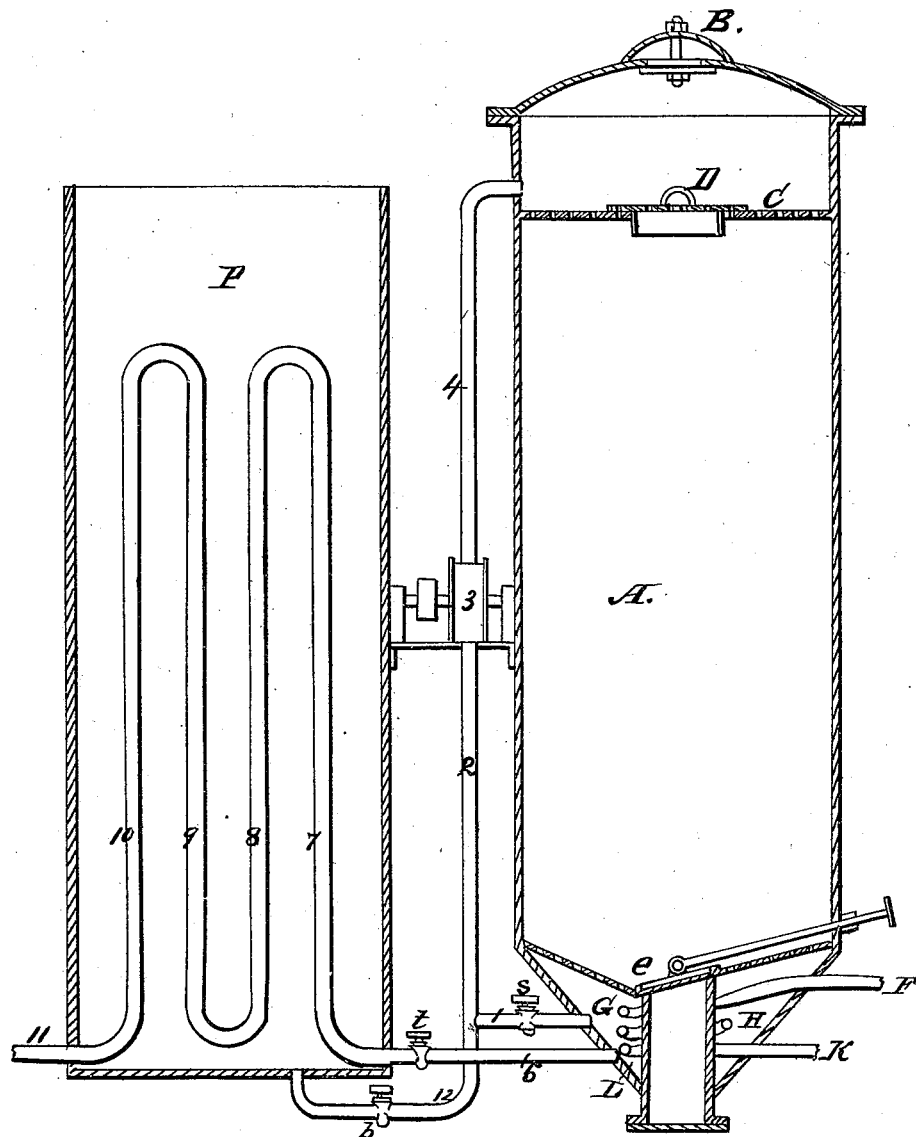


*J. W. Dixon.*  
*Pulp Digester.*  
*N<sup>o</sup> 51,430. Patented Dec. 12, 1865.*



*Witnesses.*  
*Wm W Standing*  
*C. F. Robertson*  
*Geo Buckley*

*Inventor*  
*John W. Dixon*

# UNITED STATES PATENT OFFICE.

JOHN W. DIXON, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVED APPARATUS FOR THE MANUFACTURE OF PAPER-PULP.

Specification forming part of Letters Patent No. 51,430, dated December 12, 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 Apparatus for Making Paper-Pulp from 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, making a part of this specification, which represents a vertical section of my improved apparatus.

A is a paper-pulp digester, composed of a strong iron boiler, capable of resisting a pressure of from eighty to three hundred pounds, and having an upper and lower perforated diaphragm, a man-hole, B, an aperture, c, in the upper diaphragm, and a slide-valve e over the passage in the lower diaphragm.

A coil of pipe, F G H I K, is placed in the lower part of the digester A, below the lower diaphragm. This coil is connected with a boiler or generator of steam, whereby a constant supply of hot water and steam of the requisite temperature is circulated through this coil, and its object is to heat up the mass of liquid in the digester A without overheating or burning it.

A tube, 1 2 4, passes from the lower part of the digester to the upper part, and at 3 a rotary-pump is placed, which is made to revolve by machinery, and forces a constant circulation of the liquid from the bottom of the boiler onto and through the mass of vegetable matter to be pulped, thereby causing a vigorous circulation of the highly-heated liquid through the material. The tube 5 passes from the lower part of the boiler into the coil 7 8 9 10, and escapes at 11. This coil 7 8 9 10 is placed in a tank, P. This tank P communicates, by a tube, 12, with the pump-tube 2.

The operation of the apparatus is as follows: The digester A is first filled with wood, straw, or other vegetable matter to be treated, by removing the man-hole cover and the cover of the diaphragm C, and after these are replaced it is filled. Water, steam, or hot water is

passed through the coil F G H I K to heat the water in the digester A. The cocks S being opened, and the cocks t and v closed, the pump 3 is started, which causes a vigorous circulation of highly-heated water from the bottom to the top of the digester, and thence down through the mass. After this operation has continued some time—say one hour or more—the cock t is opened and the cock S closed. The liquid, filled with gummy or other matters, passes out through the pipe 2 and the coil 7 8 9 10 11. The tank P is kept filled with fresh water, which absorbs the heat from the escaping liquid. The cock v is opened, and the heated fresh liquor in the tank C is forced in, by the pump 3, to the digester A, and when the digester A is thus filled with fresh water, the cocks v and t are closed and the cock s is opened. The continuous circulation from the bottom to the top of the digester, by the pump, is then resumed as at first, and continued as before, until the circulating water becomes surcharged with the gummy and other matters dissolved from the vegetable matter.

Having thus described my invention, what I claim as my improvement, is—

1. The combination of the pulp-digester A, the steam or hot-water heating-coil F G H I K, and the circulating-pump for throwing the digesting liquid continuously from the bottom to the top of the material to be pulped.

2. The combination of the lower perforated diaphragm, the heating-coil, and the circulating pump and tubes.

3. The combination of digester A, and the circulating-pump 4, and the heating-chamber D, whereby the heated refuse liquid coming from the digester is made to heat the fresh water, which is forced in to supply its place.

In witness whereof I have hereunto set my hand and seal this 22d day of November, A. D. 1865.

JOHN W. DIXON. [L. s.]

Witnesses:

GEO. BUCKLEY,  
WM. W. HARDING.