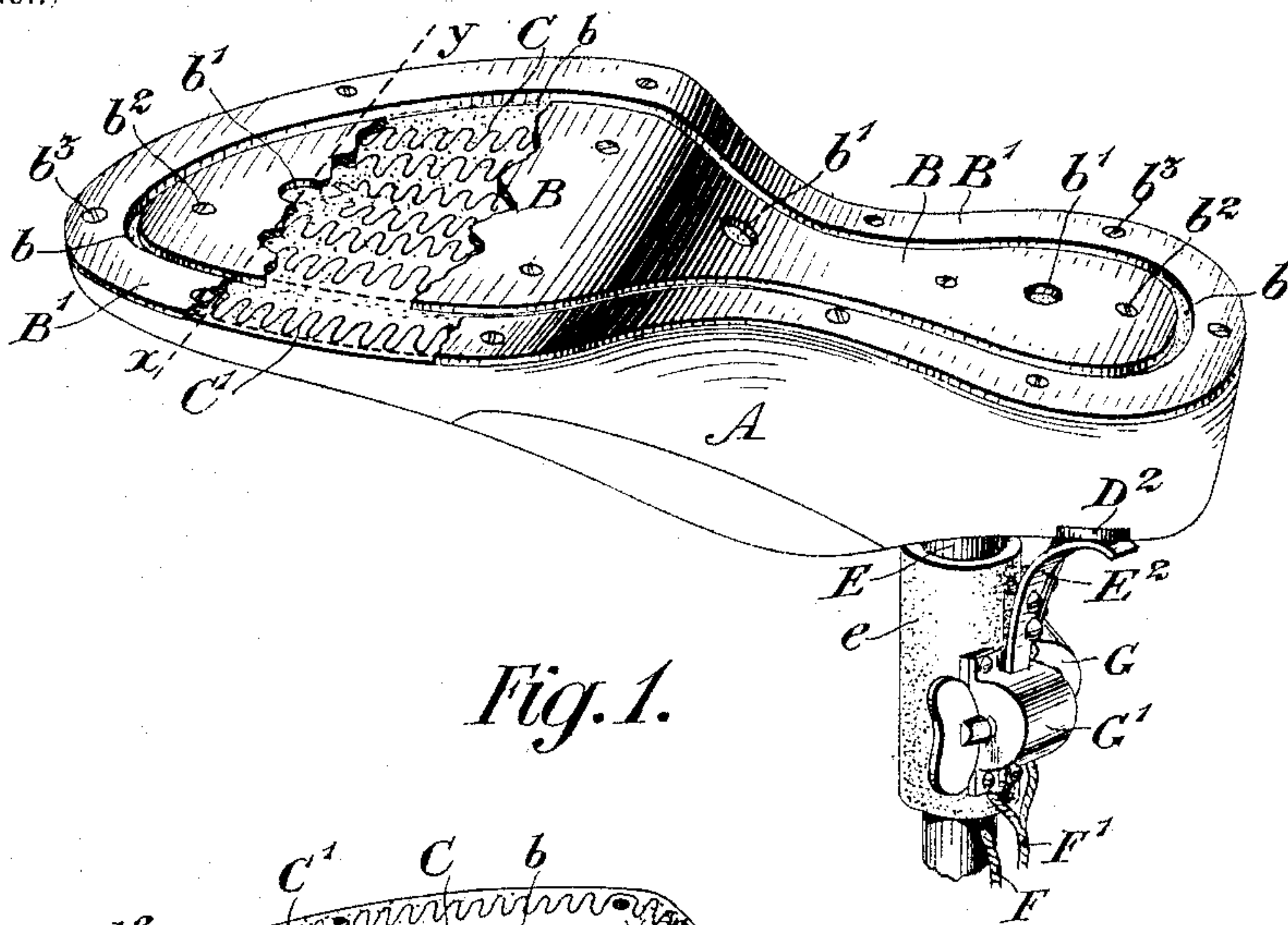


J. E. KENNEDY.

LASTING APPARATUS FOR RUBBER FOOTWEAR.

(Application filed May 10, 1897.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN ERNEST KENNEDY, OF MONTREAL, CANADA.

LASTING APPARATUS FOR RUBBER FOOTWEAR.

SPECIFICATION forming part of Letters Patent No. 616,113, dated December 20, 1898.

Application filed May 10, 1897. Serial No. 635,920. (No model.)

To all whom it may concern:

Be it known that I, JOHN ERNEST KENNEDY, of the city of Montreal, in the county of Hochelaga, in the Province of Quebec, Canada, have invented certain new and useful Improvements in Lasting Apparatus for Rubber Footwear, of which the following is a specification.

My invention relates to an improved last for vulcanizing rubber-soled footwear; and the object of the invention is to devise a last whereby the central part of the sole of the shoe when applied to the last may be given a maximum amount of heat sufficient to vulcanize the outer sole of rubber to the insole and the outer edge of the sole, where the leather of the upper comes between the insole and outer sole, may be given a minimum amount of heat sufficient to vulcanize it and yet not damage the leather or other upper material; and it consists, essentially, in providing upon the sole of the last inner and outer contact-surfaces, the outer contact-surface being designed to extend beneath the turned-in edge of the upper of the shoe placed upon the last and the inner contact-surface being designed to extend underneath the central portion of the sole, the said surfaces being preferably metallic and separated from each other and supplied with heat through a suitable source, preferably electrical, whereby a greater heat may be given to the inner contact-surface than that given to the outer contact-surface, as hereinafter more particularly explained.

Figure 1 is a perspective view of a last made in accordance with this invention. Fig. 2 is a perspective view of same last with the sole-plates removed to show arrangement of electrical heating-wires, the lower heel portion of the last being broken away to show connections between such wires and contact-plates and the conducting-post removed from its socket. Figs. 3, 4, and 5 show the manner of using the last in the successive operations of securing the rubber sole to the upper.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is the body of the last, which may be made of wood or other suitable material adapted to remain unheated while the sole thereof is heated, as hereinafter described, and to

have a non-heating effect upon the upper, which surrounds the same.

B is a central sole-plate, and B' is an outer sole-plate, both being preferably made of iron or other good heat-conducting material. Between these plates is left a narrow channel *b*, where the nails used in temporarily holding the upper over the insole may be driven into the last, and holes *b'* are left in the inner plate B for the nails temporarily holding the insole in place on the last. Beneath the plate B is placed the convoluted electric heating-wire C, which is so arranged as not to come within the channel *b* or the holes *b'* and also to avoid the screws *b*², by which the plate B is screwed to the last. The ends of the wire C are joined by the wires *c* and *c'* to the contact-plates D and D'. Beneath the plate B' is placed the convoluted electric heating-wire C', which is so arranged as not to come within the channel *b* or in contact with the screws *b*³, by which the plate B' is held in place. The ends of the wire C' are connected one by the wire *c* to the contact-plate D and the other by the wire *c*² to the contact-plate D².

The contact-plate D, I show as a tube inserted into the usual supporting-hole in the last, and the contact-plates D' and D² are small plates screwed to the under side of the last, as shown, slightly behind and to each side of the tube D.

E is an electric conducting-post upon which the last is supported when required to be heated, the post E coming within the tube D and making good contact therewith.

E' and E² are contact-springs supported by the post E, but insulated therefrom by the collar *e*, of insulating material. The post E is electrically connected to one pole of the battery or other source of electrical supply through the wire F, and the contact-springs E' and E² are independently connected at will with the opposite pole through the switches G and G' and the wire F'.

It will be seen that by turning on the switch G the electric current will pass from the source of supply along the wire F', through the switch G, contact-spring E', contact-plate D', wire *c'* to one end of the heating-wire C, through such wire, heating it, and consequently the inner plate B, then out by the

wire *c* to the contact-tube D, thence down the post E, and back to the source by the return-wire F. If, on the other hand, the switch G' is turned on, the current from the same source flows along the wire F' to the switch G', through the contact-spring E², contact-plate D², wire *c*² to the end of the heating-wire C', through such wire, heating it and the outer plate B', then out by the wire *c*, post E, and return-wire F to the source. From this it will be seen that the plates B and B' may be heated independently. Thus in the manufacture of rubber-soled footwear the central part of the sole, which may be of inferior grade rubber and require a good deal of heat to properly vulcanize the outer sole to the inner, can be given the required amount of heat during the required time. The outer edge, however, where the leather upper comes between the inner and the outer soles and where the contact portions may be of a more fusible quality, does not need and must not stand the same amount of heat as the center without damage to the leather.

By separating the inner plate B from the outer B' by a small air-space the greater heat of the inner plate is not readily conducted to the outer. The electrical connections and contact-plates are so arranged as not to interfere with the general usefulness of the last and are not liable to be damaged by ordinary usage.

The electrical-supply contacts can readily be attached to the ordinary holders in use at present without interfering with their operations.

The outer plate B', with its wire C' and connections, may be dispensed with and one plate alone used, covering the whole sole, the upper being held in place by sewing instead of nails and the plate being heated by the one wire C, the convolutions being brought closer together toward the center and wider apart near the outer edge, so as to give the required difference of heat to the various parts of the plate, which by being made thin would conduct less heat to the edges.

I shall now describe the method of using the last. In Fig. 3 I show a cross-section of last through *x y*, Fig. 1, with the inner sole K having its inner side *k* of canvas, felt, or other suitable material and its outer surface *k'* of rubber. It is temporarily held in place by nails *k*², driven into the last through the holes *b'*. The edges *l* of the leather upper L, after having been coated on the inside with an adhesive compound requiring a mild degree of heat to make it set properly, are lapped over the edges of the inner sole K and held in place in the usual manner by nails *l'*. These are driven into the last through the channel *b*. The electric current is turned on through the outer heating-wire C', thereby heating the plate B, the edges of the inner sole K, the edges *l* of the upper L, and the composition placed between, thereby causing it to set thoroughly. Then the current is turned off.

The nails are now withdrawn and the rough edges of the upper trimmed, and holes *l*² are punched through the overlapping edges *l* of the leather upper L, as shown in Fig. 4. These holes *l*² merely extend through the leather and expose the rubber surface of the inner sole K. An outer sole, together with the heel, all of a rubber composition, is molded to an exact shape, so as to fit snugly against the rubber surface of the inner sole K and the trimmed edges *l* of the leather upper L and having teats *m* formed thereon or attached thereto exactly corresponding to the holes *l*² in the edges of the leather upper. These teats *m* may be made homogeneous with the outer sole, or they may be formed of a slightly-purer rubber. When this outer sole is in place, as shown in Fig. 5, the central part rests upon and is in contact with the rubber outer surface *k'* of the inner sole K, and the teats *m* extend through the holes *l*² in the leather upper and come in contact with the rubber surface of the inner sole. The current is now turned on in both inner heating-wire C and outer heating-wire C', thereby heating the plates B and B', the inner sole K, and the outer sole M, in connection therewith, thus causing the outer sole of rubber composition to be thoroughly vulcanized to the rubber outer side of the inner sole K and made to adhere thereto. The ends of the teats *m* will of course become joined to the inner sole K, where they touch, thus holding the edges of the outer sole M, the upper L, and the inner sole K firmly together as though sewed. As the central part of the sole requires more heat to vulcanize it thoroughly on account of its greater mass and generally less degree of purity than the teats *m* at the sides and as the leather edges *l*, through which the teats pass, would be damaged by too much heat, the current is turned off from the outer wire C' and the edges allowed to cool, while the current is kept on in the plate B until the central part is thoroughly vulcanized.

Of course the current might be turned on in the central part first and the vulcanizing thereof partially done before the current is turned on to the outer part or arranged in any order so long as each part gets its required amount of heat.

What I claim as my invention is—

1. A last having a non-heating body portion adapted to be inserted within the shoe, and heating means carried by the sole of the last for applying heat to the sole of the shoe only, substantially as described.

2. A non-heating last adapted to fit within a shoe having a plate secured to the sole thereof and means interposed between said plate and said sole for heating said plate, substantially as described.

3. An apparatus for the purpose described consisting of a last having an outer contact-surface surrounding the edge of the sole of the last and superimposed thereupon and an

inner contact-surface situated entirely within the outer surface and superimposed upon the sole, and means for supplying the outer contact-surface with a mild degree of heat and the inner contact-surface with a greater degree of heat both heats being commensurate for the purpose set forth.

4. An apparatus for the purpose described comprising a last having superimposed and secured around the edge of the sole a metal edge plate and an inner metal plate situated within the edge plate and separated from it by a heat-non-conducting channel, and separate means for imparting to each plate any desired amount of heat as and for the purpose specified.

5. An apparatus for the purpose described comprising a last having superimposed and secured around the edge of the sole a metal edge plate and an inner metal plate situated within the edge plate and separated from it by a heat-non-conducting channel, and convolute heating-wires extending underneath each plate and having separate connections to a suitable electrical source of power as and for the purpose specified.

6. An apparatus for the purpose described comprising a last having superimposed and secured around the edge of the sole a metal edge plate and an inner metal plate situated within the edge plate and separated from it by a heat-non-conducting channel, and the convolute heating-wires C and C', connecting-wires c c' and c^2 , metal tube D, plates D' and D², post E connected to a source of electrical supply by the wire F and the contact-springs E' and E² connected by the switches G and G' to the wire F' leading to the source of electrical supply as and for the purpose specified.

7. An apparatus for the purpose described comprising the last-body A, the outer sole-plate B', central sole-plate B having the channel b formed between them, holes b' in the center plate, means for securing the plates to the sole of the last, and means for imparting heat separately to each plate as and for the purpose specified.

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Witnesses:

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