

UNITED STATES PATENT OFFICE.

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ARTICLE-COATING PROCESS.

933,598.

Specification of Letters Patent.

Patented Sept. 7, 1909.

No Drawing.

Application filed October 8, 1906. Serial No. 338,087.

To all whom it may concern:

Be it known that I, JESSE M. TALMADGE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Article-Coating Processes, of which the following is a specification.

This invention relates to the general subject of coating processes wherein wood, metal and fabric articles are coated with special materials and substances to improve either the physical condition of such articles, or render the same available for special uses:

To this end the invention contemplates a novel and thoroughly effective coating process which provides for imparting to articles treated by the process certain properties having a high degree of efficiency. In this connection, the invention is intended to secure valuable and practical results in rendering articles waterproof, fire or flame proof, and acid proof, besides imparting thereto great heat resistant and electrical insulating properties.

In securing the foregoing results, the invention possesses special utility in its application to electrical conductors and fixtures whereby the same may be not only effectively insulated, but by reason of having a coating which is waterproof, fireproof, and acid proof, will be specially useful in electrical wiring under extreme conditions such as prevail in the wiring of steamships, factories, and other places where the insulation is subjected to the damaging effects of heat, moisture, and gases.

A further special object of the invention is to provide a coating process applicable to paper for imparting thereto superior water and moisture-resisting properties, and, generally speaking, the invention is applicable for treating all absorbent and conductive materials, any and all kinds of electrical wires and fixtures, cloth, paper, asbestos, leather, and in fact any article or substance wherein it is important and desirable to render the same more resistant to the action of the elements, while at the same time increase the strength, life, durability, and efficiency thereof. Also, in the case of electrical wires and fixtures the improved process provides

a coating which not only possesses waterproofing, fireproofing, and acid-proofing properties, but also increases the effective insulation. It will thus be observed that one of the most important and practical uses of the invention is as a process of coating metals.

The production of a coating or surface possessing the combined characteristics above referred to is produced, in the present invention, by securing a transformation in the physical condition and properties of a special natural oil. That oil is known as Japanese wood oil, also as Chinese wood oil, also as tung oil, also as wood oil, and also as bakoly oil; the same being obtained, without distillation, directly from the seeds of the tung tree indigenous to the orient, particularly Japan and China. This tung oil is a fixed oil having a specific gravity somewhat greater than that of linseed and similar oils, and through a series of practical laboratory experiments, it has been found by me that this special oil, by the treatment contemplated by the present invention, undergoes transformation in physical conditions and properties different from that possessed in any of the known fixed oils, or oils of distillation. The experiments made in connection with the tung oil have demonstrated that when the same is applied as a coating or body to an absorbent or porous article, and then subjected to the action of a high degree of heat, it is transformed or converted into an entirely new and valuable substance possessing all of the peculiar properties above referred to.

In one of the practical applications of the invention the process claimed herein may be described as follows: The article to be treated is either of an absorbent or porous composition, or in the case of wire and similar articles is covered with an absorbent covering so as to act as a binder for the coating. This article is immersed in a bath of the tung oil, or otherwise provided with a coating thereof of any desired thickness, after which, without preliminary drying, the excess oil is removed from the coated article and the latter then subjected to the action of heat. The temperature of the applied heat usually ranges from 212 degrees

to 560 degrees Fahrenheit, and the effect of such heat upon this special oil is to transform the coating into an insoluble body, and which possesses the characteristics of complete insolubility in any of the ordinary organic solvents, and it also is flexible and elastic, while at the same time possessing firmness and strength. By reason of the insolubility of this substance the exact chemical formula of the same has not as yet been accurately determined, and therefore the applicant is only able to distinguish the same now by reason of its peculiar physical characteristics aforesaid.

In reference to the question of temperature, it may be further explained that solidification sets in at 212° (degrees) Fahrenheit, and varies from that degree to 560° (degrees) Fahrenheit according to the character of the article being coated, and hence its ability to stand the temperature, it of course being understood that the higher the initial temperature, the quicker the solidification, but in no instance has the applicant found his process to require more than 30 minutes for complete results.

The foregoing constitutes the essential and distinctive thought of the improved process, but it will of course be understood that the same may be combined with various other steps and details without affecting the peculiar results obtained. For instance, the oil may be utilized as commercially obtained, or after purifying, or after being rendered neutral. Also, the thickness thereof may be varied to suit conditions by the use of benzine, and the same may be also utilized with or without coloring matter, according to the particular conditions to be met. Also, the oil may be applied in any manner most convenient or suitable to the article or articles treated. However, in this connection it will be observed that one of the most practical and useful ways of carrying out the process consists in first mixing a body of tung or Chinese wood oil with a hydrocarbon and then applying this compound to the body to be coated.

Through extended laboratory research and experiment, it has been found that the most practical and satisfactory results are secured by carrying forward the heating step of the process in the open, that is, in the presence of air, but, in all cases, under such a high degree of heat as to effect complete polymerization directly on the article enveloped or coated with the raw oil, thus securing the above described complete transformation in the physical condition and properties of the oil by reducing the same to an insoluble form. In this connection, it is to be understood that a distinct and differentiating feature of the present invention is that of effecting the complete polymeriza-

tion of the oil directly on and in the article enveloped, coated, or saturated therewith, thus providing for a utilization of tung oil after polymerization, which, as far as the applicant is apprised, has never before been possible on account of the very fact that polymerized tung oil is absolutely insoluble, and hence, was heretofore, prior to the present invention, incapable of application for utilization. In other words, according to the present invention, the applicant has discovered through extensive chemical experiments and laboratory research that by employing tung oil in an unadulterated and raw state as a film upon an article to be permanently coated, and then subjecting the same quickly to a very high degree of heat, a rapid polymerization of the oil takes place without oxidation, and thus secures results which are impossible of attainment with any process where the tung oil is combined with resins or other adulterants, and wherein a prolonged treatment under heat necessarily involves more or less oxidation, which is opposed and antagonistic to a polymerization of the oil. As proof of these statements, though the chemistry of tung oil is necessarily little understood, the applicant has found that articles treated according to the present invention, in the open, are unaffected by the most concentrated nitric, sulfuric or hydrochloric acids. Also, the polymerized material is absolutely unaffected by the most powerful alkalies when boiled therein for twenty-four hours, or by any known solvent, and all articles treated as described, according to the present invention, are rendered water and acid proof by polymerization of the absorbed wood oil throughout the impregnated material. The improved process requires only a few minutes time in contradistinction to other processes utilizing tung oil in various ways, and which other processes require many hours of treatment to obtain the results aimed for. It has also been found that the present invention obtains the advantageous results specified through the use of tung oil without adulterants, and that such results cannot be attained through the admixture of such oil with any other substance or substances.

I claim:

1. A coating process which consists in applying to the body to be coated a film of raw tung oil and then subjecting the body thus coated to a minimum temperature of 212 degrees Fahrenheit for a period not to exceed a maximum of thirty minutes, whereby the oil is transformed into an insoluble form which is resistant to water, chemicals, fire, heat, and electricity.

2. A process of coating which consists in mixing a body of tung oil with a hydrocarbon and applying the compound to the body

to be coated, and then heating the same to a minimum temperature of 212 degrees Fahrenheit for a period not to exceed a maximum of thirty minutes, whereby the oil is transformed into an insoluble form which is resistant to water, chemicals, fire, heat and electricity.

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

JESSE M. TALMADGE.

Witnesses:

D. P. WOLHAUPTER,
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