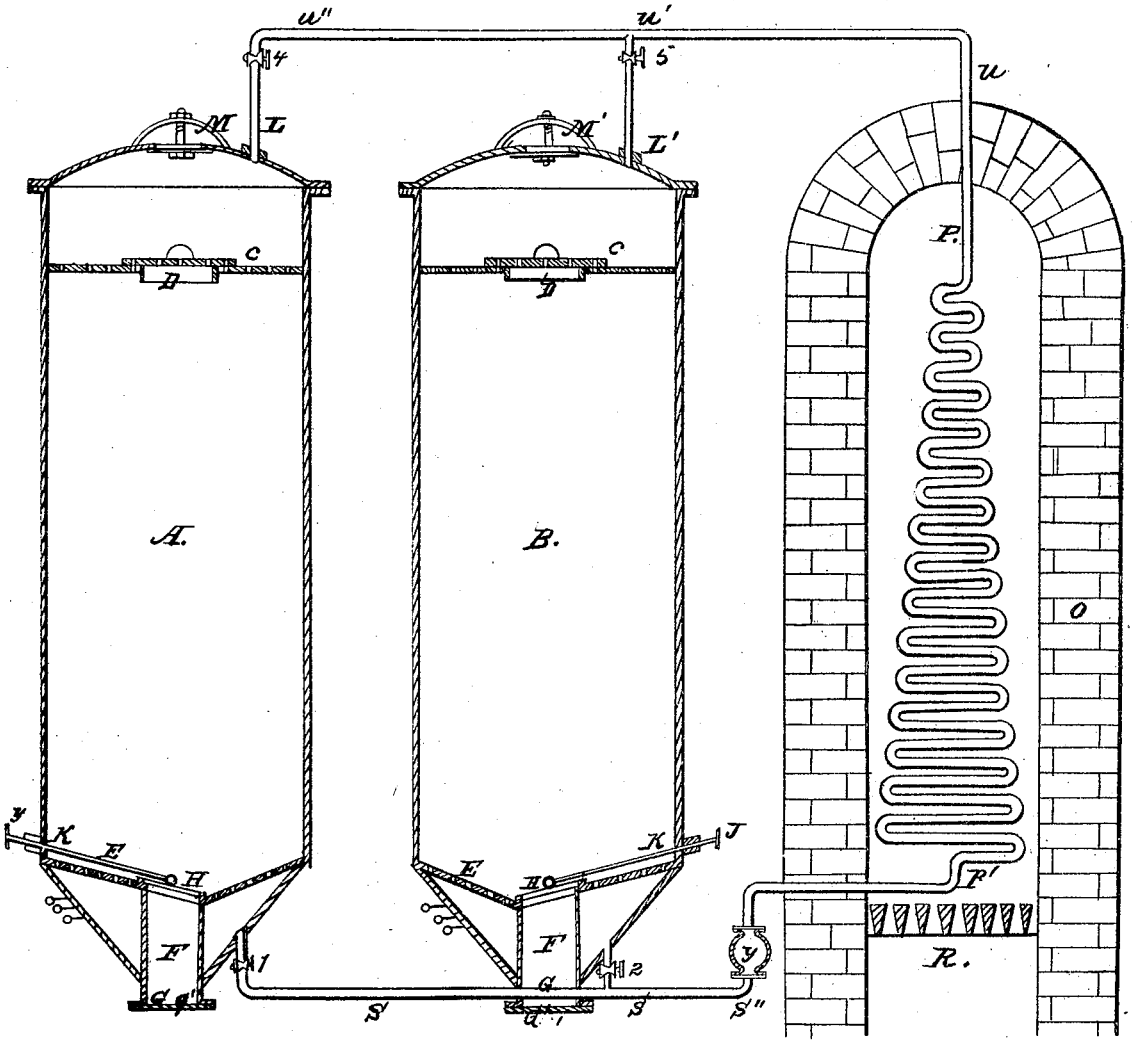
J. W. Dixon.

Pulp Digester.

No. 52,694. Patented Feb. 20, 1866.



Witnesses.

Chas. H. White

J. McGaulley

Inventor.

John W. Dixon

UNITED STATES PATENT OFFICE.

JOHN W. DIXON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF PAPER-PULP.

Specification forming part of Letters Patent No. **52,694**, dated February 20, 1866.

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 Improvement in the Apparatus for Making Wood, Straw, or Manila Pulp; 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 specifiation, in which—

Figure 1 represents a side view of my entire apparatus.

A and B are two upright boilers of wrought-iron, capable of sustaining considerable pressure—say three-eighths inch thick. I place across the interior of each of these boilers a perforated diaphragm, C, Fig. 1, with an opening through it, covered by a removable perforated cover, D. This is placed about one-tenth of the altitude of the boiler below the top. A lower perforated diaphragm, E, is placed in each boiler near the bottom, slightly conical, or tapering downward toward a central opening, F. This opening F is connected, by a pipe or tubing, G G, with the exterior pipe for carrying off the contents. A slide-valve, H, operated by a stem, I, covers this opening F in each boiler, passing through a stuffing-box, K. The top of each boiler is surmounted by a cover or head, L or L′, furnished with safety-valves and having a man-hole and cover, M.

O is a furnace or vertical fire-chamber, having a coil of pipe, P P′, extending through it, Fig. 1, with grate-bars at R, as is usual in furnaces and flues, and having, also, proper dampers.

A tube, S S′ S″, extends across in front of the lower part of the two boilers A and B, and is connected with the lower extremity of the coil of tubes P P′. Cocks are placed at No. 1 and No. 2, leading, respectively, to boilers A and B. At T a rotary force-pump is placed in the course of the tube S S′ S″, driven by an exterior pulley across the top of the boilers, a tube, U U′ U″, connecting by cocks at 4 and 5 with the upper part of boilers A and B, respectively, and connecting with the top of the coil P P′.

This apparatus is intended, mainly, to carry out the improved process for which Letters Patent have been heretofore granted to me, and the operation is as follows: The boiler A is to be charged with chipped or cut wood through the man-hole M. The boiler is then to be filled, or partly filled, with a solution of caustic soda—say from 4° to 8° Baumé, or thereabouts—the lid D having been removed from the center of the perforated diaphragm C while the wood is being charged, and replaced and buttoned or latched down before the caustic liquor is poured in. After the solution of alkali has been charged in, the man-hole is bolted down. The fire under the coil P in the furnace having been kindled the cock 1 is opened, also cock 4, the other cocks and valves being closed. The pump T is made to revolve by a belt. This pump forces the digesting liquid, strained from the wood fibers from the space below the perforated diaphragm E, up through the coil P, and through the pipe U U′ U″, and through the open cock 4, to the upper part of the boiler A. This fluid descends through the mass of wood or vegetable fibrous matter being treated and passes out through cock 1 and tube S S′ S″ toward the vertical coil P P′, as before. Thus a forced circulation through the boiler and through the heating-coil P P′ is constantly maintained, and a much more rapid heating and digesting action is obtained than can be obtained in any other way. The contents of the boiler A are to be heated above 212°. I find the apparatus works well with wood and straw at a pressure of fifty to sixty pounds, the requisite pressure being obtained by loading the safety-valve after the contents of boiler A have been subjected for a sufficient time to the circulating action, as above described, in order to digest the woody fibers, which time depends on the nature of the digesting-liquor, pressure, and nature of material treated.

While the contents of boiler A are being thus treated, the boiler B is to be prepared thus: It is to be charged with chipped woody matter in the same way as above described for boiler A, the man-hole cover M and diaphragm lid C having been removed for that purpose. An increased percentage of solution of caustic soda—say about twenty per cent. of the quantity first charged into boiler A—is to be charged into this boiler B at a strength of from 4° to 8° Baumé. The man-hole and covers are then closed down.

One boiler having been thus prepared is operated as follows: As soon as boiler A is finished digesting, the cock No. 5 is opened and No. 4 is shut, and the liquid contents of boiler A are then drawn off from the bottom of A and driven, by the rotary pump T, through the coil P P′ and pipe U U′ U″, into the top of boiler B. When the boiler A is thus emptied of its liquid contents into B, cock No. 1 is shut and cock No. 2 is opened, B being thus filled with heated liquid from A. A is isolated by closing of cocks 1 and 4. The circulation through the coil and the boiler B goes on, as before described, by the aid of the pumps, and the digested pulpy matter from A is drawn off by pulling out the slide-valve H, and can be led off to the tanks or reservoirs.

While the contents of boiler B are being cooked, A is to be filled with, say, cut straw, and the liquid contents of B are to be drawn off and forced into A by closing valve 5 and opening valve 4, and when all the liquid contents of B are forced into A the cock 2 is to be closed and cock 1 opened, by which B becomes isolated, and the slide valve in the lower part of B is to be opened and the pulp or solid contents discharged out.

This alternate action of the two boilers could be kept up for any length of time, although in my process patent I have described the manner in which I prefer to use the refuse of one operation for a succeeding one.

I do not desire to claim herein the combination of upper and lower perforated diaphragm, nor the combination of lower diaphragm and valve, as these are the subjects of claim in another application filed by me heretofore; but

What I do claim, and desire to secure by Letters Patent, is—

The combination of the two boilers A and B, the coil P P′, and the circulating pump, the tubes connecting them together for the purpose of throwing the digesting-liquid while heated and under pressure from one boiler to another, substantially as above described.

JOHN W. DIXON.

Witnesses:

CHAS. H. WHITE,

J. E. MCCAULLEY.