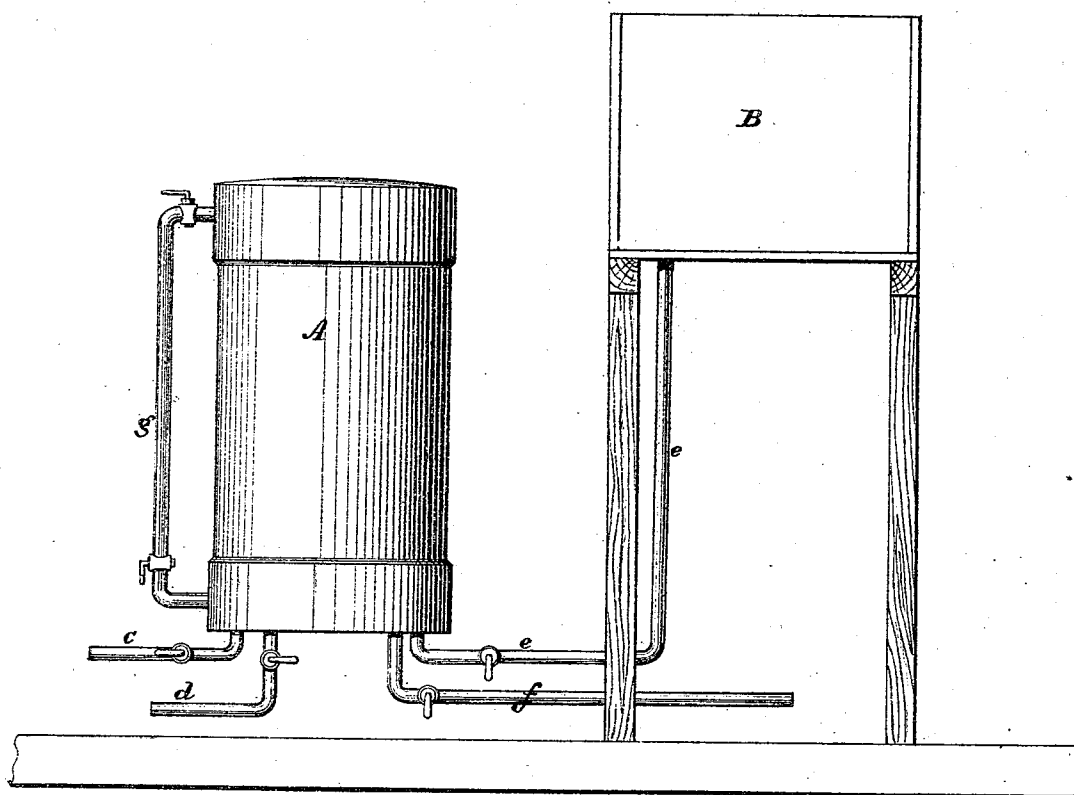


*G. E. Marshall,
Process for Pulping Wood.*

No. 94,228.

Patented Aug. 31, 1869.



Witnesses.

*Phil. T. Dodge,
Henry N. Kelly & Co.*

Inventor.

*G. E. Marshall,
by Dodge & Munn
his attys.*

United States Patent Office.

GEORGE E. MARSHALL, OF LAUREL, INDIANA.

Letters Patent No. 94,228, dated August 31, 1869.

IMPROVED PROCESS OF PREPARING WOOD-FIBRE FOR PAPER STOCK.

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

To all whom it may concern:

Be it known that I, GEORGE E. MARSHALL, of Laurel, in the county of Franklin, and State of Indiana, have invented certain new and useful Improvements in the Process of Preparing Wood-Pulp for Paper; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon, like letters indicating like parts wherever they occur.

To enable others skilled in the art to construct and use my invention, I will proceed to describe it.

My invention relates to the preparation of paper stock from wood; and

It consists in a novel manner of treating the wood with steam and water, as hereinafter explained.

The accompanying drawing represents a side elevation of the apparatus used in applying my process.

This apparatus differs but little from that ordinarily used in the preparation of paper stock, the difference consisting simply in the arrangement of the pipes.

In preparing stock, I first put the wood, suitably prepared, into an ordinary close boiler, and turn on steam from a boiler, through pipe *c*.

In this manner I subject the wood to a steam-pressure of about eighty pounds, more or less, for about two hours, the boiler being kept closed, so as to confine the steam therein during this operation.

I then open a cock in pipe *e*, which connects the bottom of the boiler A with a tank, B, containing water, and located above or on a level with the top of the boiler, as represented in the drawing.

The steam in the boiler A is then blown from the boiler into the tank B, thereby heating the water in the tank.

At this stage of the process, the wood will be found to be considerably softened and spongy, and having a strong acid taste, while the pores of the wood are opened.

I now fill the boiler within about six inches of the top with the heated water from the tank B, which flows in through the pipe *e*, then close the boiler, and turn on the steam again from the boiler, running the pressure up to about seventy pounds, after which I blow the steam and water both off through pipe *d*, at the bottom of the boiler.

If the wood be examined at this stage of the process, it will be found to be nearly or quite free from acid, the steam having first opened the pores and penetrated the wood thoroughly, dissolving the gums, and setting free the acids, both of which are then absorbed, or taken up by the water, and carried off with it, when the latter is blown off, as described.

Or, instead of injecting heated water from the tank, a jet of cold water may be injected at the top of the boiler, thereby condensing what steam there may be

remaining in the boiler, this condensation creating a partial vacuum in the boiler, and thereby causing the wood to expand, and, of course, opening still more its pores.

The boiler should be nearly filled with water, which may be either warm water from the tank B, or cold water, injected as before; and, when thus filled with water, I apply steam to the boiler, using superheated steam, so as quickly to run the pressure up to about seventy pounds, and heat the mass.

I then blow off the water by letting in steam, and, as the water has to pass down through the mass of wood to escape at the bottom, it absorbs and carries off with it nearly all the gums and acid contained in the wood.

After blowing off the water, it is desirable to let fresh steam pass through the boiler A, and escape through pipe *d* or *f* for a short time, this passage of the steam through the mass tending to expel therefrom all water, with its gum and acid held in solution.

When this is done, the pipes are closed, and an alkaline solution is injected into the boiler, and the mass treated therewith in the usual manner.

Now, by this preliminary steaming and rinsing of the wood, I find that a solution of 4° Baumé is amply sufficient to complete the process, and produce fibre, in all respects equal to that produced by the ordinary process, with a solution of 9°; and, by repeating the process of steaming and rinsing the wood before applying the alkaline solution, a still weaker solution may be made to answer.

Thus, by my improved process, I find, by actual experiment, that I can save from one-half to two-thirds of the cost of the chemicals ordinarily used; and, as the entire process is conducted without removing the wood from the boiler, or handling it in any way, it renders the process extremely simple and cheap.

I am aware that cane has been treated with steam by the explosive process, and also that it has been saturated by steam in a boiler, and then crushed between rollers; but my process is distinct and different from these, and I do not claim either of them; but, having thus described my invention,

What I claim, is—

The herein-described process of treating wood for preparing paper stock; that is to say, first subjecting it to the action of steam, in a closed vessel, then rinsing it with water to remove the dissolved gum and acids, and then cooking it in an alkaline solution, all without removing it from the boiler, substantially as herein set forth.

GEO. E. MARSHALL.

Witnesses:

R. J. DAY,
PETER C. AKERS.