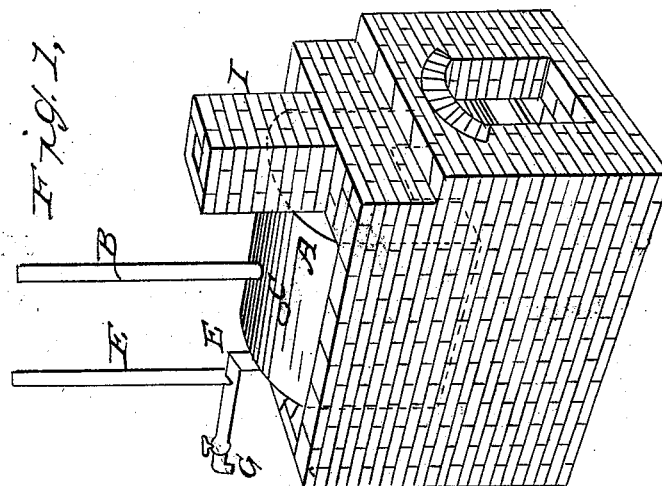
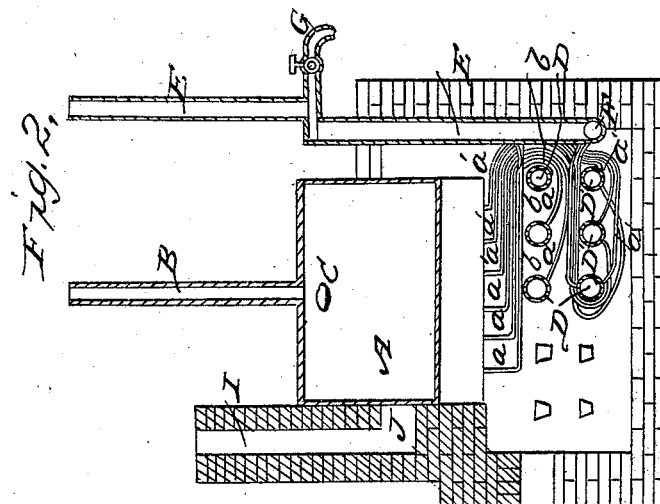


W. NIMS.
Domestic Boiler.

No. 4,826.

Patented Oct. 24, 1846.

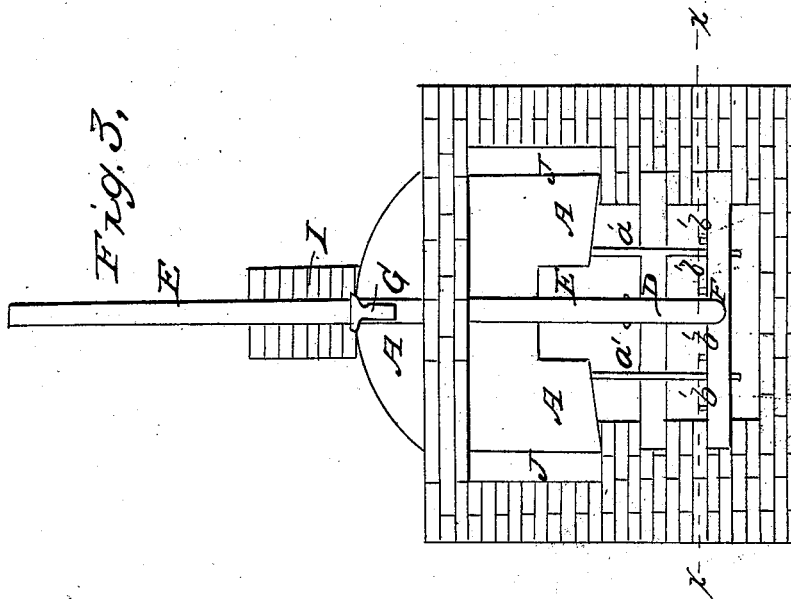
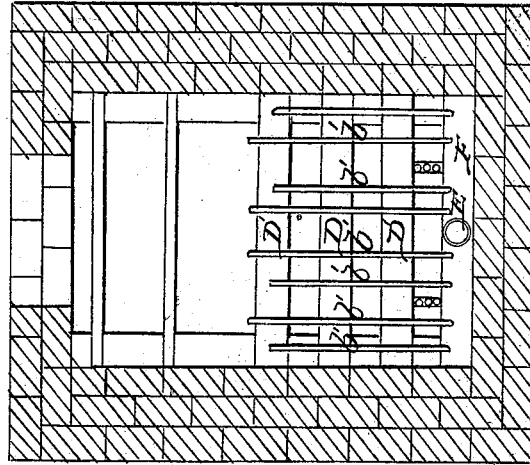


W. NIMS.

Domestic Boiler.

No. 4,826.

Patented Oct. 24, 1846.



UNITED STATES PATENT OFFICE.

WARREN NIMS, OF FORT ANN, NEW YORK.

BOILER FOR HEATING LIQUIDS.

Specification of Letters Patent No. 4,826, dated October 24, 1846.

To all whom it may concern:

Be it known that I, WARREN NIMS, of Fort Ann, in the county of Washington, in the State of New York, have invented certain
5 new and useful Improvements in the Manner of Constructing Boilers for the Heating of Tanning Liquid and other Fluids; and I do hereby declare that the following is a full and exact description thereof.

10 In the process of tanning as now carried on, the tanning liquid, which has been allowed to act on the skins until it is nearly spent, is reheated and made to act upon fresh bark so as again to become saturated
15 with tannin.

My boiler has been constructed with a view to its application to the heating of such exhausted tanning liquor, but is equally applicable to the heating of liquids for a
20 variety of other purposes. I construct a boiler of sheet metal in the usual way, and above this I place a reservoir, or cistern, into which the liquid to be heated may be raised from a tan-vat, or other receptacle, by means
25 of a pump. From the bottom of this cistern, a pipe descends and passes through the top of the boiler which is to be kept entirely full of the liquid. Below the boiler is a furnace, or fire chamber, in which wood is to be
30 used as fuel; this fire chamber I divide into two compartments, the number may however be increased, but I deem two sufficient for all useful purposes. This division into compartments consists merely in a double tier
35 of tubular grate bars to support the fuel. In the boiler that I have assayed, these tubular grate bars are about three inches in diameter; three, or any other preferred number of these are used in each compartment, cross-
40 ing the fire chamber from side to side. They are closed at their ends and the liquid from the boiler is admitted into them through smaller tubes, say of one inch in diameter, which tubes may enter those which constitute the grate bars near their ends at each
45 side of the fire chamber. The liquid, which thus enters is not to be returned to the boiler but is to be conveyed from the larger transverse tubes first named into a tube which
50 rises vertically at the rear end of the boiler to a height equal, or nearly equal to that of the top of the boiler, where it is furnished with a cock by means of which the heated liquid is allowed to run off and to be con-
55 veyed into a vat or other receptacle where it may be wanted.

Under this arrangement, the cold liquor which is allowed to run into and fill the boiler, is partially heated therein, but it passes therefrom through the small tubes
60 above named, in a continuous stream into the larger tubes that constitute the grate bars, and from these it also passes off in a continuous stream through other small tubes into the vertical discharge pipe and in its passage
65 it is brought to the boiling point. The continuous current thus kept up effectually protects the pipes from injury by the action of the fire, which is thereby applied to the purpose of heating in the most economical
70 manner.

The discharge of the liquid from the delivery tube is regulated by means of a cock as above named which allows a larger quantity to escape when the fire is intense and a
75 smaller when the combustion is more slow. By merely turning this cock the fluid may be allowed to pass off as rapidly as it reaches the boiling point and the respective tubes may consequently be prevented from attain-
80 ing a temperature that is much above that point.

In the accompanying drawing Figure 1 is a perspective view of my boiler and the arch, or stack, in which it is set. Fig. 2 is a
85 vertical section thereof through its center from front to back. Fig. 3 is a back elevation, the brick work constituting the back wall being removed for the purpose of showing the arrangement of the interior. Fig. 4
90 is a horizontal section in the line x, x of Fig. 3.

A is the boiler.

B is a tube opening into it and extending up to a height somewhat greater than that of
95 the liquid contained in the reservoir or cistern from which the boiler is to be supplied.

C is an opening through the boiler which is to receive a tube that proceeds from the bottom of the reservoir, or cistern containing
100 the cold liquid; this cistern is not represented as it is a mere containing vessel of any suitable kind.

D, D, D, are the tubular grate bars, closed at their ends, and having the liquid from the
105 boiler conveyed into them through the smaller tubes $a a a$ which open into them and into the boiler, and which liquor is to be subsequently conveyed from them into the ascending or delivery tube E. The direction
110 of these tubes is shown most distinctly in Fig. 2; the three tubes $a a a$ it will be seen,

extend back and around so as to enter the upper tier of tubes D D D' on their lower sides; and the three tubes a' a' a' extend back and around so as to enter the three lower grate bar tubes D', D', D', in like manner. A similar arrangement is made through the series of tubes toward each side of the fire chamber.

From the upper tier of grate bar tubes D D D, tubes b b b lead into the ascending delivery tube E; and from the lower tier D' D' D' of grate bar tubes, the smaller tubes b' b' b' lead into a horizontal tube F (Figs 3 and 4) situated in the rear of the tubes D' and into which the lower end of the tube E is inserted so that they concur in performing the same office. By leading the tubes b into the ascending tube E on a level with the upper tier of grate bar tubes, the tubes b do not interfere with the putting of wood into the furnace as they would do were they curved down and made to enter the tube F. The tubes b' b' b' (shown most distinctly in Figs. 2 and 4) as they pass from the tubes D' into the tube F lie upon the tubes D' and aid in sustaining the fuel.

The pipe E should be extended up to the height of the pipe B and it then serves for the escape of steam and may be considered as performing to the necessary extent the office of a safety valve; the escape of steam will, however, be small, as the liquid is allowed to flow off through the cock G into a vat or other receptacle as fast as it attains the boiling point; the partial opening and closing of said cock accomplishing this end,

H, H, are bars in front of the hollow grate bars, serving to sustain and to guide the wood to them.

The course of the draft is through flues in the upper part of the stack along the sides and front of the boiler to the chimney I. The rear ends of these flues are seen at J J in Fig. 3 and they are continued in the same manner in front until they enter the chimney as shown at J in the section Fig. 2.

Having thus fully described the manner in which I construct and arrange the respective parts of my boiler and furnace for the heating of tanning or other liquids, and shown the operation of the same,

What I claim therein as new and desire to secure by Letters Patent is—

The manner of combining the boiler, (which is to be kept full of liquid) with the respective series of hollow grate bars, and with the delivery or discharging tube F, by means of the series of smaller tubes a, a' and b, b', arranged and operating substantially as herein made known.

I do not of course claim the use of grate bars made hollow for the purpose of passing water or other liquid through them, this having been frequently done, but I limit my claim to the special arrangement and combination of the respective parts of my apparatus by which it is adapted to the attainment of the end herein proposed.

WARREN NIMS.

Witnesses:

THOS. P. JONES,
H. W. BALL, Jr.