R. R. DOAN.
Steam-Boilers.

No. 214,285. Patented April 15, 1879.

Fig. 1

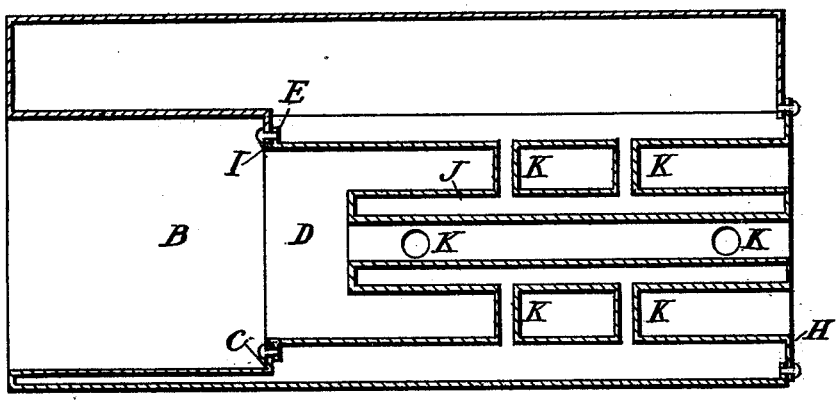
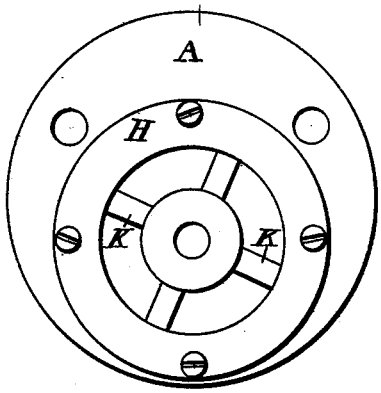


Fig. 2



Witnesses
D. B. Lawler.
Will B. Schwartz.

Inventor
Riley R. Doan
per J. L. Boone
Attorney

UNITED STATES PATENT OFFICE.

RILEY R. DOAN, OF SACRAMENTO, CALIFORNIA.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **214,285**, dated April 15, 1879; application filed November 20, 1878.

To all whom it may concern:

Be it known that I, RILEY R. DOAN, of the city and county of Sacramento, State of California, have invented an Improved Steam-Boiler; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the drawings accompanying this specification, and forming a part of the same.

My invention has reference to that class of steam-boilers in which a water-heater is secured centrally in the rear portion of the main flue, the water-space of which is connected with the water-space in the main boiler by radiating tubes, which pass across the annular space between the water-heater and surrounding wall of the flue, so that the heat and products of combustion, in their passage through the flue, are compelled to pass over, through, and around the water-heater, and its connecting-tubes, for the purpose of giving a large heating-surface and more completely utilizing the heat. This style of boiler I have found to be the most economical and to give the best results of all the steam-boilers with which I am acquainted; but heretofore it has had the disadvantage of being difficult to repair, as the heater and cross tubes could not be got at to be repaired in case of leakage or damage.

My present invention has for its object the remedying of this difficulty; and this I do by constructing the main flue in two parts, the rear portion, in which the heater and its tubes are secured, being separate and removable from the boiler and front part of the flue, all as hereinafter more fully described.

Referring to the accompanying drawings, Figure 1 is a longitudinal section. Fig. 2 is a view of rear of boiler.

Let A represent the boiler, which is represented, in the present instance, as being of the return-flue class; but my invention can be applied to any boiler that has a main flue, B, passing through it from the furnace to the combustion-chamber. The boiler here shown can either be secured inside of a shell, or it can have a furnace and uptake constructed in front of it and a combustion-chamber in the rear. These features, however, are immaterial to my invention.

In constructing the main flue I carry it back only a short distance into the boiler, and there secure an inward-projecting flange, C, to it, as shown. The rear portion, D, of the flue I make in a separate piece, and of a diameter corresponding with the diameter of the space between the inner edges of the flange C, and its forward end I provide with an outward-projecting flange, E, which is placed slightly back from the end of the flue, so as to leave a projecting edge, I, which is equal in length to the thickness of the flange C. The rear end of this flue has a wide flange, H, projecting outward from it. In the center of this portion D of the flue I secure the tubular water-heater J, and connect its water-space with the wall of the flue by tubes K K, in the usual way, thus making the rear part of the flue and the supplemental water-heater in a separate and independent part of the boiler.

In the rear boiler-head I make a circular opening, which is large enough to admit the flange on the front end of the flue-tube D I then insert the end of the flue D through this opening, and carry it forward until the projecting portion I of its forward end passes through the circular space between the edges of the flange C, and until the outward-projecting flange E on its front end abuts against the flange C. This brings the rear flange, H, squarely up against the rear boiler-head. I then introduce suitable packing between the flanges and secure them tightly together by means of screws, so that the joint is made water and steam tight.

Now, when anything happens to the heater or its connecting-tubes, or it becomes necessary to repair the interior of the boiler, I can, by withdrawing the screws which fasten the flanges together, remove the rear tube, D. Every part can then be repaired with great facility.

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

The boiler A, having the short front flue, B, with its flange C, and the opening in its rear boiler-head, in combination with the removable rear portion, D, with its projection I and flange E on its front end and the wide flange H on its rear end, substantially as and for the purpose specified.

In witness whereof I have hereunto set my hand and seal.

RILEY R. DOAN. [L. S.]

Witnesses:
C. W. MOULTHROP,
H. F. ROOT.