No. 757,665. PATENTED APR. 19, 1904.

J. E. LEWIS.

FEED WATER HEATER.

APPLICATION FILED DEC. 29, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

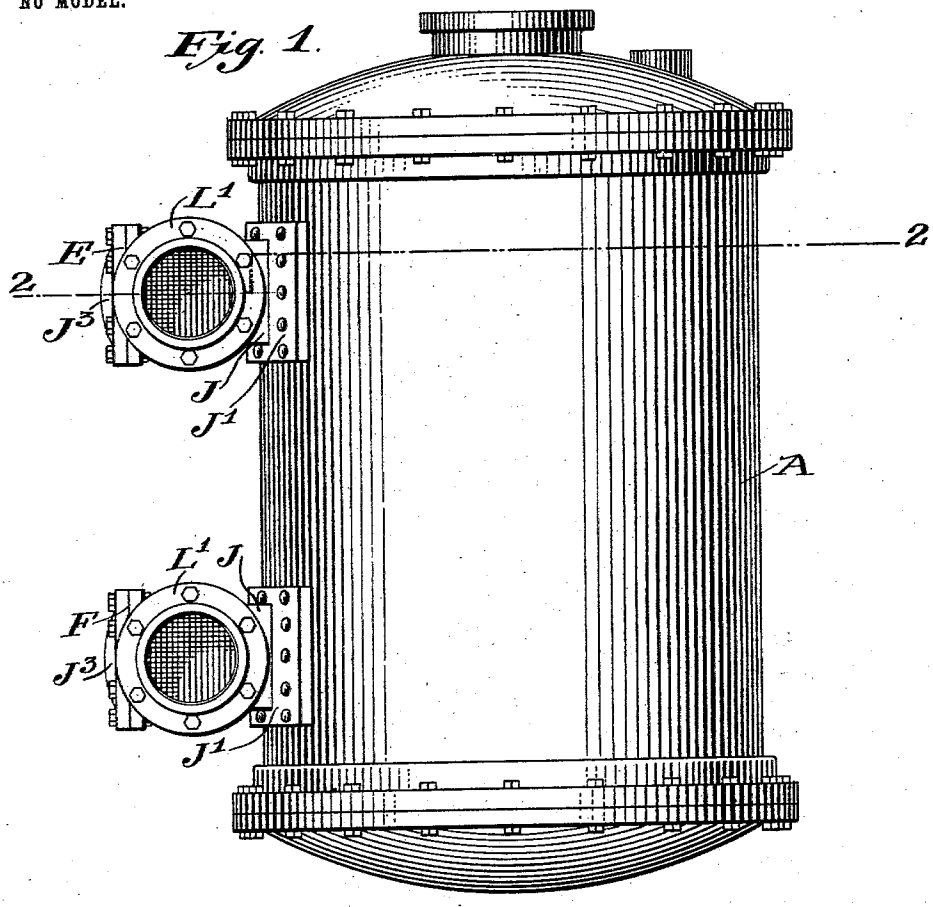
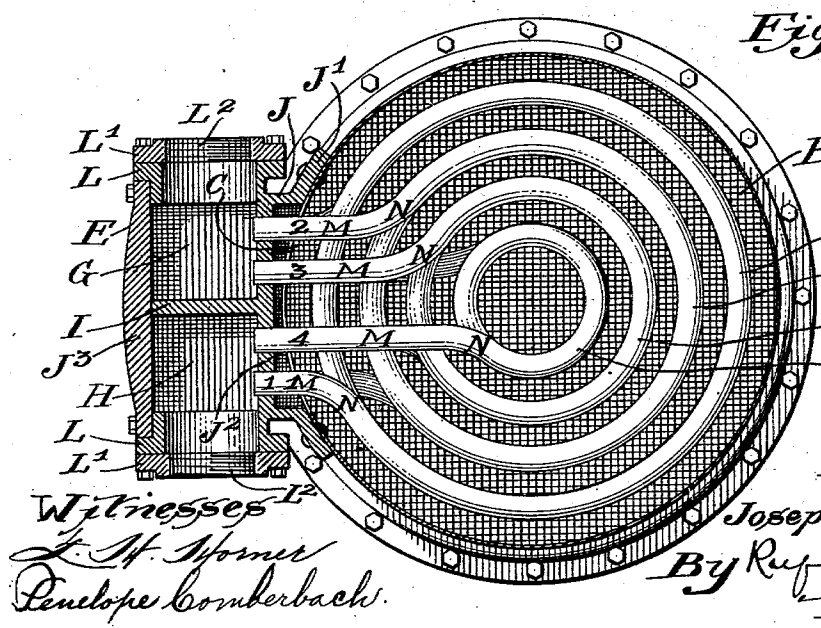


Fig. 2.



Witnesses
L. M. Yorner
Penelope Comberbach.

Inventor
Joseph E. Lewis
By Rufus B. Fowler
Attorney.

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FEED WATER HEATER.

APPLICATION FILED DEC. 29, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

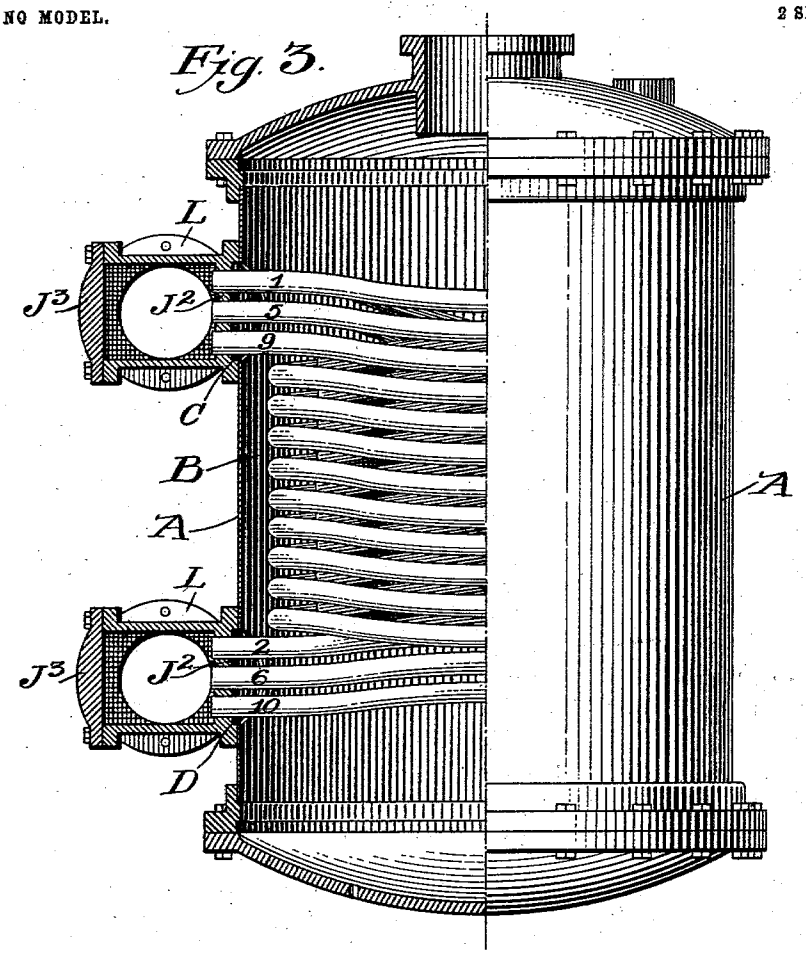
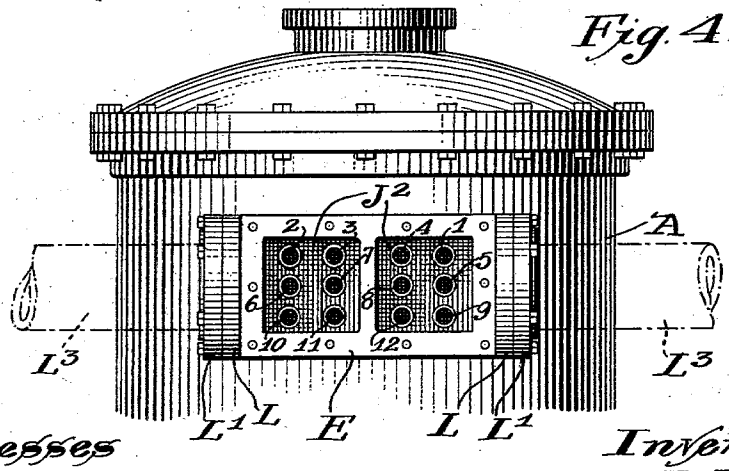


Fig. 4.



Witnesses
L. H. Homer
Penelope Comberbach.

Inventor
Joseph E. Lewis.
By Rufus B. Sowle,
Attorney.

No. 757,665. Patented April 19, 1904.

UNITED STATES PATENT OFFICE.

JOSEPH E. LEWIS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO WHITLOCK COIL PIPE COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 757,665, dated April 19, 1904.

Application filed December 29, 1902. Serial No. 136,968. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. LEWIS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Feed-Water Heaters, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a side elevation of a feed-water heater embodying my invention. Fig. 2 is a transverse sectional view on line 2 2, Fig. 1. Fig. 3 is a side elevation with one-half represented in central sectional view, but with the inclosed water-pipes shown in full; and Fig. 4 is a front elevation of the upper portion of the heater and showing the upper header for the water-pipes with its cap or cover removed.

Similar reference letters and figures refer to similar parts in the different views.

My present invention relates to a feed-water heater for heating the water supplied to steam-boilers and for other purposes, and particularly to that class of feed-water heaters which comprises a casing inclosing a heating-chamber to which steam is admitted and a series of water-pipes inclosed in the chamber through which the water to be heated is passed, although the object may be accomplished by filling the heating-chamber with water and passing steam through the pipes.

The objects of my invention are to increase the efficiency of this class of heaters, to simplify their construction, to facilitate repairing, to make the joints of the apparatus readily accessible without disconnecting any of the steam or water pipes, and to provide means whereby a single heater is able to heat water for more than one purpose, and these objects are accomplished by means of the construction and arrangement of parts as hereinafter described, the novel features being set forth in the annexed claims.

Referring to the accompanying drawings, A denotes a shell or casing inclosing a steam-chamber B, having suitable provision for the admission of steam thereto and having openings C and D, Fig. 3, through which the ends of the water-pipes project. Attached to the side of the heater are cast-iron headers E and F, inclosing chambers with which the water-pipes communicate. Each of the headers represented in the drawings consists of a shell containing two rectangular compartments G and H, divided by a transverse partition I, Fig. 2. On the side of the header next the casing A is a neck J, provided with a flange J′, which is attached to the side of the casing and surrounds the openings C and D. The water-pipes, which in the present instance are twelve in number, are arranged in sets of preferably three pipes each, the pipes of each set being wound into spiral coils of different diameters and arranged concentrically with one coil within another. The coiled water-pipes have their ends entering and attached to the vertical wall J^2 of the headers E and F next the casing of the heater, either by being expanded therein, by soldering, or by some other suitable and practiced method.

Referring to Figs. 2, 3, and 4 of the drawings, the water-pipes comprising one set consists of pipes 1, 5, and 9, which are coiled into the larger spiral K. The next or second set consists of the pipes 2, 6, and 10, which are coiled into the next smaller coil K′ and inclosed within the coil K. The next or third set consists of the pipes 3, 7, and 11, which are coiled into a still smaller coil K^2, inclosed within the coil K′, and the fourth or last set consists of the pipes 4, 8, and 12, which are coiled into the smallest coil K^3, inclosed within the coil K^2. The upper ends of the pipes 1, 4, 5, 8, 9, and 12 communicate with the compartment H in the upper header E and the opposite ends of the pipes 1, 4, 5, 8, 9, and 12 connect with the compartment in the opposite end of the lower header F. Similarly, the upper ends of the pipes 2, 3, 6, 7, 10, and 11 communicate with the compartment G in the upper header and their lower ends with a similar compartment in the opposite end of the lower header F. The vertical side wall of the headers opposite the wall J^2 consists of a removable plate or cap J^3. In Fig. 4 the header E is represented with its cap removed, thereby exposing the ends of the water-pipes which pass

through and are attached to the opposite wall J^2. The ends of the headers are provided with circular flanges L, to which are attached collars L′, provided with an internal screw-thread L^2 to receive the screw-thread ends of pipes, as represented in broken lines L^3, Fig. 4, for the purpose of conveying the water to be heated into the compartments of the upper header E and discharging it from the compartments of the lower header F.

The heater represented in the accompanying drawings embodies in a single heater two separate and independent systems of water-supply, one through the pipes 1, 4, 5, 8, 9, and 12 and the other through the pipes 2, 3, 6, 7, 10, and 11, enabling one system of pipes to supply hot water for one purpose, such as feed-water to a boiler, and the other set of pipes to supply water for another and different purpose—such as a wash-sink, dye-vat, or other purpose—or the discharge-pipes from the header F may be connected together and the heated water discharged through a single pipe.

My method of construction embodies several advantages over any heater now in use, so far as I am aware. I am able to secure an increased heating-surface on the water-pipes by means of the concentric spiral coils, and each of the water-pipes has a straight section M between the coiled section and the header and a short bend N between the coiled section and the straight section M, said bent section being curved in an opposite direction to the curvature of the coiled section. This method of bending enables the end of the pipe to be easily brought into registration with its corresponding hole in the wall J^2 of the header without changing the alinement of the straight section M. For instance, the projecting end of one of the water-pipes can be adjusted vertically by separating or compressing its coils and laterally by varying the curvature of the pipe at its coiled section and at the bent section N. The employment of the neck J on the headers permits the ends of the water-pipes to project beyond the outside of the shell or casing, which facilitates the application of the headers and allows complete access to the ends of the pipes by the removal of the headers.

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

1. In a feed-water heater, the combination with a heating-chamber, of a series of pipes inclosed in said chamber, a pair of headers connecting the ends of said pipes, each of said headers having a partition by which it is divided into two separate compartments, with said pipes connecting a compartment in one end of one of said headers with the compartment in the opposite end of the other header, substantially as described.

2. In a feed-water heater, the combination with a shell or casing inclosing a heating-chamber and having openings for the projecting ends of pipes, a series of pipes inclosed in said chamber and having their ends projecting through said openings, headers inclosing chambers communicating with said pipes, a removable cap on said headers opposite the ends of said pipes, and openings in the ends of said headers, and screw-threaded collars attached to the ends of said headers for supply and discharge pipes, substantially as described.

3. The combination with a shell or casing, inclosing a heating-chamber and having openings in its sides, of a series of pipes inclosed in the heating-chamber and having their ends projecting through said openings, headers outside said casing inclosing chambers and provided with flanged necks between said chambers and said casing and attached to said casing around said openings, removable caps on one side of said headers and opposite said pipes, and screw-threaded collars attached to the opposite ends of said headers to receive supply and discharge pipes, substantially as described.

4. The combination with a shell or casing inclosing a heating-chamber, having openings in its sides, of a series of coiled pipes having their ends projecting through said openings, headers outside said casing inclosing chambers communicating with said pipes, a removable cap on the side of each header and opposite said pipes, and an opening in the end of each header to receive discharge and supply pipes.

Dated this 23d day of December, 1902.

JOSEPH E. LEWIS.

Witnesses:
J. B. MURPHY,
W. L. HOWARD.