

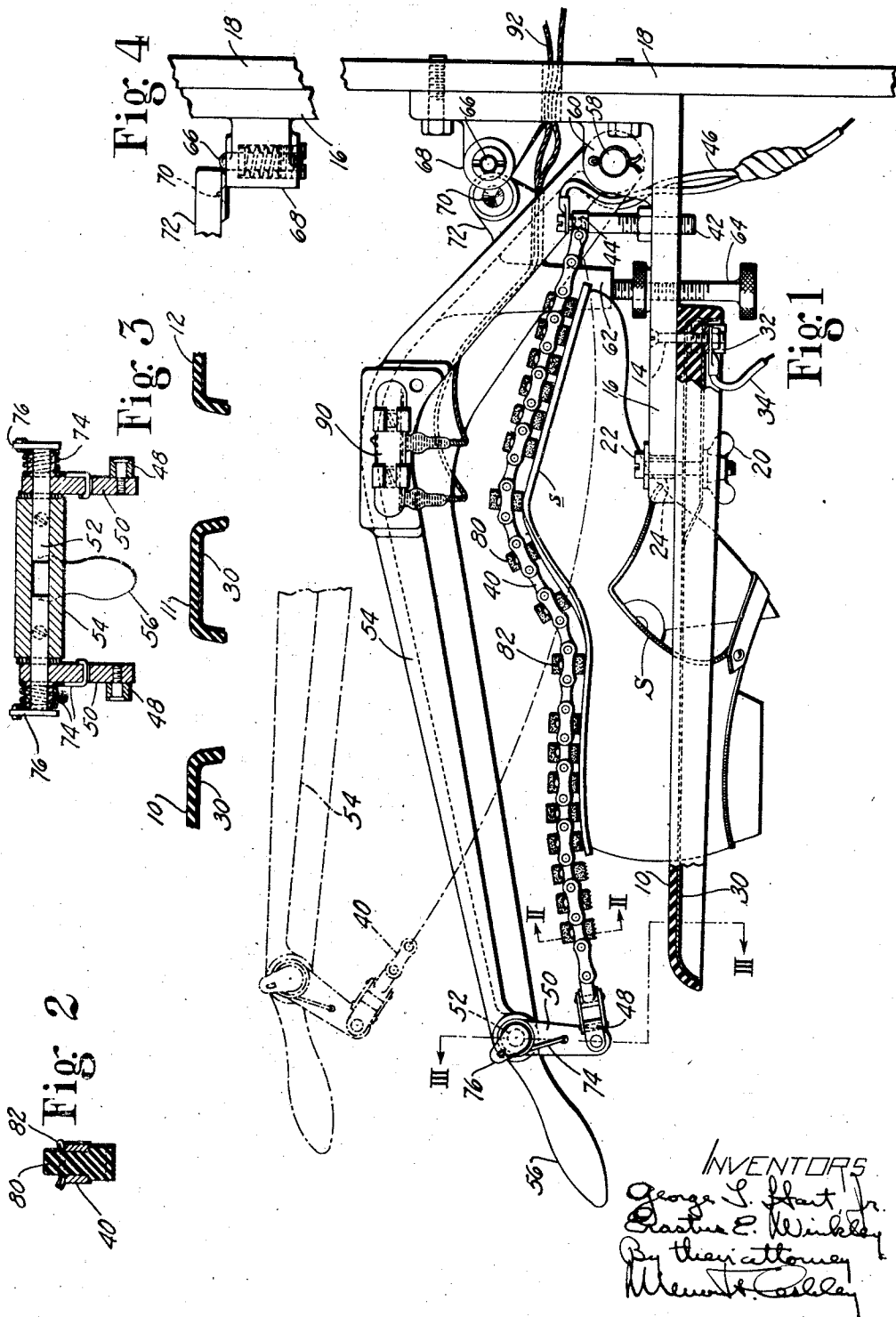
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ELECTRODE FOR SHOE-TREATING APPARATUS

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ELECTRODE FOR SHOE-TREATING
APPARATUS

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This invention relates to electrodes for an apparatus using high frequency current to produce an electrostatic field. The invention has been illustratively described herein as applied to the treatment of shoes to dry them, but its application to other articles and for other treatment than drying will become apparent.

It is well recognized that a moist article placed in a high frequency electrostatic field will be heated and, hence, dried. It should be understood, furthermore, that the drying action of such a field starts at the inner portions of the material just as soon as it starts on the outside surface thereof. As a consequence, leather dried in this fashion is not "casehardened" and is more supple and in better condition than when the drying is carried out in the usual ways. For the uniform drying of shoe soles in such a field, however, it is not sufficient to place the sole between a pair of plates serving as electrodes without regard to the position of the sole and the relation of the electrodes thereto, as it is found that, because of differences of potential and coupling and a distortion of the field produced by the introduction of such a foreign article, the drying then takes place quicker in some parts of the sole than in others.

Accordingly, one object of the present invention is to provide an improved arrangement of electrodes for association with articles of irregular contour whereby the action of the electrical field will be substantially uniform therein.

The arrangement of electrodes which has been illustrated herein is shown as applied to the treatment of soles attached to shoes and includes means for supporting the shoes in inverted position. Uniformity of treatment of these soles is effected, in accordance with one feature of the invention, by providing electrodes, which commonly will be connected to one side of the source and will be associated with shoe supports such as the paddles which are sometimes employed for holding shoes in inverted position, and also providing another electrode occupying an intermediate position and spaced from the first electrodes sufficiently to permit the interpositioning of a shoe. This electrode will be connected to the other side of the source.

Another feature of the invention resides in an adjustable electrode, here shown as flexible, so that it may readily be associated with a curved portion of the shoe such as the shoe bottom and brought into the desired relation thereto. In the illustrated construction a flexible chain has been employed which is held in uniformly spaced relation to the sole of a shoe by means of spacing members of dielectric material.

Still another feature of the invention resides in the employment of a movable carrying arm for one electrode. This arm may be lifted to

carry its electrode away from the shoe, thereby to facilitate the removal of one shoe and its replacement by another. As illustrated, means is provided for positioning the arm in a predetermined relation to the shoe supporting members.

Still another object of the invention is to devise an improved method of treating shoes in an electrostatic field, which method, in one aspect, includes the steps of causing the component parts of one electrode to assume a curvature determined by the curvature of the bottom of the shoe, and of supporting that electrode in a predetermined space relation to said shoe bottom.

These and other features of the invention will now be described in the following specification, taken in connection with the accompanying drawing, in which

Fig. 1 is a side elevation of a shoe supporting device with which are associated the novel electrodes constituting one specific embodiment of our invention;

Fig. 2 is a detail section, through an insulating block for one electrode, on the line II—II of Fig. 1;

Fig. 3 is a vertical section, through the shoe supports and an arm which supports one of the electrodes, taken on the line III—III of Fig. 1; and

Fig. 4 is a fragmentary plan view of a latch associated with the electrode carrying arm.

The illustrated arrangement is designed to support a pair of shoes *S* in inverted position between spaced paddles 10, 11, 12, which are attached by screws 14 to a bracket 16 mounted upon a support 18. The spacing between two outer paddles 10, 12 and a middle paddle 11 may be adjusted by loosening wing nuts 20 upon outer supporting screws 22, which pass through slots 24 in the bracket 16. This arrangement accommodates the cones of the lasts for shoes of radically different sizes, permitting the height of the soles above the paddles to be made substantially uniform.

One set of electrodes 30 is associated with these paddles and may conveniently be provided by attaching a metal sheet to the under side of each of the paddles, which latter conveniently are constructed of a dielectric material, such as the phenol condensation product known as Bakelite. The electrode sheets 30 on the group of paddles are interconnected by means of a metal strip 32, to which there is joined a flexible lead 34 for connection to one side of a source of power, such as a high frequency oscillator. The other electrodes 40, which are adapted to be associated with the soles *s* of the shoes, are supported at their inner ends upon posts 42 by means of a swivel 44 and to these posts are attached leads

46, whereby these electrodes may be connected to the other side of a suitable source of power. It will be noted that the posts 42 are adjustable in height and are positioned near the toe ends of the shoes, the arrangement being such that the chain electrodes 40 extend axially of the shoes and substantially along the middle of the soles between the coating electrodes 30 (Fig. 3). The outer ends of the chain electrodes 40 are provided with swivels 48 to connect them to pivoted depending fingers 50 mounted to turn on studs 52 extending laterally from an arm 54, which is provided with a handle 56 and is mounted for upward tilting movement about a pin 58 extending between two lugs 60 on the bracket 16. The arm 54, substantially T-shaped in cross-section for the sake of strength and rigidity, may also be constructed of Bakelite and has a shoulder 62, which engages the upper end of an adjustable stop 64 in the bracket 16 when in its lower or operative position. When in its upper position, to permit the positioning of shoes upon the supports, the arm 54 will be held there by means of a friction latch 66 mounted in an extension 68 of the bracket 16. This latch is adapted to engage a socket 70 formed in a lug 72 extending upwardly from the arm. A light tension is applied to the chain 40 by means of a spring 74 extending between the finger 50 and a head portion 76 on the stud 52. This stud may be rotated to adjust the spring tension and then clamped by a set screw.

Uniformity of heating in the shoe sole is effected partly by the substantially mid-position of the chain with respect to the sole and hence its mid-position with respect to the electrodes on the supporting paddles, and partly by causing the chain electrode to assume a position substantially parallel to the bottom of the shoe and to this end insulating blocks 80, as of hard rubber, are inserted in separated, ventilating relation in many of the links of the chain and are held therein by cotter pins 82 (Fig. 2). These blocks 80 have enlarged foot portions, the lower ends of which are serrated so that there may be no accumulation of moisture between them and the sole of the shoe. Near the heel and toe ends of the chain 40, more of the links are provided with blocks 80 in order that the separating distances shall be shorter and so that there may be no possibility of contact between the chain and the shoe when, in smaller sizes of shoes, the chain tends to curve down around the ends of the shoe.

When the lever 54 is tilted upwardly by means of the handle 56 to allow the insertion of a pair of shoes for treatment, or the removal of those which have already been treated, any danger of sparking between the electrodes or of shock to the operator is obviated by a mercury switch 90, which is mounted on the lever 54 and has leads 92 adapted to be connected in circuit with the source of power in such a way that the electrodes are de-energized whenever the circuit within the switch 90 is broken.

No matter how the electrodes are placed with respect to the shoes, their wet soles will ultimately be dried. It has been found, however, that there is considerable variation in the evenness of the drying action and in the total time required as the relation and spacing of electrodes and sole is changed. Furthermore, in some positions, it is found that the metal plates which not infrequently are utilized on the bottoms of lasts have a definite shielding effect which de-

creases the efficiency of the apparatus. This shielding effect is minimized, however, if the field passes at right angles to the metal plates, which means, in the case of lasted shoes, that it will pass substantially heightwise of the shoe. With this arrangement, also, the uniformity of treatment is greatly increased and the relation of the electrodes to the shoe soles is not materially different in shoes of the smallest and largest sizes, the field passing substantially heightwise of the shoes and substantially normal to the soles.

In the use of the apparatus, the paddles will be adjusted, if necessary, in accordance with the sizes of the shoes by loosening the wing nuts 20 and swinging the outer paddles laterally. The height of the posts 42 supporting the inner ends of the chain electrodes 40 may be also adjusted, if desirable, and the stop screws 64 turned to a suitable height so that the blocks 80 of the electrode chain will contact lightly with the bottom of the shoe and position the links of the chain electrode 40 at an equal distance heightwise from the sole. The action of the electrodes upon the soles will then be substantially uniform. When one pair of shoes has been treated, the arm 54 will be raised, being held by the latch 66 and the supply of current to the electrodes will be shut off by means of the mercury switch 90, permitting the shoes to be removed and other shoes to be substituted.

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

1. In an apparatus for producing a high frequency field, a support for an article of irregular shape, an electrode for association with an upper portion of the article and arranged to assume the contour thereof upon engagement therewith, another electrode positioned adjacent to said support and between which and said first electrode a field may be set up intersecting said article, and ventilated means for holding said first electrode in a predetermined spaced relation to the article.

2. In an apparatus for producing a high frequency field, a support for an article of irregular shape, an electrode comprising a flexible conducting member, a plurality of dielectric spacing devices carried by said conducting member to hold it at a predetermined distance from the article against which the electrode is positioned, and another electrode spaced from the first and between which and said first electrode a field may be set up including said article.

3. In a shoe-treating apparatus, a shoe support, an electrode for association with that portion of a shoe which is uppermost on the support, said portion having an irregular contour, said electrode being arranged for engagement with the shoe to be partially supported thereby and comprising a flexible conducting member, separated spacing means carried by the conducting member to prevent said member from coming in contact with the shoe, another electrode spaced from the first and between which and said first electrode a field may be set up including said shoe, and means for connecting said electrodes to a source of high-frequency current to produce an electrostatic field therebetween.

4. In a shoe-treating apparatus, a support for a shoe, spaced electrodes between which an electrostatic field may be set up to include a shoe on the support, an arm carrying one of said electrodes being movably mounted on the apparatus,

said electrode being flexible to permit it to assume the contour of the bottom of a shoe upon contact therewith, and means distributed along said electrode to hold it in a predetermined space relation with respect to the bottom of the shoe.

5. In a shoe-treating apparatus, electrodes between which an electrostatic field may be set up and adapted to be associated with spaced portions of a shoe, one of said electrodes having the form of a chain to enable it to be flexed, thereby to conform to the curvature of a portion of the shoe.

6. In a shoe-treating apparatus, electrodes between which an electrostatic field may be set up and adapted to be associated with spaced portions of a shoe, one of said electrodes being flexible to conform to the curvature of a portion of the shoe, and a plurality of dielectric spacing blocks attached to said flexible electrode whereby it may be caused to assume the curvature of the shoe by contact of the blocks with said shoe.

7. In a shoe-treating apparatus, laterally spaced shoe supports holding between them a shoe in an inverted position, an electrode adjacent to at least one of said supports, an electrode supported for movement toward and away from a shoe on the supports and adapted to be positioned adjacent to the bottom of the shoe, and means for connecting said electrodes to a source of high frequency electric current.

8. In a shoe-treating apparatus, a shoe support, a flexible electrode adapted to be brought into operative relation to a portion of a shoe positioned on the support, an arm extending over the shoe and supporting one end of the electrode, said arm being tiltably mounted with respect to the support, and a stop for limiting movement of the arm toward the shoe on the support.

9. In a shoe-treating apparatus, a shoe support, an electrode for association with a shoe on the support comprising a flexible conducting member, spacing means carried thereby to prevent contact of said member with the shoe, an arm, and spring means for connecting one end of the flexible electrode to one end of said arm.

10. In a shoe-treating apparatus, a shoe support comprising substantially parallel members for engagement with the sides of a shoe rested thereon in inverted position, an electrode associated with one of said supports, a tiltably mounted arm extending lengthwise of the shoe substantially medially thereof, a flexible electrode carried beneath said arm in a slack condition whereby it may assume the contour of the bottom of the shoe as the arm is moved toward the shoe, and electrical insulating means between said electrode and the shoe.

11. In a shoe-treating apparatus, shoe supporting paddles of dielectric material, metallic material adjacent to one side of one of said paddles to serve as an electrode, another electrode spaced from said paddle to permit the interpositioning of a shoe, and means for connecting said electrodes to a source of high frequency current.

12. In a shoe-treating apparatus, shoe-supporting paddles of dielectric material, a metal member attached to the under side of one of said paddles to serve as an electrode, another electrode spaced from said first electrode, and means for connecting said electrodes to a source of high frequency current.

13. In a shoe-treating apparatus, spaced shoe-supporting paddles, an electrode associated with

a paddle and adapted to be connected to one side of a source of high frequency current, an insulated electrode adapted to be positioned adjacent to the sole of a shoe mounted in inverted position on said paddles and to be connected to the other side of said source, and means permitting lateral adjustment of one of said paddles to bring the sole of the shoe into substantially a predetermined heightwise relation to the paddles.

14. In a shoe-treating apparatus, spaced paddles of dielectric material for supporting an inverted shoe, an electrode associated with one of said paddles but out of contact with the shoe, a flexible chain serving as another electrode, means for loosely supporting said chain above the sole of the shoe, and dielectric spacing blocks on the chain permitting the chain to assume the curvature of the sole when this electrode is lowered into contact therewith.

15. In a shoe-treating apparatus, means for supporting a lasted shoe, an electrode mounted thereon extending along the side of the shoe and outside the shoe upper, another electrode also outside the shoe and flexible to allow it to assume the contour of the bottom of the shoe, spacing blocks for said electrode, said blocks having serrated faces for contact with the shoe, and means for connecting said electrodes to a source of high frequency current.

16. In a shoe-treating apparatus, means for supporting a lasted shoe in inverted position, an electrode mounted thereon outside the shoe, a flexible electrode outside the shoe and positioned above the shoe to rest thereon and consequently to assume the contour of the shoe bottom to pass an electrostatic field through a portion of the shoe on the support, separated spacing blocks on said latter electrode, said blocks being separated by shorter distances near an end of the shoe, and means for connecting said electrodes to a source of high frequency current.

17. In a shoe-treating apparatus, spaced electrodes adapted to be associated with the sides of a shoe and another electrode spaced from said first electrodes a sufficient distance to permit the interposition of the shoe, said latter electrode occupying an intermediate position to cooperate with each of the first-mentioned electrodes, and means for connecting one side of a source of high frequency current to said intermediate electrode and the other side to the other electrodes.

18. In a shoe-treating apparatus, electrodes positioned adjacent to the opposite longitudinal sides of the outer surface of a shoe and adapted to be connected to one side of a source of high frequency current, and another electrode positioned longitudinally and substantially medially of the sole of the shoe and adapted to be connected to the other side of said source.

19. That method of treating shoes by means of an electrostatic field produced between electrodes, one of which has a plurality of component parts, which consists in positioning a shoe in a definite relation to one of the electrodes between which said field is produced, causing the component parts of the other electrode to assume a curvature determined by the curvature of the bottom of the shoe, supporting that electrode in a predetermined space relation with respect to the bottom of the shoe, and applying a high frequency current to the electrodes.

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