J. KITCHEN.

FURNACES FOR EVAPORATING ALKALINE SOLUTIONS.

No. 186,349. Patented Jan. 16, 1877.

FIG. 1

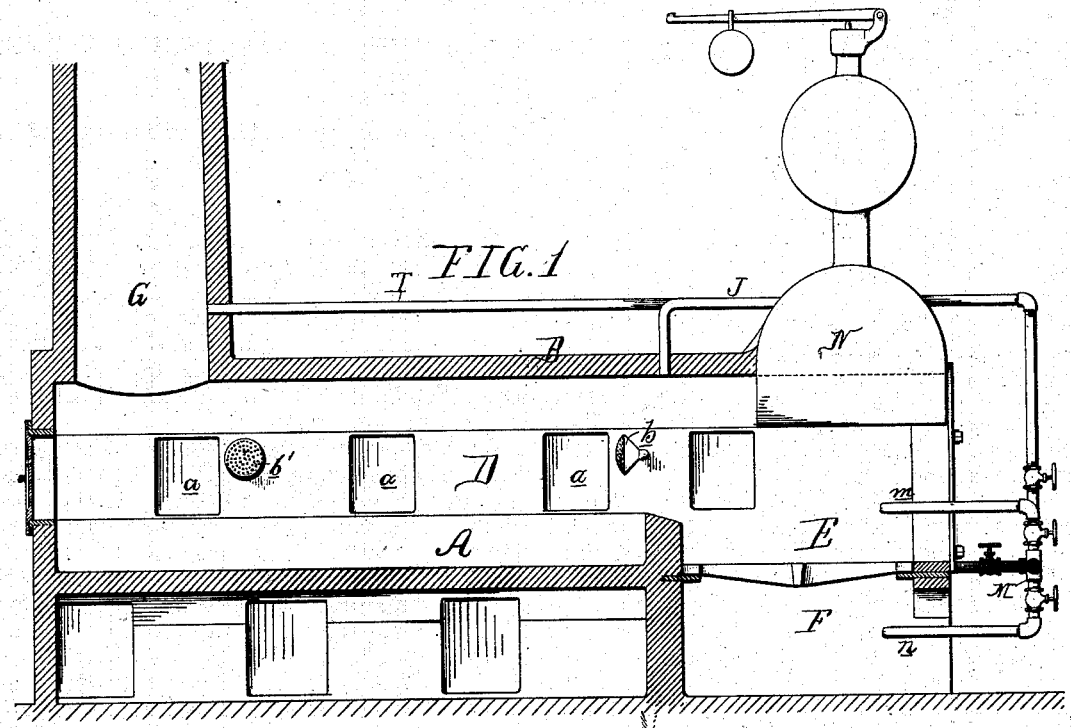
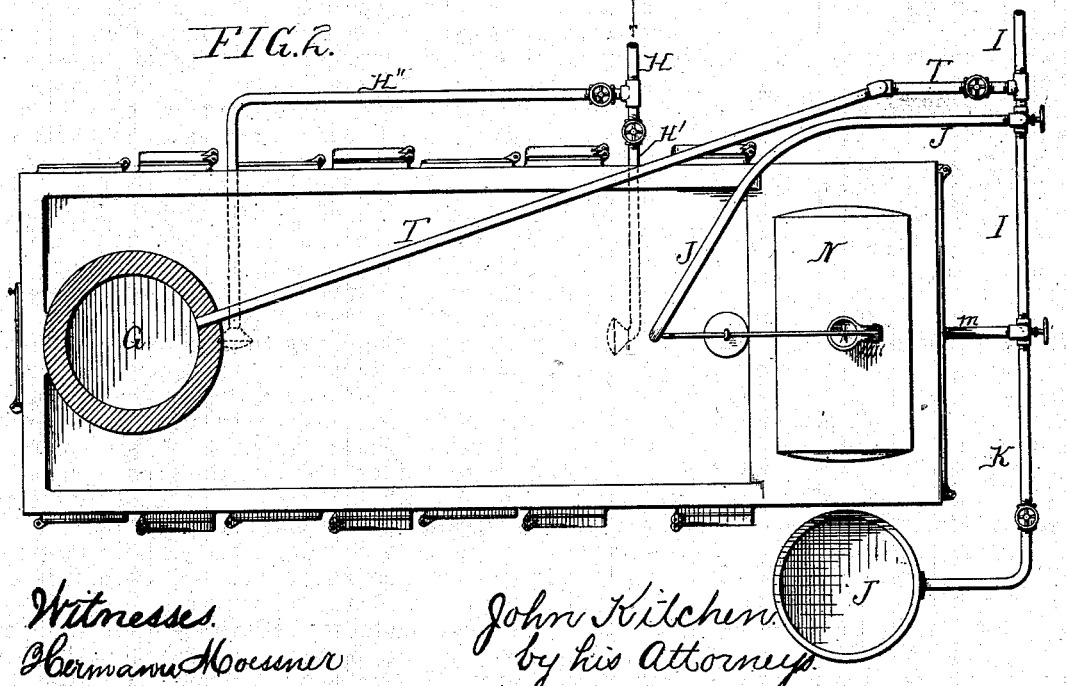


FIG. 2.



Witnesses.
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John Kitchen
by his Attorneys.
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UNITED STATES PATENT OFFICE.

JOHN KITCHEN, OF MANAYUNK, PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND URIAH C. ALLEN, OF SANDY HILL, NEW YORK.

IMPROVEMENT IN FURNACES FOR EVAPORATING ALKALINE SOLUTIONS.

Specification forming part of Letters Patent No. **186,349**, dated January 16, 1877; application filed August 30, 1876.

To all whom it may concern:

Be it known that I, JOHN KITCHEN, of Manayunk, Philadelphia, Pennsylvania, have invented certain Improvements in Evaporating Alkaline Solutions, of which the following is a specification:

The object of my invention is to rapidly and economically evaporate and calcine alkaline solutions, an object which I attain in the following manner.

Figure 1 in the accompanying drawing is a sectional view of a furnace whereby my invention is carried into effect, and Fig. 2 a plan view of Fig. 1.

A is the calcining-bed of the evaporating-furnace, between which and the roof B is the evaporating-chamber D, and on each side of the latter are the working-holes *a*, provided with suitable doors. E is the fire-place, F the ash-pit, and G the chimney.

The alkaline solution to be evaporated may be contained in a well near the furnace, or in an elevated tank, and may be forced by any suitable pump into the pipe H, from which extend two branches, H′ and H″, passing through the furnace into the evaporating-chamber, the former near the front and the latter near the rear end of the calcining-bed A. The branch H′ terminates in a rose, *b*, and the branch H″ terminates in a similar rose, *b′*.

The alkaline solution is caused to pass through the branches H′ and H″ alternately, the operation being conducted in the following manner: The solution is first forced through the branch H′, and, on issuing from the rose *b*, is brought into direct contact with the heated products of combustion from the furnace, thus causing the partial evaporation of the solution, the alkali falling in flakes onto the front portion of the calcining-bed. When a sufficient quantity of this partially-calcined alkali has accumulated, the flow of solution through the branch H′ is cut off, and, while the alkali on the front portion of the bed is being properly manipulated to finish the calcining operation and remove the product, the solution is forced through the branch H″ and rose *b′*, and by the time the alkali on the front of the furnace has been calcined and removed a sufficient quantity of partially-calcined alkali will have accumulated at the rear end of the bed A, to permit the stoppage of the flow of solution through the branch H″, the flow through the branch H′ being then resumed, while the alkali at the rear of the bed A is being calcined and removed.

By this means the operation of calcining is rendered continuous, while the danger of cooling any part of the furnace, owing to the continuous injection into the same of cold solution, is prevented. In fact, the great heat generated in the end of the furnace in which the calcining process takes place greatly facilitates the evaporation of the solution at the opposite end.

I propose, in cases where petroleum is available and cheap, to use it as a fuel, either alone or in connection with other fuel, for which purpose I arrange near the fire-place a pipe, I, through which a blast of air is forced through any suitable blower. A pipe, K, from a tank, J, of petroleum meets the air-pipe I at the vertical pipe M, and from the latter pipe extends a branch, *m*, into the fire-place, and another branch, *n*, may, if desired, extend into the ash-pit, both pipes terminating in nozzles, through which air and petroleum combined are projected. Any of the jet arrangements used for burning petroleum in furnaces may be used in connection with the pipes *m n*.

As pumping appliances will, in most cases, be required in conducting the process, and as a blowing-machine may be necessary in some cases, I combine with the furnace a steam-boiler, N, the bottom of which forms part of the roof of the fire-place, the steam generated in the boiler being used for the engine which drives the pumps and blower.

Pipes T and J may extend from the air-pipe, one to the chimney for the purpose of increasing the draft, the other passing through the roof of the furnace above the bridge-wall, so as to insure the thorough ignition of the products of combustion as they pass over the said bridge-wall.

I claim as my invention—

The combination of an evaporating-furnace, having a bed, A, fire-place E, and chimney G with the distributing-nozzles *b* and *b'*, arranged above opposite ends of the bed, as described, whereby the evaporating and calcining processes may both be carried on at the same time at said opposite ends alternately.

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

JOHN KITCHEN.

Witnesses:

HENRY HOWSON, Jr.,

HUBERT HOWSON.