UNITED STATES PATENT OFFICE.

HENRY H. FURBISH, OF YARMOUTH, MAINE.

IMPROVEMENT IN THE PROCESSES FOR MANUFACTURING PAPER-PULP FROM WOOD.

Specification forming part of Letters Patent No. **179,103**, dated June 27, 1876; application filed November 11, 1875.

To all whom it may concern:

Be it known that I, HENRY H. FURBISH, of Yarmouth, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Processes for the Manufacture of Paper-Pulp from Wood; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of my invention is the production of an improvement in the processes for the manufacture of paper-pulp from wood.

It consists in several steps which I employ in the preparation of wood-pulp for paper manufacture and in the combination of such steps or methods with others known to this art. Such known steps, as far as used by me, are these: Previous to my invention the wood was cut into chips or small pieces. The chips were then saturated with an alkaline solution. The unabsorbed part of the solution was then drawn off from contact with the wood, and steam heat was applied to a jacket around the vessel in which the wood or chips were contained, to reduce or dissolve the proximates of the wood.

I will now describe the whole process which I employ. I take the wood, after the bark has been removed, and cut it into chips of a suitable size to be acted upon by the alkaline liquor which I use. I prefer to cut the chips from the log when placed against a rotating cylinder having projecting cutters. The chips are thus cut off in a direction with the grain of the wood and around the periphery of the log, thus forming what I call veneer-chips. These chips are then subjected to a saturation of alkaline liquor, under a cold pressure of, say, one hundred pounds to the square inch, or they may be immersed therein and allowed to absorb the liquor without pressure. After having been subjected to this process for a time sufficient to thoroughly saturate the chips and place the chemicals around the fibers of the wood, the surrounding liquor is drawn off, leaving only so much of it as is retained in, and has been absorbed by, the chips. I then place in the vessel in which chips are, as the next step, to be subjected to heat, a quantity of water large enough to surround the chips, to act as a steam-bath, in order to prevent the coloring-matter in the wood from becoming fixed by heat. This effects a saving of the chemicals, and, if the further heating or cooking which then takes place were conducted without the addition of any liquid whatever, the fiber would receive a dark color, which defect is prevented by the introduction of the water after the unabsorbed solution is drawn off. The consequence of this is that the bleaching is rendered easier, quicker, and cheaper. Indeed, without this good bleaching is practically impossible. Then, either in the vessel in which the saturation has taken place, or in some other vessel, sufficient heat is applied to dissolve the proximates from the fibers. The heat is applied by means of steam introduced into a steam-jacket surrounding the vessel. This I prefer to do in a closed vessel. The mass is then discharged from the vessel in which the heat has been applied into a percolating vat or tank. I prefer a vat or tank high and narrow as practicable. In such a vat action upon all the parts of the mass, by all the water, is more thoroughly accomplished than in a shallow tank. The fiber is then ready to be treated in the ordinary way for paper manufacture.

The water formed from the steam of the cooking-vessel, while the cooking process is going on, is saved for washing the lees from the fiber, and when the process is finished, the steam produced by the cooking of the saturated chips is blown off into a tank of water, thereby heating the water ready for washing the lees from the fiber. This step also saves fiber which is otherwise wasted and lost. For instance, when the steam carries off any fiber with it when blowing off, such fiber is blown into the water-vat, where it can be skimmed off; or when the water is used for washing out the lees, the fiber in the vat unites with the other, and is thus saved.

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

1. In the reduction of wood to pulp for

paper manufacture, as herein described, wherein the chips are saturated with an alkaline solution previous to cooking, the process of preventing discoloration of the fiber while being subjected to heat, and of rendering bleaching easier and quicker, which consists in introducing into the vessel in which the chips are placed, after saturation has taken place and before heat is applied to the chips, a small quantity of water, as herein set forth.

2. The process of treating wood, in the reduction of it to pulp for paper manufacture, which consists of the following steps: Cutting off from the periphery of the log, and in a direction with the grain of the wood, thin veneer-chips; subjecting these chips to a thorough saturation in an alkaline solution, either with or without a cold pressure; drawing off the unabsorbed and surrounding part of the solution from the chips; placing a small quantity of water with the chips, and then submitting the chips to the action of steam or other heat, without contact of the steam with the same; and then discharging the mass into a percolating-tank, as and for the purposes set forth.

3. In the reduction of wood to pulp, the process of saving the fiber carried away by the steam in blowing off, which consists in conducting the steam into a vessel of water, whereby, also, the water is heated for subsequent use, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HENRY H. FURBISH.

Witnesses:
WILLIAM HENRY CLIFFORD,
FRANK H. JORDAN.