UNITED STATES PATENT OFFICE.

RALPH W. E. MOORE, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

IMPREGNATING PROCESS.

1,286,057. Specification of Letters Patent. Patented Nov. 26, 1918.

No Drawing. Application filed February 19, 1914. Serial No. 819,857.

To all whom it may concern:

Be it known that I, RALPH W. E. MOORE, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Impregnating Processes, of which the following is a specification.

My invention relates to impregnating processes, and it has for its object to provide a novel, expeditious and simple process of impregnating porous materials with waxy, resinous or bituminous impregnating agents.

In impregnating porous materials, such as paper and cloth, with waxy or resinous substances, it has heretofore been customary to take extreme precautions to guard against the presence of water during the impregnation. To this end, the materials to be impregnated are usually baked for a considerable time and subjected to vacuum, the impregnating liquid being supplied while the vacuum is maintained.

I have discovered that, while water or other liquid is not desirable in the final product, its presence in the early stages of the impregnation process may be highly beneficial, and may greatly expedite and improve the process.

My invention has particular reference to an improved process of impregnation in which I take advantage of the above mentioned discovery, and subject the material to be impregnated to a preliminary treatment with water or other suitable moistening liquid. The water or other suitable liquid, hereinafter referred to as the "moistening liquid" is vaporized in a subsequent stage of the process, and the vapor so generated drives out the air present in the interstitial spaces of the fabric. In order to accomplish this result, the moistened fabric is treated with a suitable waxy, resinous or bituminous impregnating liquid, and heat is applied, to vaporize the moistening liquid and drive off the air and vapor, thus permitting the impregnating agent to enter all the pores of the fabric. Upon cooling, any trace of vapor of the moistening liquid that may possibly remain in the fabric condenses, and the impregnating liquid takes its place. The exceedingly small amount of water or other liquid that may be formed by this condensation is not sufficient to wet the final product, but is held in suspension therein, and its quantity is so small that it can be measured only by refined methods of determination. Its presence, therefore, does not impair the usefulness of the final products for insulating or other purposes.

I will illustrate my process by reference to the impregnation of paper or cloth with waxy bodies, such as ceresin, and a preliminary treatment with water. I first moisten the paper or cloth with water, either by dipping or sprinkling. The fabric need not be thoroughly saturated, since only enough water is required to supply sufficient aqueous vapor to expel all the air from the fabric. I then subject the fabric, by immersion or otherwise, to the liquefied wax, and heat until the temperature of the treated fabric is raised to a point considerably above the boiling point of water. A temperature of 160° C. or 175° C. is not excessive. I continue the heating until bubbling has ceased for some time, in order to insure the complete expulsion of the air and the water, and I then reduce the temperature nearly to the solidifying point of the wax and remove the fibrous material from the bath.

If, as is frequently the case, I desire to use an impregnating material at a temperature above the boiling point of water as when the melting point of the impregnating material is above 100° C., I prefer to carry out my process under sufficient induced pressure to raise the boiling point of the water above the initial temperature of the melted wax or other impregnating material at the beginning of the treatment. Pressure may also be applied, if desired, after the impregnating step, and while the treated fabric is cooling.

The example which I have given and in which water and wax are the materials used, is to be understood as merely illustrative and not as limiting my invention, which comprehends broadly the use of any liquid as the moistening agent which does not readily dissolve the impregnating agent and the boiling point of which is either above the melting point of the impregnating agent or can be raised above such melting point by the application of pressure. In my process, I may use any of the ordinary impregnating agents, such as vegetable or mineral waxes, asphalts, resins, halogenated waxes,

etc., and I may apply my process to every variety of porous substance, such as cloth, paper, wood, or even closely wound coils of wire, or assembled condenser sections having dielectric layers of fabric.

I claim as my invention:

1. The process of impregnating porous material which comprises moistening the material with a liquid having a relatively low boiling point and causing the replacement of the moistening liquid, by the application of heat, with an impregnating liquid insoluble in the said moistening liquid and of higher boiling point.

2. The process of impregnating porous material which comprises moistening the material with a liquid of relatively low boiling point, treating the moistened material under super-atmospheric pressure with an impregnating liquid insoluble in the said moistening liquid and of higher boiling point, and heating to about the boiling point of the moistening liquid.

3. The process of impregnating porous material which comprises moistening the material with a liquid having a boiling point which is normally relatively low, treating the moistened material with an impregnating liquid under a pressure such that the moistening liquid cannot boil, although the temperature of the impregnating liquid at the beginning of the treatment is above the boiling point of the moistening liquid, and heating to a temperature at least high enough to cause boiling of the moistening liquid and until bubbling, due to such boiling, ceases.

4. The process of impregnating porous material which comprises moistening the material with water, immersing the moistening material in a melted waxy substance that is insoluble in water, and heating the said waxy substance above 100° C.

In testimony whereof, I have hereunto subscribed my name this 16th day of Feb. 1914.

RALPH W. E. MOORE.

Witnesses:
GOLDIE E. MCGEE,
B. B. HINES.

Correction in Letters Patent No. 1,286,057.

It is hereby certified that in Letters Patent No. 1,286,057, granted November 26, he application of Ralph W. E. Moore, of Wilkinsburg, Pennsylvania, for an improvement in "Impregnating Processes," an error appears in the printed specification requiring correction as follows: Page 2, line 22, claim 2, for the word "about" read *above;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 24th day of December, A. D., 1918.

[SEAL.]

F. W. H. CLAY,

Acting Commissioner of Patents.

Cl. 91—70.