

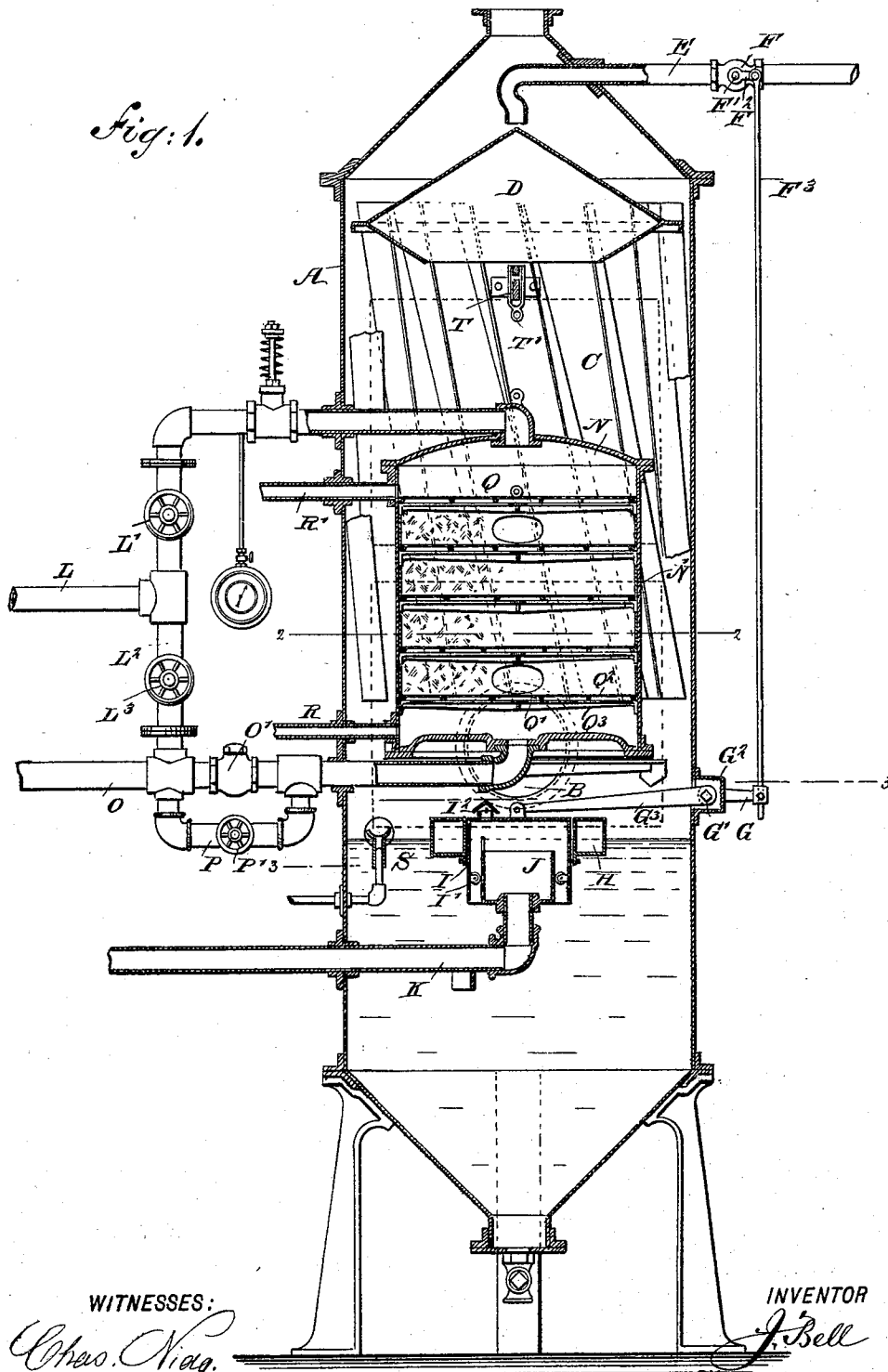
(No Model.)

2 Sheets—Sheet 1.

J. BELL.
FEED WATER HEATER.

No. 516,426.

Patented Mar. 13, 1894.



WITNESSES:

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INVENTOR

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ATTORNEYS.

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Fig: 2.

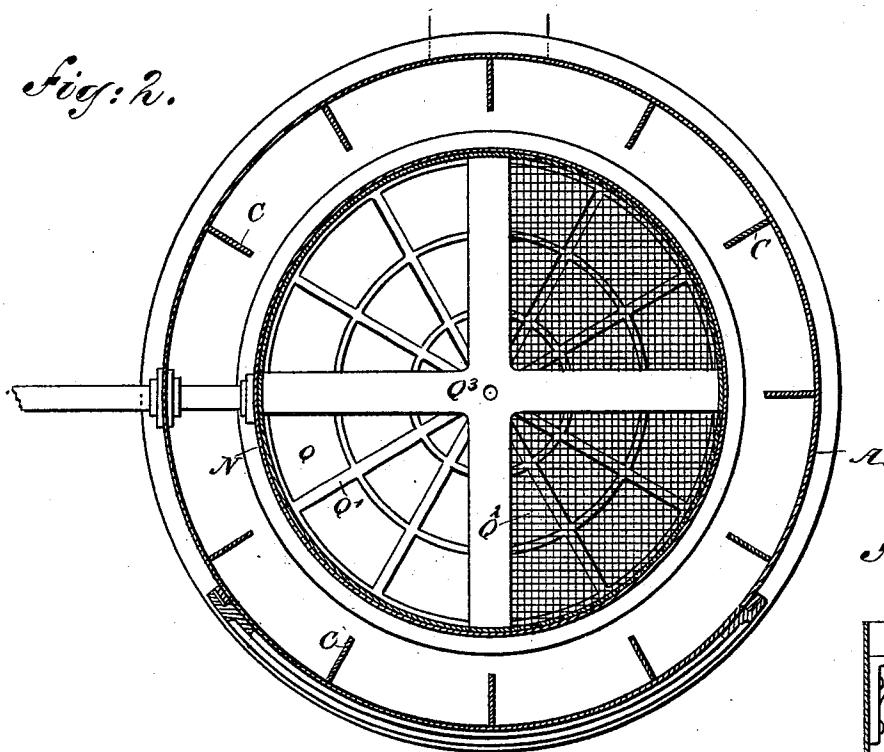


Fig: 4.

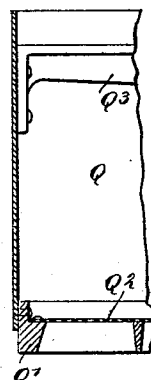
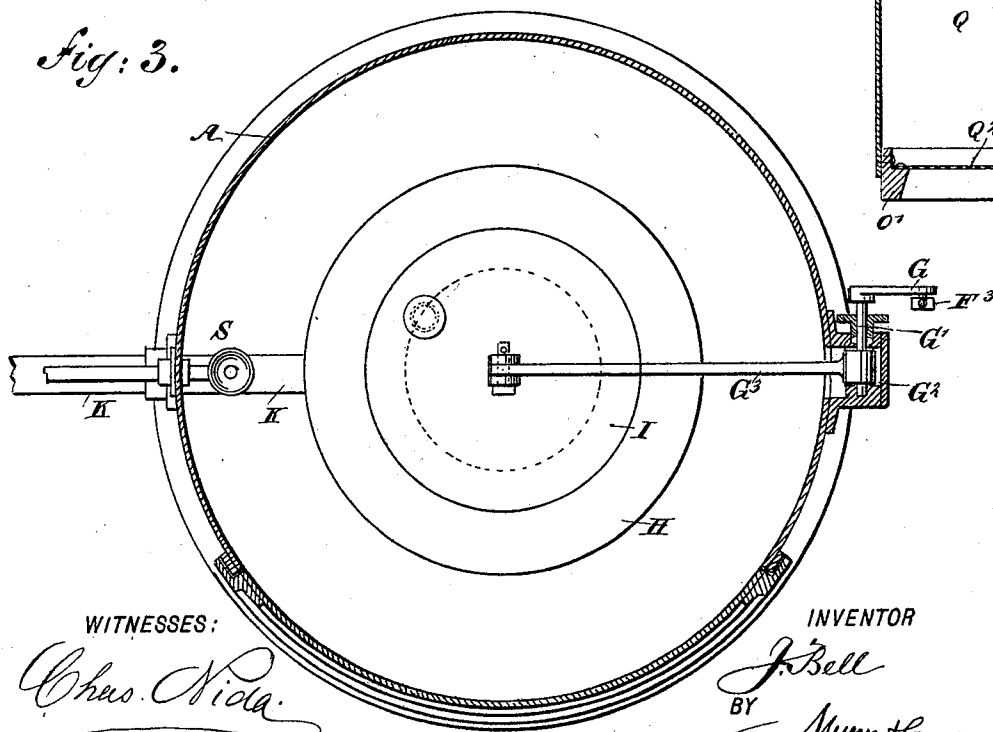


Fig: 3.



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JOSEPH BELL, OF TROUTDALE, OREGON.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 516,426, dated March 13, 1894.

Application filed June 3, 1893. Serial No. 476,500. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH BELL, of Troutdale, in the county of Multnomah and State of Oregon, have invented a new and Improved Feed-Water Heater, of which the following is a full, clear, and exact description.

The invention relates to feed water heaters, such as shown and described in the Letters Patent, Nos. 470,972 and 477,491, granted to me on the dates of March 15, 1892, and June 21, 1892, respectively.

The object of the present invention is to provide a new and improved feed water heater, in which the filter for purifying the water can be readily cleaned whenever desired, without removing the filter from the casing or stopping the flow of the feed water through the casing to the boiler.

The invention consists principally of a filter arranged in the heater and provided with an outlet pipe leading to the boiler and adapted to be connected with the filter inlet pipe.

The invention also consists of certain parts and details, and combinations of the same, as will be hereinafter described 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 sectional side elevation of the improvement. Fig. 2 is an enlarged sectional plan view of the same on the line 2—2 of Fig. 1; and Fig. 3 is a similar view of the same on the line 3—3 of Fig. 1; and Fig. 4 is an enlarged sectional side elevation of part of one of the filter sections.

The improved feed water heater is provided with a casing A, into the lower part of which extends the exhaust pipe B, for discharging the exhaust steam of an engine or other apparatus into the said casing, which latter is open at the top to permit the exhaust steam to pass into the open air after rising and passing through the said casing for heating the incoming water.

Within the casing A and above the entrance of the exhaust pipe B are arranged a series of plates C, onto the upper ends of which discharges a deflector D, preferably of the construction shown and described in the Letters Patent above referred to, the said

deflector receiving the feed water through a pipe E, connected with a suitable water supply and containing a valve F, governed by a suitable mechanism controlled from the accumulating water in the lower part of the casing A. This mechanism is connected with the valve stem F' of the valve F and is provided with an arm F², on the said stem and pivotally-connected by a link F³, with an arm G, secured on the outer end of a shaft G', journaled in a cap G², secured to one side of the casing A, as plainly shown in Figs. 1 and 3. On the shaft G' is secured an arm G³, which extends inwardly into the lower part of the casing A and pivotally connects with a float mechanism which rises and falls with the water accumulating in the lower part of the casing A, so that more or less water is admitted through the pipe E, as the float mechanism shifts the valve F accordingly to admit more or less water into the casing through the pipe E.

The float mechanism is provided with a float H, secured to the exterior surface of an inverted cup I, provided on its inside with friction rollers I', adapted to travel on the outer surface of the cup J, connected in its bottom with a pipe K, leading to a pump or other device for returning the water to a pipe L, connected with the top of the filter N, as plainly illustrated in Fig. 1. The outlet for the water in the lower part of the casing A and composed of the inverted cup I and cup J, is similar in construction to the one in the patents above referred to, with the difference that the float H is attached to the cup I and the latter is pivotally connected with the arm G³ forming part of the mechanism for controlling the position of the valve F. It will be seen that by this outlet only pure water can pass into the pipe K leading to the pump, as the scum and other impurities on the top of the water can pass out through a suitable skimming device S shown and described in the patents referred to. The pipe L is provided with a valve L', for controlling the flow of water to the filter N, the said pipe being also connected by a branch pipe L² containing a valve L³, with the pipe O leading from the bottom of the filter N to the boiler, the said pipe containing a check valve O' to prevent a return flow of the water from the boiler

to the filter. A branch pipe P is arranged in the pipe O on opposite sides of the check valve O', and this pipe contains a valve P', which permits of passing water from in front of the check valve O' to the rear thereof and to the filter, when it is desired to clean the latter with hot water.

The filter N is provided with an exterior casing N', preferably made cylindrical in cross section and containing a series of short cylinders Q, fitted on the inside of the casing N' and one on top of the other, as plainly shown in Fig. 1. Each of the short cylinders Q is provided near its lower end with a spider Q', which supports on top a perforated disk Q², on which filtering material is placed to fill the short cylinder Q. Near the upper end of each short cylinder except the uppermost one, is secured a cross Q³, on which rests the projecting lower end of the spider Q' of the cylinder Q next above. By this arrangement each filtering section can be readily removed from the filter casing N' without disturbing the position of the latter in the casing A, it being understood that the top of the said filter casing N' can be removed whenever desired, for removing the individual filter sections.

Into the lower end of the filter N leads a steam pipe R connected with a suitable source of steam supply to force steam through the filter and the several filter sections and the filtering material supported thereon, to clean the filtering material whenever necessary. The uppermost filter section is connected with a discharge pipe R' for removing the impurities forced out of the filter when using steam or hot water passing through the pipe P and part of the pipe O into the lower end of the filter. The casing A, as well as the casing N' of the filter, are provided with suitable manholes for obtaining access to the said casings whenever desired.

The skimming device S previously referred to may be of any approved construction.

Near the top of the casing A is supported a rail T provided with a hook T' for supporting a pulley, block or other means for conveniently moving the top of the filter casing N' and supporting the same within the casing A during the time the individual filter sections are removed from the said casing.

When the feed water heater is working in the usual manner, then the valves L³ and P' are closed, so that the feed water heated within the casing A in the manner described in the patents above referred to, finally passes through the pipe K to a pump or other similar device to be returned through the pipe L into the filter N and forced through the same to finally pass in a purified state into the pipe O and to the boiler.

Now, when it is desired to clean the filter without stopping the flow of water to the boiler, then the operator closes the valve L' and opens the valve L³, so that the feed water

passing to the pump through the pipe K flows through the pipe L and branch pipe L² into the pipe O in front of the check valve O' and then to the boiler without passing through the filter N. Part of this feed water may be utilized for cleaning the filter and in order to do so, the operator opens the valve P' to permit water to flow from the pipe O in front of the check valve O' to the rear of the same in the pipe O and to the filter to finally pass through the pipe R' to the outside, taking along such impurities as had previously accumulated in the filtering material of the filter N. By this arrangement both steam and hot water may be used for cleaning the filtering material in the filter.

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

1. A feed water heater comprising a heater casing, a filter arranged within the said casing, an outlet pipe leading from the said filter and connected with the boiler, and a water supply pipe for the said filter and adapted to be connected with the said filter outlet pipe, substantially as shown and described.

2. In a feed water heater, the combination with a casing, of a filter arranged within the said casing, a water supply pipe leading to the top of the said filter and connected with a pump or other device, an outlet pipe for the said casing and connected with the pump discharging into the said filter pipe, and a discharge pipe leading from the bottom of the said filter and connected with the boiler, substantially as shown and described.

3. In a feed water heater, the combination with a heater casing provided with a water inlet pipe and a water outlet pipe, a valve arranged within the said water inlet pipe, and a float mechanism for controlling the said valve and forming part of the outlet for the said outlet pipe, substantially as shown and described.

4. A feed water heater comprising a filter arranged within the heater casing, a water inlet pipe for the said filter and provided with a valve, a water outlet pipe for the said filter, and containing a check valve and leading to the boiler, and a valved branch pipe connecting the said inlet pipe with the outlet pipe, substantially as shown and described.

5. A feed water heater comprising a filter arranged within the heater casing, a water inlet pipe for the said filter and provided with a valve, a water outlet pipe for the said filter and containing a check valve and leading to the boiler, a valved branch pipe connecting the said inlet pipe with the outlet pipe, and a second valved branch pipe arranged in the outlet pipe on opposite sides of the said check valve, substantially as shown and described.

JOSEPH BELL.

Witnesses:

F. C. HINDLE,
JOHN P. WILDMAN.