

D. J. MURPHY.
METHOD OF WATERPROOFING SOLES OF SHOES.
APPLICATION FILED JUNE 19, 1909.

980,664.

Patented Jan. 3, 1911.

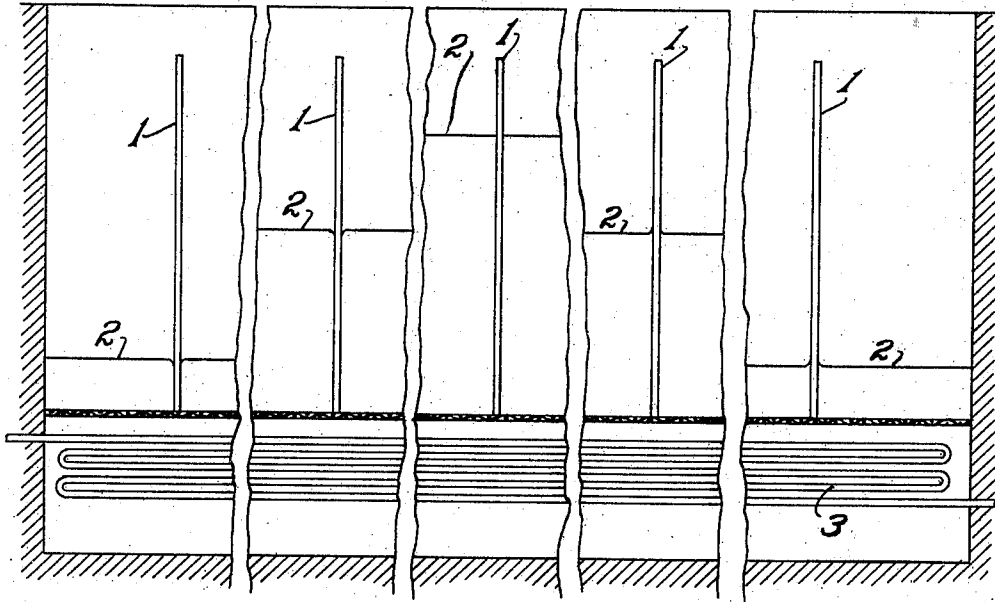
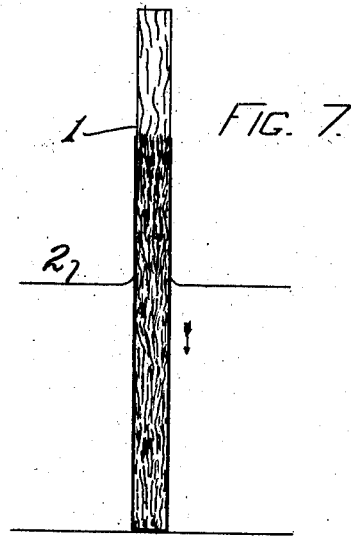
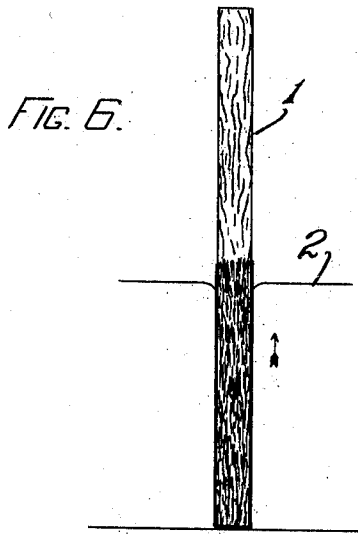


FIG. 1. FIG. 2. FIG. 3. FIG. 4. FIG. 5.



WITNESSES

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METHOD OF WATERPROOFING SOLES OF SHOES.

980,664.

Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed June 19, 1909. Serial No. 503,120½.

To all whom it may concern:

Be it known that I, DANIEL J. MURPHY, a citizen of the United States, residing at Lawrence, county of Essex, Commonwealth of Massachusetts, have invented certain new and useful Improvements in Methods of Waterproofing Soles of Shoes, of which the following is a specification.

This invention relates to the impregnation of leather with such a substance or composition as a heavy oily waterproofing agent.

In the impregnation of leather soles, great difficulty is experienced in securing the complete permeation of the leather by a heavy oil or one normally approaching a state of viscosity.

In order to secure satisfactory results in a waterproof sole it is necessary that the permeation be complete and uniform and that the waterproofing be deposited in such a manner that it will be permanent and afford the water resisting qualities which are sought. It is also necessary that the waterproofing take place in such a manner as to leave the leather at least as pliant as it was before treatment and that its wearing properties be unimpaired and that its surface be capable of proper finish.

To the end of securing the above features, indicated as desirable, I have devised my present invention which consists in a method of applying waterproofing by which the above effects are secured.

This method will be more fully described in the specification which follows and it is illustrated in the accompanying drawings in which I have endeavored to illustrate diagrammatically the series of steps involving the principles of my invention. In this drawing I have used certain reference numerals assigned to certain parts to identify them in connection with the specification in which I have employed the same numerals in a corresponding manner.

Figure 1 is a fragmentary sectional view of a tank in which a sole shown in edge elevation is just beginning to be submerged. Fig. 2 is a similar view of an adjacent part of a tank in a more advanced stage of submersion. Fig. 3 is a similar sectional view showing the liquor at its highest elevation on the sole. Fig. 4 is a similar sectional view showing the liquor at a lower level and Fig. 5 is still another similar view showing the receding liquid at a level corresponding

to that of Fig. 1. Fig. 6 is an enlarged sectional view of a blank during submersion and Fig. 7 is an enlarged view of a blank during emersion.

In Figs. 1 and 5 the separate views are intended to indicate successively the periods of submersion and emersion of a blank 1 in a liquid 2.

In Fig. 4 are indicated the walls of a tank and viewed together, Figs. 1 to 5 express in broken parts the general construction of such a tank.

3 is a heating coil such as a steam pipe and 5 is a screen supporting the blank 1 in a vertical position in the liquid.

Referring to Fig. 6 it will be seen that the liquid rising in the direction of the arrow works up in the blank as indicated by the shaded part in advance of the surface of liquid.

In Fig. 7 the liquid 2 is indicated as receding in the direction of the arrow, leaving behind it an impregnated area, the excess of liquor in which drains down slowly as the blank emerges above the level of the receding solution.

My invention consists, in brief, in overcoming the internal action of the air in the cells of the leather by the simple manipulation of the materials in the carrying out of the process.

It is to be understood that in such an article as a leather shoe sole there is present an extensive cellular and agglomerated fibrous structure upon which atmospheric conditions act with considerable directness. If now this sole is plunged into a waterproofing preparation which, in most instances, is so heavy as to have a tendency to become viscid there is trapped within the cells and among the fibers a certain amount of air which is a permanent obstruction to complete impregnation. Having once been externally subjected to a coating of waterproofing this air compels the formation on the surface of the sole, of a shell or outer layer of waterproofing which in itself prevents any future penetration on the part of the waterproofing liquid, to the parts of the sole within. The surface so coated is also not adapted to take a finish or polish as it contains an excess of oil locally. I have discovered by employing the well known principles of capillary action I am able to expel the greater part, if not all, of the air from the sole by using a

method of gradual progressive submersion. My method of impregnation, therefore, is practically as follows, still referring to the waterproofing of shoe soles as illustrative thereof: I place in a tank a number of shoe soles vertically supported, toe down and heel up and suitably spaced apart to permit the free passage of liquid. I then turn into the tank a stream of waterproofing preparation which is preferably warmed if the same contain heavy oils. I gradually raise the level of the preparation by feeding it into the tank out of contact with the soles until the surface of the liquid reaches the toes of the vertically disposed soles. As the surface of the liquid reaches the tips of the sole it begins to soak in and work through the leather, rising slightly above the level of the liquid on account of the capillary action of the cells and fibers. As the liquid progresses in its permeation of the sole it drives out the air contained in the sole, the same escaping upwardly and outwardly as the waterproofing penetrates within. As the penetration progresses the level of the liquid is raised and this is continued throughout the entire length of the sole, or as far up toward the heel seat as it is thought necessary to waterproof. In this manner it will be seen the waterproofing by the strong capillary action is enabled to dislodge the air before the entire upper surface is closed and this capillary action is rendered progressive by the progressive submersion of the sole.

In draining the soles before drying it is preferable to do this by a practically reversing of the steps above set forth. This is in order that the excess of liquor may be gently removed still leaving the leather as heavily impregnated as possible. After the soles have been completely submerged and allowed to stand a length of time, which depends upon the specific gravity of the liquid and the porosity of the soles, the level of the liquid is gradually lowered, thus relieving gradually the internal pressure upon the sole and permitting the deposit of the waterproofing material within the sole in a gradual manner without subjecting the same to the drag of rapidly draining liquid. In practice I find that substantially all kinds of sole leather may be treated successfully in this manner. There is, however, a difference in the treatment of bark tan or in acid or chrome tanned leather. I find that bark tanned soles are best treated at a temperature of 100° Fahrenheit.

In treating bark tanned soles the submersion and emersion should be timed to be completed in about sixty minutes, that is to say the gradual submersion of the sole should be accomplished in about thirty minutes, and the gradual draining should be finished in about the same time. In the case of acid or chrome tanned blanks much less time is required and the submersion and emersion may be accomplished usually in fifteen minutes. I find that it is advisable not to submerge the blank further than the heel seat or that portion to which the heel lifts are attached. This is for the reason that the untreated seat is firmer and takes a much better beading; furthermore being protected by the heel it is not necessary that the seat be impregnated.

I find that soles prepared in this manner are waterproofed to the utmost degree, have a remarkable softness and flexibility even when the original leather was stiff and crude, and have a wear resisting quality which seems to be entirely independent of the grade of the leather.

As indicated above, various substances and materials might be used within the limits of the appended claims without departing from the spirit of my invention.

What I, therefore claim and desire to secure by Letters Patent is:

1. The method of impregnating a leather sole with an oily waterproofing, consisting in subjecting a dry sole to a gradual progressive submersion.

2. The method of impregnating a leather sole with an oily waterproofing, consisting in subjecting a dry sole to a gradual progressive submersion longitudinally and then to a gradual progressive emersion therefrom.

3. The method of impregnating a leather sole with an oily waterproofing, consisting in subjecting a dry sole to a gradual progressive submersion longitudinally.

4. The method of impregnating a leather sole with an oily waterproofing consisting in subjecting a dry sole to a gradual progressive submersion longitudinally and then to a gradual progressive emersion therefrom and then drying in the presence of warmth.

In testimony whereof, I affix my signature in presence of two witnesses.

DANIEL J. MURPHY.

Witnesses:

MARION NEWELL,
JAMES F. CAVANAGH.