

UNITED STATES PATENT OFFICE.

WILLARD C. BRUSON, OF CHICAGO, ILLINOIS.

COMPOUND FOR PRESERVING WOOD, &c.

SPECIFICATION forming part of Letters Patent No. 251,346, dated December 27, 1881.

Application filed April 1, 1881. (No specimens.)

To all whom it may concern:

Be it known that I, WILLARD C. BRUSON, of Chicago, Illinois, have invented a new and Improved Compound for Preserving Wood and Rendering it Uninflammable, of which the following is a specification.

This invention relates to the preservation of wood by a new compound and a new method of introducing antiseptic substances into the central part of or within wood, the diffusion of the preservative being effected by exosmosis instead of endosmosis—the ordinary method when wood is immersed in preserving solutions. Therefore, by the use of my invention the objection is obviated which has heretofore prevented the central part of the wood from becoming impregnated by antiseptic solutions when the wood is several inches thick, and especially when it is green or partly dried.

It is well known that the decay of wood proceeds from both internal and external agencies. The external decomposition of wood, known as "common rot," is occasioned by alternate exposure to moisture and dryness. When wood in a moist state is exposed to the air it gradually undergoes decomposition, a species of fermentation is occasioned by the nitrogenized constituents, and by which oxygen is absorbed, carbonic anhydride and water are exhaled, and the wood crumbles down into a blackish or brownish vegetable mold. This decay occurs more rapidly in young spongy wood, which admits the oxygen of the atmosphere more freely, and at the same time contains a proportionately larger quantity of the albuminous substance than the harder and older portions. The decomposition of this albuminous compound favors the growth of lichens and fungi and encourages the ravages of insects to which the albuminous portions in particular afford the means of nutriment.

The following conditions have been found to be favorable to decay: The presence of parasites or germs, albuminous matter, moisture, or free oxygen, together with a warm temperature. It is obviously a matter of great importance to protect the wood from these conditions. The progress of this decay is from the exterior. Hence a coating of the surface with paint, tar, or other substances that are impervious to air and moisture has been used as a preventive;

but experience has shown that an air and waterproof coating can only be applied to the surface of perfectly seasoned wood as a preventive of decay.

It has been demonstrated that to paint or coat or to char and paint green or partly-dried wood with a water-proof substance, instead of preventing, hastens decay, from the fact that the coating of wood effectually prevents the drying of the central part. The moisture of the wood, being retained within, causes fermentation, which in due time produces fungi—such as *Merulius lacrimans*, *Merulius vastator*, and *Polyporus destructor*—and under favorable conditions there is great rapidity of growth and profusion of these spores, which in time become diffused throughout the wood. This condition is then denominated "eremacausis," (known as "slow decay" or "dry-rot,") and the strength and usefulness of the timber thus infested is practically destroyed.

It is also well known that attempts to preserve wood have been made by immersing it in different chemical solutions—such as corrosive sublimate, chloride of zinc, arsenic, sulphate of copper, sulphate of iron, creosote, bituminous oils, &c.; but these processes of impregnating wood have failed, except for perfectly-seasoned wood, from the fact that these solutions will penetrate green or partly-dried wood but to a limited extent. The central portion of the wood is then left in a similar condition as when painted or coated with waterproof substances, and fermentation and dry-rot are thereby facilitated.

My invention consists of the internal application of effective antiseptic and antizymic substances, by means of which the central portion of the wood is impregnated and preserved at once, thereby effectually preventing fermentation and eremacausis. The preservative then permeates from the central to the exterior part of the wood by exosmosis.

The preservative that I employ is of such a character that it will penetrate and preserve either green, dry, or partly-dried wood. Hence its general usefulness and advantage over the so-called wood-preserved heretofore used.

The antiseptic that I employ to preserve wood is prepared as follows: I take sulphur sublimatum, forty pounds; calcium oxide, freshly

calcined and ground to a fine powder, one hundred pounds. Mix thoroughly and put it in a porcelain or earthen or other suitable vessel, and gradually heat over a moderate fire. Keep constantly stirring until the composition changes to a dark-brown color, which usually occurs within from ten to thirty minutes, according to the heating-surface of the vessel and quantity of material heated. Then add at once sodium chloride, ground to a fine powder, four hundred pounds. Stir well together and immediately add carbo-ligni, powdered, twenty-five pounds. Stir thoroughly and gradually heat the mass to about 250° Fahrenheit; then remove from the fire, and at once put it up and keep in air and moisture tight packages until required for use. To introduce my preservative in the wood I first perforate the wood, usually lengthwise, and about the central part thereof, with a suitable instrument. Then insert the preservative in the perforation. Wood can be perforated lengthwise at a less expense for the same capacity than it can be crosswise, and without weakening the timber to any noticeable extent. Timber perforated crosswise requires several perforations sufficient to hold the same quantity of preservative as when perforated lengthwise. Another beneficial result is obtained by having the wood perforated lengthwise in the central part and filled with preservative. It acts at once as a preventive of decay throughout the entire length of the timber.

To preserve green or but slightly-dried wood I fill the perforations with my antiseptic compound in a dry condition, then drive a tight-fitting plug two or three inches in the perforation to prevent the escape of the preservative. The preservative is dissolved by the moisture contained in the wood, as hereinafter explained.

For partly dried or seasoned wood I fill the perforations with my antiseptic compound, then pour in sufficient cold water to fill the perforations for the purpose of dissolving the compound, or a portion of it, so that it will be absorbed by the wood; or my antiseptic compound may be mixed with sufficient cold water to form a consistence of thin paste or cream, and then poured in the perforations; then drive a tight-fitting plug two or three inches in the perforation for the purpose of retaining the compound within the wood. The proportions of the materials employed, as above mentioned, are considered the best for general purposes; but they may be differently proportioned and beneficial results derived from their use in the manner described.

I herewith describe the operation and effect of my preservative on wood. For example, green oak wood contains on an average about thirty-four per cent. of water. After being exposed to the air in a dry place for from ten to twelve months, it has been found that on an average only about fourteen per cent. of moist-

ure has been evaporated. It is then usually called "dry wood," although it yet contains about eighteen per cent. of moisture, which cannot readily be expelled, except by artificial heat—such as kiln or hot-air drying—which has been found to be too slow and expensive for ordinary purposes, such as railroad cross-ties, bridge-timbers, fence-posts, telegraph-poles, foundation-timber for buildings, &c. Therefore it becomes necessary in actual practice, to meet the requirements of railroads and for other purposes, to treat the wood in the green or partly-dried state.

Numerous experiments during the past years have proved that the central part of wood—for instance, of railroad cross-ties, bridge and foundation timbers—cannot be impregnated when in the green or partly-dried state by external applications, or by the immersion of the wood in antiseptic solutions. Therefore, to successfully impregnate the entire wood by a quick and comparatively inexpensive process, I have invented and put into practical operation the following method: With a suitable instrument I perforate one or both ends (as circumstances may require) of railroad-ties, bridge, foundation, and other timber, usually in the central portion thereof, and insert therein my antiseptic compound before mentioned, which penetrates and preserves the wood. I then tightly plug up the perforation. When treating dry or partly-dried wood, which does not contain sufficient moisture to dissolve my antiseptic compound, which I usually prepare in the form of a dry powder, I add sufficient water to form a solution, so that the wood will absorb it.

For green or partly-dried wood my antiseptic compound is used in an anhydrous state. As it possesses a great affinity for water, it absorbs the water by attractive capillarity from the cells of the wood, and dissolves the antiseptic compound, which solution is then diffused throughout the wood by repulsive capillarity, and combines with the fermentescible albuminoids, forming an insoluble compound, which imparts additional strength, toughness, and durability to the woody fiber, thereby preventing eremacausis, and renders the wood unflammable. Wood thus preserved is not only rendered fire-proof, but must remain sound for ages.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination of sulphur, lime, salt, and charcoal for preserving wood in the manner substantially as herein described.

In testimony that I claim the foregoing I have hereunto set my hand this 5th day of January, 1881.

WILLARD C. BRUSON.

Witnesses:

B. M. KENYON,
G. D. KENYON.