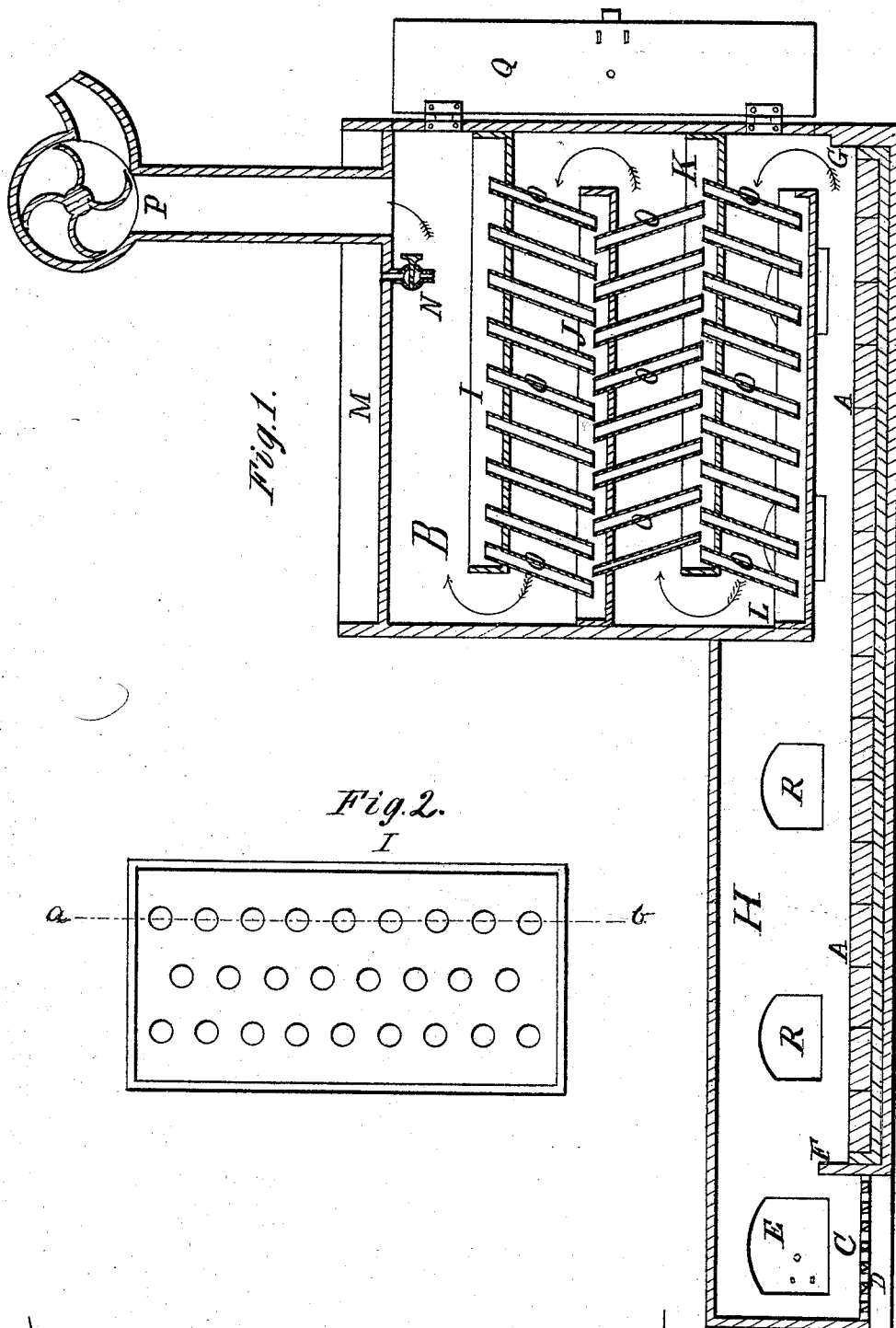


W. F. LADD.
Furnaces for Recovering Waste Alkalies.
 No. 147,505. Patented Feb. 17, 1874.



WITNESSES—
F. B. Kinner
Horace Binney, Esq.

INVENTOR—
William F. Ladd.
 by his atty *Georg Harding*

UNITED STATES PATENT OFFICE.

WILLIAM F. LADD, OF NEW YORK, N. Y.

IMPROVEMENT IN FURNACES FOR RECOVERING WASTE ALKALIES.

Specification forming part of Letters Patent No. **147,505**, dated February 17, 1874; application filed December 15, 1873.

To all whom it may concern:

Be it known that I, WILLIAM F. LADD, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Furnaces for Recovering and Utilizing Waste Alkalies; and I do hereby declare the following to be a full, clear, and precise description thereof, which will enable others skilled in the art to which it appertains to make and use the said improvement, reference being had to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1 is a vertical longitudinal section of my furnace, taken on the line *a b* of the pans in Fig. 2, exhibiting the entire internal arrangement of its component parts; and Fig. 2 is a top view of one of the pans, separated from the other pans, and removed from the chamber.

Similar letters of reference indicate corresponding parts in both the figures.

My invention aims at the production of an evaporating-furnace calculated for the recovery of alkalies from waste alkaline solutions.

For better information of the public I will proceed, minutely and in detail, to describe the construction of my said furnace.

It consists, elementarily, of three parts: A pasting-down or incinerating hearth, A; a hearth-chamber, H; and a pan-chamber, B. The pasting and incinerating hearth is formed after the pattern of the ordinary reverberatory furnace, having a fire-box, C, and grate D at the extreme end, provided with the usual fire-doors E, one upon each side, and separated from the hearth by a bridge wall, F. The hearth itself is constructed of fire-brick laid inside of a suitable iron pan, filling the hearth from end to end. At the pan-chamber end of this hearth there is a second bridge-wall, G, similar to F. This hearth may be constructed of any convenient length. Forty-five feet from bridge-wall to bridge-wall I find a convenient length. At convenient intervals, along the sides of the hearth-chamber, I locate little doors R R, through which the stirring-tools are inserted during the pasting down and incinerating of the charge, and through which again the burnt and finished alkali is withdrawn. The pan-chamber B, a rectangular

chamber of large dimensions, constructed as usual in furnaces of this description, incloses a series of iron or metal pans, I J K L, placed one above the other, which communicate with each other by means of inclined pipes O O O, six inches in diameter, any convenient number of which there may be. These pipes are carried up through the bottom of the pan to a height of three inches, and project below some fifteen inches, as shown approximately in the drawing. They are inclined at an angle of about twenty degrees in the direction in which the hot air and products of combustion pass under the pan to which they are attached. These pans, which are six inches deep, are placed so that the bottom of each shall be at least nine inches above the upper edge of the pan immediately beneath it, thus leaving an interspace between the pans for the passage of the hot air from the fire. The ends of these pans are so arranged, by a system of alternate abutment against the opposite end walls of the pan-chamber, that the heat is compelled to pass under the bottom and over the top of each pan. The direction of the current of heat is shown by the arrows in the drawing. Q is one of the pan-chamber doors. The draft of air requisite to produce a strong heat in the fire, and to carry the products of combustion and heated air through the pan-chamber, is created by means of a sucking-fan, P, placed in the throat of the flue leading out of the pan-chamber at its upper end, thus avoiding the necessity of a costly stack to create a draft. Located on the top of the pan-chamber is a large tank, M, to be used as a reservoir for the solutions. It connects with the upper pan through a stop-cock, N.

Having thus described its construction, the mode of operation of my furnace is as follows: The waste alkaline solution is pumped up into the upper tank M, the fire being in operation. The solution is then drawn, through the regulating-cock N, into the upper pan, whence, by overflow into and through the inclined pipes O O O, it passes into the pan next below, and so on in regular descent, being meantime exposed to the current of hot air, as described, until it reaches and flows over the hearth, where it is exposed to a yet stronger heat. As the action of evaporation goes on the solution on the

hearth thickens and becomes pasty, when it is to be stirred by means of paddles through the side doors, as before described, and this is continued until the solution becomes dry and sufficiently incinerated. The solution is now transformed into a black pulverulent substance—the crude carbonate of soda of commerce—and it is now to be withdrawn, ready for use.

I am aware that furnaces of general arrangement such as I describe are patented and in use for the purposes described, and for the furnace itself I lay no claim; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

The combination, in a furnace for the recovery of waste alkaline solutions, of a series of pans, I J K L, constructed with inclined pipes O O O, the arrangement being such that the waste solution shall overflow, through the pipes O O O, from one pan to another in regular descent, onto the hearth, being exposed, meanwhile, to a constant current of heated air generated in the fire-pot C, and circulated by the sucking-fan P, as hereinbefore described.

WM. F. LADD.

Witnesses:

A. A. DE BONNEVILLE,
GEO. W. LADD.