

UNITED STATES PATENT OFFICE

JOHN T. AVERILL, OF ST. PAUL, MINNESOTA.

IMPROVEMENT IN PROCESSES FOR PRODUCING PULP FROM WOOD.

Specification forming part of Letters Patent No. **177,917**, dated May 30, 1876; application filed May 17, 1876.

To all whom it may concern:

Be it known that I, JOHN T. AVERILL, of St. Paul, Ramsey county, Minnesota, have invented a new and useful process by means of which pulp of superior strength and of light color can be produced from wood; and that the following is a clear, full, and exact description thereof.

Heretofore wood has been prepared for grinding by boiling in alkaline liquor or in water under pressure, by which process the fiber produced, though sufficiently long and tough, has, nevertheless, acquired a dark color. My invention is based on the discovery that by boiling the wood in water at the ordinary atmospheric pressure a fiber is produced equal in length and toughness to that produced by the above-described process, but of a lighter color, resembling the original color of the wood.

Long prior to the date of my invention a machine, commonly known as the Voelter machine, has been in use in this country by means of which wood is reduced to fiber by being ground upon a grindstone in presence of water, the pulp resulting from this process being manufactured into paper after being mixed with a certain percentage of pulp produced from rags, tow, jute, &c., so as to increase the strength of the paper. In this process the wood was applied to the grindstone in its natural state, or just as it comes from the tree.

Lately—viz., on the 21st of April, 1874—a patent has been granted in this country to Voelter and Meyh for an improved process of making pulp from wood, in which the wood is described as being steamed in close vessels at a pressure of from forty-five to sixty pounds, then bleached, and finally applied to a Voelter machine and reduced to pulp. The same patent also disclaims a process in which the wood is steamed under pressure in close vessels, and then applied to the Voelter machine without any bleaching, and upon that machine reduced to pulp.

The process claimed in this patent is an expensive one, but does produce pulp of longer fiber than that produced in the old Voelter manner, and the wood, after being steamed and bleached, can be reduced to fiber with less expenditure of power than is required in pro-

ceeding according to the original Voelter process.

The process disclaimed in the patent to Voelter and Meyh has also been tried in this country with the result of increased length of fiber as compared with the original Voelter process, and diminished power exerted in the grinding; but the resulting fiber was of a dark-brown color, and useful only in making inferior qualities of paper.

I desired to produce wood fiber of the superior length and with the comparatively small expenditure of power obtained by the Voelter and Meyh process, but without the expense of bleaching the wood; if I employed the claimed process, and without the dark color which resulted from the use of the unclaimed process, and, after thought and experiment, succeeded by means of the process now to be described.

My process consists in subjecting the wood for a sufficient time to the action of boiling water in open vessels—that is, vessels having a free communication with the air, or in subjecting the wood to steam at about the pressure of the atmosphere, and, after the wood is thus softened, operating upon it in a Voelter machine, or machine acting to grind wood in a similar manner.

In carrying out the process I have found it expedient first to reduce the wood into comparatively thin slabs or board-like pieces, and have worked the process with success as follows: I take what are commonly called edgings, sawmill refuse, pieces cut from the edges of boards about an inch thick, pieces split from sawed bolts of wood, or pieces of board sawed to such lengths as are employed in Voelter machines, and put them into a wooden tub with a cover neither air nor steam tight; fill the tub with water, and then introduce steam through a pipe into the tubs; raise the water thus to about the boiling-point, and keep it boiling for thirty-six hours. The wood may be pine, fir, spruce, &c. After the boiling the wood is placed in the ordinary feed-boxes of a Voelter machine and there ground, the result being a fiber as long or longer than that produced by the Voelter and Meyh process, and of a color about that which is commonly termed Manila paper—a color far superior to

that which results from wood steamed under pressure and not bleached prior to being ground. I make from this pulp a fair wrapping-paper without any admixture of other pulp, and wrapping-paper of superior quality and color with a mixture of only fifteen per cent. of tow or jute pulp. This latter paper is as good and strong as paper having sixty per cent. of jute pulp and only forty per cent. of wood pulp made by the original Voelter process.

When poplar and other white woods, such as are now employed in making pulp for white paper by the original Voelter process, are treated by my new process, then the resultant pulp is of longer fiber than before, while the color remains such that it can be used in making white paper without bleaching, and the power required in grinding is diminished.

I am unable to explain exactly why my process produces pulp of as good fiber, to say the least, as the Voelter and Meyh process, and of equally good color, without any bleaching; but I do know that no discoloration takes place in working out my process, and that it produces as good pulp, of as great a length of fiber, and of as good color, as the Voelter and Meyh process, and with as small expenditure of power in grinding, and at much less expense, as bleaching is saved.

If wood of greater thickness than that before described be used the boiling must be longer continued. The wood, whether an inch or more thick, may be boiled in steam—that is, kept in an atmosphere of steam at about the pressure of the atmosphere, without being actually immersed in water, as before described.

I do not desire to limit myself to the exact number of hours before mentioned as necessary to the boiling operation, since this must necessarily vary with the kind of wood employed, and the size of the pieces that are treated, the important feature of my process being that the wood shall be boiled or steamed for such a time as will insure the maximum length and toughness in the resulting fiber.

What I regard as my invention, and desire to secure by Letters Patent, is—

The within-described process of producing pulp from wood, and preventing its discoloration, which consists in boiling or steaming the wood in small pieces without pressure, substantially as described, and then subjecting it to the ordinary grinding operation, as herein set forth.

JNO. T. AVERILL.

Witnesses:

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