Aug. 26, 1947. G. T. HART 2,426,268

METHOD OF SOLE ATTACHING USING HIGH-FREQUENCY FIELD

Original Filed May 23, 1944 2 Sheets-Sheet 1

Fig. 1

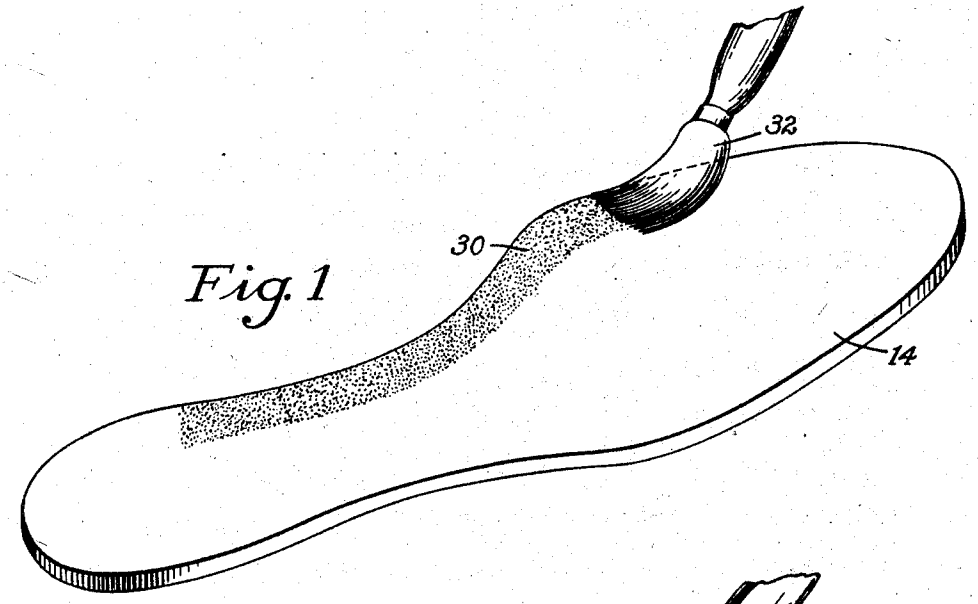
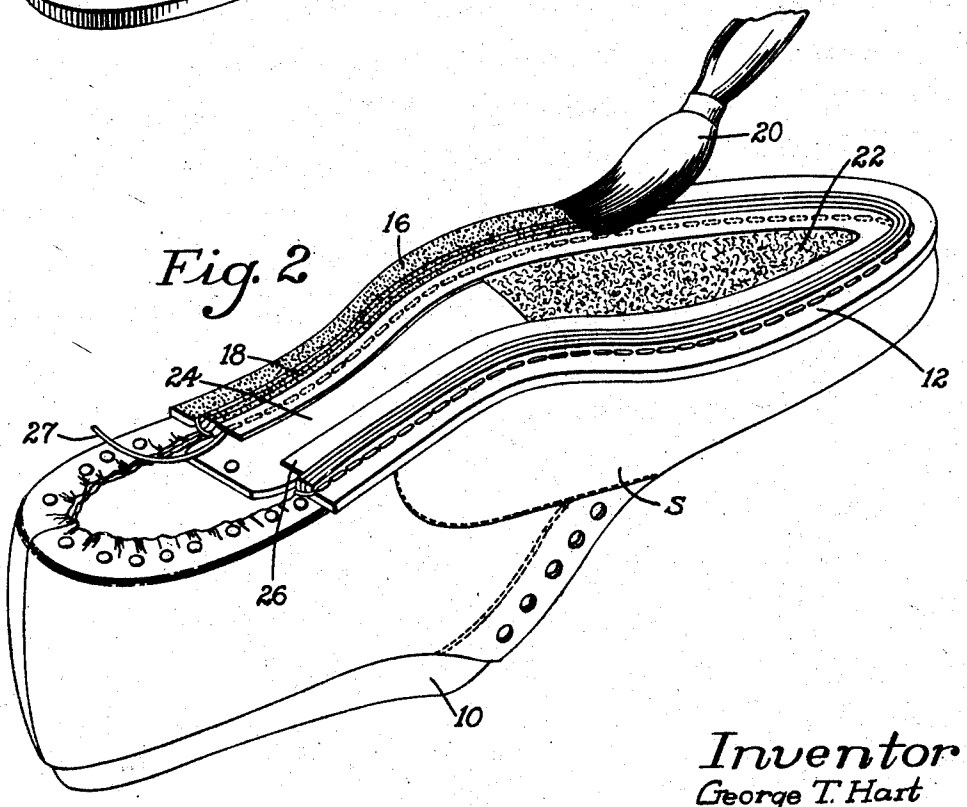


Fig. 2



Inventor
George T. Hart
By his Attorney

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Original Filed May 23, 1944 2 Sheets-Sheet 2

Fig. 3

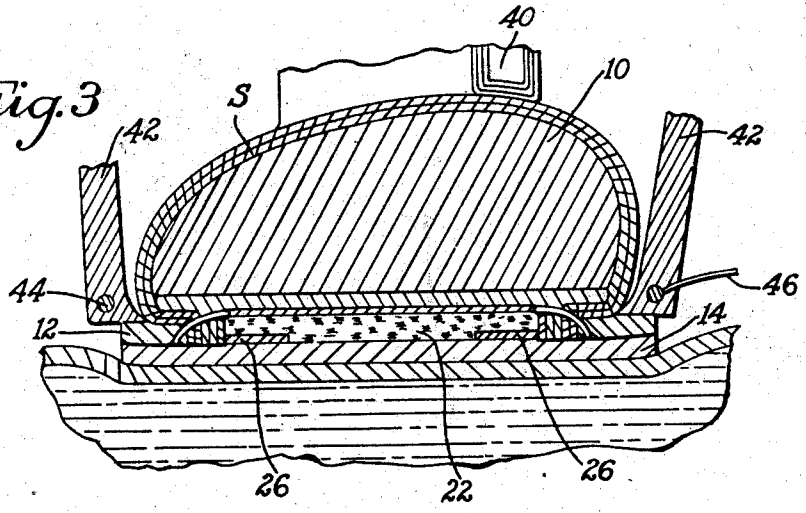


Fig. 4

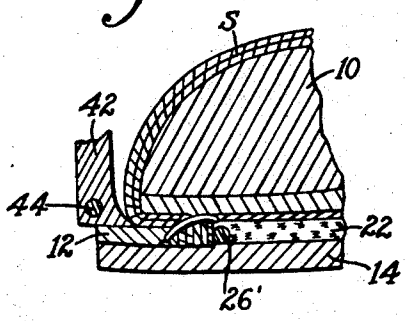
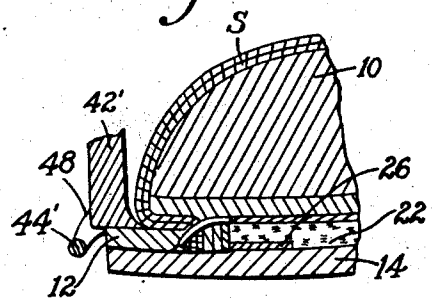


Fig. 5



Inventor
George T. Hart
By his Attorney

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METHOD OF SOLE ATTACHING USING HIGH-FREQUENCY FIELD

George T. Hart, Lynn, Mass., assignor to United Shoe Machinery Corporation, Flemington, N. J., a corporation of New Jersey

Original application May 23, 1944, Serial No. 536,857. Divided and this application February 26, 1947, Serial No. 731,077

5 Claims. (Cl. 12—142)

1

This invention relates to methods of attaching outsoles to welted shoes, and more particularly to methods of attachment by means of cement activated in situ by a high-frequency electric field. The present application is a division of my application Serial No. 536,857, filed May 23, 1944.

It is well known that soles may be attached to shoes by means of a cement which is activated in situ by the application thereto of a high-frequency electric field which produces heat directly in the cement. Such methods have commonly been applied to shoes of the McKay type in which the edge of the sole is close to the periphery of the shoe last with the inherent result that the sole and shoe are firmly held together during the activation of the cement by pressure applied to the outsole and to the last within the shoe. These methods are not applicable to welted shoes, however, in which the outstanding welt strip is unsupported by the last and in which, consequently, there is no assurance that this strip will be held in engagement with the outsole during the activation of the cement.

When attaching outsoles to such shoes by means of a solvent-activated cement, in which the cement has been applied marginally between welt and outsole, it is the custom to apply pressure to the outstanding welt by means of a welt-holddown member closely surrounding at least the forepart of the shoe, and pressure is applied through this holddown member to keep the welt strip in firm contact with the outsole. There are various forms of apparatus developed for this purpose.

One important object of the invention is to devise an improved method of attaching outsoles to welted shoes which makes its possible to activate the cement in situ while pressure is applied to keep the welt in firm contact with the sole and to produce a rapid and uniform activation of the cement for bonding irrespective of differences in shapes and sizes of shoes or thickness of sole, utilizing available instrumentalities wherever possible.

In one respect, my invention contemplates a novel method in which pressure is applied to clamp together the welt strip, and a holddown or

2

correspondingly located electrode is employed extending around at least the forepart of the shoe and with the help of which a high-frequency electric field is set up, traversing the marginal band of attaching cement, between the holddown electrode and an inner electrode which has been secured to the shoe bottom preferably against the inner face of the inseam with provision for connection to a high-frequency oscillator. By this method uniform cement activation is insured irrespective of the shape or size of the shoe since the distance between the electrodes is substantially uniform for a wide range of shapes and sizes of shoes, or differences in thickness of outsoles since the activating field traverses the cement band directly. Moreover, if desired, the inner electrode may be positioned conveniently at the time the filler is applied to the shoe and may thus be secured in position.

These and other aspects of the invention will now be discussed in the following specification taken in connection with the accompanying drawings, in which

Fig. 1 is an angular view, illustrating the application of cement to an outsole;

Fig. 2 is a similar view, illustrating the application of cement to a shoe bottom;

Fig. 3 is a transverse vertical section through the forepart of a shoe positioned in a sole attaching machine modified for the utilization of applicant's method; and

Figs. 4 and 5 are transverse sections of the forepart of a shoe, in the bottom structure of which an electrode strip or wire has been embodied for cooperation with a welt-holddown electrode either embodied directly in the holddown as in Fig. 4, or carried by the holddown at a lower elevation as in Fig. 5.

In preparing the bottom of a lasted shoe S having an outstanding welt strip 12 for the attachment thereto of an outsole 14, it is common practice to apply to the attaching face of the welt strip a band of cement 16 (Fig. 2) which ordinarily will extend over the edges of the inseam 18. This may be applied by means of a hand brush 20 or in any other desired fashion. When the sole is to be attached by means of a thermoplastic cement which may be activated in a high-frequency

electric field, the cement utilized will be of a type which may be activated in situ after the sole has been pressed against the shoe and can be one of the Vinylite resin types of cement, although there are many others which are applicable. The preparation of the shoe bottom also includes the application of shoe filler material **22** to the forepart of the shoe and frequently includes the application of a shank piece **24** which may be of fiber, wood or even metal. In accordance with the invention herein disclosed, an electrode strip **26** such as of metal foil (as shown) or of wire (**26'** of Fig. 4) will be secured to the shoe bottom closely adjacent to the inner periphery of the inseam, and provided with a lead **27** or extension by which it can be connected to one side of an oscillator. This strip may be held in a suitable manner as by a separate adhesive or preferably by means of the retaining or adhesive action of the filler, in which latter case the strip will be secured in position at the time of application of the filler. The electrode strip will thus be held in readiness for use in connection with its intended purpose, in a position which will not interfere with subsequent operations on the shoe or affect the essential qualities thereof. The filler material, which may comprise a granulated cork agglomerate with an initially sticky binder, may advantageously be employed, as stated, very conveniently in securing the inner electrode to the shoe. A band of cement **30** will also usually be applied to the peripheral margin of the outsole **14** by means of a hand brush **32** or in any other desired way.

After these coatings of cement have dried, they then being hard and non-tacky, thereby facilitating the correct positioning of the outsole with respect to the shoe bottom, the shoe S and the outsole **14** will be brought together in a sole-attaching machine, such as the one illustrated in Letters Patent of the United States No. 2,138,960, granted December 6, 1938, upon the application of Sidney J. Finn. Pressure may be applied to the shoe bottom by way of the last through various members including a toe pad **40** (Fig. 3) and to the welt through a holddown member **42** extending around at least the forepart of the shoe and contacting substantially the whole width of the grain or upper surface of the welt strip **12**. Frequently, such a welt holddown will be slightly flexible and usually will be of electrically non-conductive material so that an outer electrode **44** which may be in the form of a wire or cable may be embodied directly in the welt holddown itself. To such an electrode, a convenient lead **46** will be applied to enable its attachment to a source of supply of high-frequency current such as an oscillator (not shown). In using this arrangement, as pressure is applied from above or below to clamp the welt firmly in contact with the outsole, a high-frequency electric field will be set up between this electrode **44** and the inner electrode member **26** (or **26'**, Fig. 4) which will pass substantially horizontally of the shoe through the band or bands of cement previously applied. The production of heat in this cement will take place rapidly by virtue of the well-known dielectric heating effect, enabling the cement to be activated in situ and will not require the time necessary for the dissipation of a solvent as is the case when solvent-activated cements are employed. When the sole has thus been secured to the shoe, the lead **27** or other electrode extension may be clipped off readily by the operator and the shoe will then present the usual appearance.

In the use of the electrode arrangements shown in Figs. 3 and 4 the field will be understood to extend from the holddown electrode **44** to the shoe bottom electrodes **26** or **26'** substantially horizontally and substantially in the plane of the attaching cement. In other instances, it may be found desirable to cause the field to be more exactly in the plane of the attaching cement, and this may readily be accomplished by supporting a similar outer electrode **44'** (Fig. 5) by means of brackets **48** extending outwardly and downwardly from the welt holddown **42'**. It will be understood that, with this arrangement, either an inner electrode strip of foil **26** may be employed or the wire **26'** shown in Fig. 5.

It may be appreciated from the foregoing description of the invention that the method offered thereby may be carried out conveniently and efficiently, without need of additional expensive apparatus, other than a source of high-frequency energy, or extensive preparations of the shoe parts beyond those ordinarily encountered in the industry. Furthermore once the shoe has been thus prepared and assembled in accordance with the method it will at once be ready for any ensuing operations such as sole trimming or the like.

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

1. The method of cement sole attaching with welt shoes and the like, comprising the steps of securing an inner electrode strip on the shoe bottom near the inner face of the inseam, laying the sole on the shoe with a marginal band of unactivated thermoactive cement therebetween, providing marginal compacting pressure to the sole and welt, positioning an outer electrode about the shoe, activating the cement by the application of a high-frequency field established between said electrodes, and removing the pressure after the cement has become set.

2. The method of cement sole attaching for welt shoes and the like, comprising the steps of laying an inner electrode strip on the shoe bottom along the juncture of the insole lip and the filler, laying the sole on the shoe with a marginal band of unactivated cement therebetween, positioning a cooperative electrode adjacent the shoe, applying clamping pressure to the sole and welt marginally, and establishing between the electrodes a high-frequency field for the activation of the cement.

3. That improvement in methods of attaching soles to welted shoes by means of a thermoactive cement band positioned between the welt strip and the sole, which consists in securing an inner electrode around and to the bottom of the shoe extending along the inner edge of a cement band positioned between the welt strip and an applied sole, applying a sole to the shoe upper, positioning an outer electrode in parallel relation with a welt holddown applied to the welt strip, and establishing a high-frequency field between said electrodes to activate said band of cement in bonding the sole to the shoe.

4. That improvement in methods of attaching soles to welted shoes by means of a thermoactive cement band positioned between the welt strip and the sole, which consists in incorporating an electrode strip in the shoe bottom next to and extending around the inner surface of the insole rib, securing said electrode strip in said position concurrently with the application of filler material to the insole, applying a sole to the shoe, positioning an outer electrode in parallel rela-

tion to a welt holddown applied to the welt strip, and establishing a high-frequency field between said electrodes to activate said cement in forming a bond between the sole and shoe upper.

5. The method of preparing a shoe having a ribbed insole for the attachment of an outsole by means of a layer of cement to be activated with the use of a high-frequency field, comprising the steps of positioning an elongated conductive electrode member next to the inside of said rib and extending therearound with an extension of said electrode member adapted for connection to a terminal lead of a high-frequency oscillator during sole attaching, and applying a filler over said electrode member to hold said member in position and impart uniformity to the bottom surface of the insole.

GEORGE T. HART.