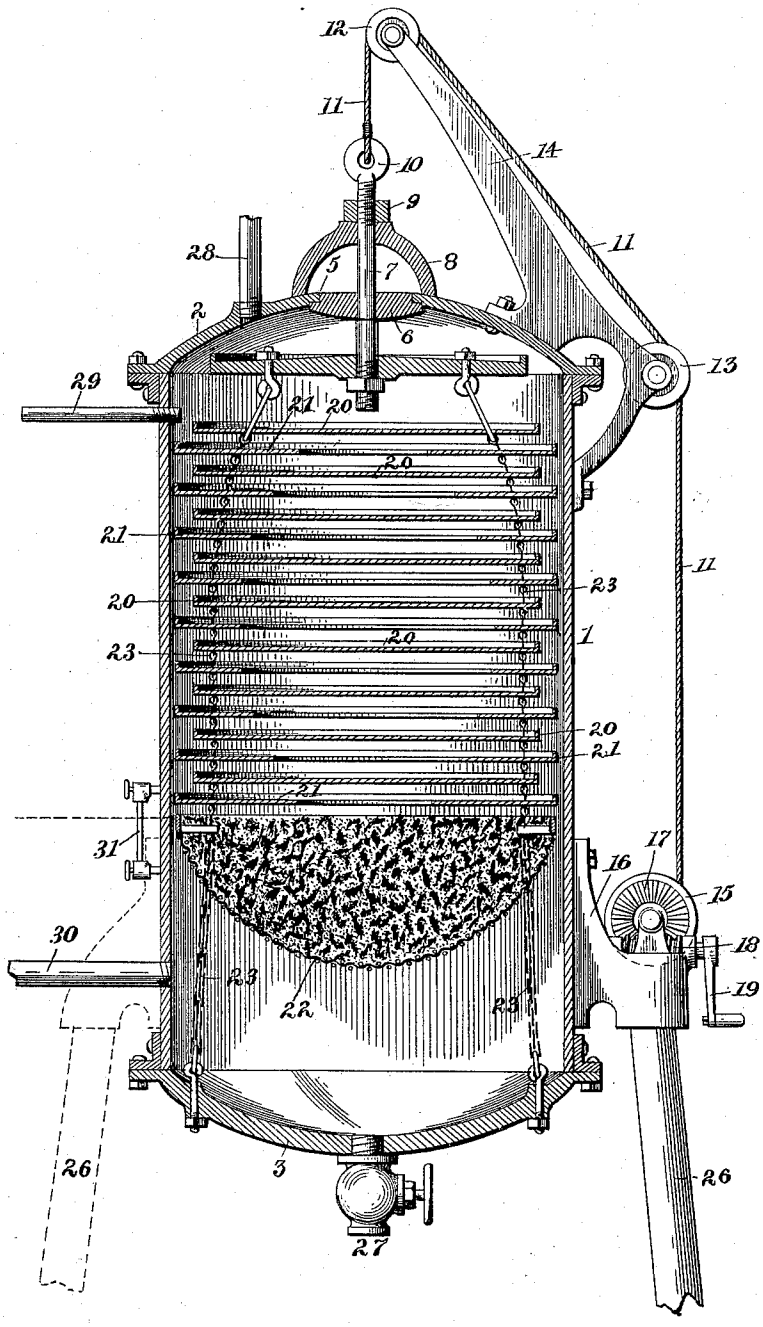
(No Model.)

C. B. ROGERS.

FEED WATER HEATER AND PURIFIER.

No. 591,058. Patented Oct. 5, 1897.



Witnesses:
Howard D. Orr.
Ella V. Barnett.

Inventor:
Charles B. Rogers
By Van Buren Hillyard.
his Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES B. ROGERS, OF ST. PETER, MINNESOTA, ASSIGNOR OF THREE-FOURTHS TO MILO CARRIER, OF SAME PLACE.

FEED-WATER HEATER AND PURIFIER.

SPECIFICATION forming part of Letters Patent No. 591,058, dated October 5, 1897.

Application filed June 25, 1896. Renewed April 23, 1897. Serial No. 633,532. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. ROGERS, a citizen of the United States, residing at St. Peter, county of Nicollet, and State of Minnesota, have invented certain new and useful Improvements in Feed-Water Heaters and Purifiers, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to means for purifying and heating water prior to its entrance into the boiler, the water being fed in a positive manner to the boiler by live-steam pressure.

The purpose of the invention is to provide for the ready removal of the impurities separated from the water from the device and to enable the cleaning to be performed by one person, the separating mechanism, such as a basket, containing filtering material, and a connected series of settling-pans being removably fitted within a case or shell and attached to a hoisting-tackle, whereby it can be conveniently, readily, and easily removed for cleaning, repairing, inspection, and any purpose whatsoever and can be replaced with the same facility.

Other objects and advantages are contemplated and will become manifest as the nature of the invention is comprehended, and to this end reference is to be had to the following description and the accompanying drawing, which is a vertical section of a device especially designed for attaining the objects of the invention.

The device must be placed so that the water-line of the boiler when projected will pass through the lower portion thereof a proper distance above the bottom, as indicated by the dotted line in the drawing. The shell or casing 1 may be of required size and of any form in cross-section and is adapted to be placed in an upright position, being closed at its ends by heads 2 and 3. The upper head 2 is riveted or bolted to the upper edge of the shell, and the latter is provided with a ring 4, to which the head 2 is secured, said ring serving to reinforce and strengthen the shell. The lower head 3 is removably attached to the lower end of the shell, preferably by being bolted thereto, so as to be readily detached when it is required to gain access to the interior of the shell or to the separating and purifying mechanism. A manhole 5 is centrally formed within the head 2 and is closed from the inner side by a cap 6, the latter being held in place by a threaded stem 7 and a crab 8, the latter spanning the manhole 5 and centrally apertured for the passage therethrough of the stem 7, which in turn passes through the cap 6 and is threaded to receive a nut 9, by means of which the parts 6 and 8 are drawn together upon opposite sides of the head 2, the stem 7 having a shoulder at a point below the cap 6 to prevent the relative movement of the stem and cap when these parts are in operative relation, as shown. The upper end of the stem 7 is formed with an eye 10 or is otherwise constructed for the attachment therewith of a chain or cable 11, the latter passing over a pulley 12 directly above the stem 7 and journaled to a bracket 14, attached to the shell and head 2. This chain or cable 11 passes over a direction-pulley 13 at the side of the shell and journaled in the said bracket 14 and is adapted to wind upon a drum 15 within convenient reach and mounted in a bracket 16, secured to a side of shell 1, said drum being provided with mechanism for rotating it, so as to wind up or unwind the chain or cable 11 as required, and for this purpose a worm-gear 17 is formed on a head of the drum and meshes with a worm-shaft 18, provided at its outer end with a crank 19 for convenience in rotating it in its bearings.

The separating or purifying mechanism is located within the shell or case 1 and consists, essentially, of a series of shallow pans or trays 20 and 21, the pans 20 alternating with the pans 21 and being imperforate, whereas the pans 21 have their middle portions removed, giving them the appearance of annuli. The pans 21 are of larger diameter than the pans 20 and are disposed so as to have their rims projecting beyond the rims of the pans 20, so that the overflow from the pans 20 will be received by the pans 21 and directed by the latter to the middle portion of the pans 20 immediately below the respective pans 21. The opening in the topmost pan 21 is smaller than the opening in the pan 21 next below,

thereby directing the water nearer the center of the pan 20 immediately therebelow, and these openings gradually increase to about midway the series of pans when the openings in the remaining pans gradually diminish, so that the lowermost pan 21 has the smallest opening, thereby delivering the water to about the center of the basket 22. Thus it will be seen that the openings in the pans 21 gradually decrease from about a central point of the series of pans toward the ends of the series. The several pans 20 and 21 are connected in series in any convenient way, preferably by chains 23, which are secured to the pans in any substantial manner. A pan or casting 24 is secured to the lower end of the stem 7 and is located above the series of pans and has the upper ends of the chains or connections 23 secured thereto by eyebolts 25 or in any approved way.

The basket 22 may be of wire, perforate sheet metal, or cast, as found most advantageous, and may be given any desired shape, and is intended to receive a filtering material, such as coke, so as to purify the water, and has connection with the chains 23. The chains or connections 23 are extended below the basket 22 and are secured to the lower head 3, thereby connecting the said head with the separating and purifying mechanism, so that the latter and the head will move together when raising and lowering the separating mechanism, as will be readily comprehended.

The device must be supported at a proper elevation to admit of the lowering of the separating mechanism from the shell or case, and, as shown, is supported upon legs 26. A blow-off 27 is applied to the lower head 3 for removing sediment which may have accumulated in the bottom of the device. The supply-pipe 28 communicates with the upper portions of the device and passes through the head 2. The steam-pipe 29 likewise communicates with the upper portion of the device and with the live-steam space of the boiler. The pipe 30 for conveying the purified water to the boiler communicates with the lower portion of the shell at a point below the basket 22 and with the boiler below the water-line.

When the invention is in operation, the parts will appear in the relation substantially as shown in the drawing, but when it is required to gain access to the interior of the shell or casing or to the separating or purifying mechanism the lower head 3 is loosened and the chain or cable 11 slackened and unwound from the drum 15, thereby permitting the parts to move and drop from the shell or case. Before slackening the chain or cable the nut 9 is backed upon the stem 7, so as to loosen the crab 8 and cap 6, thereby permitting the crab to be tilted so it can be passed through the manhole 5. After the parts have received the required attention they are placed in position by winding the chain or cable 11 upon the drum 15, thereby elevating and lifting the parts and causing them to assume the position illustrated. A sight-gage 31 is provided at one side of the shell or case, so as to determine the level of the water.

The device can be used for an exhaust-steam heater and for other purposes which will readily suggest themselves. Hence when adapting the invention for a particular use it is to be understood that various changes in the form, proportion, and minor details of construction may be resorted to without departing from or sacrificing any of the advantages of the invention.

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

1. In a feed-water heater and purifier, the combination of a shell or casing supported in an upright position at a proper elevation, a head detachably fitted to the lower end of the shell, a separating and purifying mechanism suspended within the shell and adapted to be lowered when the said head is detached, and a hoisting mechanism operating through the upper head of the shell to elevate and lower the separating and purifying mechanism, substantially as described for the purpose specified.

2. In a feed-water heater and purifier, the combination of a shell or casing supported in an upright position at a proper elevation, a head detachably fitted to the lower end of the shell, a connected series of separating-pans suspended within the shell and having the lower head connected therewith and adapted to be lowered, and a hoisting mechanism operating through the upper head of the shell to elevate and lower the pans and lower head, substantially as described.

3. In a feed-water heater and purifier, the combination of a shell or casing closed at its upper end by a head having a manhole, a head detachably fitted to the lower end of the shell, a separating and purifying mechanism removably fitted within the shell and having its lower head connected therewith, means for closing the manhole in the upper head, and a hoisting mechanism adapted to operate through the said manhole for raising and lowering the separating and purifying mechanism and the parts connected therewith, substantially in the manner set forth for the purpose specified.

4. A feed-water heater and purifier, comprising the following elements: a shell or casing supported in an upright position at a proper elevation, a head closing the upper end of the shell and having a central manhole, a head detachably fitted to the lower end of the shell, a cap closing against the inner side of the manhole, a crab spanning the said manhole, a threaded stem passing through the crab and cap and provided with means for drawing them together upon opposite sides of the upper head, a series of separating-pans, a basket, means for connecting the said pans, basket and lower head to-

gether and to the threaded stem, and a hoisting mechanism connected with the said stem to lower and raise it and the parts connected therewith when the lower head and the threaded stem are loosened, substantially as described for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES B. ROGERS.

Witnesses:
C. F. BROWN,
J. M. ROGERS.