

UNITED STATES PATENT OFFICE.

ANTONIO MEUCCI, OF CLIFTON, NEW YORK.

IMPROVED PROCESS FOR REMOVING THE MINERAL, GUMMY, AND RESINOUS SUBSTANCES FROM VEGETABLE MATERIAL.

Specification forming part of Letters Patent No. 44,735, dated October 18, 1864.

To all whom it may concern:

Be it known that I, ANTONIO MEUCCI, of Clifton, in the county of Richmond and State of New York, have invented a new and useful process for removing the mineral, gummy, and resinous substances from wood and other vegetable materials, so as to leave the fibrous portion thereof in a suitable condition for the manufacture of paper and other articles to which such fiber is applicable; and I do hereby declare that the following is a full, clear, and exact description of my said process, which consists essentially in treating the vegetable material while wet with the substances produced by the action of nitro-muriatic acid upon carbonate of lime and iron, or their equivalents, and then subjecting it to the action of an alkali.

The best mode which I have essayed of practicing my invention is to exhaust the air, as completely as possible, from the wet vegetable material, and then treat it with the substances produced in gaseous form by the action of the compound acid upon oyster-shells and iron. If wood be the vegetable material to be operated upon, I split it in the direction of the grain to a thickness of about one-sixth of an inch, more or less. I then soak it in clean water for twenty-four hours, and afterward pass it twice between a pair of crushing-rolls, by which it is partially crushed and the grain is opened, washing it thoroughly with clean water after each passage through the rolls. The wood thus prepared and drained from the water, but in a wet state, is placed in a vat or vessel that can be closed air-tight and is of suitable form and strength to sustain the pressure of the atmosphere when the air within is exhausted. A suitable vessel for this purpose is a cylinder with bulging heads, one of which is made removable to permit of the ready insertion and withdrawal of the material. The cylinder should be coated on its interior with a material which is not affected by the chemical substances used—such, for example, as shellac. It should be connected by a pipe fitted with a valve or stop-cock, with an air-pump or other means of exhausting the air within it, and by a second pipe also fitted with a valve, with a close vessel constituting the gas-generator, in which the nitro-muriatic acid is permitted to act upon the oyster-shells and

iron. The gas-generator should also be fitted with a funnel-pipe extending to the vicinity of its bottom for the introduction of the acid, and fitted with a stop-cock or valve to regulate that introduction. The oyster-shells and iron are charged into the gas-generator, and as soon as the vegetable material shut up in the cylinder is exhausted as much as practicable of air by the operation of the air-pump, some of the acid is permitted to enter the gas-generator, and the mixture of gases produced by the action of the nitro-muriatic acid on the oyster-shells and iron, and consisting of carbonic acid, chlorine, oxygen, and nitrogen, is permitted to enter the cylinder containing the wet vegetable material. As fast as the gas is absorbed, fresh quantities of acid are permitted to enter the gas-generator until the charge of acid required for treating the charge of wood is exhausted and the wood is saturated with the gas produced. The vessel is then opened. The wood is removed from it, and placed in a bath of caustic alkali for about twenty-four hours, more or less. At the end of this period the wood is taken from the alkaline bath, and is passed again between the crushing-rollers, after which it is washed with clean water and macerated either in a stamping-mill or in the ordinary cylinder pulp-engine used in the manufacture of paper. The washed material is then soaked for two or three hours in a bath of water containing from two to five per cent. of acid, (muriatic acid being preferred for this purpose,) after which it may be pressed and dried, if it is to be used in a dry state, or may be bleached with chlorine in the usual manner before pressing, if the purpose for which it is to be used requires bleaching.

The quantities of acid and other materials which I have used with success to produce the mixture of gases are, for each one thousand pounds of wood, twelve pounds of commercial muriatic acid, thirty-six pounds of commercial nitric acid, twelve pounds of iron, two pounds of oyster-shells, and two pounds of water.

The alkaline bath which I have used with success is composed of one thousand pounds of water, one hundred pounds of soda or potash, and fifty pounds of quicklime for each one thousand pounds of wood. These proportions may, however, be changed as circumstances render expedient.

Another mode in which my invention may be practiced is by dissolving the mixture of gases in water, and then subjecting the crushed wood to the action of this watery solution previous to placing it in the alkaline bath; but in order that this mode may be practiced with success the water in which the gas is dissolved must be kept cold by ice, and this mode of practicing my invention is not as effectual or economical as that first described.

My invention may also be practiced by steeping the crushed wood for about forty-eight hours directly in a bath composed of water containing from five to twenty per cent. of the nitro-muriatic acid and one or two per cent. of oyster-shells or mineral carbonate of lime before placing the wood in the alkaline bath; but this mode of practicing the invention has the effect of rendering the fibrous material brittle and impairs its elasticity.

The process is applicable to other substances than wood—as, for example, to hay, straw, and rushes—and the fibrous material obtained may be used for any purpose to which it is applicable.

Having thus described the several modes in which I have contemplated the application of the principle or character by which my invention may be distinguished from others, I declare that I do not claim broadly, the treatment of vegetable materials by a gas, nor the subsequent treatment of it by a caustic alkali; but

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

The process of treating a vegetable material in a wet state with the substances produced by the action of nitro-muriatic acid upon carbonate of lime and iron, or their equivalents, and then subjecting the vegetable material to the action of caustic alkali, substantially as set forth.

In witness whereof I have hereunto set my name this 31st day of August, 1864.

ANTONIO MEUCCI.

Witnesses:

WM. E. RIDER,

JOHN S. CLARK.