(No Model.) 2 Sheets—Sheet 1.

W. L. HARVEY.

FEED WATER HEATER.

No. 524,590. Patented Aug. 14, 1894.

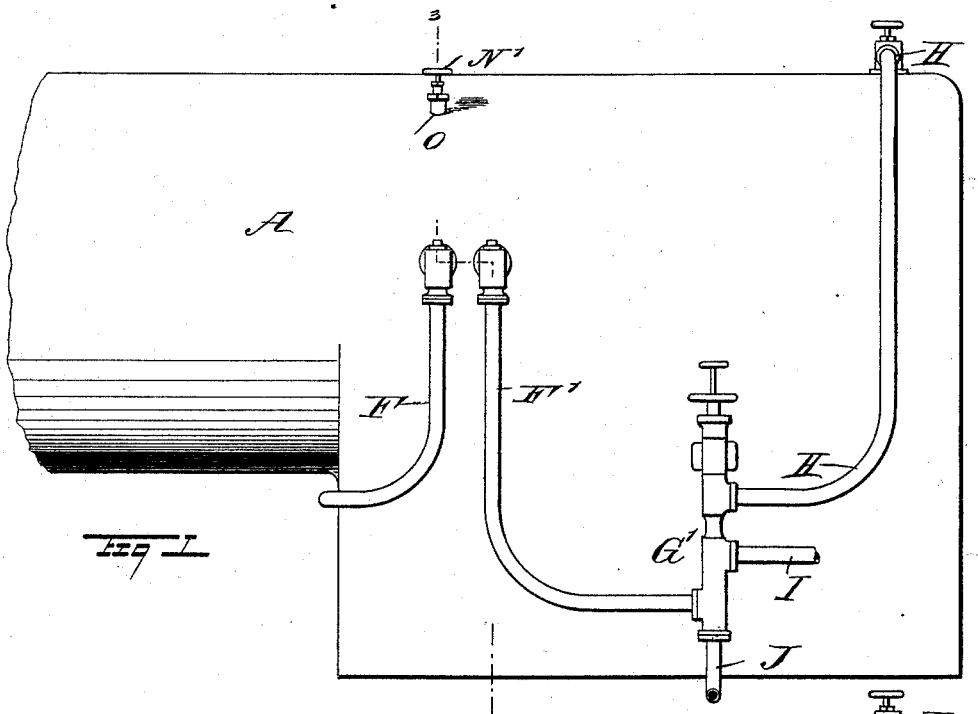

Fig 1

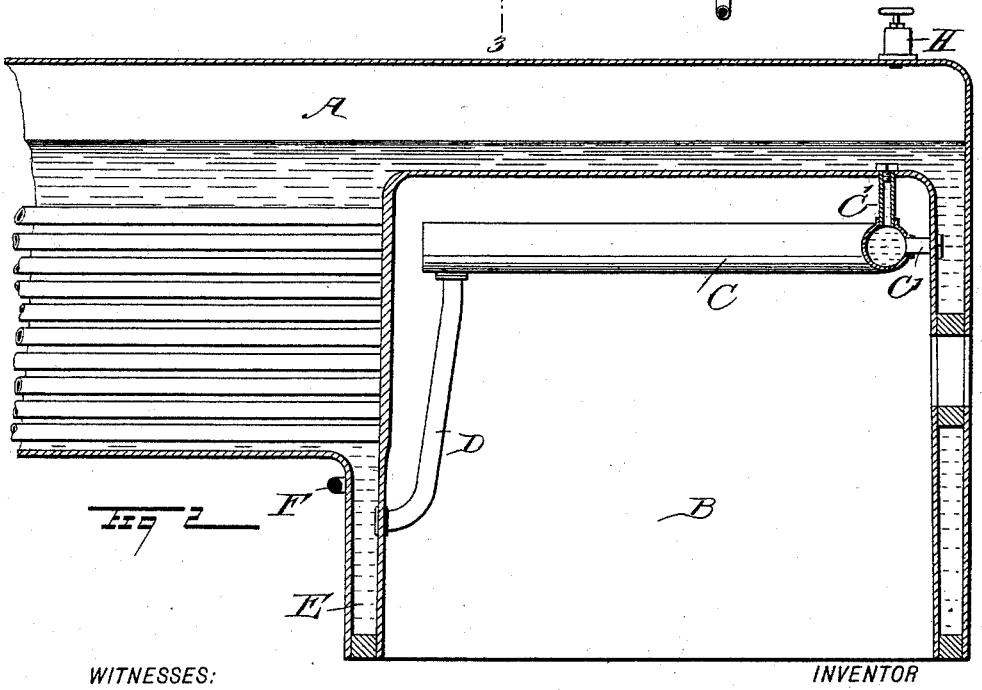

Fig 2

WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

W. L. HARVEY.

FEED WATER HEATER.

No. 524,590. Patented Aug. 14, 1894.

Fig 3

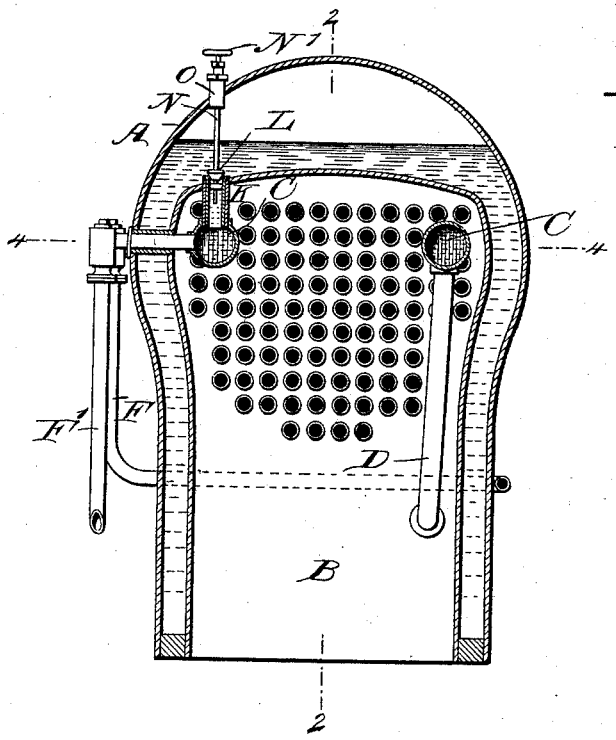
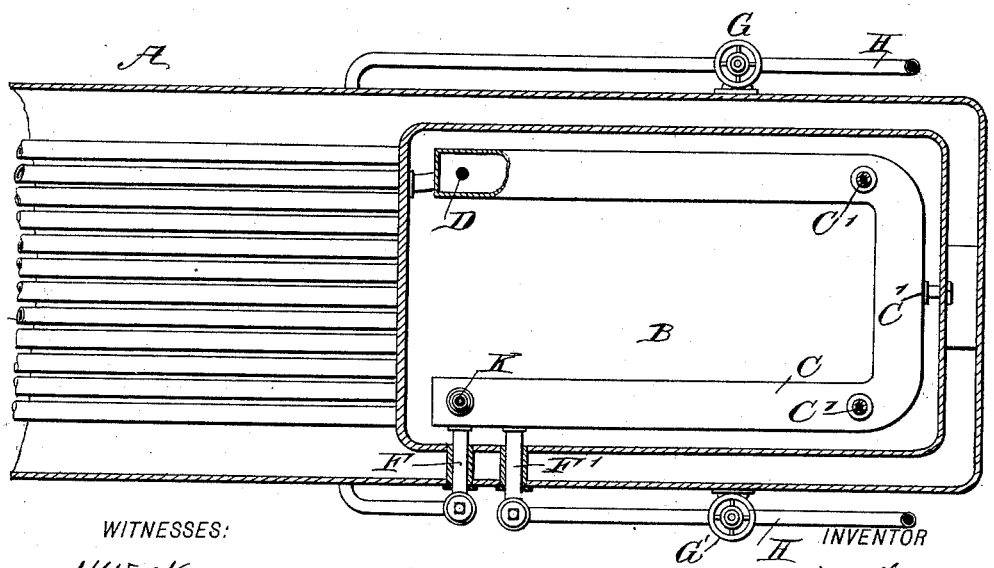


Fig 4



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM LESTER HARVEY, OF STANBERRY, MISSOURI.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 524,590, dated August 14, 1894.

Application filed December 20, 1893. Serial No. 494,178. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM LESTER HARVEY, of Stanberry, in the county of Gentry and State of Missouri, have invented a new and Improved Feed-Water Heater, of which the following is a full, clear, and exact description.

The invention relates to boilers, and its object is to provide a new and improved feed water heater, which is simple and durable in construction, very effective in operation, and arranged to quickly and thoroughly heat the incoming feed water, and also to effect a rapid circulation of boiler water, during the time the feed is stopped.

The invention consists of certain parts and details, and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement. Fig. 2 is a sectional side elevation of the same on the line 2—2 of Fig. 3. Fig. 3 is a cross section of the improvement on the line 3—3 of Fig. 1; and Fig. 4 is a sectional plan view of the same on the line 4—4 of Fig. 3.

The boiler A of the usual construction, is provided with the fire box B, in the upper part of which, is arranged a horizontally disposed tube C, preferably made U-shaped, and suspended in the fire-box by hollow stays C′, connected with the crown sheet, as is plainly illustrated in Fig. 2. One end of this tube C, is provided with a downwardly extending pipe D opening into the leg E of the boiler A, as shown in Figs. 2, 3, and 4, so that the feed water passing through the said tube, passes into the leg of the boiler, to rise from the latter into the other parts of the boiler. The other end of the tube C is provided with feed water supply pipes F and F′ extending to opposite sides of the boiler, as is plainly shown in Fig. 4; the said supply pipes being connected with injectors G and G′ respectively, which are alike in construction and each provided with a steam supply pipe H, leading from the steam compartment of the boiler A. Each injector is also provided with a pipe I, connected with the source of the water supply and with an overflow pipe J.

Either injector can be set in action in the usual manner or both at the same time if desired, so that water is forced through the pipes F, F′ into one end of the tube C, and through the same to pass finally in a heated condition, down the pipe D into the leg of the boiler. On the inlet end of the tube C, is arranged an upwardly extending branch pipe K, which passes through the crown sheet into the water compartment of the boiler; the upper end of the said pipe being normally closed by a valve L, held on the valve stem N, extending upward, and passing through a suitable stuffing box O, fastened in the shell of the boiler A, as is plainly shown in Figs. 1 and 3.

On the outer end of the stem N is arranged a handle N′ under the control of the operator, to open and close the said valve L whenever desired. When this valve L is open and the two injectors G and G′ are stopped, then water can circulate through the tube C, the water entering the pipe D from the leg of the boiler passing through the tube C to rise through the branch pipe K and pass back into the boiler A. Now, it will be seen, that the water circulating through the tube C is subjected to the high degree of heat of the burning fuel in the fire box B, so that the said circulating water is thoroughly heated in its passage through the tube C. It will further be seen, that during the time the injectors or other feed pumps are not in operation, a circulation of the water can be had in the boiler by the operator simply turning the handle N′, so as to open the valve L, to permit the water to pass through the tube C in the manner above described.

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

1. A feed water heater, comprising a tube arranged in the fire box of the boiler and having one end connected with the lower part of the boiler and its other end with a water supply, said tube being provided with a branch pipe adapted to be placed in communication with the upper part of the boiler to permit a

circulation of the water in the tube, when the water supply is cut off, substantially as described.

2. A feed water heater, comprising a tube arranged in the fire box of the boiler and having one end connected with a water supply, a branch pipe leading from one end of the said tube in an upward direction to extend through the crown sheet to connect with the boiler in the upper part of the water compartment, a pipe leading from the other end of the said tube to connect with the leg of the boiler, and a valve under the control of the operator and adapted to open and close the said branch pipe to permit the boiler water to circulate through the said tube or pipes when the water supply is cut off as set forth.

3. The combination with a boiler, of a U-shape tube arranged in the upper part of the fire box of the boiler, a pipe leading from one end of the tube to the leg of the boiler, water supply pipes connected with the opposite end of the tube, a pipe leading from the end of the tube to which the water supply pipes are connected, through the crown sheet into the water compartment, and a valve for closing the said pipe, having its stem extending through the shell of the boiler and provided with a handle, substantially as described.

WILLIAM LESTER HARVEY.

Witnesses:
JAMES T. DUNN,
SETH B. HINKLEY.