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METHOD AND APPARATUS FOR THE CEMENTING OF ARTICLES

Original Filed May 17, 1941

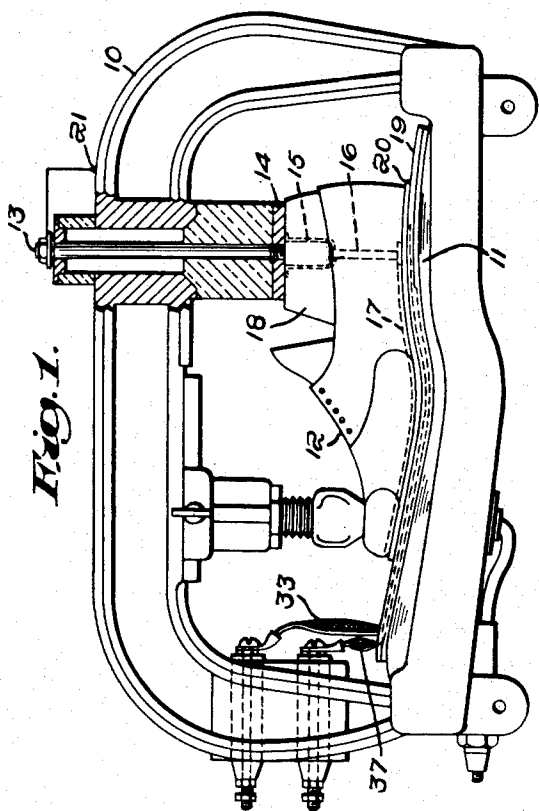


Fig. 1.

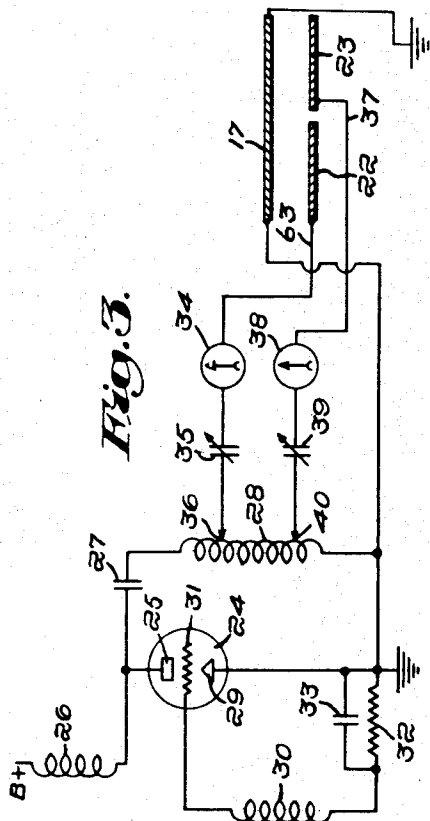


Fig. 3.

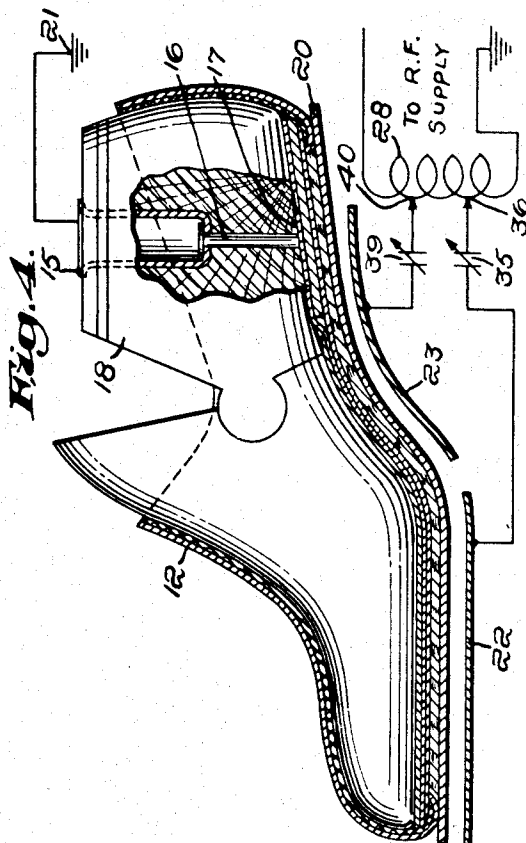


Fig. 4.

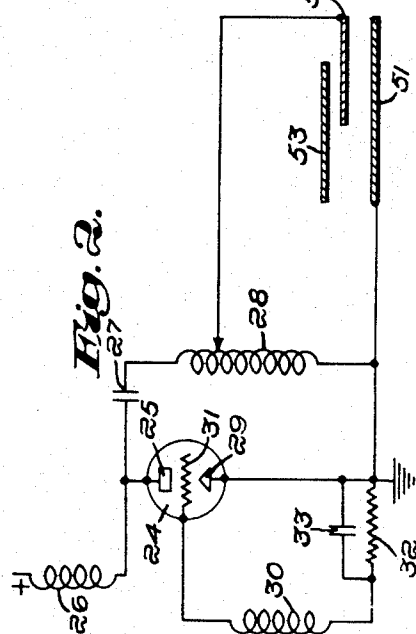


Fig. 2.

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METHOD AND APPARATUS FOR THE CEMENTING OF ARTICLES

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Original application May 17, 1941, Serial No. 393,990. Divided and this application October 8, 1942, Serial No. 461,253

8 Claims. (Cl. 12—38)

This invention relates to methods and apparatus for the cementing of shoes and relates more particularly to methods of using, and apparatus for using, high frequency electric energy for heating adhesive for cementing shoe parts together.

This application is a division of my co-pending application, Serial No. 393,990 filed May 17, 1941.

The Pitman Patent No. 2,087,480 and the Smith Patent No. 2,109,323 disclose the cementing of shoe bodies to outsoles through the use of heat derived from high frequency electrostatic fields. Each of said patents discloses the use of a pair of electrodes connected to opposite sides of a high frequency electrical source for generating heat in heat responsive adhesives, on electrode being placed within the shoe, on one side of the adhesive, and the other being placed at the bottom of the outsole.

With some types of shoes when pairs of opposed electrodes as disclosed in said Pitman and Smith patents, are used, the shanks and foreparts of the shoes are heated unevenly. The construction of one particular shoe may be such that the shank will get hotter than the forepart where both receive energy from a common source. In another shoe the forepart may get hotter than the shank where both receive energy from a common source. It is desirable therefore for avoiding overheating in one part of a shoe and perhaps underheating in another part of the shoe to be able to regulate the heat at the shank and at the forepart separately.

This invention provides for the regulation of the heat at the shank and forepart of a shoe, separately by adjustment of the intensity of the electrostatic field at the shank and at the forepart separately. In one embodiment of the invention one of the opposed electrodes is separated into two sections, one at the forepart and one at the shank of a shoe with the two sections connected separately to the high frequency electric source so that the electric energy to each may be separately controlled for providing exactly the desired degree of heat at the shank and at the forepart.

An object of the invention is to improve the quality of cemented shoes.

Another and more definite object of the invention is to provide different degrees of heat at the shank and at the forepart of a shoe being cemented.

The invention will now be described with reference to the drawing, of which:

Fig. 1 is a side elevation of a shoe press containing a shoe assembly and embodying this invention;

Fig. 2 is a circuit schematic showing three electrodes which may be used in the practice of the invention, one of the electrodes being capacity coupled to the other electrodes;

Fig. 3 is a circuit schematic showing three electrodes which may be used in the practice of the invention, together with means for varying the electric energy supplied to two of the electrodes, and

Fig. 4 is a sectional view of a lasted shoe and the relations of the forepart and the shank of the shoe to separate electrodes, one of which is placed under the shank and the other under the forepart of the shoe.

In sole cementing utilizing electrostatic fields, it is the practice as disclosed in said Smith patent, to roughen the bottom of the lasted shoe and the top of the outsole; to coat these parts with an adhesive such as is disclosed in said Pitman patent; to apply pressure to the parts by inflating the pad, and then to expose the shoe to heat derived from an electrostatic field.

The shoe press 10 of Fig. 1 includes the inflatable pad 11 into which a fluid may be introduced for applying pressure to a shoe assembly as disclosed in detail in said Smith patent. The press 10 is substantially a duplicate of that of Fig. 1 of said Smith patent except that in the present press, provision is made for the electric supply to three electrodes instead of to the two electrodes in the patent.

The electric conducting bolt 13 makes contact through the conducting plate 14, the conducting lining 15, and the conducting pin 16, with an electrode 17 within the shoe assembly. This electrode 17 may be a metal bottom on the last 18 or it may be an electrode built onto the shoe body as disclosed in my copending application, Serial No. 387,823. The bolt 13 is grounded to the press at 21.

The electrode pad 19 of Fig. 1 placed between the inflatable pad 11 and the outsole 20 contains electrodes which may be arranged as disclosed by Fig. 4, there being two lower electrodes 22 and 23, the electrode 22 being below the forepart of the shoe and the electrode 23 being below the shank of the shoe. The pad 19 may have upper and lower enclosing portions of soft leather or of rubber, with their edges suitably fastened as by stitching or by cementing.

The vacuum tube triode 24 of Fig. 3 has its anode 25 connected through a radio frequency choke 26 to a suitable high voltage source of direct current. The anode 25 is connected through the blocking condenser 27 to one end of the tank coil 28, the other end of the tank coil being connected to the cathode 29 of the tube 24 and to ground. The grid circuit of the tube contains the coil 30 which is connected in series with the grid 31 of the tube, and with the leak 32 and condenser 33 in shunt, and with the cathode 29. The constants of the coils determine the frequency at which the tube 24 oscillates, the frequency of 20 megacycles being, for example, suitable.

The upper electrode 17 is connected to ground as illustrated by Figs. 1, 3, and 5. The forepart electrode 22 which, for example, may be wire mesh, is connected through the lead 33, the radio frequency ammeter 34, and the variable condenser 35 to the tap 36 on the tank coil 28 (Fig. 3).

The shank electrode 23 is connected through the lead 37, the radio frequency ammeter 38, and the condenser 39 to the tap 40 on the coil 28.

The variable condensers 35 and 39 serve for varying the high frequency voltage applied separately to the forepart and shank electrodes and the meters 34 and 38 serve for indicating the current flow in each circuit. Since the capacitive reactance in the circuits remain substantially constant, the current flow is proportional to the applied voltage.

The condensers 35 and 39 act due to the high frequency in the same way as variable resistors do in direct current circuits, to reduce the voltage and the current flowing in the separate circuits thus giving individual control of the heat in the shank and the forepart of the shoe.

In the embodiment of Fig. 2, the two opposed electrodes 51 and 52 are connected to opposite sides of the tank coil circuit while the free electrode 53 spaced from the electrodes 51 and 52 is capacitively coupled thereto, and an electrostatic field between the free electrodes and the other, direct connected electrodes is set up, the intensity of which field depends upon the capacity between the respective electrodes which in turn depends upon their physical dimensions and spacing. A stronger field would of course, be produced between the direct connected electrodes 51 and 52 than between either and the free electrode.

Either of the electrodes 52 or 53 could be placed above or below the shank or forepart of the shoe depending upon the peculiarities of an individual shoe.

While embodiments of the invention have been described for the purpose of illustration, it should be understood that the invention is not limited to the exact apparatus and arrangements of apparatus illustrated as modifications thereof may be suggested by those skilled in the art without departure from the essence of the invention.

What is claimed is:

1. The method of cementing parts of an article together, which comprises placing an adhesive between the parts; pressing the parts together, placing one electrode on one side of the pressed together parts, placing a plurality of spaced electrodes on another side of said pressed together parts; establishing different electrostatic fields between said one electrode and said plurality of electrodes, and regulating independently, the intensity of said fields.

2. The method of cementing parts of an article together, which comprises placing an adhesive between the parts; pressing the parts together, placing one electrode on one side of the pressed together parts, placing a plurality of spaced electrodes on the opposite side of said pressed together parts; establishing different electrostatic fields between said one electrode and said plurality of electrodes, and regulating independently, the intensity of said fields.

3. The method of cementing outsoles to shoes, which comprises applying an adhesive between the surfaces to be cemented; pressing the surfaces together; placing one electrode on one side

of the pressed together surfaces; placing a second electrode on the opposite side of the pressed together surfaces in the forepart area of the shoe; placing a third electrode on said opposite side in the shank area of the shoe; establishing electrostatic fields between said one electrode and said second electrode and between said one electrode and said third electrode, and regulating independently, the intensity of said fields.

4. The method of cementing outsoles to shoes, which comprises applying an adhesive between the surfaces to be cemented; pressing the surfaces together; placing one electrode within the shoe; placing a second electrode between the outsole and the pad of the sole attaching machine, in the forepart area of the shoe; placing a third electrode between said outsole and said pad, in the shank area of the shoe; establishing electrostatic fields between said one electrode and said second electrode and between said one electrode and said third electrode, and regulating independently, the intensity of said fields.

5. Apparatus for cementing parts of an article with a heat responsive adhesive, comprising means including a pair of opposed members for pressing said parts together with adhesive therebetween; an electrode at the inner side of one of said members; a plurality of electrodes at the inner side of the other of said members; means for producing different, high frequency electrostatic fields between said electrode and the electrodes of said plurality of electrodes, and means for adjusting independently the strength of said fields.

6. Apparatus for cementing parts of an article with a heat responsive adhesive, comprising means including a pair of opposed members for pressing said parts together with adhesive therebetween; an electrode at the inner side of one of said members; a pair of electrodes at the inner side of the other of said members, and means for producing high frequency electrostatic fields between said electrode and said pair of electrodes, one of said pair of electrodes being capacity coupled to said first mentioned electrode.

7. Apparatus for cementing parts of an article with a heat responsive adhesive, comprising means including a pair of opposed members for pressing said parts together with adhesive therebetween; an electrode at the inner side of one of said members; a pair of electrodes at the inner side of the other of said members, and means for producing high frequency electrostatic fields between said electrode and said pair of electrodes, one of said pair of electrodes being capacity coupled to said first mentioned electrode and to the other electrode of said pair.

8. Shoe cementing apparatus comprising a shoe press; means comprising a pair of opposed members in said press for pressing a shoe and an outsole together with adhesive therebetween; one electrode at the inner surface of one of said members; a second electrode at the inner surface of the other of said members in the forepart area of the shoe; a third electrode at the inner surface of said other of said members in the shank area of the shoe; means for producing high frequency electrostatic fields between said one electrode and said second electrode and between said one electrode and said third electrode, and means for adjusting independently the strength of said fields.

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