

UNITED STATES PATENT OFFICE.

CARLETON ELLIS, OF LARCHMONT, NEW YORK.

PRESERVED WOOD AND PROCESS OF MAKING SAME.

No. 871,392.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CARLETON ELLIS, a citizen of the United States, and a resident of Larchmont, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Preserved Wood and Process of Making Same, of which the following is a specification.

This invention relates to processes of preserving fiber, particularly wood fiber, by impregnation with an organic body of liquid or plastic nature carrying a dissolved inorganic fungicide; and to the product of such process.

The present methods of preserving wood involve the use either of soluble salts such as sulfate of copper and chlorid of mercury and zinc, or of an insoluble oil containing carbolic and cresylic acids and the like. Of the soluble salts employed, copper sulfate is, generally speaking, by far the most efficient. The compounds of copper are strong fungicides and were it not for the soluble character of copper sulfate its use as a timber preservative would doubtless be widespread. In moist localities the salt is completely removed from the wood in the course of time. Copper sulfate is not satisfactory from another view point, in that it does not render the wood water-proof or resistant to the entry of moisture.

My invention has for its object the treatment of timber or other fibrous matter with a composition which has the needful fungicidal properties and at the same time renders the material highly water-proof.

My invention consists in the impregnation of timber or other fiber with a fluent organic body carrying a dissolved inorganic fungicide, preferably an organic salt of copper; and in the product resulting from such process, that is to say, wood or other fibrous material as railroad ties and paving blocks more or less impregnated with a fluent organic body and a therein dissolved inorganic fungicide or antiseptic.

To properly preserve wood it is necessary that there be present a fluent body immiscible with water, or at least substantially immiscible, which renders the article fairly water-proof and which is capable of some movement in and around the fibers so that if, in the course of time, the surface of the wood

checks or cracks, the fluent water-proofing material may gather at the exposed surface to a sufficient extent to retard further disintegration. Carbolic acid and its homologous acids, cresylic acid and the like, commonly known in their commercial forms as dead oils, have considerable water-proofing action, but are not sufficiently fungicidal. Dead oil and the like are not really strong fungicides. In using them it is quite customary to employ enough not only to impregnate, but to actually saturate so as to fill up the pores mechanically and mechanically prevent entrance of germs or growth of germs. With these cheap and cheaply used fluid oils, it is difficult to keep a saturating amount in the pores, particularly for instance with railroad ties lying in contact with dry and absorbent soil. On the other hand copper salts are active and efficient fungicides; not so much with regard to bacteria as with regard to higher fungi, but it is one of these higher fungi, dry rot, that causes much of the decay of wood. A minimal amount of copper salt in wood or other fiber will wholly prevent the growth of dry rot. It is not necessary for the prevention of dry rot to charge the fiber with large quantities of copper salts and in fact it is hardly beneficial to do so. The extremely powerful action of copper makes it necessary to use only a relatively small amount.

In carrying out my invention I preferably dissolve a salt of copper or compound of copper such as the resinate, carbolate etc. in dead oil, petroleum or any similar solvent or tarry compound of an oily character and impregnate the wood or fiber by simply dipping or in any other manner which brings about suitable impregnation. Ties for instance may be subjected to an atmosphere of steam until the air in and around their fibers is expelled and may then be treated with the composition under conditions whereby the impregnating oil is rapidly drawn into the wood. Or pressure may be employed. The oily solvent for the copper compound may even be thick and plastic, as for instance when tarry matter is the chief constituent. In such cases considerable heat may be necessary in order to make the composition fluid enough to properly

penetrate. Or thin solvents such as the lighter petroleum or rosin oils may be caused to dissolve a quantity of the copper salt and this thin composition may be used without heating; the oil being carried by capillarity even to the heart of the wood. Copper being the active fungicide, only enough solvent need be used to impregnate, as distinguished from saturating. Being dissolved by this oily solvent it will not be removed by the water, nor can it damage the fiber; the solution of course being liquid or fluent and preferably free from bodies which crystallize in such a manner as to weaken the fiber or materially modify its resiliency. Where crystallizable insoluble salts are formed by double decomposition, the preservative matter is apt to be localized in the fiber. The composition may also be transported to and into the fibers by making it into the form of an emulsion with water or water thickened or rendered somewhat viscous by the addition of cellulose sulfite liquor, soap and the like.

Ties impregnated as distinguished from saturated are of course lighter and easier to handle; they cannot lose fluid capillaryly; thin fluids can be used which are much easier to handle and are more penetrating, and, of course the smaller amount needed with the active fungicide makes the process cheaper. Other metallic compounds as zinc, mercury and lead salts may also be used, although they do not possess the specific fungicidal action that copper has. They are, however, rather strong bactericides and perhaps better suited for wet timbers in which the decay is more bacterial than fungoid.

The metallic compound employed should be readily soluble in the oily carrier. Copper resinate is a useful and a cheap form of copper base. It may be made either by fusion or precipitation. By the fusion method 10 or 15 pounds of copper carbonate or hydrate for instance are heated to over 200 deg. Fahr. with 100 pounds of resin until the resin has dissolved a substantial portion of the carbonate.

In making the copper salt by precipitation one may proceed in the following manner. Resin soap made by saponifying colophonium with caustic alkali in the usual manner is precipitated by the addition of a solution of sulfate of copper, sufficient of the latter being added to completely throw down the rosin. The mass is washed and dried and dissolved in the oil employed.

Even an extremely minute amount of soluble copper is effective and its use in the present way combines the powerful fungicidal action of copper with the sealing and the water-proofing action of dead oil and

similar oils so that the composition is a powerful fungicide and bactericide as well as a water-resisting agent and its use effectually prevents the decay of wood.

An illustrative preserving composition and one which I prefer owing to its general utility and cheapness comprises: copper carbolate, 6 pounds, creosote oil (dead oil), 100 pounds. The carbolate is well incorporated with the creosote by stirring and heating. Another illustrative formula comprises: copper resinate, 10 pounds, paraffin oil (or rosin oil), 100 pounds. This composition is particularly advantageous in cases where the smell of creosote is objectionable.

In the above formulæ the proportions may be varied to secure any desired strength or consistency. As little as one-twentieth of one per cent. of dissolved copper is effective. Zinc, lead or other metallic salt or metallic compound of an oil soluble character may be substituted for the copper compound although as stated copper is to be preferred owing to its peculiar fungicidal action. In lieu of the creosote or paraffin oil such bodies as tar or petroleum residuum may be employed. The addition of the drying oils greatly increases the cost of the composition and tends to cause the latter to eventually lose its fluent character when exposed; thereby hindering the continuity of the fiber sealing action which prevails with a fluent body. Drying oils, therefore, under some circumstances, may be quite detrimental.

To recapitulate, my invention comprises the process of preserving fiber which consists in impregnating fibrous material with a fluent organic body such as dead oil or petroleum oil and the like, or tarry material, carrying a dissolved inorganic fungicide, preferably a copper compound; and the product of such process, that is to say, fibrous material such as wood impregnated with a fluent or plastic organic material such as creosote, carrying a dissolved inorganic fungicide.

It will be understood that this process of preserving fiber may be used in conjunction with other preservative treatments and I do not limit myself precisely to the foregoing description, nor to the precise product therefrom as it will be evident that various modifications thereof are possible as well as divers combinations with other well known methods of timber treatment.

Having described my invention and set forth certain illustrative formulæ to the details of which this invention is, of course, not limited, what I claim is:

1. The process of preserving wood which consists in impregnating wood with carbolate of copper dissolved in oily material.
2. The process of preserving wood which

consists in impregnating wood with carbolate of copper dissolved in creosote oil.

3. As an article of manufacture, wood impregnated with organic oil carrying dissolved copper carbolate.

4. As an article of manufacture, wood impregnated with copper carbolate dissolved in an oil.

5. As an article of manufacture, wood im-

pregnated with copper carbolate dissolved in creosote oil.

Signed at New York, in the county of New York and State of New York this 11th day of June A. D. 1907.

CARLETON ELLIS.

Witnesses:

R. WASTCOAT,

H. B. CHALMERS.