(No Model.)

W. L. LONGLEY.

APPARATUS FOR RECLAIMING SODA FROM THE SPENT LIQUORS OF PULP MILL DIGESTERS.

No. 262,443. Patented Aug. 8, 1882.

Fig. 1.

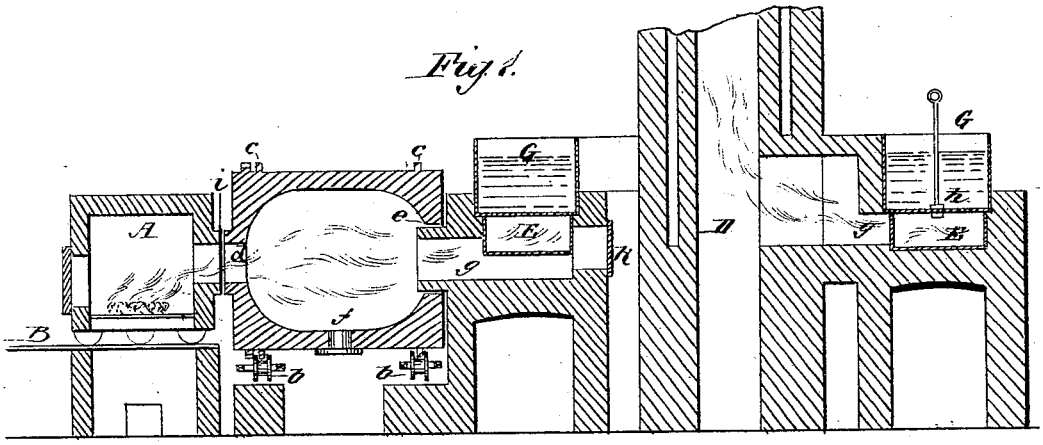
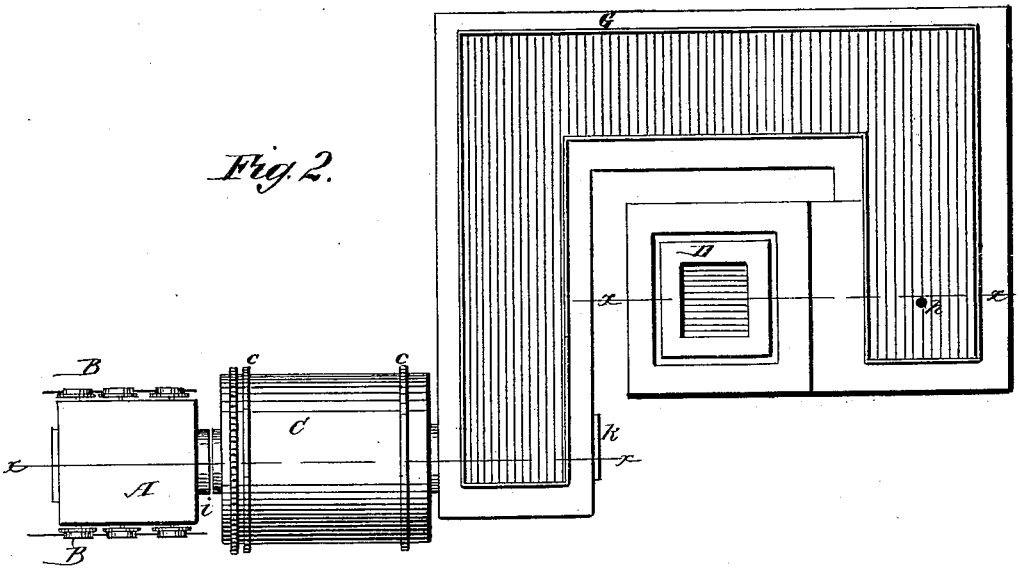


Fig. 2.



WITNESSES:

Francis M. Wadle.

C. Sedgwick

INVENTOR:

W. L. Longley

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM L. LONGLEY, OF WESTBROOK, MAINE, ASSIGNOR TO SAMUEL D. WARREN, OF BOSTON, MASSACHUSETTS.

APPARATUS FOR RECLAIMING SODA FROM THE SPENT LIQUORS OF PULP-MILL DIGESTERS.

SPECIFICATION forming part of Letters Patent No. 262,443, dated August 8, 1882.

Application filed March 18, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. LONGLEY, of Westbrook, in the county of Cumberland and State of Maine, have invented new and useful Improvements in Apparatus and Furnaces for Reclaiming Soda from the Spent Liquor of Pulp-Mill Digesters, of which the following is a specification.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 represents a vertical section on the irregular line *x x* in Fig. 2 of a furnace and apparatus constructed in accordance with and applicable to carrying out my invention, and Fig. 2 is a partly-sectional plan of the same.

The invention consists of a movable fire-box, a rotating boiler or cylinder provided with axial inlets and outlets, and a series of evaporating pans or trays, as hereinafter more fully set forth, and pointed out in the claims.

In the apparatus represented in the drawings, A is a fire-box fitted with suitable grates, dampers, and other ordinary appliances. This fire-box is mounted on wheels arranged to run upon rails B of a track, or is otherwise suitably carried to admit of its being easily and quickly separated from the remainder of the apparatus with which it is shown in connection, whereby certain advantages are obtained, as hereinafter specified. Adjoining said fire-box or furnace when in place is a horizontal cylindrical or otherwise suitably-shaped agitator, C, that may rest by flanges *c* on grooved rollers *b*, and be driven to rotate horizontally by gearing applied to the exterior of it. This receptacle or boiler or cylinder C has axial openings *d e* in its opposite ends to allow the gaseous products of combustion from the fire-box A to pass through it on their way to the chimney D, the one, *d*, of said openings adjoining and being in line with the flue-opening in the fire-box. Said receptacle C is also provided with one or more plugged outlets, *f*, for the discharge of its contents.

E indicates a series of evaporating pans or trays, arranged so that the substances contained in them will also be subjected to the heat of the escaping gases from the fire-box, or, rather, such heat as remains after the passage of the gases through the agitator. These trays should be so connected or arranged in relation with the rotary boiler or cylinder C that liquid may be run from the trays into the agitator without leakage by a channel or space, *g*, below the trays and in line with the axle of the agitator.

Arranged above the trays E is a tank, G, for holding a supply of the liquor to be treated. This tank is provided with one or more valves, *h*, for discharging liquor from it into the trays, as required. After the heated gases have passed through the series of trays they are allowed to escape through suitable dampers to the chimney D.

By arranging the tank G and trays E about or around the chimney D, as shown in the drawings, much space and heat are economized.

The method of operation is as follows: The spent liquor from the pulp-mill digester having been run into the tank G, it is drawn from said tank so as to fill the trays E to a suitable depth; or it may be directly run into the trays without the intervention of the tank. Said liquor in the trays is then evaporated to a proper consistency and run from them through the space *g* into the rotary boiler or cylinder or receptacle C, to which a suitable supply is maintained. The great heat of the rotating boiler or cylinder or receptacle C, having its contents freely exposed on constantly-varying surfaces to the gaseous products of combustion passing through it from the fire-box, causes the liquor as received from the evaporating-trays to be quickly and still further evaporated until all the moisture has been expelled, when all the inflammable substances are burned out. Whenever required, more liquor is run into the receptacle C, and this regulation of the supply, together with the adjustment of the speed of said receptacle and adjustment of the various dampers, regulates the burning of a charge in the receptacle C, and after a sufficient quantity of ash has been accumulated in the boiler or cylinder or receptacle C and the proper time arrives the charge is dumped into suitable receivers beneath. The process just described is repeated till the whole of the spent liquor has been similarly treated.

Between the flue-opening in the side of the fire-box A and the adjacent axial opening *d* in

the rotary receptacle C a space, *i*, is left, which may be increased or diminished to regulate a draft of cold air through it by simply adjusting the movable fire-box A toward or from the receptacle C, which adjustment gives the operator a very perfect control of the burning of the charge. The mounting of the fire-box on wheels and arrangement of the same on a rail-track afford every facility for adjusting the fire-box and for moving it entirely away from the receptacle C when repairs are necessary. The track B, however, might be dispensed with, and, instead of mounting the fire-box on wheels, it might be carried by a swinging or other suitable movable support.

The whole process while under operation may be viewed by the operator from time to time by looking through a peep-hole, *k*. He may also regulate the several dampers, valves, and speed of the agitator C from the same position.

The first set or line of trays E nearest the receptacle C are placed at right angles to the axis of said receptacle, whereby a comparatively unobscured view of the burning of the charge may be seen from the door or peep-hole *k*.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in an apparatus for reclaiming soda from the spent liquor of pulp-mill digesters, of a fire-box, a rotating boiler or cylinder in axial arrangement with the outlet from the fire-box, and a series of evaporating-trays in axial communication with the agitator on its reverse side or end to that on which the fire-box is situated, essentially as described.

2. The combination, with the chimney D and the surrounding valved tanks G, of the subjacent trays E, connected with the agitator by the channels *g*, having valves *k*, and in line with the axis of said agitator, as and for the purpose specified.

WILLIAM L. LONGLEY.

Witnesses:
EDWIN W. AYER,
JNO. E. WARREN.