

UNITED STATES PATENT OFFICE.

JAMES DAVY, JR., OF NIAGARA FALLS, NEW YORK.

PREPARING WOOD FOR MAKING PAPER-PULP.

SPECIFICATION forming part of Letters Patent No. 229,307, dated June 29, 1880.

Application filed May 15, 1880. (No model.)

To all whom it may concern:

Be it known that I, JAMES DAVY, Jr., of Niagara Falls, Niagara county, State of New York, have invented a new and useful Improvement in Preparing Wood for Making Paper-Pulp, which improvement is fully set forth in the following specification.

This invention has for its object more particularly the thorough removal from the wood to be used for making paper-pulp of the bark, including the filaments or bundles of fiber which adhere to the solid stick and lie under the outer cuticle or dry circle of bark; but it has also as an object the preparation of the woody fiber itself which is to be converted into pulp, so that the grinding operation is more easily effected and the pulp is whiter and better.

The ordinary method of preparing the wood is to shave the logs by hand, to remove the knots, and to cut the wood into sticks or blocks of the proper size for grinding. The shaving and knotting operations take considerable time; besides, by the former the best part of the wood for pulp is apt to be taken off with the bark, or the filaments under it are not wholly removed, but enter into and discolor the pulp.

In this invention the bark, with the underlying filaments, is readily and entirely removed, while the outer layers of wood, from which the finest pulp is made, are retained. The knots, if allowed to remain, do not discolor the pulp. Whiter pulp than heretofore can be made from inferior wood, and, as already stated, the grinding operation is much more easily effected.

The wood is thoroughly heated or cooked by means of moist steam, as hereinafter more fully set forth, so that the extractive matter is not set by the heat and retained in the wood, but is wholly or in part removed, and that the albuminous matter which attaches the bark to the log is dissolved.

In order that the invention may be the better understood, and to enable those skilled in the art to which it appertains to use my said invention, I will now proceed to describe the preferred mode of carrying the same into effect.

Poplar, basswood, whitewood, birch, maple, spruce, fir, cedar, or, in fact, any of the ordi-

nary woods suitable for making paper-pulp, is cut into sticks or logs of a length convenient for use—four feet is a good length—and then placed in a steam-chamber or closet. This latter is a close chamber, in size sufficient to contain, say, a cord of wood, connected with a steam-boiler by a three-quarter-inch pipe having a stop-cock and provided with a trap, and also with suitable doors. The chamber being filled with wood, it is closed and steam from the boiler, at ten or fifteen pounds, is admitted for, say, one hour, the cock being one-quarter open. The temperature gradually rises to 140° Fahrenheit, and the wood is, during the operation, gradually heated throughout. The steam is condensed and the water of condensation is trapped off. The time during which the treatment continues depends, of course, somewhat upon the temperature of the weather. In cold weather the time should be extended. In very cold weather it may be extended to two hours. The full head of steam is then turned on for half an hour, or until the wood is thoroughly cooked, which can readily be ascertained from examination of the condition of the fiber. The temperature in the steam-chamber rises to 170° Fahrenheit, and finally reaches 200° Fahrenheit.

The cooked wood is removed from the steam-chamber, and it being placed in a suitable trough, one or more cuts are made with a suitable instrument lengthwise of each log. The bark is readily removed with a wooden spud, and the wood is ready to be cut, split, or otherwise made into suitable form for grinding.

The wood being warmed gradually, the albuminous or other sticky matter which cements the bark to the wood (at certain periods of the year) is not fixed or coagulated by the low temperature first employed, and this operation is continued for a sufficient time to loosen from the stick the filaments which discolor the pulp.

The subsequent steaming at higher temperature swells the bark and enables it to be readily peeled off. After the bark is once released it will not, under the higher temperature of the steam, adhere.

The steaming or vaporizing also, as before indicated, brings the wood into a better condition for grinding, improves the quality of the pulp, rendering it whiter and of better

fiber, and it is found, also, that knots, when allowed to remain, do not discolor the pulp, as when the wood is treated as heretofore.

5 The details of the foregoing process may be varied. No particular size of steam or vapor chamber is essential. It may be larger or smaller according to the quantity of wood to be treated, and the connections with the steam-boiler may be modified.

10 The conditions of boiler-pressure and temperatures and times of treatment also may be somewhat altered; but I have found the best results to be produced with moist steam and substantially the temperatures and times of
15 treatment indicated.

It is possible, also, to substitute water for steam, but not, it is believed, advantageously.

20 Having thus fully described my said invention and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. The method of separating the bark from wood by subjecting the sticks or logs to a vaporizing or steaming operation, which loosens the
25 bark by dissolving the albuminous or adhe-

sive matter that attaches the bark to the wood, and then peeling off or removing the bark, as set forth.

2. The method of treating wood in the manufacture of paper-pulp by first steaming the
30 wood at low temperature and finally raising the temperature and continuing the application of steam until the wood is thoroughly cooked, substantially as described.

3. The method of preparing for grinding
35 logs or sticks of wood by subjecting the logs or sticks with the bark thereon to a vaporizing or steaming operation for a suitable time at a low temperature, continuing the treatment with the steam or vapor at a higher tempera-
40 ture, and then removing the bark, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JAMES DAVY, JR.

Witnesses:

PHILIP MAURO,
C. J. HEDRICK.