Patented Nov. 8, 1927. 1,648,294

UNITED STATES PATENT OFFICE.

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PROCESS OF IMPREGNATING WOOD.

No Drawing. Application filed January 26, 1926. Serial No. 83,961.

This invention relates to impregnated woods and to methods of impregnating woods. In my Patent No. 1,556,570, granted October 6, 1925, I have disclosed a method of treating wood with a high melting point wax, either alone or in combination with certain fungicides or other materials, which immensely improves the characteristics of the wood. This treatment makes the wood waterproof, it prevents it from shrinking and swelling, and protects it from decay. Furthermore, these effects are substantially permanent. The invention therefore represents an important advance in this art.

The present invention aims further to improve the process disclosed in said patent with a view to reducing the time required and the expense involved in effecting the impregnation, and making the process more adaptable for practice in the present commercial wood treating plants.

The more important wood treating plants now in operation are equipped wth pressure cylinders and are designed fundamentally for the impregnation of wood wth creosote. This impregnation usually is carried on at a temperature of between 180° F. and 190° F. In impregnating wood with Montan wax or with a mixture of Montan wax and creosote, in accordance with my prior patent, it is preferable to force the impregnating material into the wood at a temperature of from 220° F. to 240° F. The latter temperature is rather close to the point at which the structure of the wood will be impaired if the temperature is maintained for a long period, so that there is danger of injuring the wood unless the temperature is controlled very accurately. Moreover, the fact that the treatment should be carried on at this high temperature requires modifications in the equipment of the present commercial treating plants which are comparatively expensive to make.

I have found that these objections can be avoided, and the time required for the treatment can be materially reduced by mixing with the Montan wax, or with the impregnating compound in which it or one of its substitutes is the chief ingredient, a liquid which will readily penetrate the wood and which is either a solvent for the wax or is readily miscible with the melted wax. Liquids which are suitable for this purpose are carbon tetrachloride, turpentine, kerosene or gasolene. Another liquid which I have found very satisfactory is a distillate obtained from the fractional distillation of petroleum, and which, I understand, comes off between gasolene and kerosene. This oil has properties somewhat like those of a mixture of kerosene and naphtha, and it is used very widely in the paint trade as a substitute for turpentine. A grade of this oil with which I have obtained very satisfactory results is on the market under the name of Atlantic safety solvent.

Whether all of the liquids just named are true solvents for Montan wax is not entirely clear. Carbon tetrachloride appears to be a true solvent for the wax and at high temperatures the unions of the other liquids and Montan wax act like solutions. They may, however, be simply very intimate mixtures.

All of the liquids just mentioned are volatile and they all penetrate the wood very rapidly. Ten to fifteen percent of one of these liquids added to the Montan wax permits a reduction in temperature during impregnation to approximately the temperatures ordinarily used in impregnating wood with creosote. From considerations of economy and safety I prefer to use the petroleum distillate above mentioned, and with ten or fifteen percent of this material the impregnating process may be carried out exactly as described in my patent above designated except for the difference in temperature. Of course a larger or smaller percentage of the solvent may be used depending upon the results desired. Uusally it is preferable to effect the impregnation with as high a concentration of the constituents which are to remain permanently in the wood as can be

used and still treat at a suitable temperature and in a satisfactory length of time. The concentration may also be varied in accordance with the quantity of wax which it is desired to leave in the wood. Where the chief object is to reduce the time required to effect the impregnation, the treatment may be carried on at a higher temperature, say for example, 225° to 240° F., and in such a case the oil or solvent added is of great value in promoting penetration and therefore shortening the time required for the treatment.

When the impregnation has been effected and the wood has been removed from the cylinder, the impregnating compound is sealed in the wood by the cooling thereof. The volatile ingredient of the impregnating compound subsequently evaporates, leaving the Montan wax, creosote, or other constituents of the treating material permanently sealed in the pores and tracheids of the wood.

Some compounds suitable for this purpose may not be volatile, and it is not essential that they should be so long as they are readily miscible with the wax, penetrate the wood rapidly, and do not have any substantial adverse effect on the more important characteristics of the treating material. It is important for nearly all purposes for which impregnation is effected that the impregnating compound will not ooze from the treated wood and will not soften sufficiently in the wood at high atmospheric temperatures to produce a moist or tacky surface. The surface of wood used out of doors, and even that of much of the wood used in doors, is very likely to attain a temperature of at least 120° F. at certain times, as for example, in the heat of a summer sun. Consequently, it is important that any of the constituents used with the Montan wax, or its substitutes, should not result in permanently reducing the softening point of the material to a temperature below 120° F. In other words, the surface of the treated wood should remain hard and non-tacky at all temperatures below 120° F. This fact should be borne in mind in preparing the impregnating compound. The oils which have been mentioned as solvents are substantially inert so far as toxicity is concerned, but either the wax or the solvent used with it may be made toxic if desired by adding suitable agents such, for example, as beta napthol. This is a concentration of the more toxic constituents of creosote oil. Three percent of beta napthol added to the treating solution will make it sufficiently toxic to protect the wood from decay.

The process provided by this invention, by permitting impregnation at a lower temperature, or by reducing the time required for the treatment at a higher temperature, economizes heat; and in the latter case it permits an increased production from a given plant. It is also readily adaptable to the present commercial treating plants. By treating with a lower temperature the danger of injuring the structure of the wood due to variations in control is practically eliminated. Furthermore, even when a high temperature is used the fact that the time of treatment required for this process is very short, also practically eliminates the danger of injuring the structure of the wood since a treatment carried on at 250° F. for a short time, will not damage the wood. This process may also be used to advantage in the treatment of fibre board, some grades of which are very difficult to treat without the use of a solvent or a liquid which is miscible with the melted wax.

While I prefer to use Montan wax as an essential, and usually the predominating, ingredient of the impregnating compound, carnauba or candelilla waxes have somewhat similar properties and may be substituted for it under some conditions as I have explained in my prior patent. Montan wax may be modified somewhat by methods known to the producing industry, and an example of such a product is known commercially as Romalin wax. The modified wax, however, appears to retain all the essential characteristics of Montan wax.

Having thus described my invention, what I desire to claim as new is:

1. That improvement in the process of impregnating wood, fibreboard and the like, which consists in mixing a melted waxy material having a softening point above 120° F. with a substantial percentage of an inert liquid which is miscible with said melted waxy material, and forcing said mixture into the pores of the material being treated for a substantial depth.

2. That improvement in the process of impregnating wood, fibreboard and the like, which consists in forcing into the pores thereof for a substantial depth a melted compound containing a high percentage of a wax having a softening point above 120° F. with from 5% to 20% of a highly penetrative liquid readily miscible with said wax.

3. That improvement in the process of treating wood which consists in forcing into the pores and tracheids of the wood for a substantial depth a melted waxy material having a softening point above 120° F. diluted with a substantial percentage of a volatile liquid which is miscible with said melted waxy material, and subsequently allowing said liquid to evaporate.

4. That improvement in the process of treating wood which consists in forcing into the pores and tracheids of the wood a melted mixture of a toxic preservative, a waxy substance which is hard and non-tacky at tem-

peratures below 120° F. and a substantial percentage of a solvent for said waxy substance, and allowing the wood to cool sufficiently to cause said mixture to harden in the pores and tracheids of the wood.

5. That improvement in the process of impregnating wood, fibreboard and the like, which consists in forcing Montan wax dissolved in a solvent therefor into the pores of said material, and subsequently allowing the solvent to evaporate.

6. That improvement in the process of treating wood which consists in forcing into the pores and tracheids of the wood for a substantial depth and impregnating material consisting essentially of Montan wax and a highly penetrative solvent for said wax.

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