United States Patent Office.

JOEL TIFFANY, OF ALBANY, NEW YORK.

Letters Patent No. 68,261, *dated August* 27, 1867.

IMPROVED PROCESS OF PREPARING PAPER-PULP FROM STRAW AND OTHER MATERIALS.

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, JOEL TIFFANY, of the city and county of Albany, and State of New York, have invented a new and improved Process for Preparing Paper-Stock for the Manufacture of Paper; and I hereby declare that the following is a full and exact description thereof.

My improvement consists in a succession of manipulations and operations by means of which the stock employed is cheaply and speedily reduced to a pulpy state suitable for the manufacture of paper.

First, I prepare the stock by cutting the same into short lengths in the usual manner of preparing the same. I then put the stock thus prepared in a large bin or reservoir capable of containing many tons of the stock thus prepared. This bin is so situated that I can charge directly from it into the boiling-vessel. Having deposited the stock thus prepared into this bin, it is subjected to soakings and repeated steamings in the manner hereinafter described. In this manner the stock is softened and prepared for the operation hereinafter described.

Having placed the man-hole of the boiler directly under an opening in the bin, the prepared stock is charged into the boiler until the same is sufficiently supplied with the stock to be treated. The boiler may be packed with stock to any desirable degree of density, by means of a plunger passing through the man-hole into the boiler, and thus pressing the stock into the same. After the boiler is thus charged with stock, it is to be closed steam-tight. By any suitable means the air is to be exhausted therefrom for the purpose of opening the cells and pores of the stock by the expansion of the air therein and its escape therefrom. When the air is exhausted from the boiler, I open a communication between the boiler and the vessel containing the liquor in which it is to be boiled, by means of which the liquor rushes in to supply the vacuum caused by the exhaustion of the air from the boiler. This brings the liquor into immediate contact with every part of the stock, and a simultaneous action of the liquor upon every part of the stock immediately takes place, resulting in a speedy and uniform reduction of the stock to a pulpy condition. The necessary quantity of boiling liquor being thus introduced, I immediately apply pneumatic pressure by any suitable means, for the purpose of forcing the boiling liquor into every cell and pore of the stock which may have resisted the introduction of the liquor thereto. I then apply fire-heat or steam-heat to the boiler and its contents for a length of time, and to a degree of intensity demanded by the refractory character of the stock being treated. After a sufficient boiling, which is easily determined by knowing the character of the stock, the strength of the caustic liquor, the temperature at which and the time for which the boiling process has been conducted, I conduct the steam by proper tubes or pipes into a bin or reservoir of stock, for the purpose of steaming and soaking or softening the same, and I continue this transfer until the internal pressure in the boiler is largely reduced, when, by opening large faucets in the pipes communicating between my boiler and my washing-tub, by means of the remaining internal pressure in the boiler, I eject the contents thereof into the washing-tub, there to be washed preparatory to bleaching the same. I next proceed to wash the stock thus blown off into the washing-tub, in any of the manners well known to the art, after which the same may be submitted to the further process of bleaching. This bleaching process is also conducted in a close vessel in the following manner: After the stock is properly washed and freed from the presence of water used in the washing, either by draining, pressing, or drying, it is put into a close vessel, rotary or otherwise, and is subjected to the action of the ordinary bleaching liquor, applied under pneumatic pressure, for the purpose of bringing every portion of the stock into contact with the bleach. Therefore it is of advantage, after the stock is placed in the vessel for bleaching, to close the same air and gas-tight, and exhaust from such vessel all air, and immediately thereafter to introduce the bleaching liquor into the vessel by any of the well-known means used for such purpose, and immediately thereafter to introduce, by a forcing-pump or otherwise, air or dilute chlorine gas to produce pneumatic pressure.

To facilitate the boiling operation, I recommend the employment of two boilers, which may be stationary or movable, as is best suited to circumstances of previous arrangement or local convenience. The object in using two boilers is to be able to charge and make ready for boiling the one, while the boiling process is being carried forward in the other, so as to be able at all times to keep up the process of boiling in the one or the other of the boilers.

By this process, taken together, there is a great saving of time, chemicals, and stock, besides a great improvement in the quality of the fibre produced. The cause of this saving is as follows: By the previous preparation of steaming and soaking the stock, it is softened so much that on submitting the same to the next

step in the process, to wit, the exhausting of the air from the boiler, the pores and cells of the stock are opened by the expansion and escape of the air therefrom, so that on the introduction of the caustic liquor, it comes into immediate contact with every portion of the stock, and its chemical action thereon and in every part thereof is simultaneous. In this manner all portions of the stock being acted upon together, the action is uniform, and the whole is completed together. By the ordinary process of treatment, the action commences upon the external portions of the stock, and works inwardly by the increased heat and pressure of the liquor upon the stock. As a consequence, the part first acted upon by the caustic liquor continues subject to its continued action, and before the interior portions of the stock are sufficiently treated and reduced, the first portion is over-treated, and much of it is reduced to a paste and is lost in the washing. All these consequences are avoided by employing the above process.

Having thus fully and sufficiently described my improved process in a manner to enable one skilled in the art to put the same in practice and avail himself of its advantages, I will proceed to describe what I claim as my invention, and what I desire to secure by Letters Patent.

I do not claim the steaming or soaking of the stock preparatory to the boiling of the same, nor do I claim the process of exhausting the atmosphere or air from the boiler prior to charging the same with the caustic liquor for boiling, nor do I claim the use of pneumatic or any other pressure in the treatment of the stock while boiling the same, nor do I claim the use of a caustic liquor of any specific degree of strength, or for any definite length of time of boiling. But what I do claim as my invention, and which I desire to secure by Letters Patent, is—

The above-described process, consisting in preparing the stock, charging the boiler, exhausting the air therefrom, letting in the boiling liquor, using pneumatic pressure, and boiling the stock, in combination with the use of any caustic boiling liquor, substantially in the manner and for the purpose above described.

I also claim the use of the within-described bleaching process, in combination with the above-described process of preparing the stock for bleaching, substantially in the manner and for the above-described purpose.

JOEL TIFFANY.

Witnesses:

EDWARD WADE,

CHARLES B. KING.