M. NIXON.

Apparatus for Recovering Alkali from Waste Solutions.

No. 198,671. Patented Dec. 25, 1877.

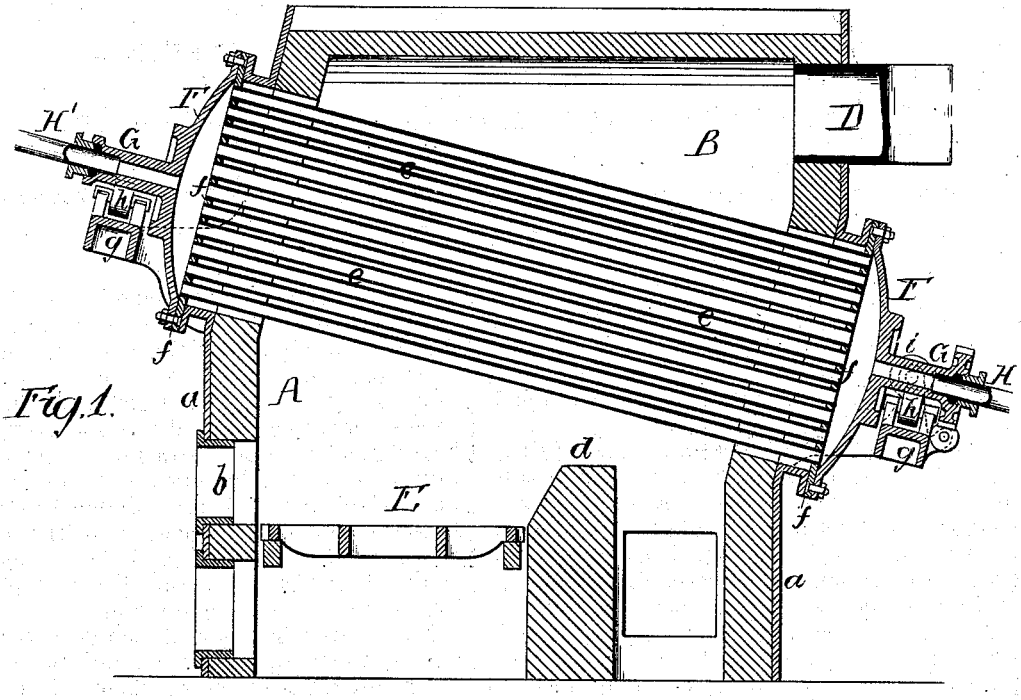


Fig. 1.

Fig. 3

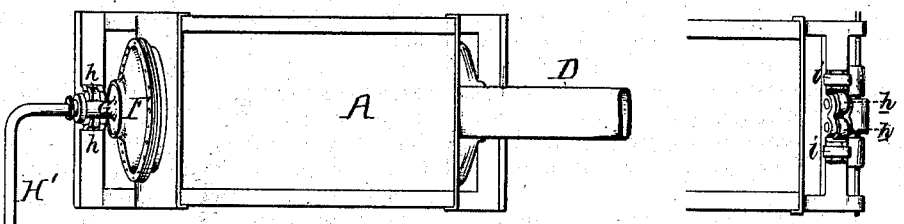
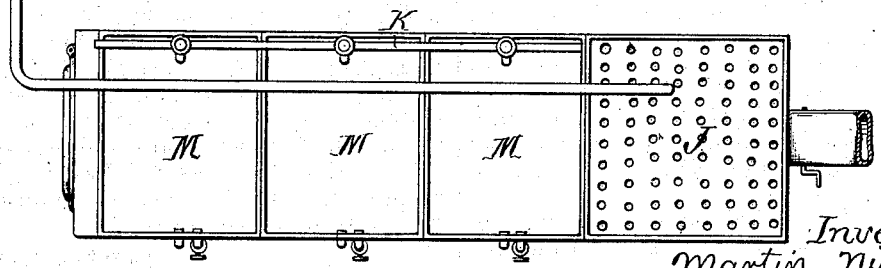


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

MARTIN NIXON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR RECOVERING ALKALI FROM WASTE SOLUTIONS.

Specification forming part of Letters Patent No. **198,671**, dated December 25, 1877; application filed September 8, 1877.

To all whom it may concern:

Be it known that I, MARTIN NIXON, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Recovering Alkali from Waste Solutions, of which the following is a specification:

The object of my invention is to facilitate the concentration of alkaline solutions resulting from the treatment of paper-stock and similar manufactures, by subjecting the solutions to heat, in the manner described hereinafter, prior to their introduction into the evaporating and concentrating reservoirs.

In the accompanying drawings, Figure 1 is a vertical section; Fig. 2, a plan view of apparatus wherewith to carry my invention into effect, and Fig. 3 a detached plan view of part of the apparatus.

A is a structure of brick-work, suitably strengthened by iron plates *a*, the structure containing the combustion-chamber B, of which D is the outlet, and the fire-place E, of which *b* is the doorway, and *d* the bridge.

The heater consists of a series of inclined tubes, *e*, secured at each end to a disk or plate, *f*, and to each plate is secured a cover, F, preferably of the concavo-convex form shown in the drawing.

From each cover projects a hollow trunnion, G, the trunnions of both covers bearing on anti-friction rollers *h*, carried by brackets *g*, secured to the structure A.

The end of an inlet-pipe, H, fits snugly in the hollow trunnion of the lower cover F, and the outlet-pipe H′ fits in the trunnion of the upper cover, each trunnion having a stuffing-box for preventing leakage as the heater revolves, the inlet and outlet pipes being fixed.

For the purpose of reducing friction, I prefer to let the lower cover of the heater bear against two anti-friction rollers, *i*, carried by the lower bracket *g*.

When the apparatus is in operation a fire is constantly maintained on the grate of the fire-place, the heater is caused to revolve slowly, and a continuous stream of the alkaline solution is forced through the pipe H to the space within the lower cover F, whence the solution is forced through the series of tubes into the chamber within the upper cover, and thence through the pipe H′ to the concentrator.

As the solution passes through the heater in as many subdivided streams as there are tubes, it must be exposed to such an extended heating-surface that the desired effect must be rapidly attained, the quick and effective heating of the solution being enhanced by the rotation of the heater, since the position of each of the subdivided streams is thus constantly changed in respect to the direction pursued by the products of combustion.

The heated solution flows into a vessel, J, having a perforated bottom, and through the latter into a vessel below, whence it flows into a pipe, K, from which it may be discharged into any one or more of a series of concentrating-pans, M, and from the latter the concentrated solution may be discharged onto the bed of a calcining-furnace, which supports the pans.

It should be understood, however, that the concentrating-pans and calcining-furnace constitute no part of my present invention, and that they are shown in the drawing and referred to in the specification merely for the purpose of fully explaining my improvement.

I am aware that a system of tubes connected to hollow end plates adapted to be rotated is not new. This, therefore, I do not desire to claim separately; but

I claim as my invention—

The within-described heating and evaporating apparatus, consisting of a furnace and a heater adapted to be rotated within the furnace, the said heater, through which the solution is caused to pass, being composed of a system of tubes, *e*, hollow end plates, and trunnions, all substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARTIN NIXON.

Witnesses:

HERMANN MOESSNER,

HARRY SMITH.