

# ALIEN PROPERTY CUSTODIAN

## METHOD OF TREATING WOOD

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No Drawing. Application filed October 17, 1941

This invention relates to the protection of wood against the parasites attacking it in sea water, particularly in salt water, especially the pile-worm (teredo) or the limnoria lignorum or limnoria terebrans. The invention also relates to wood protected against such attacks.

It is well known to provide wood with a coating, which cannot be pierced through by the parasites in question, particularly pile-worms and limnoria against which the wood has to be protected. The coating which has been most frequently used for this purpose consists of sheet iron and in case of isolated piles tubes of concrete or pottery have also been used. It is known, however, that such hard materials are not indispensable, as on the contrary even a heavy deposit of rust in the outer crust of the wood appears to have a protecting action.

In connection with the coating of the surface of the wood or as the only protecting means impregnation of the wood by creosote oil, molten naphthalene or by tannic acid in connection with an iron salt has also been employed, frequently in such a manner that only the layers of the wood adjacent the surface thereof are penetrated by such means.

These methods of protecting wood against the parasites of the kind described are very expensive if carried out in such a manner that they are effective. Moreover, if the wood is exposed to rough sea, the sheet iron after it has been somewhat deteriorated by corrosion will tend to be torn off and, on the places where the water is incessantly renewed and where it is consequently most exposed to the attacks of the said parasites, any kind of impregnation will also be open to a strong washing effect.

The object of the present invention is to avoid these drawbacks and to find a method which will be cheap and effective in preventing the attack of the said parasites such as pile-worms and limnoria against wood placed in sea water, particularly in salt water in the shape of piles, quays, bridges, duc d'Albes and the like, ships or parts thereof, fisher's out-fit etc.

With these general statements of the object and purpose of my invention I will now proceed to describe the embodiments thereof and the manner in which my invention is carried out and it will be understood that while I have described what may be considered a preferable embodiment of my invention, I do not limit myself to the precise conditions or proportions set forth, as they may be varied by those skilled in the art in accordance with the particular purposes for which they are

intended and the conditions under which they are to be utilized.

The wood to be treated is of the kind usually employed for structures to be built in sea water such as harbours, quays, duc d'Albes, bridges etc. or for wood ships, such as pine, spruce, ash, beech, or oak etc. Experiments have particularly been carried out with pine, ash, beech and spruce. It has been found that the three former ones are comparatively easily provided with a well adhering protective layer according to the present invention, whereas this is somewhat more difficult in the case of spruce. In order to describe as completely as possible the difficulties that can be met with I therefore refer in the following particularly to the treatment of spruce.

It has been found that the protective coating made in accordance with my invention is most readily applied to the wood in its dry or seasoned condition, whereas it is comparatively difficult to obtain a protective coating that will adhere sufficiently to the surface under severe conditions in case of fresh wood still containing the juice in it.

The first treatment to be carried out in accordance with my invention is the formation upon the surface of the wood to be exposed to sea water a burnt or scorched layer. Scorching must be made so that the whole exposed surface of the wood is made evenly black and preferably a layer of charcoal of 1-2 mm in thickness is produced on it.

For this purpose the wood to be treated can be placed in a gas furnace with internal flame of a construction similar to those used for singeing pigs or an equivalent apparatus. In place thereof scorching can also be carried out by means of a portable burner, f. inst. a blow-torch and the use of a portable apparatus of this kind is indispensable when the protective coating is to be produced after the structure has been built, f. inst. in the case of ships, or if the object is of such a nature that it cannot be treated in a furnace.

The next step in the treatment is the impregnation and covering by an impregnating agent capable of binding to the charcoal. Such agents must also preferably be capable of penetrating to some degree into the outer part of the wood, as it has been found that if this is not the case, particularly in the treatment of spruce, the protective coating will have a tendency to loosen in the form of shells or flakes, thereby exposing parts of the surface of the wood to the attack of the parasites in question. It has been found by examining samples of spruce coated in various

manners under the microscope that in case the impregnating agent has not penetrated to some degree, f. inst. one or a few millimeters in the wood, there will be an interstice between the burnt and the protective coating, which interstice when the wood is placed in water will absorb water and push off the protective layer.

The impregnating agent which is called so in spite of the fact that it does not merely impregnate the wood to some small degree but also and particularly it forms a coating on the surface of the wood, may consist in tar, pitch or asphalt as well as similar materials which are capable of moistening charcoal and of absorbing and being absorbed by charcoal. It has been found that pitch and asphalt are not so well adapted as tar because they tend to produce coatings that will not adhere sufficiently to the wood. I have found that the best kind of tar which is also the cheaper one is coal tar. Preparations of tar, such as the black varnish, so called, used for treating the bottom of wooden ships, are also well adapted.

In order to apply the impregnating agent in such a manner that the coating will satisfy the above-named conditions in several cases it is sufficient to spread it out, preferably in a hot condition, over the surface of the wood by painting, spraying or in similar manner. This is particularly true in the case of the kinds of wood that are easily treated, such as pine, ash or beech, particularly when they are well seasoned.

In other cases, however, and particularly when the wood to be treated consists of spruce, I prefer to cook the charred wood in the impregnating agent for a considerable time.

In some cases, in order to obtain a sufficient coating, the impregnating agent is first applied in the hot condition and then in the cold condition, the purpose to be aimed at being to obtain both the penetration of the impregnation agent to a small depth into the wood and an unbroken coating on the surface of the wood. This coating when finished is preferably  $\frac{1}{4}$ -2 mm thick or more.

I have found that when the wood is difficult to impregnate, as f. inst. in the case of spruce, it is good to alternately cook it in the impregnating agent and place it in the cold impregnating agent which can be repeated for a few times. Thus, f. inst. a pile of spruce is first cooked in coal tar at a temperature from 100-180° C, preferably 160°, for 5 hours and then placed in coal tar for half an hour after which it is again cooked for 2 hours, once more placed in coal tar and once more cooked.

In this method the use of fresh unseasoned spruce is to be preferred.

The next treatment is what I have called mineralizing, which consists in incorporating into the coating of the impregnating agent particles or grains of some hard mineral substance. The same may be a powder or grains or shells. Thus ordinary sand can be used or the comminuted shells of oysters or mussels, the object being to impart to the coating a consistency or structure which cannot be readily penetrated by the parasites in question.

In order to make the coating form a practically homogenous layer which will not deteriorate when influenced by rough sea or tidal streams I prefer to use for the mineralizing treatment a mineral binding agent such as an air-bound or hydraulic mortar. I prefer a hydraulic cement such as Portland cement or Roman cement.

The mineraliser is applied by dusting it into the coating still wet or soft in so great a quantity as the coating will absorb. Alternately I may dip or turn the wood with the still liquid or soft coating upon it in the mineraliser or apply the same to the surface by means of rollers. Thus in case the wood has been cooked with the impregnating agent it can be placed still hot upon an area over which a thick layer of Portland cement has been spread out. When the wood is turned round as to apply the cement to all sides of it, the impregnating agent will retain all the cement it can possibly absorb and in a few minutes will solidify to form an elastic or plastic solid or semi-solid coating, from which any loosely attaching cement can easily be dusted or blown away. Other manners of applying the mineraliser is by air-spraying.

The mineraliser can alternately be mixed with the impregnating agent before the impregnating treatment but in this case it must be used in so small a quantity that it does not prevent the impregnating agent in penetrating into the wood. In case of the impregnation being repeated, the mineraliser can be mixed with the second or subsequent coatings alone, but I prefer first to impregnate and then to mineralise.

After mineralisation the wood is moistened by water if a hydraulic binder has been used and then it is stored for some days or better for a fortnight to harden the coating before its being used.

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