

July 6, 1943.

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2,323,325

SOLE ATTACHING IN ELECTROSTATIC FIELDS

Filed May 31, 1941

Fig.1.

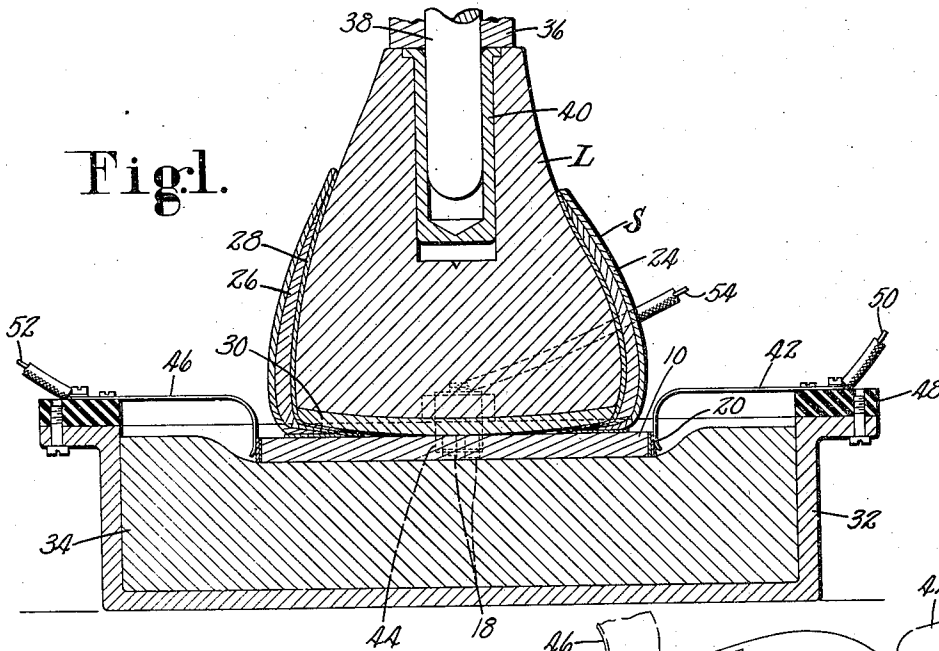


Fig.2.

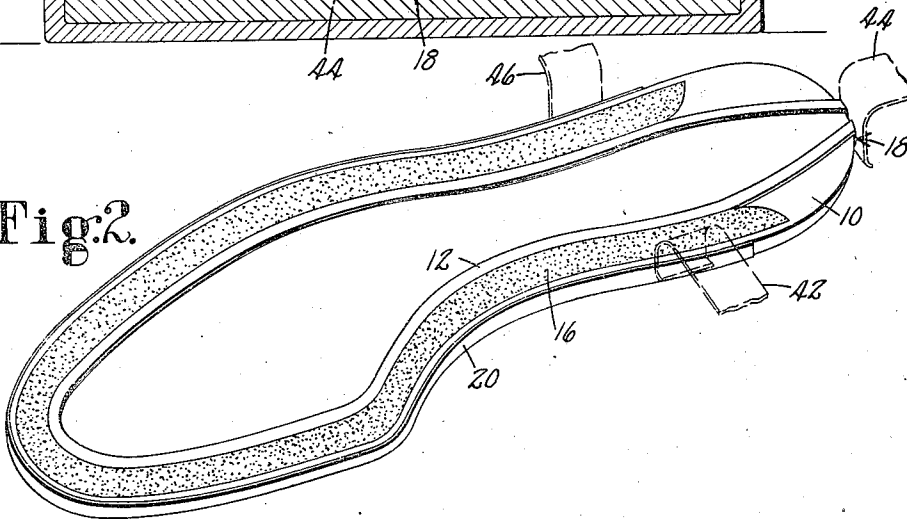
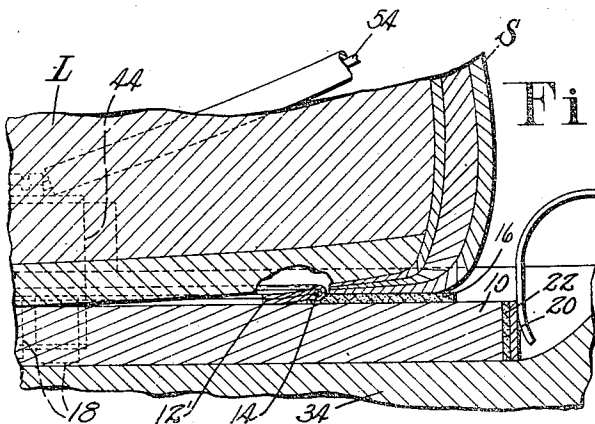


Fig.3.



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2,323,325

SOLE ATTACHING IN ELECTROSTATIC FIELDS

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Application May 31, 1941, Serial No. 396,070

11 Claims. (Cl. 12-142)

This invention relates to methods of attachment of soles to shoes by cement and wherein a high-frequency electrostatic field is employed for activating the sole-attaching cement.

In the commonest method of attaching soles to shoes by means of cement, a coating of pyroxylin cement is applied both to the shoe bottom and to the sole and is allowed to harden. Later, just before the sole and shoe are brought together, this cement is activated by applying to it material containing a solvent for the cement, thereby rendering the cement tacky. It has been realized for some time that thermoplastic cements may be employed and that the activation of the cement may be accomplished after a sole and shoe have been brought together by utilizing a high-frequency electrostatic field to produce heat to activate the cement. Various forms of electrodes have been suggested for use in setting up such a field, it being understood that these electrodes act as condenser plates which are attached to opposite sides of a source of current. For various reasons, it is desirable to avoid putting one of these condenser plates between the last and the shoe. One of the most urgent of these reasons is the necessity of changing the dimensions of the last in order to make room for the condenser plate when it is to be positioned in the shoe.

Accordingly, one important object of the invention is to increase the ease with which an electrostatic field may be applied and to facilitate the employment of existing apparatus for pressing the shoe and sole together.

To this end, electrodes are employed at least one of which is embodied in the shoe construction, being disposed along an edge of the marginal band of attaching cement. As herein illustrated, one of these electrodes comprises a strip of metallic foil paralleling the inner edge of the band of adhesive and the other of which, also of metallic foil, is disposed adjacent to the outer margin of the band of adhesive and preferably upon the periphery of the sole. Features of the invention will therefore be found to reside in a shoe or a sole embodying one or both of these electrodes.

From another aspect, invention will be found in a method of preparing shoes and soles for cement attachment which includes the steps of applying a marginal band of cement to one of these and also attaching an electrode strip alongside said band.

Whenever the outer electrode comprises a strip

of metallic foil upon the periphery of the sole, as recited above, and which is not desired in the completed shoe, then, in accordance with another aspect of the invention, we have provided a novel method of making shoes in accordance with which, after the sole has been attached, the outer electrode is removed by trimming the periphery of the outsole, thus cutting away both the foil and the leather at the same operation.

In the drawing,

Fig. 1 is a transverse section through an apparatus for pressing together a sole and shoe which are shown as positioned in the apparatus and as provided with electrodes embodied in the shoe construction.

Fig. 2 is an angular view of the attaching surface of a sole to which electrodes have been applied; and

Fig. 3 is a sectional view on a greatly enlarged scale of a portion of the shoe and apparatus which is shown in Fig. 1 in order to show even more clearly the disposition of the cement and of the electrodes upon the shoe.

To the attaching surface of an outsole 10 there has been applied an inner electrode 12 in the form of a narrow strip of tin foil secured to the sole by means of adhesive. Since such tin foil has little tensile strength, it may be found desirable to employ a folded strip 12', such as is illustrated in Fig. 3, and reinforced by an element of greater tensile strength, such as a cord 14. Although this electrode is herein illustrated as attached to the sole before the latter has been embodied in a shoe, it will be recognized that the activation of the cement will be equally well accomplished if the electrode is secured to the shoe bottom; and, similarly, the band of adhesive 16, herein shown as applied to the flesh or attaching surface of the sole, may be applied, if desired, upon the bottom of the shoe. It will be noted that the electrode 12 is carried to the periphery of the sole and bent over the rear end thereof, as shown at 18, thereby to facilitate the conduction of an electric current thereto after the sole and shoe have been brought together. The other electrode 20 of tin foil, has, as shown, been attached to the periphery of the sole by means of an adhesive 22 (Fig. 3). Each of these electrodes parallels the edge of the band of sole-attaching cement 16.

Assuming that the shoe parts have been prepared with the electrodes, as above described, then, a shoe S having an upper 24, a counter 26 and a lining 28 is positioned with its bottom in

engagement with the attaching surface of the outsole 10. The sole also embodies the usual insole 30 and has been assembled upon a last 1. While the bringing together of the sole and shoe under pressure may be carried out in any of the many forms of apparatus for this purpose, there has been shown diagrammatically herein a box-like structure 32 containing a yielding pad 34 into the surface of which the shoe and sole are forced by pressure applied through a member 36 having a pin 38 extending into the last pin socket 40. The showing of the sole is also somewhat diagrammatic inasmuch as shoe soles are commonly reduced at their shank portions and, when the sole-attaching pressure has been applied, the sole will usually be curved and wrapped up toward the upper.

To facilitate the conduction of electricity to the electrodes, the apparatus has been provided with spring contacts 42, 44 and 46 which are mounted upon the box 32 and are insulated therefrom by means of blocks of insulating material 48. The side contacts 42 and 46 are arranged for engagement with the electrode 20 upon the periphery of the sole and are intended to be connected by wires 50 and 52 to the same side of a source (not shown) of high-frequency electricity. The contact 44, similarly insulated from the box 32, is positioned to engage the ends of the inner electrode 12 where they overlap at 18 the periphery of the sole, and this contact member is intended to be connected to the other side of the source by means of a conductor 54.

In carrying out the attachment of the sole to the shoe, the positioning of the shoe on the sole is greatly facilitated by reason of the fact that the band of cement is non-tacky, being dry and hard and therefore offering no resistance to adjustment of the position of the shoe. With some sorts of cement, it may be found desirable to apply a coating both to the bottom of the shoe and to the sole. Having provided electrodes 12 and 20 in the shoe construction, and having brought together the sole and shoe upon the attaching press, pressure will be applied, as through the member 36. The positioning of the sole upon the pad 34 with its electrodes in contact with the spring contacts 42, 44 and 46 renders the apparatus immediately available for the production of an electrostatic field which will, in a matter of only a few seconds, activate the cement. This activation being completed, the electric current is turned off and, after a suitable interval to permit the setting of the cement, the shoe may be removed from the press. This setting interval will be much shorter in most cases than with other types of cement. The shoe then is carried through the step of trimming the edge of the sole, thereby shaping it exactly to the shape of the bottom of the shoe and simultaneously therewith removing the outer foil electrode 20. If this trimming is done, as is usually the case, with a rotary cutter, chips of both tin foil and leather will be removed at the same time.

By this method, sole attachment may be carried out in any of the various forms of apparatus which have been provided without the necessity of building special electrodes or embodying them in the apparatus, and the only change that becomes necessary is to furnish the insulated spring contacts mounted in suitable position and to conduct thereto a high-frequency electric current.

Any portion of the tin foil constituting the inner electrode 12 which remains visible at the rear

end of the shoe may be trimmed to the bottom of the rand crease by means of a hand knife.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. That improvement in methods of attaching outsoles to lasted shoes, between which there has been positioned a band of adhesive extending around the margin of the bottom of the shoe, which consists in positioning upon the periphery of said outsole a strip of thin, pliable, metallic foil adapted to serve as one electrode, positioning another electrode adjacent to the inner edge of said margin, bringing together the shoe and outsole, applying pressure thereto, supplying high-frequency electric current to said electrodes to set up an electrostatic field passing through said adhesive to activate it, relieving said pressure, and trimming said sole edge to remove said peripheral electrode.

2. That improvement in methods of preparing soles for cement attachment to shoes which consists in applying a band of thermoplastic cement to the marginal portion of the attaching face of the sole and progressively attaching electrode strips to the sole, one inside and one outside of the cement band.

3. That improvement in methods of preparing shoes and soles for attachment to each other which consists in applying a band of a thermoplastic cement to the marginal portion of the attaching face of one of these elements, and attaching electrodes to at least one of said elements within the inner edge and without the outer edge of the cement band and adjacent thereto.

4. That improvement in methods of preparing lasted shoes and soles for attachment to each other which consists in applying a band of a thermoplastic cement to the marginal portion of the attaching face of one of these elements, and attaching a thin, flexible, metallic electrode strip to one of said elements along a narrow band within the inner edge of said band of cement and adjacent to said band of cement throughout the length of the strip.

5. In a shoe construction, an upper, an outsole, a marginal band of thermoplastic cement between the sole and the upper, electrodes attached to a shoe part and extending along both margins of said band of cement with one electrode at the same level as the cement, said electrodes being adapted to be connected to opposite sides of a source of high-frequency electric current, at least one of said electrodes being retained as a permanent part of the shoe.

6. In a sole for embodiment in a shoe to which the sole is to be attached by means of a dry marginal band of cement on said sole, electrodes extending in narrow bands along the margins of said band of cement and adapted to be connected to opposite sides of a source of high-frequency electric current, at least one of said electrodes being secured to the attaching face of said sole and being adapted to be retained as a permanent part of the shoe construction.

7. In a sole for embodiment in a shoe to which the sole is to be attached by cement, a marginal band of thermoplastic cement on the marginal portion of the attaching face of the sole, electrodes extending along the margins of said band of cement and adapted to be connected to opposite sides of a source of high-frequency electric current, at least one of said electrodes being secured to the periphery of said outsole and be-

ing adapted to be cut away when the sole edge is trimmed.

8. In a sole for attachment to a shoe by means of cement, electrodes disposed along the opposite edges of a band which, in the finished shoe, will be occupied by the sole-attaching cement, one of said electrodes comprising a narrow band of metallic foil secured adhesively to the sole and having a portion extending to the periphery of the sole to permit high-frequency electric current to be conducted thereto after a shoe has been positioned in engagement with the sole ready for the activation of the cement for the attachment of the sole to the shoe.

9. In a sole for attachment to a shoe by means of thermoplastic cement, a strip of thin, flexible, metallic foil secured to the sole along the inner edge of the cement-carrying margin, said foil having a reinforcement of greater tensile strength than the foil thereby to facilitate the handling of the foil while securing it to the sole.

10. In a sole for attachment to a shoe by means of a marginal band of thermoplastic cement adapted to be activated by the application thereto of an electrostatic field produced between electrodes, electrodes each comprising a strip of thin, flexible, metallic foil one strip being secured to the periphery of said sole by means of cement and the other strip being secured to the attaching face of the sole adjacent to the inner periphery of the margin to be cemented.

11. A sole for cement attachment to a shoe having, on its attaching face, a band of thermoplastic cement, an electrode on the attaching face of the sole paralleling the inner edge of the cement band, and an electrode of metallic foil secured to the sole outside of the cement band.

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