

UNITED STATES PATENT OFFICE.

CHARLES COON, OF SAUGERTIES, NEW YORK.

REPULPING PAPER CLIPPINGS, WASTE, &c.

SPECIFICATION forming part of Letters Patent No. 247,016, dated September 13, 1881.

Application filed January 19, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES COON, a citizen of the United States, residing at Saugerties, Ulster county, New York, have invented certain new and useful Improvements in Steaming, Repulping, and Bleaching Paper-Stock, of which the following is a specification.

The difficulty heretofore experienced in repulping paper-stock—that is, clippings and scraps of paper—arises from the breaking or shortening of the fibers, which are thus made so short that they will not unite to form a sheet of adequate strength. The paper having been previously hardened and toughened by the admixture with the pulp of size and other substances, it is found that the necessary grinding and disintegrating required to pulp it break and destroy the fiber, as above stated. It has been customary, therefore, to mingle with the paper-stock a quantity of rags, and to reduce the whole to pulp by grinding them together. Thus the paper-stock is employed merely as a filler, the fiber being supplied by the rags.

The object of my invention is to preserve the fiber of the paper-stock in repulping it, so that said stock may be employed alone or without the admixture of rags or other fibrous material in the manufacture of paper. To this end I find it necessary to remove the sizing which firmly binds the fibers together, after which they will readily separate without breaking under the subsequent operation of the beater or pulper.

My process comprehends several steps, which I will now set forth.

I first place the paper-stock, which usually consists of cuttings, clippings, and waste, into an upright tank or vessel having a perforated false bottom, and add to it a solution of pearl-ash of about six degrees strength, in the proportion of about two gallons to six hundred pounds of the dry stock. The vessel is then covered and hot steam admitted under the false bottom of the vessel for about four hours. This treatment causes the sizing and other substances to separate from the stock and to rise to the surface of the water of condensation which will have accumulated in the vessel. The steam is now shut off, and water (either hot or cold) is admitted at the bottom of the vessel until the water in the latter rises,

bearing the sizing, &c., on its surface, and overflows the top of the vessel or passes off at a waste-outlet. This I call “floating” the size. When the surface impurities are thus removed the incoming water is cut off and the water in the vessel is allowed to drain off at the bottom. The stock thus treated is called “water-leaf,” and contains little or no sizing or other substances which would cause the fibers to adhere.

The next step consists in removing the water-leaf to the beater, where it is placed in water at a temperature of from 120° to 150°, to which has been added two gallons of solution of pearl-ash of about six degrees strength, which serves to remove or destroy all the size that may remain in the stock, and leaves the latter in condition to receive the bleach, color, &c. The pulping now proceeds, and while it is in progress the chlorine is added, which bleaches the mass in about fifteen minutes. The chlorine being employed while the stock is hot, the bath in the beater being kept at from 120° to 150°, it accomplishes its work and passes off with the steam and vapor, leaving no traces behind. Consequently I do not need to employ anti-chlorine to remove it, as is ordinarily done.

By the ordinary method from eight to ten days are required to bleach the stock. This is done while the stock is in the washer and known as “half-stuff,” and from the washer it is let down into the drainers, where it is allowed to remain, as above stated, eight or ten days. The anti-chlorine is added when this half-stuff is removed to the beater, and as cold water is usually employed in beating or pulping, the chlorine is generally only partially removed, and the paper made from the stock is apt to turn yellow with age.

In my process the hot pearl-ash solution acts in concert with the chlorine, so as to accelerate the bleaching of the stock or pulp and to dissipate the chlorine, as above stated.

After the stock has been reduced to pulp in the beater it may be sized, colored, &c., in the usual way; but this forms no part of my present invention.

The employment of a vessel or tank with a false bottom for steaming the stock is a convenience; but I do not limit myself to any form

or kind of vessel. It would be possible to steam the stock in the beater-tank. Water, either hot or cold, may be added to the dry stock before the steam is admitted, if desired.

5 I prefer to employ pearl-ash as the best form of potash for my purpose with which I am acquainted. Caustic potash appears to weaken, rot, or burn the fibers, and they break and become too short in the operation of pulping.
10 I prefer the pearl-ash solution of sufficient strength to remove the sizing and free the fibers, and this will vary somewhat with the kind of stock employed, the softer kinds requiring a little weaker and the harder kinds a
15 little stronger solution than that named; but a little experience will enable the operator to readily determine the proper strength for his purpose.

The temperature of the water or solution in
20 the beater should not exceed 150°, as a higher temperature is liable to thicken or cook the sizing materials employed in preparing the pulp for use. For pulping soft material 120° is sufficient. I prefer to employ this temperature
25 for rag-stock fiber, while for grass or wood fiber I prefer 140°.

In floating off the size after the steaming operation, it is best to admit warm or hot water at the bottom of the tank, although the hot stock
30 may be sufficient to warm it. Care should be taken that the size be not chilled, as it will set and be difficult to remove.

I do not claim as my invention the employment of hot water or steam in the beater-engine, as that is quite old. As long ago as 1862
35 fibrous materials were beaten to separate the fibers while under the influence of steam at a high temperature. Nor do I claim steaming the stock previous to pulping it, as this has
40 long been practiced. So far as I am aware, however, only steam has been employed, and no attempt has been made to float the size off at the top of the tank.

I am aware, also, that rags have been and are

boiled under pressure in solutions of lime and 45 soda-ash to cleanse them, the alkali acting as a detergent.

Having thus described my invention and set forth distinctively its novel features, I claim—

1. The herein-described improvement in re- 50 pulping paper-stock, which consists in treating said stock to a bath of hot water to which a solution of pearl-ash has been added for the purpose of removing the sizing and other substances which cause the fibers to adhere to each 55 other, substantially as set forth.

2. The herein-described mode of treating paper-stock for repulping, which consists in adding to it a solution of pearl-ash, steaming it in a suitable vessel, floating off the disengaged 60 sizing, &c., at the top by the introduction of water from below, and then draining it from the bottom, substantially as and for the purposes set forth.

3. The herein-described mode of repulping 65 paper-stock, which consists in treating the material in the beater-engine to a bath of water at a temperature of from 120° to 150°, to which has been added a solution of pearl-ash of about the strength and proportion specified, sub- 70 stantially as and for the purposes set forth.

4. The herein-described mode of treating paper-stock for repulping and bleaching, which consists in treating the material in the beater-engine to a bath of water at a temperature of 75 from 120° to 150°, to which has been added a solution of pearl-ash of about the strength and proportion specified, beating the stock to a pulp, and during the process of pulping adding the chlorine for bleaching, substantially as set 80 forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES COON.

Witnesses:

BENJ. M. COON,
D. B. CASTREE.