Nov. 16, 1943. A. J. WELLS 2,334,232

CONDITIONING APPARATUS

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Fig. 2

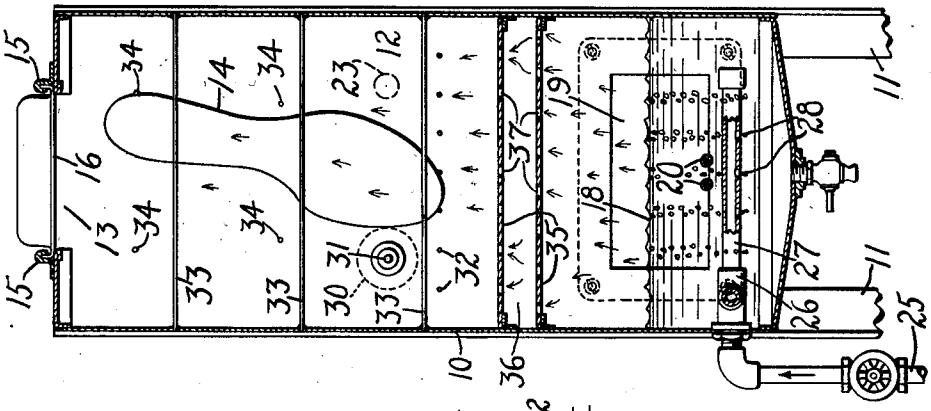


Fig. 1

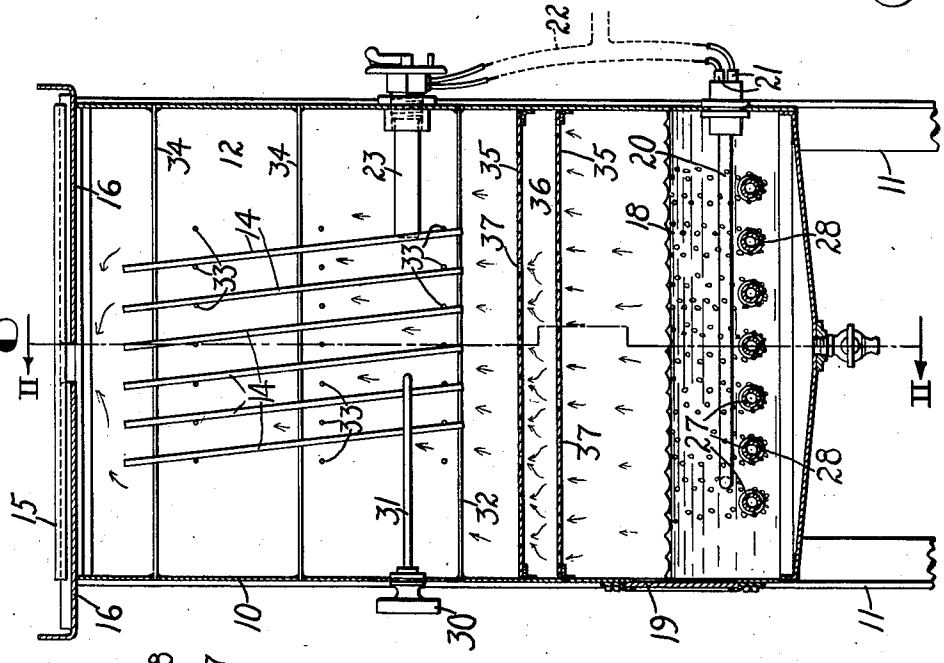
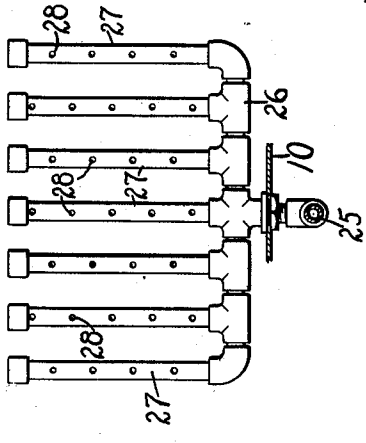


Fig. 3



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2,334,232

UNITED STATES PATENT OFFICE

2,334,232

CONDITIONING APPARATUS

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Application January 25, 1941, Serial No. 375,951

5 Claims. (Cl. 12—1)

This invention relates to the treatment of materials with water vapor, and is herein disclosed as embodied in an apparatus designed to treat unattached leather soles for shoes.

An object of the invention is to provide an apparatus by which the grain sides of unattached soles may be rapidly rendered pliant with water vapor without being stained. The illustrated apparatus embodying the invention is designed, and has a capacity, to satisfy the demands of a sole-conforming machine, provided the soles are placed in the treatment chamber and removed therefrom in regular order of succession and in pace with the operations of the conforming machine. Under these conditions it is sufficient to allot about one-half minute of treatment for each sole.

The conditioning apparatus provides a treatment chamber in the upper part of which the articles of work are supported for treatment. A body of water in the lower part of this chamber and a short distance below the work is heated to accelerate its vaporization and to heat the atmosphere about the soles. The temperature of this atmosphere may be about 140° F., that being about the highest temperature to which the general run of sole-leathers may be subjected without harm.

Now, if the water and the atmosphere surrounding the soles remained quiescent some cool air could enter the treatment chamber where the soles are inserted. This would condense the vapor and a much longer time than one-half minute would be required to supply the soles with enough vapor to bring them to the desired condition. Therefore, the invention provides for forcing so much vapor to flow from the water to the work and thence to the work-receiving opening that no air will enter through the latter.

To this end the apparatus is provided with means for blowing many small jets of air into the water from nozzles immersed therein. This air becomes heated while bubbling through the water and becomes saturated with vapor which it carries to the work. The work-receiving opening, located at the top of the treatment chamber, is restricted to prevent the influx of cool air so long as the normal quantity of heated air and vapor flows past the work.

If any small globules of water entrained in the stream of vapor were deposited on the grain of the leather they would stain it. To guard against such staining the illustrated apparatus is provided with baffles located in the path of the vapor below the work station. These baffles are provided with a sufficient number of small holes to insure supplying the work with the full quantity of vapor, but at the same time they act as a filter to separate the globules of water from the vapor and return them to the body of water from which the vapor is supplied.

The method of creating a tempering atmosphere for leather herein set forth is being claimed in an application for Letters Patent of the United States, Serial No. 430,350, filed February 11, 1942, as a division of this application.

Referring to the drawing,

Fig. 1 is a vertical section of a conditioning apparatus embodying the invention and having work-supporting means designed to provide individual stalls for soles inserted for treatment;

Fig. 2 is a vertical section of a portion of the apparatus indicated by line II—II in Fig. 1; and

Fig. 3 is a plan view of piping designed to supply many small jets of compressed air in a body of water.

The illustrated apparatus is designed to stand on the floor adjacent to a sole-conforming machine. A sheet metal casing 10 supported by legs 11 forms a closed treatment chamber 12 having a restricted opening 13 in its top wall to receive a plurality of soles 14. Grooved strips 15 (Fig. 2) are fastened to opposite margins of the top wall to provide guides for retaining one or more movable closures 16, 16 by which the opening 13 may be restricted much or little, as desired. The closures are adapted to slide toward and from each other in the grooved strips and may be separated to admit the soles and adjusted to reduce the gap between them.

The lower part of the casing 10 is formed to maintain a body of water 18 to be converted into vapor for conditioning the articles of work. A panel 19 of transparent glass in one of the upright walls of the casing enables the user to observe the quantity of water available for use. An electrical heating unit 20 is arranged to be immersed in the water 18 to raise its temperature. The butt of this unit extends through one of the upright walls of the casing and is provided with eletric terminals 21, 21 for connection with the wires (dotted lines) of an electrical circuit 22. The circuit also includes a regulatable thermostat 23 in series with the heating unit and located in the vapor space of the chamber 12 above the water.

The quantity of vapor that would normally rise from the surface of the water 18 in a still atmosphere would be insufficient to accomplish the desired results in the length of time (about one-half minute) allotted for treatment, with regard to the demands of a sole-conforming machine. Consequently, to accelerate the transfer of vapor from the water to the work, the apparatus includes means for supplying many small jets of air above atmospheric pressure in the water. For this purpose, a supply pipe 25 (Fig. 3), is arranged to conduct compressed air from a source of supply to a manifold 26 from which a series

of branches 27 extend. The remote ends of these branches are closed but the jets of air are emitted downwardly through small perforations 28 in the bottoms of the branches 26. As the air bubbles through the water it becomes heated and saturated with vapor. A slight gap between the closures 16 will insure a continuous and rapid flow of the vapor to and around the articles of work in the treatment chamber 12.

The indicating portion 30 of a thermometer is attached to the exterior of the casing 10 and the active element 31 thereof is located in the vapor space of the treatment chamber adjacent to the station occupied by the work.

To insure rapid and uniform conditioning of the soles, the treatment chamber 12 is provided with means arranged to maintain a series of soles on edge and in face-to-face relation, and spaced one from another to permit a flow of vapor along both surfaces of each sole. Accordingly, a series of thin, parallel, supporting strips 32 (such as wires), suitably spaced, are secured to opposite upright walls of the casing. They are preferably located at a level far enough below the top of the chamber to enable the soles to stand on end. Moreover, the treatment space is divided into individual upright stalls, one for each sole, by a plurality of tiers of thin, parallel strips 33 extending crosswise with respect to the strips 32. In addition to these separating strips 33, the treatment chamber is provided with thin strips 34 parallel with the supporting strips 32 and arranged to maintain the soles approximately upright, as represented in Fig. 2. These latter strips maintain the upper ends of the soles nearly, if not exactly, in register with the opening 13 to facilitate removal of the soles. The ends of the strips 33 and 34 are also secured to the upright walls of the casing.

Two baffle plates 35 are arranged between the water 18 and the work. Each is provided with many small perforations 37 through which the vapor may flow, the perforations in the lower plate being out of register with those in the upper plate, and the space or chamber 36 between the plates being shallow to change abruptly the direction of travel of the vapor. The perforations 37 may be about ¼ inch in diameter, and surely not so small as to have a capillary effect.

The baffles 35 prevent the splash or spray of the water 18 from rising above the upper plate. Moreover, any small globules that might be entrained in the vapor in the chamber 36 will accumulate on the lower surface of the upper plate 35 and drain back through one or more of the perforations in the lower plate.

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

1. A conditioning apparatus for leather soles comprising a casing closed except for a sole-receiving opening in its upper portion, sole-supporting means arranged to support the soles in the upper part of said casing in spaced relation, the lower portion of said casing being adapted to contain a body of water with its surface a considerable distance below the soles, means for heating the water, means for maintaining the water at a predetermined temperature substantially below its boiling point, and means for forcing air through said water in sufficient quantity to maintain a constant outward current of hot vapor-laden air through said sole-receiving opening and to subject the soles to the action of said current of hot vapor-laden air.

2. An apparatus for tempering leather soles comprising a casing having in its upper portion an opening through which the soles may be introduced into the casing, means for supporting the soles in the upper portion of the casing with substantially all of their surfaces exposed, said casing being adapted to contain a body of water in its lower portion, the surface of the water being a considerable distance below the sole-supporting means, means for heating the water, means for maintaining the water at a temperature substantially below its boiling point, means for forcing jets of air through the water to cause the air to be heated and to absorb water-vapor and to maintain a constant flow of said water-vapor-laden air upwardly through the casing past the exposed surfaces of the soles and outwardly through said opening, and means for removing water in liquid form from the current of water-vapor-laden air in its passage from the surface of the water to the sole-supporting means.

3. A conditioning apparatus for leather soles comprising a casing closed except for a restricted sole-receiving opening in its upper portion, means in said upper portion for supporting the soles so as to permit access of vapor to substantially all of their surfaces, a body of water in said casing at a considerable distance below the soles, an electric immersion heater to heat the body of water, a thermostat for maintaining the water at a predetermined temperature substantially below the boiling point, nozzles immersed in the body of water for emitting jets of air under pressure at room temperature in the water to increase the vapor output of said heated water and to maintain a constant flow of vapor-laden air through said opening, and baffles comprising a plurality of perforated plates spaced from each other with the perforations in one plate staggered relatively to those of the other and with an open space between them, said baffles being located between the surface of the water and the soles to remove from the current of heated vapor-laden air particles of water as such.

4. A conditioning apparatus comprising a casing forming a closed chamber but having a restricted opening in its upper portion to receive soles, an adjustable closure for said opening, means in the upper part of said chamber to support a series of soles on edge in spaced face-to-face relation, the lower part of said casing being formed to maintain a body of water below the soles, heating means arranged to raise the temperature of said body of water, and means arranged to supply many small jets of air above atmospheric pressure in said body of water to accelerate the transfer of vapor from said water to the work stationed above it.

5. A conditioning apparatus comprising a casing forming a closed chamber but having a restricted opening in its upper portion to receive soles, an adjustable closure for said opening, a plurality of thin strips spaced one from another and secured to said casing to form a series of upright stalls to support the soles on edge in face-to-face relation in the upper part of said chamber, the lower part of said casing being formed to maintain a body of water under said stalls, heating means arranged to raise the temperature of said body of water, and means arranged to supply many small jets of air above atmospheric pressure in said body of water to accelerate the transfer of vapor therefrom to and through said stalls.

ADONIRAM J. WELLS.