

B. S. LEE.
SOFTENING APPARATUS.
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Patented May 25, 1920.

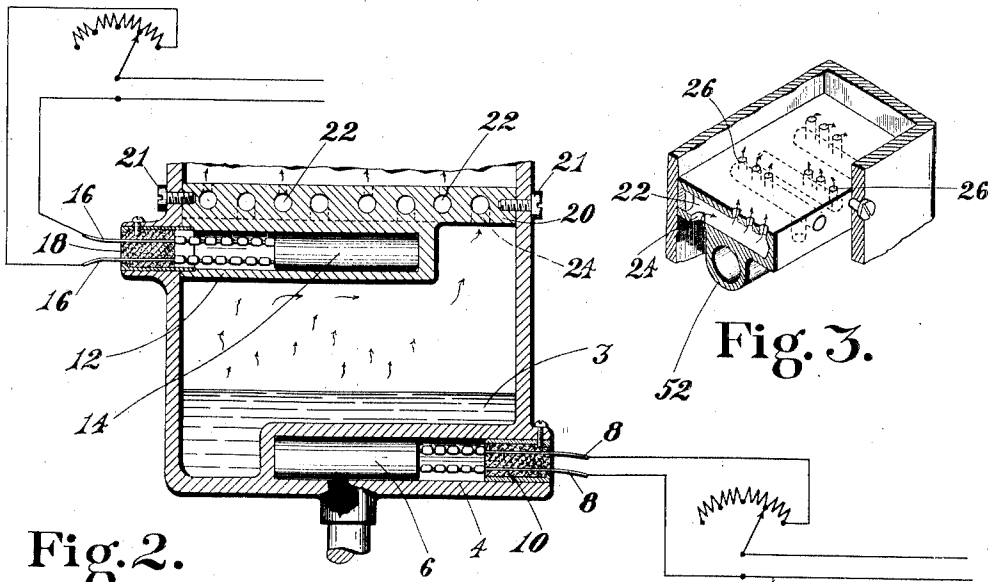


Fig. 2.

Fig. 3.

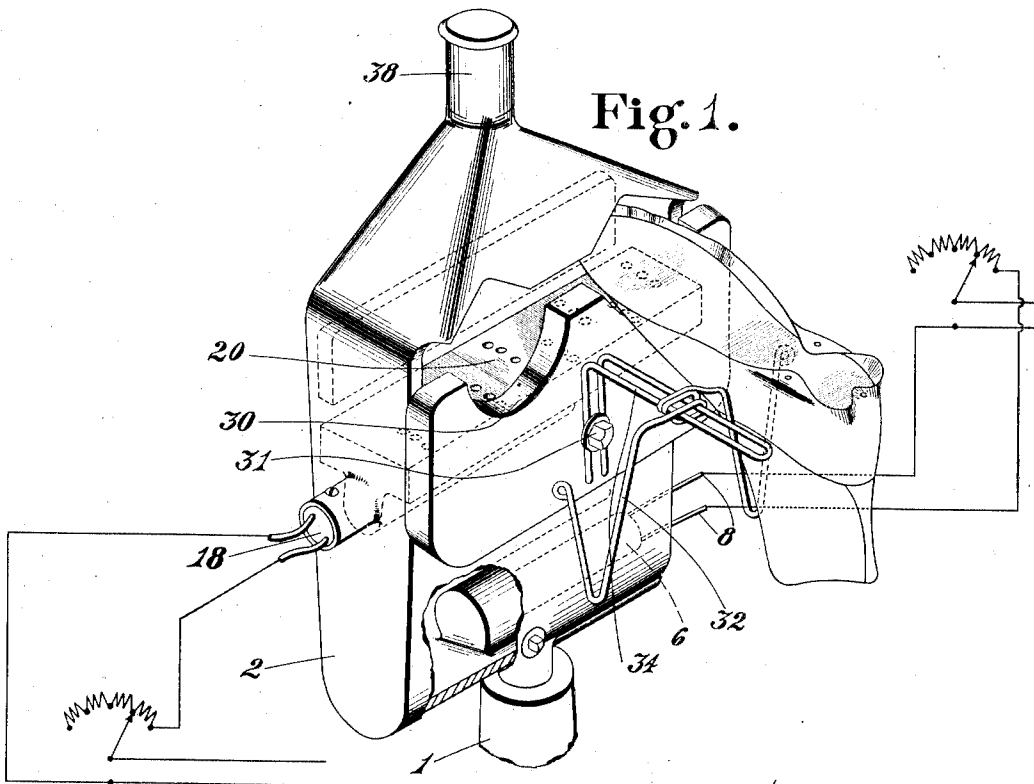


Fig. 1.

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SOFTENING APPARATUS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, BERNARD S. LEE, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Softening Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to apparatus for use in softening parts of boots and shoes by steam or vapor during their manufacture.

Great difficulty is experienced in operations such as pulling-over and lasting operations in the production of toes properly shaped and conformed to the last, unless the shoe materials have been rendered soft and pliable. Various apparatus have been devised for supplying steam or dry heat or both to the toes of shoes in order to prevent damage to the material, and also to facilitate molding the materials of the box toe to the last. Steam is generated, at atmospheric pressure, at about 212° F. It becomes much lowered in temperature, however, before reaching the shoe in the steaming devices that are now in use, even if it travels only a few inches, the temperature of the steam as it reaches the shoe being frequently below 130° F. The steam is consequently very wet. Some shoes have box toes that require steam of a higher temperature or a drier vapor, or both, than supplied by known forms of toe-softening devices to soften the material sufficiently to permit satisfactory shaping to the form of the last. For example, the Beckwith box toes require a temperature of 140° F. or higher, while it is unsafe to subject many kinds of leather, especially vegetable tanned leather, to such high temperatures. An important object of the present invention is to provide an improved organization of means to increase the heat content of the steam or vapor supplied in toe-moistening devices without increasing the quantity of moisture discharged or the pressure at which it is discharged, to the end that vapor at substantially atmospheric pressure may be heated to any desired temperature at a point so close to the work that its effective temperature as it reaches the work may be regulated with precision.

The stiffening material of which the so-

called "Beckwith toe-boxes" are made becomes soft when heated moderately without moisture, but in practice a small quantity of vapor is desirable (the quantity depending upon the kind of leather used for the upper) to soften the leather. One fault in apparatus heretofore used for softening uppers is that the requisite heat cannot be obtained without excessive steam-pressure and excessive discharge of moisture. This fault is due to generating the steam at a great distance from the point of use. This condition necessitates considerable steam-pressure and copious discharge to carry the steam to the work before its temperature falls below the useful degree. Consequently apparatus of the latter type are not only wasteful of heat but they entail a discharge of moisture that is too great for the good of the leather and for the health of the occupants of the workroom.

In order to overcome the objectionable conditions attendant upon former apparatus a feature of the present invention consists in a novel organization of means for generating vapor at substantially atmospheric pressure in proximity to the work, and means for raising the temperature of the vapor to any desired degree, without entailing a too forcible or a too copious discharge. Another feature consists in an arrangement whereby the latter means may, when desired, be used to generate heat without requiring the first said means to generate vapor.

Other objects and advantages of the invention will more fully appear from the following description of one embodiment of the invention, and from the accompanying drawings illustrating the same in which,

Figure 1 is a view in perspective of the toe softening apparatus;

Fig. 2 is a view in vertical longitudinal section through the lower portion of the apparatus, and

Fig. 3 is a detail view, in perspective, of a portion of the baffle plate and casing.

The apparatus comprises a tank 2 which may be suitably supported, as upon a pedestal 1. The tank 2 contains a body of water 3 which may be supplied thereto and maintained at an appropriate level therein by any suitable means. The lower portion of the tank may be formed with a cylindrical or other appropriately shaped casing

4, within which is located suitable heating means in the form of an electric unit 6 and having wires 8 for supplying current, the wires passing through an insulating plug 10. By means of the electrical unit the water 3 in the tank is caused to boil, thereby generating steam.

In the upper portion of the tank 2 is provided a longitudinal bore 12 which forms a casing for a second heating device, herein shown as an electrical unit 14 and having current-supplying wires 16 which pass through an insulating plug 18, the unit 14 serving to heat or superheat the steam or vapor which rises from the body of water 3, as will appear. Above the unit 14 is located a diaphragm or baffle plate 20 which extends across the tank 2, and may be secured to the walls thereof by suitable means as screws 21. The baffle plate is herein shown as provided with a plurality of transverse passages 22, and each of said passages communicates with the steam space below the baffle plate by openings 24, each alternate opening 24 being arranged at the opposite end of its passage 22, and perforations 26 permit the escape of the heated steam from the ends of the passages 22, said perforations being arranged in staggered relation so that the vapor flows in tortuous passages through the baffle plate.

The volume of steam generated and the temperature of the steam delivered from the baffle plate may be independently regulated by rheostats, as shown. The steam approaching the baffle plate may be below 212° F., due to loss of heat during its rise from the water 3, and may be brought back to the saturation point, or even superheated at the baffle plate. Its temperature will again drop as it moves to the shoe.

The front wall of the casing 2 is provided with openings 30 which are shaped to receive the toe-ends of the shoes being treated. In order to support the shoes with their toes in the vapor-chamber of the casing 2 a shoe-rest 32 is provided in front of each opening 30. The shoes are supported in inverted position upon the V-shaped portions of the rest 32 and the toe ends of the shoes rest upon the lower walls of the openings 30, as clearly shown in Fig. 1.

The casing 12 for the superheating electric unit 14 may be integral with, or secured to the baffle plate, see Fig. 3, so that the heat of said unit is applied directly to the baffle plate, and the vapor which flows through the tortuous passages 22 is heated to a suitable degree. Such superheated vapor rises and passes to and heats the toe-ends of the shoes projecting into the space above the baffle plate. In consequence of heating the vapor the latter softens the box toe quickly without unduly moistening the upper leather or the insole, and the toe materials are there-

fore prepared for lasting without undergoing the injury that has heretofore been caused by too much moisture.

The top portion of the tank 2 is, as shown in Fig. 1, provided with a suitable cover which confines the vapor, more or less, to the space in which are located the toes of the shoes being treated, and an outlet 38 from said top permits the vapor to escape from the tank in such quantities as to prevent an undue amount of back pressure in the apparatus.

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

1. An apparatus of the character described comprising a casing, means for supporting a shoe with a part thereof in said casing, means for generating heat in a body of liquid in said casing to produce vapor, and means arranged directly in the path of the vapor for superheating the vapor.

2. An apparatus of the character described comprising a casing, means for supporting a shoe with a part thereof in said casing, means for supplying vapor to said casing, a baffle having one or more passageways for conducting the vapor, and means to superheat the vapor as it flows through said passageways.

3. An apparatus of the character described comprising a casing, means for supporting a shoe with a portion thereof in said casing, means to vaporize liquid in said casing, a baffle plate having tortuous passages therethrough for the vapor, and means to superheat the vapor flowing through said passages.

4. An apparatus of the character described comprising a casing, means for supporting a shoe with a part thereof in said casing, heat-generating means in the lower part of said casing for vaporizing a body of liquid therein, and other heat-generating means located in the path of the vapor to superheat the vapor.

5. An apparatus of the character described comprising a casing arranged to contain liquid, means for supporting a shoe with a part thereof above the liquid in said casing, heating means located below the liquid and adapted to vaporize the same in said casing, a diaphragm above said heating means having a passage for the vapor, and means to superheat the vapor as it flows through said passage.

6. An apparatus of the character described comprising a casing arranged to contain a body of liquid, means for supporting a shoe with a part thereof in said casing, a compartment in the lower part of the casing, a heating unit therein for vaporizing the liquid, a baffle located in the casing above the first-named compartment and having ducts for the passage of the vapor through

it, and a heating unit embedded in said baffle to superheat the vapor passing through said ducts.

7. An apparatus of the character described comprising a casing arranged to contain a body of liquid, means for supporting a shoe with a part thereof in said casing, a compartment arranged below the liquid to contain a heating unit, a baffle plate above the liquid-level in said casing and having passages therethrough, and a compartment below said baffle plate to contain a heating unit to superheat the vapor.

8. An apparatus of the character described comprising a casing, means for vaporizing liquid in said casing, a baffle plate located above said vaporizing means and provided with horizontal passages, vapor inlet and outlet openings for said passages, said openings being in staggered relation, means to superheat the vapor flowing through said passages, and means for supporting a shoe

with a part thereof within said casing and above the baffle plate.

9. An apparatus of the character described comprising a casing arranged to contain a body of liquid, a heating unit in said casing below the liquid therein, a baffle plate provided with tortuous vapor-passages and located in said casing above said heating unit, a second heating unit located below said baffle plate for superheating the vapor flowing through said passages, and means for supporting a shoe with a part thereof within the casing and above said baffle plate.

10. An apparatus of the character described comprising steam generating means, a baffle plate to which the steam is conducted arranged to heat the steam, and an electric unit in thermal communication with the baffle plate.

In testimony whereof I have signed my name to this specification.

BERNARD S. LEE.