

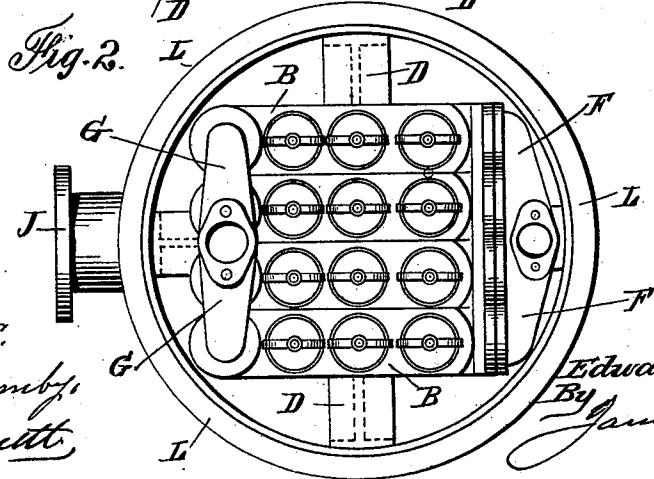
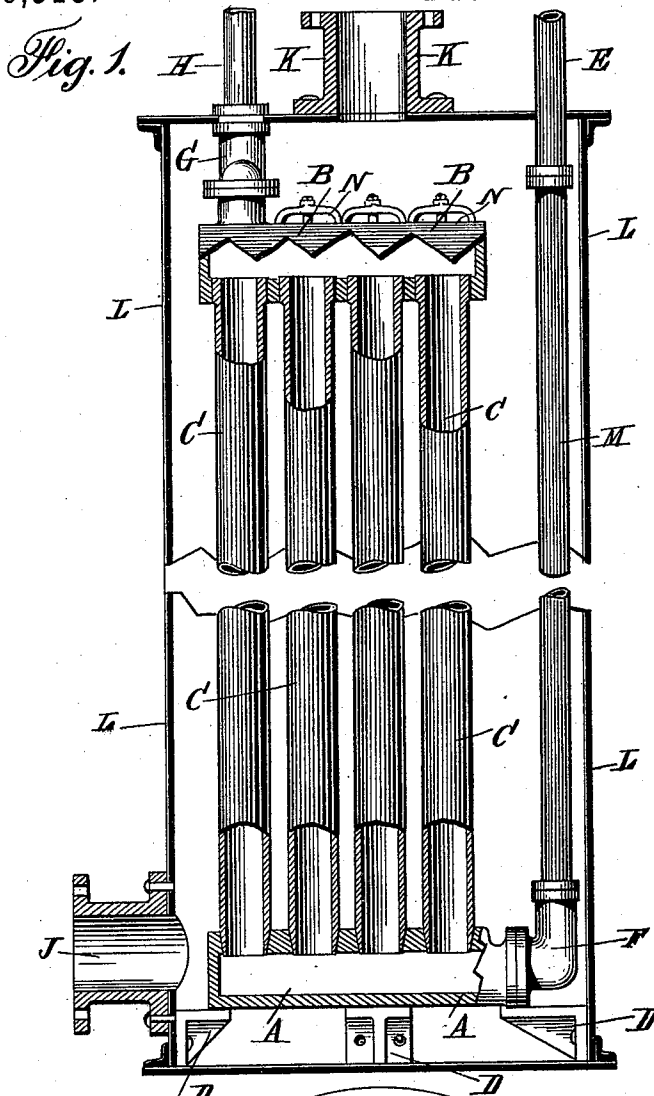
(No Model.)

E. GREEN.

FEED WATER HEATER AND CONDENSING APPARATUS.

No. 536,515.

Patented Mar. 26, 1895.



Witnesses.

Dennis Bump,
Robert Smith,

Inventor

Edward Green.

By James L. Norris,
Att'y.

UNITED STATES PATENT OFFICE.

EDWARD GREEN, OF WAKEFIELD, ENGLAND.

FEED-WATER HEATER AND CONDENSING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 536,515, dated March 26, 1895.

Application filed December 28, 1894. Serial No. 533,191. (No model.) Patented in England March 7, 1894, No. 4,831.

To all whom it may concern:

Be it known that I, EDWARD GREEN, baronet, a subject of the Queen of Great Britain, and a resident of Wakefield, York, England, have invented a certain new and useful Improvement in Feed-Water Heaters and Condensing Apparatus, (for which I have obtained a patent in Great Britain, No. 4,831, dated March 7, 1894,) of which the following is a specification.

This invention relates to water heaters and has for its object to heat water rapidly by spent or live steam, the water to be heated and the admitted steam having free circulation into and through the apparatus.

The water heater is composed of upper and lower boxes in which water tubes are affixed, said boxes and water tubes being as one body lodged on and supported by a stool like frame arranged in a casing in which the heater is inclosed, and in which steam has free circulation around the boxes and the tubes. The boxes are of rectangular form, and one side of each, *i. e.*, in which the tubes are fitted, are of greater thickness than the other sides or ends. The lower box is made open at one end for the reception of a wide junction piece for leading the inlet water to all the tubes, and the upper box which has both ends closed is provided with a number of apertures to allow of the tubes being inserted through them, said apertures being closable by covers or lids. The exit end of the upper box has flanged collars on to which a junction piece is affixed, this having a single outlet common to all the end tubes. The holes in the upper part of the lower box are of tapered form and the lower ends of the tubes correspond in shape for fitting therein, and the lower part of the upper box has parallel shaped holes for the reception of shoulders of the upper ends of the tubes, the fit in both cases being without luting or fastenings of any kind.

The annexed drawings will enable my invention to be clearly understood.

Figure 1 is a vertical section; Fig. 2, a plan from the top of the upper box.

A, B, represent lower and upper boxes respectively for water; C, C, tubes connecting said boxes; D, D, stool like frame supporting

same; E, water inlet pipe; F, junction connecting said pipe E with box A; G, junction connecting box B with water exit pipe H; J, steam inlet; K, steam vapor exit; L, casing in which steam has free play around both boxes A, B, tubes C, C, junctions F, G, and the descending branch M of the water inlet pipe E.

N, N, are lids or covers of the upper box B through which the tubes C, C, can be inserted for location in the boxes, as indicated.

The boxes A, B, may each be in a single casting, or composed of a series of castings capable of being bolted or braced together for the attachment of the junctions.

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

1. In a water heater, the combination with the exterior shell or casing provided with a steam inlet at its lower end and an exhaust passage at its upper end, a hollow water-box supported within the lower portion of said casing, a similar water-box located within the upper portion of said shell, and provided with an outlet opening, an inlet opening for the lower box, a series of tubes connecting the two water-boxes, a series of ports in the top portion of the upper water-box, said ports being in a line with the tubes, and a lid or cover for each port, substantially as described.

2. In a water heater, the combination with an exterior shell or casing provided with a steam inlet at its lower portion and an exhaust passage at its top, an upper and a lower water-box located within said shell, a stool for said lower water-box, said stool being secured to the inner wall of the shell, a feed pipe located within and traversing the side wall of the shell and communicating with the lower water-box, an outlet pipe for the upper water-box, a series of tubes connecting the two water-boxes, a series of ports in the top of the upper water-box, said ports being directly in alignment with the tubes, and a lid or cover for each of said ports, substantially as described.

3. In a water heater, the combination with a shell or casing provided with an inlet and an exhaust port, upper and lower water boxes

located within said shell, the bottom and top portions respectively of said water-boxes being thicker than the remaining portions thereof, a series of tubes connecting the thickened portions of said water-boxes whereby communication is established from one box to the other, a feed pipe for the lower water box and a delivery pipe for the upper water box, substantially as described.

In witness whereof I have hereunto set my hand, in presence of two witnesses, this 20th day of November, 1894.

EDWARD GREEN.

Witnesses:

WM. LIPSCOMB,

Heath, Wakefield.

LEO GAPIOT,

2 Queen's Gate, London.