United States Patent Office.

CHARLES KARMRODT AND NICHOLAS THILMANY, OF BONN, PRUSSIA.

Letters Patent No. 88,392, *dated March* 30, 1869.

IMPROVEMENT IN PRESERVING WOOD.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, Dr. CHARLES KARMRODT and NICHOLAS THILMANY, both residents of the town of Bonn, in Prussia, have invented certain new and useful Improvements in Kyanizing Wood; and we do hereby declare that the following is a full and complete description of the same.

The nature of this invention relates to the preservation of wood from decay, by the impregnation of the same with antiseptic agents, whereby the inherent properties contained in the wood, inducing decay, are neutralized, or destroyed, but leaving its organic structure unimpaired, and its chemical character unchanged.

Sulphate of copper (blue vitriol) has proved itself hitherto one of the most efficient means for preserving wood coming in permanent contact with water, damp surfaces, from decay, from fungus, from the attacks of worms, and for preventing the havoc caused by the ship-worm, (*Teredo navalis*,) in salt water.

On that account, telegraphic posts, railway-sleepers, ship-timbers, &c., have been impregnated with a solution of sulphate of copper. By this means, they have been able to give to the less expensive sleepers, and poles, prepared from the so-called soft woods, the durability of the very best oak, and protected the ship-timbers from the attacks of the teredo.

Notwithstanding the favorable results which have been attained by impregnating the soft woods with blue vitriol, the fact is, that the preservation afforded by the imbibed vitriol only endures as long as the vitriol remains in the wood, and that this only lasted for a period of about twenty years.

It became apparent that the blue vitriol was gradually washed away by water, in view of which, one naturally thought of means to prevent either the chance of the vitriol being washed away, or to reduce this to an immaterial minimum. To accomplish this, many attempts have been made by your petitioners during the last ten years, and of all the means which have been tried, muriate of barytes, (*Chloridum barii*,) has proved itself the most efficient, if used in the following manner and proportions, and which requires no permanent nor expensive apparatus, but can be used with safety and ease by any one, and anywhere. This alone is an improvement on the old method of impregnating with blue vitriol, which required a permanent apparatus, or one with hydraulic pressure, which was difficult to transport.

Process.

The logs should be cut up, as soon as possible after the trees have been felled, into the lengths which are needed for the intended purpose. Each log is to be placed upright upon a basis which will allow of water flowing off, for example, gravel, or cross-bars of wood. A band, or ring of sheet-lead, is then laid round the upper transverse end of each log thus placed uprightly, in such a manner that it shall be some two or three inches higher than the transverse section, so that it forms a dish-like vessel, in which the liquid can be poured.

The band of sheet-lead is fastened to the wood with copper or zinc-covered nails, which can be easily drawn out. Common iron nails must not be used.

The interstices between the inner side of the vessel formed in this manner, and the section of the tree forming its bottom, which is to be impregnated, should be well plastered with thick clay, so as to allow of no fluid trickling through.

Other suitable means may be employed for charging the timber with the compound.

When the logs to be impregnated have been prepared in this manner, water should be poured on them, and that gradually, in the proportion of two libras (four Prussian pounds) to a cubic foot of wood. This water interpenetrates the wood, removing from it the juices which are easily decomposed, and which hasten its decay, and flows off at the lower end. The non-observance of this point in the old process, had an injurious result on the object to be obtained.

A solution of muriate of barytes is then to be poured on, and that in the proportion of one and a half to two libras to the cubic foot. The solution should be prepared in such a manner that two Prussian pounds of muriate of barytes are dissolved in fifty libras of distilled or rain-water, an operation which is easily performed in a barrel, by stirring with a stick.

When the solution of muriate of barytes, in the above proportions, is poured over and has penetrated the wood, a solution of blue vitriol is then poured upon it, which has been prepared in the same manner, with rain or distilled water. The use of iron or zinc vessels is most carefully to be avoided. To fifty libras of rain-water, three Prussian pounds of blue vitriol should be added, and of this solution, two to three libras to the cubic foot should be poured on the log.

The value of this process is seen in the following explanation. By means of the muriate of barytes, the sulphuric-acid combinations of the wood become fixed, the more easily soluble combinations disappearing. These results prove the formation of the difficultly-soluble salts of barium. If a solution of blue vitriol is then added, a considerable number of combinations is formed, especially sulphate of barytes, insoluble in water, which cannot be washed away, while the oxide of copper partly enters into a chemical combination with organic substances. Gray-colored spots, containing chloride of copper, appear at length in the wood, proving the successful termination of the operation.

The logs impregnated in this manner should now be removed from their present position, to make room for fresh ones. The rings, or bands of lead are then taken off, and from which any adherent clay is removed. They are again used for new logs, as before described

We obtain a view of the extent of the work if we calculate that, at the outside, two days are necessary (often only one) for the impregnation of a single log.

The logs which have been removed from the place of operation, should be so laid that they will dry in a horizontal position in the shade, and can be conveyed as required to the saw-mill. The impregnated logs are then worked up, with well-greased saws, for their destined purposes, for example, sleepers, beams, planks, &c., and can be cut into any required thickness.

Prepared in this manner, the timber is of greater durability than that prepared solely with blue vitriol, which may be, to a great extent, washed away, thus rendering null the very means used to preserve the wood.

The object to be attained is to keep the salts of copper in the wood, thus operating, on the one hand, against decay, and on the other hand, also preventing vegetable parasites, or small animals, as wood-worms, or *Teredines navales*, &c., from effecting their work of devastation.

It is also of no small importance that the newly-formed salts of barium both contribute to the attainment of the last-named advantages, and also that the sulphate of barytes fills up the pores of the wood, rendering it stronger and more capable of resistance.

Timber which has been so prepared, is especially suited for buildings under water, railway-sleepers, telegraph-posts, fences, mining-operations, buildings of wood in the open air, ship-building, and inlaid floorings, the wood being stained according to individual tastes, &c.

What we claim as our invention, and desire to secure by Letters Patent, is—

The herein-described chemical compound, consisting of the chloride of barium, muriate of barytes, or baryta in any of its forms, in combination with sulphate of copper, or blue vitriol, for the purpose specified.

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Witnesses:
CH. FR. TROMMENSCHLÄGER,
JACOB FRITZEN.