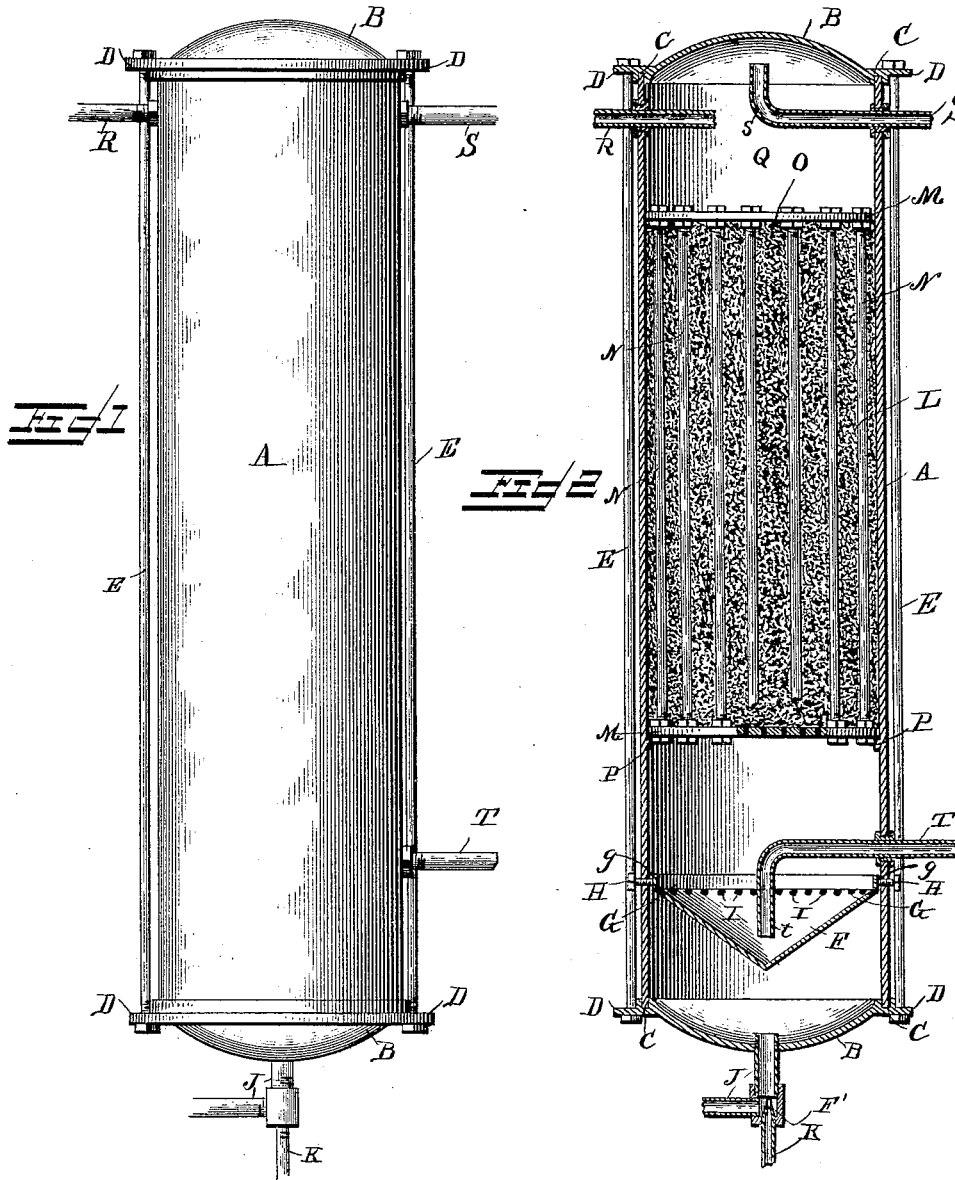


(No Model.)

L. V. LEWIS.
FEED WATER PURIFIER AND HEATER.

No. 493,406.

Patented Mar. 14, 1893.



Witnesses

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UNITED STATES PATENT OFFICE.

LOYAL V. LEWIS, OF KENDALLVILLE, INDIANA.

FEED-WATER PURIFIER AND HEATER.

SPECIFICATION forming part of Letters Patent No. 493,406, dated March 14, 1893.

Application filed September 30, 1892. Serial No. 447,431. (No model.)

To all whom it may concern:

Be it known that I, LOYAL V. LEWIS, a citizen of the United States, residing at Kendallville, in the county of Noble and State of Indiana, have invented a new and useful Feed-Water Purifier and Heater, of which the following is a specification.

This invention relates to feed water purifiers and heaters; and it has for its object to provide an improved device of this character in which, the live steam, used in connection therewith, is not only employed to raise the temperature of the feed water, but at the same time serves in the capacity of a precipitant, which causes the precipitation and settling of the scale-forming impurities.

To this end the invention primarily contemplates a simple and improved construction, whereby boiler feed-water is purified and heated prior to its delivery to the boiler, and the mud and scale-forming substances effectually precipitated and removed therefrom.

With these and many other objects in view, which will be readily apparent as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts, hereinafter more fully described, illustrated and claimed.

In the accompanying drawings, Figure 1, is a side elevation of the combined purifier and heater, constructed in accordance with this invention. Fig. 2 is a central vertical sectional view thereof.

Referring to the accompanying drawings, A represents the outer cylindrical shell of the combined purifier and heater, having upper and lower open ends, which are inclosed by the removable caps or heads B. The said caps or heads B, are curved or rounded, as illustrated, and are provided upon their clamping faces with the circular grooves C, which take over the ends of the cylinder A, to form a perfectly water tight joint therewith, and the laterally extended circular flanges D projecting beyond the outer wall or flange of the grooves, which receive the exterior clamping rods E, arranged outside of the cylinder, and connecting the two caps or heads, in order to tightly clamp the same in position upon the ends of the cylinder. The parallel walls or flanges which form said circular grooves over-

lap both the outer and inner sides of the cylinder at its ends to effectually secure the result noted.

Arranged within the lower end of the cylinder A, a short distance above the lower end thereof is the inverted cone shaped deflecting and sediment pan or dish F. The pan or dish F, is provided with the circular base flange G, smaller in diameter than the interior diameter of the cylinder, so as to leave a side passage g, for the upward passage of the water through the cylinder, and said flange receives the inner ends of the securing studs or screws H, passing through the sides of the cylinder, and bearing against the flange of the cone-pan in order to secure the same properly and stationary in position and also to provide for the removable support thereof. The pan or dish F, is also provided near the upper edge thereof with a circular series of perforations I, which also form passages for the ascending water, and the lower apex of the pan lies directly above the center of the inner end of the feed water pipe J, connected with an ordinary injector or pump, which forces the water through said pipe and into and through the cylinder. A live steam pipe K, enters the elbow of the pipe J, directly below the lower cap or head, and terminates therein in a jet-nozzle F', which jets the live steam into and through the water as it enters the cylinder. The water enters the cylinder into the lower water space between the lower cap or head and the cone-pan, but the body of the entering stream strikes the apex of the pan F, and is deflected thereby to the sides of the cylinder, where it finds escape through the passage g, and the pan perforations I, above the pan, in the meanwhile being continuously subjected to the heating and purifying action of the live steam, which causes a precipitation of impurities from the water, which will settle down into the bowl of the pan or dish F, from the water which has passed above the same and is about to enter the elongated filter basket L.

The filter basket, L, is arranged within the cylinder A, and extends from a point above the pan F, to a point about an equal distance from the upper cap or head. The said filter basket L, comprises the upper and lower perforated disks M, approximately of the same

diameter as the inner diameter of the cylinder A, and the circular series of tie-rods N, bolted to said disks near their edges to hold the same apart and also to form the inclosing wall of the filter basket, in which is placed charcoal, or other suitable filtering material, O, as illustrated. The lower perforated disk of the filter basket, rests upon inwardly projecting shoulders or ledges P, projecting inwardly from the inner sides of the cylinder, so as to hold such basket properly in position, in order that the water above the pan F, can be subjected to additional purification in the filtering medium. The water being relieved to a certain extent of mud and other impurities, by the action of the steam, and the deflection of the pan F, now enters the filtering basket and passes through the filtering strata therein, and the top perforated disk thereof, into the top or upper water space Q, between the upper disk M, and the upper cap or head of the cylinder. After the water reaches the upper water space Q, the same is in a thoroughly purified and heated condition ready to be carried to the boiler through the upper discharge pipe R, piercing the cylinder near its upper end and entering the upper water space Q. An upper blow-off pipe S, enters the upper end of the cylinder and is provided with an inner curved end s, turned toward and in close proximity to the top cap or head so as to provide means for blowing out the upper end of the apparatus, without removing any of the parts thereof, and a corresponding lower blow-off pipe T, enters the cylinder above the pan F, and is provided with an inner right angularly disposed end t, projecting into the bowl of the pan and terminating a short distance above the lower apex thereof, so as to provide means for readily blowing out the accumulated sediment from said pan, and the entire lower end of the cylinder.

It is thought that the construction, and operation, and many advantages of the herein described feed-water purifier and heater will now be readily apparent.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a feed water purifier and heater, the inclosing cylinder having a combined steam and water inlet at its lower end and a discharge at its upper end, a combined deflecting and sediment pan removably supported within the cylinder directly above said inlet, said pan being of smaller diameter than the interior diameter of the cylinder and provided with

perforations near its upper edge, and an elongated filter basket removably supported within the cylinder between said pan and the upper discharge, substantially as set forth.

2. In a feed water purifier, the inclosing cylinder, the inlet pipe entering the lower end of the cylinder, a combined deflecting and sediment pan arranged within the cylinder directly above said inlet, a filter basket supported above said pan, and the discharge pipe at the upper end of the cylinder, substantially as set forth.

3. In a feed water purifier and heater, the cylinder, the inlet pipe entering the lower end of the cylinder, a live steam-jet nozzle, arranged within said inlet pipe, an inverted cone shaped pan in the lower end of the cylinder and having its apex directly above the inlet pipe, said pan being spaced from the inner sides of the cylinder and having a circular series of perforations near its upper edge, and a filtering strata supported within the cylinder above the said pan, substantially as set forth.

4. In a feed water heater, the cylinder having a lower inlet, and an upper discharge, a filtering basket, supported within the cylinder between the inlet and discharge and comprising upper and lower perforated disks, and a circular series of tie-rods connecting said disks near their edges and forming the inclosing wall of the basket, and suitable filtering material within said basket, substantially as set forth.

5. In a combined feed water purifier and heater, the cylinder, the lower inlet pipe having a steam jet - nozzle, an inverted cone-shaped pan arranged within the lower end of the cylinder above the inlet and having perforations, a filter basket supported within the cylinder above said pan and terminating short of the top of the cylinder to leave an upper water space, a discharge pipe entering the upper water space, and upper and lower blow-off pipes having inner right angularly disposed ends, the lower of which projects into the bowl of the pan and terminates a short distance above the lower apex thereof, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

LOYAL V. LEWIS.

Witnesses:

THOMAS L. GRAVES,
H. A. LEWIS.