UNITED STATES PATENT OFFICE.

ROBERT ATHELSTAN MARR, OF NORFOLK, VIRGINIA, ASSIGNOR TO GENERAL WATER-PROOFING CO., INCORPORATED, OF NORFOLK, VIRGINIA, A CORPORATION OF VIRGINIA.

IMPREGNATED LEATHER AND METHOD OF MAKING SAME.

1,166,846. Specification of Letters Patent. Patented Jan. 4, 1916.

No Drawing. Application filed January 13, 1914. Serial No. 811,913.

To all whom it may concern:

Be it known that I, ROBERT ATHELSTAN MARR, a citizen of the United States, residing at Ghent, Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Impregnated Leather and Methods of Making Same, of which the following is a specification.

This invention relates to the treatment of leather for the purpose of rendering the same impervious to moisture, also for densifying and hardening the same to a desired degree, also for increasing the wear resisting qualities of the leather, and to preserve the same against rotting and the like.

In my process I am able to completely fill the spaces existing in leather, even in poor leather, such as that produced from the hides of old animals, with a material including solid silica in suspension (in a suitable menstruum) said leather thereby becoming absolutely impervious to moisture, and unaffected by the action of organic acids and the like.

The silica which I employ is preferably that known as diatomaceous earth, which is a very finely divided material, so that 90% of the same will pass through a bolting cloth having 40,000 meshes to the square inch.

My experiments show that all leathers can be made impervious to moisture and that the process gives life to the leather and gives it a healthy appearance, increases its tensile strength, also increases its resiliency and increases the weight of the leather. The silica being a very hard material also increases the wearing qualities of the leather, for example if the same is used for sole leather, harness leather or leather belting.

Leather may be treated in a finished condition, that is after the tanning operation is completed, and the leather has been rolled, or it may be treated in a partially prepared state, for example, after the currying operation, or the currying operation may be dispensed with. The skins, from the tan liquor vats may be simply dried and then treated in accordance with my process.

It has heretofore been stated that many varieties of leather are water-proof, but this term has been used in a relative sense only, since heretofore no leather has been able to withstand soaking in water for a considerable time, and then drying, without getting hard and more or less brittle, so that the leather after such treatment will be likely to crack.

In carrying out my process I preferably proceed as follows: The finished or unfinished leather is immersed in a bath preferably composed of the following materials, and in the proportions stated, although these proportions may be varied more or less. Paraffin 100 parts; naphthalene 2 to 5 parts; diatomaceous earth 5 to 10 parts; to which may be added rosin 2 to 10 parts, if this material is desirable, for special purposes to be referred to later.

The temperature of the bath at the time of immersion will preferably be about 213° F., and the leather may be immersed in this bath for a time, say from one to two minutes, during which time, or at the end of which time, the temperature may be allowed to drop to a lower temperature, say 180 to 200° F., if a rather heavy penetration of the material is desired. As a modified mode of procedure the temperature of the hot stage may be from 208 to 212° F., and the temperature may be allowed slowly to drop to 180° F., or even lower, if a heavy impregnation of the leather is desired.

Leather in its air dry condition, ordinarily contains more or less moisture, the moisture content ordinarily varying between 10 and 20%, with about 15% as a mean. If so desired I may use leather containing materially more moisture than these amounts, and thereby am able to secure a very heavy impregnation of the leather, with the impregnating material above referred to.

I call attention to the fact that the silica being in a state of extreme sub-division is carried wherever the melted material is carried and I am able to thoroughly impregnate every portion of the leather or other hide product under treatment.

The amount of impregnation of the material will depend upon the amount of moisture in the original leather, the temperature and time of subjection or immersion in the bath, the porosity and physical condition of the leather, and will depend to a certain extent with a particular leather, upon whether or not the material has been rolled and finished. I am able in this manner to increase

the weight of the leather from 12 to 25% in ordinary cases, and in some instances I have been able to increase the weight even more than this, but further increase beyond 25% is generally not advisable or necessary.

As above stated the rosin may be used if desired, or may be omitted, and the use or non-use of the rosin will depend upon the use to which the product is to be put, for example one property which is given by the rosin is that of adhesion to surfaces, for example the adhesion of belts to pulleys or the prevention of the slipping of the belt over the surface of the pulley.

I call attention to the fact that the leather may be only partly immersed in the liquid, that is to say one side only of the leather may be immersed, in the liquid, in which case substantially complete impregnation of the leather, can be effected.

The impregnated leather may be used for making pulleys, and the like, by being turned in a lathe if so desired.

In working leather treated by my process, the preservative and suspended silica renders longer service from the needles and tools used and a prepared thread does away with the heated wax through which in sewing ordinary leather the thread must constantly pass before passing to the needles. This is especially true with respect to sole leather as used in the manufacture of boots and shoes. The process also prevents the ready formation of ice upon the surface of the leather thereby preventing slipping. Since sole leather and some other varieties of leather are usually sold by weight the increase in weight during the work will very much more than pay for the cost of the treatment.

I call attention to the treatment of thin leathers for book binding purposes. Leather is an extremely popular material for book binding, but as is well known, the leather does not last well, since it undergoes a rapid deterioration and rotting action, so that books bound with leather have to be rebound rather frequently, thereby entailing considerable expense. Leather treated in accordance with this process absolutely will not rot in this manner, since it is entirely protected from atmospheric influences and from moisture. I call attention to the fact that paraffin which is the largest ingredient of my mixture, is entirely insoluble in water, and acts as a preservative and prevents the entrance of water in any form to the impregnated material.

The function of the naphthalene in this process appears to be more than a preservative for the reason that the vaporization or partial vaporization of the naphthalene and its consequent liquefaction upon cooling, drives out the moisture and air in the interstices of the material, thereby allowing the ready entrance of the paraffin and the materials carried thereby.

I desire to call attention to the fact that heretofore various materials have been employed in the impregnation of leather, in combination with volatile solvents such as gasolene and the like, and call attention to the fact that in my process no solvent of this character is employed, since the same is not necessary. By thus doing away with the necessity of a volatile solvent, the expense incident thereto is avoided, and also a more perfect impregnation is secured, than can be obtained when using solvents.

The use of a bath comprising paraffin, diatomaceous earth, and rosin, or equivalents thereof, for impregnating leather, is described and claimed in my copending application No. 812,026, filed Jan. 14, 1914.

The treatment of leather and similar materials with a bath comprising paraffin and naphthalene, without diatomaceous earth, is not claimed herein, but is claimed in my copending application Serial No. 871,816, filed November 12, 1914.

What I claim is:—

1. A process of treating leather and skins which comprises impregnating the same with a filling and impermeablizing agent comprising diatomaceous earth, paraffin, and naphthalene.

2. A process of treating leather and skins which comprises impregnating the same with a filling and impermeablizing agent comprising diatomaceous earth, paraffin, naphthalene and rosin.

3. A process of treating leather and skins which comprises immersing the same in a bath comprising paraffin, naphthalene, and a solid material of sufficient hardness to increase the wear-resisting qualities of leather and of sufficient fineness to enter the pores, at a temperature somewhat above 212° F.

4. A process of treating leather and skins which comprises immersing the same in a bath comprising paraffin, naphthalene, rosin and a solid silicious material of sufficient fineness to enter the pores, at a temperature somewhat above 212° F.

5. A process of treating leather and skins which comprises submerging the same in a bath comprising paraffin, naphthalene and diatomaceous earth at a temperature above 212° F., then lowering the temperature of the bath to below 212° F., and removing the articles from the bath when sufficiently impregnated with the filling material.

6. A process of treating leather and skins which comprises submerging the same in a bath comprising paraffin, naphthalene, rosin and diatomaceous earth at a temperature above 212° F., and removing the articles from the bath when sufficiently impregnated with the filling material.

7. As an article of manufacture a hide

product impregnated with a mixture including diatomaceous earth, paraffin, rosin, and naphthalene.

8. As an article of manufacture, a hide product impregnated with a mixture including diatomaceous earth, paraffin and naphthalene.

In testimony whereof I have affixed my signature in presence of two witnesses.

ROBERT ATHELSTAN MARR.

Witnesses:
JANEY HOPE MARR,
A. B. FOSTER.