

J. Nixon,

2. Sheets. / Sheet. 1.

Feed Water Heater.

No. 104,987.

Patented July 5, 1870.

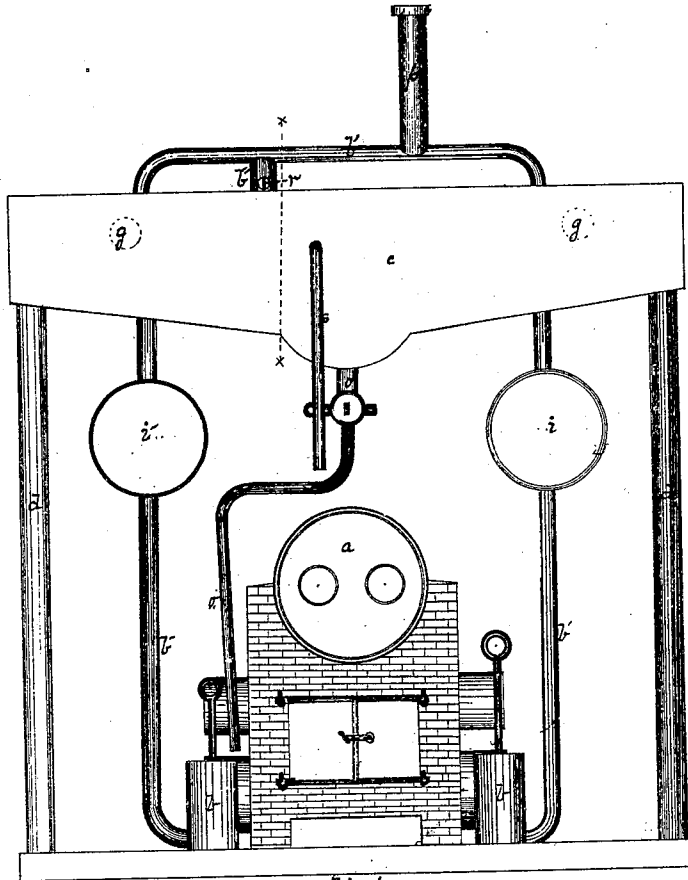


Fig. 1.

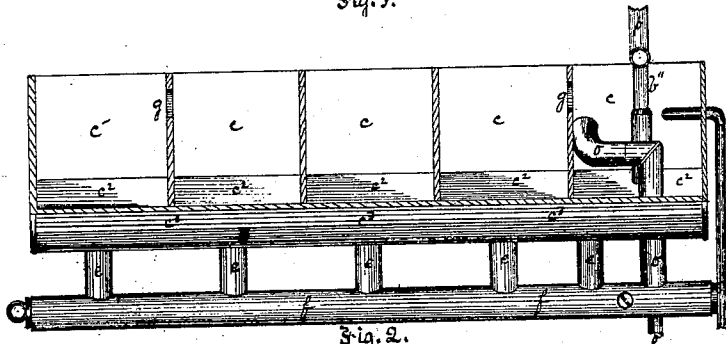


Fig. 2.

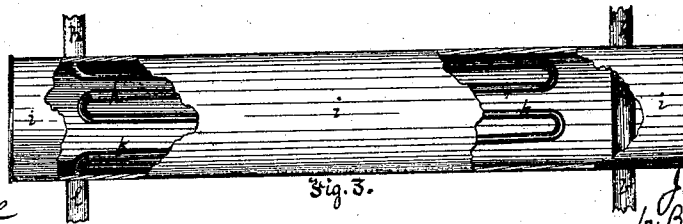


Fig. 3.

Witnesses:

R. Wrenshall
Thos. S. Kern

Inventor:
Joseph Nixon,
by B. Kewell & Christy,
his Attys.

J. Nixon,

2. Sheets, Sheet 2.

Feed Water Heater.

No. 104,987.

Patented July 5, 1870.

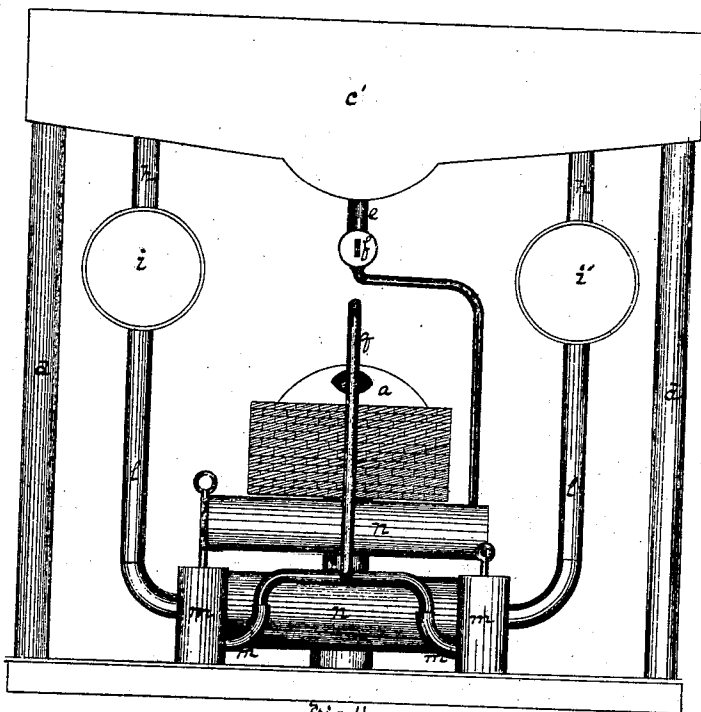


Fig. 4.

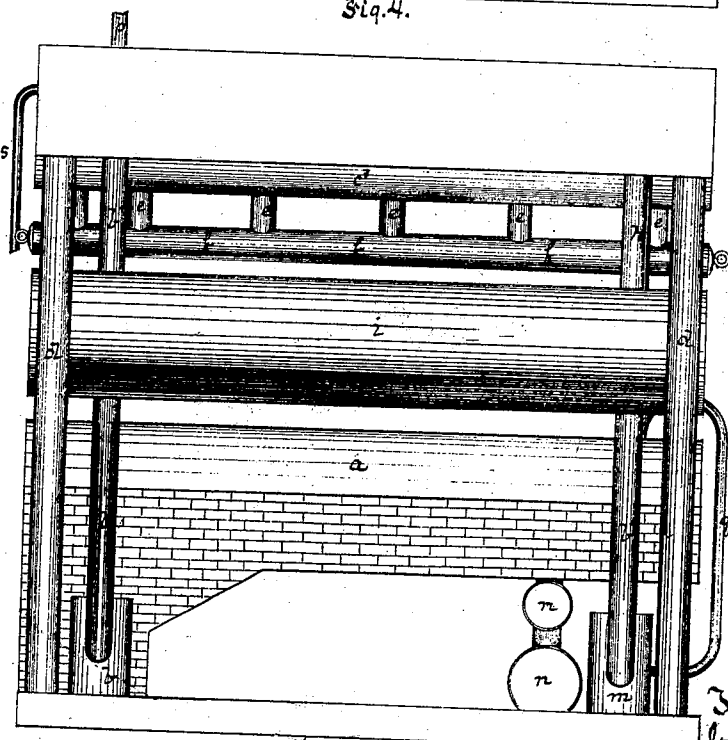


Fig. 5.

Witnesses:

R. G. Benschall

Wm. B. Kern

Inventor:

Joseph Nixon,
by Bakewell, Reinhart,
his Attys.

United States Patent Office.

JOSEPH NIXON, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 104,987, dated July 5, 1870.

IMPROVEMENT IN FILTERS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, JOSEPH NIXON, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Steam-boiler Filter and Reservoir; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, in two sheets, making part of this specification, in which—

Figure 1 is a front elevation of my improved boiler-filter;

Figure 2 is a sectional view of the tanks or reservoirs through the line *x-x*, fig. 1;

Figure 3 shows my arrangement of the boiler-supply pipe inside the condenser of a low-pressure engine, a part of the side of the condenser being broken away;

Figure 4 is a rear-end elevation of the boiler-filter; and

Figure 5 is a side elevation of the same.

Like letters of reference indicate like parts in each.

As many of our rivers pass through beds of clay, and other like soils, a great deal of sedimentary matter is taken up by and carried along with the water. This water, when taken into the boilers of steamboats, deposits the sediment therein, in such quantities as to make it a matter of very serious difficulty and expense to keep them in working order, which difficulty and expense it is the object of my invention to obviate.

My invention consists—

First, in the arrangement above the boiler of a series of reservoirs or tanks, each one opening into the adjoining one by gates, alternately arranged, and so forming a connected series throughout; the bottom of the tanks slanting from their outer ends, so that their lowest point shall be at or near the center, from which lowest points of the tanks connections are made to a mud-drum, which extends along under the tanks.

Second, in the arrangement of the boiler-supply pipes, leading from the tank into the boiler.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

On each side of an ordinary steam-boiler, *a*, or at other suitable point, I place a force-pump, *b*. Leading upward from the chambers of the pumps *b b* into a tank, *c*, above the boiler, are two water-pipes, *b' b'*, which are connected together at their upper ends in the tank *c*, and discharge into the tank *c* through a short pipe, *b''*.

The tank *c* is one of a series of similar tanks, which are placed side by side, as shown in fig. 2, and are supported by the standards *d*. They lie at right angles with the boiler, and their bottoms slant downward from their outer ends, as at *c'*, so that their lowest

part, *c'*, is in the middle, directly over the boiler. Leading down from their lowest part *c'* into a mud-drum, which, running along under the tanks, lies parallel with the boiler, are short pipes *e*, one from each tank, for carrying off the sediment deposited in the tanks, by the water.

The tanks *c* communicate with each other by openings *g* in their alternate ends, or at any suitable points between their ends, but alternately arranged, so that when the water is pumped into the first tank *c*, and flows through the holes *g*, fig. 2, it will have to traverse the length of the second one before it enters the third, and so on through the whole series.

Passing down from the bottom of the last tank, *c'*, but outside the limits of the sedimentary deposits, are two pipes, *h h*, one on each side of the boiler *a*, one of which enters the condenser *i*, and the other the condenser *i'*, and there connect with a system of pipes, *k*, as shown in fig. 3, which, in their turn, are connected with the pipes *l l*, that run down and open into the chambers of two force-pumps, *m m*.

The force-pumps *m m* stand, one on each side of the back end of the boiler, and operate to force the water, taken from the tank *c'*, in the manner just described, through the pipes *m' m'*, into and through the pipe *q*, which, after traversing the boiler from end to end, discharges into the mud-drum *n*, that stands under and opens into the boiler in the usual manner.

The operation is as follows:

The water is pumped from the river by the pumps *b b*, which are operated in any convenient manner, forced up through the pipes *b' b'*, which, it is seen, pass through and act as supports for the forward ends of the condensers *i i'* into the first tank *c*. From this tank it passes through the holes *g*, which are situated near the top of the tanks, so as to be above the heavier portion of the sedimentary matter, into the next tank, traversing this one; it flows through the openings into the next; and so on until it reaches the last tank *c'*.

My arrangement of the tanks *c* and openings *g* operates so effectually to deposit the sediment, that, by the time the water reaches the last tank *c'*, it is almost entirely free from it. The water passes from the tank *c'* down through the pipes *h h* into the systems *k k* inside the condensers.

This arrangement, whereby the water is made to traverse the condensers, is for the purpose of heating it before it is introduced into the boiler, so that it may neither injure the boiler, nor seriously lower the temperature of the water in it. From the systems *k k* it passes down through the pipes *l l* into the force-pumps *m m*, and, by them, is forced through the pipes *m' m'* and *q* (the latter of which traverses the boiler and ends in the mud-drum *n*) into the mud-drum *n*. From this

drum the water, becoming more perfectly heated, rises into the boiler, leaving behind, in the drum, any sediment that may have reached that point.

The sedimentary matter deposited in the tanks *c* settles down into the mud-drum *f* through the short tubes *e*. When the drum gets full it can be emptied by being blown out in the usual way. If I desire to keep the water at a certain level in the tanks, I gauge the pipe *o* so that the surplus shall run off through it. The upper elbow end of this pipe is movable, so that it can be adjusted to carry off the water at a higher or lower elevation. In case of fire, I can turn the whole force of the water into the pipe *p*, by shutting off the escape through the short pipe *b'*, by means of a stop-cock, *r*; then, if a hose is attached to the pipe *p*, the water can be directed to any part of the boat.

A pipe, such as *s*, may lead down from any one of the tanks, for supplying water for culinary or other purposes.

The tanks *c* may be made in other shapes, the one shown being adopted merely as a convenient and suitable one.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A series of tanks, *c c'*, arranged over a steam-boat-boiler, side by side, communicating by holes *g*, arranged out of line, such tanks having bottoms *c''*, inclined to a depression, *c''*, substantially as described.

2. The subject matter of the foregoing claim, in combination with the force-pumps *b b'*, elevating pipes *b' b'*, and discharge-pipes *b''*, substantially as and for the purposes set forth.

3. The subject matter of the first claim, in combination with the pipes *e* and mud-drum *f*, arranged substantially as set forth.

4. A series of feed-water heating pipes, *k*, arranged in the condensers *i i'*, in combination with the filter-tanks *c c'*, arranged substantially as described.

5. The elements of the second claim, in combination with cock *r* and pipe *p*, substantially as described. In testimony whereof, I, the said JOSEPH NIXON, have hereunto set my hand.

JOSEPH NIXON.

Witnesses:

WM. F. GRAHAM,
THOS. B. KERR.