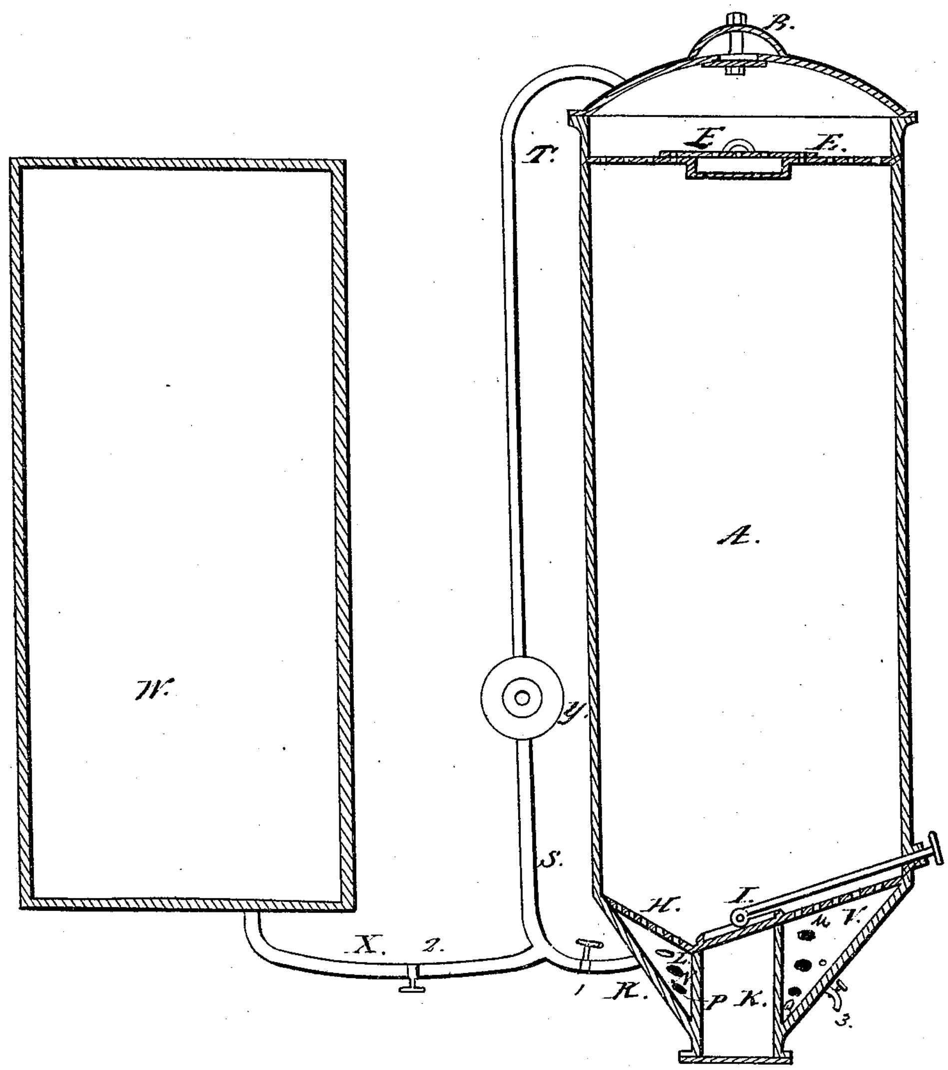
J. W. Dixon.
Bleaching Paper.
No. 51,569. Patented Dec. 19, 1865.



Witnesses;

Benj. McMakinder
Geo. Buckley

Inventor;

John W Dixon
by his atty J. W. Harding

UNITED STATES PATENT OFFICE.

JOHN W. DIXON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVED PROCESS FOR BLEACHING PAPER-PULP.

Specification forming part of Letters Patent No. **51,569**, dated December 19, 1865.

To all whom it may concern:

Be it known that I, JOHN W. DIXON, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful Process for Bleaching Paper-Pulp, applicable especially to pulp made from straw, wood, or other vegetable fibrous material; and I do hereby declare the following to be a full and exact description of the same, reference being had to the annexed drawing, which shows one convenient form of apparatus for carrying out my process.

Heretofore bleaching of the pulp for paper has been conducted in open tubs or vats, and with warm or cold solutions of chloride lime and acid or with chlorine gas.

My improvement consists in subjecting the material to be pulped to the successive action of dilute acid in a liquid state at a high temperature and pressure in a close digester, and of a solution of hypochlorite of lime (bleaching-salts) in the same digester under pressure.

If desired, the operation can be performed in the same boiler or digester in which the material has been pulped, after the pulping has been performed.

I prefer the apparatus shown in the annexed sketch, which I have also applied to pulping wood and other vegtable fibrous material.

A is a strong iron digester or boiler, having a man-hole and cover, B, and a perforated diaphragm, E, with a central opening and cover, F, and a lower perforated diaphragm, H, with a slide-valve, I, communicating by the tube K with the stuff-chests or grinding-engine.

In the space V is a spiral coil, L M N O P, through which steam or water is to be passed to maintain the heat of the contents of the digester.

A tube, R S T, connects the space in the digester below the diaphragm with the upper part of the digester.

At Y a rotary pump is placed.

W is a tank or receiver in which the solutions are to be placed before passing into the digester.

A branch tube, X, connects the tube T S at S with the bottom of W. There is a cock at 1 on the tube R S, and one at 2 on the pipe X.

There is a discharge-cock at 3 to drain off and empty the liquid in the digester.

The operation is as follows: The material to be bleached is placed in the digester A through the man-hole top and the opening at F. If the material to be bleached has been previously pulped in the same digester, then it is to be well washed out by closing the cock 1, opening the cock 2 and the cock 3, and starting the pump *v*, which will cause the fresh water in W to be forced up into the top of the digester, and to pass down through the mass and drain off through cock 3. Cock 3 is then closed and a very weak mixture of water and sulphuric acid—say two gallons of acid to about fifteen hundred gallons of water—is then placed in the tank W, and this is pumped up by pump *v* onto the top of the material. After the digester is filled with this acid solution, cock 2 is to be closed, cock 1 opened, and heat is to be applied, by the steam or hot water coil L M N O P, until the whole contents are brought to an ordinary boiling-heat. The pump *v* is kept in action, and causes a circulation of the acidulated water from the bottom to the top of the boiler and through the mass to be bleached. After this circulation has continued for some time—say about one hour—the cock 3 is opened and the acid water drained off. The cocks 3 and 1 are then again closed and the tank W is filled with a solution of hypochlorite of lime (commonly called "chloride of lime" or "bleaching-salts") of about $\frac{1}{4}$° to $\frac{1}{2}$° Baumé. The pump *v*, being again started, throws this solution into the top of the digester upon the mass to be bleached. When the digester is filled in this way the cock 2 is then closed and the cock 1 opened. The pump then, being continued in action, will force the bleaching-solution to circulate from the bottom to the top of the digester and through the mass to be bleached. During this last operation the heat of the bleaching-liquid should be maintained at near or above 300° Fahrenheit by causing steam or hot water of the required temperature to pass through the coil L M N O P from any convenient boiler or generator.

I do not design in this specification to confine myself to this specific form of apparatus, but merely describe it as a good form to carry out my process.

What I do claim as my invention is—

1. The process of bleaching pulp by the action of a solution of chlorine or chloride of lime at a high temperature and under pressure.

2. Circulating the bleaching-solution through the mass to be bleached in the digester, while highly heated and under pressure, by means of a pump or its equivalent, substantially as above described.

3. Pulping, washing, and bleaching wood, straw, or other vegetable fibrous material in the same digester under pressure.

JOHN W. DIXON.

Witnesses:
J. ROBERTS HOWELL,
GEO. BUCKLEY.