L. H. CAVERLY.

FEED WATER HEATER.

APPLICATION FILED FEB. 29, 1908.

902,208. Patented Oct. 27, 1908.

Fig. 1.

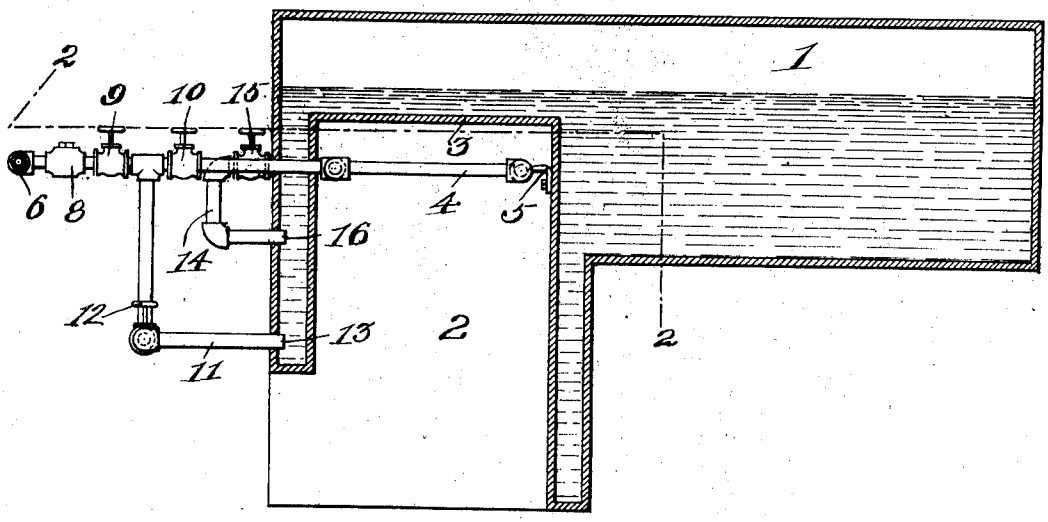
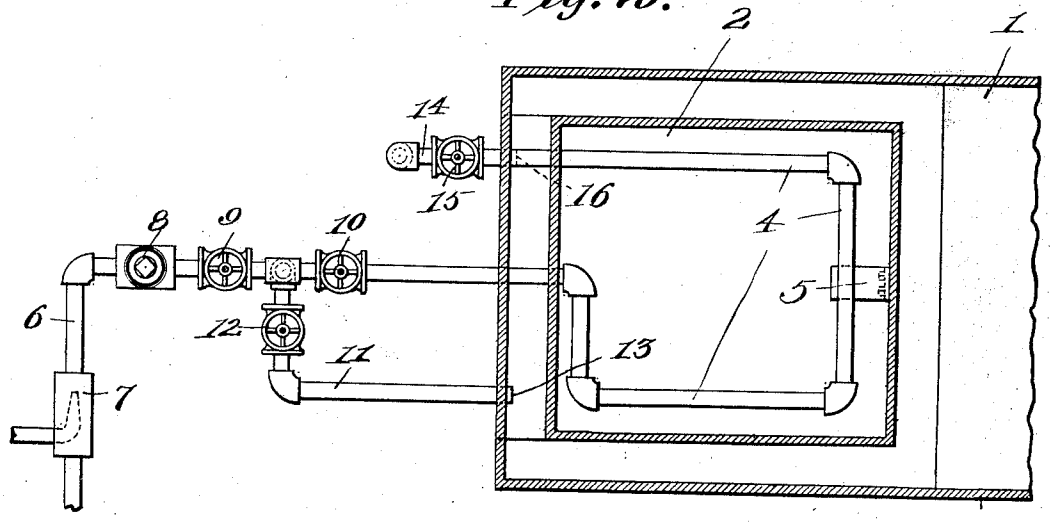


Fig. 2.



Witnesses

James F. Crown

L. O. Little

Inventor

L. H. Caverly

By Watson E. Coleman

Attorney

UNITED STATES PATENT OFFICE.

LUTHER HENRY CAVERLY, OF SOMERS, MONTANA.

FEED-WATER HEATER.

No. 902,208. Specification of Letters Patent. Patented Oct. 27, 1908.

Application filed February 29, 1908. Serial No. 418,571.

To all whom it may concern:

Be it known that I, LUTHER H. CAVERLY, a citizen of the United States, residing at Somers, in the county of Flathead and State of Montana, have invented certain new and useful Improvements in Feed-Water Heaters for Boilers, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in feed water heaters for steam boilers.

The object of the invention is to provide a device of this character comprising a simple and practical arrangement of pipes and valves whereby the water fed to the boiler may be heated to a very high temperature without the use of more fuel than is necessary to keep up steam in the boiler, thereby effecting a great saving in fuel.

With the above and other objects in view, the invention consists of the novel features of construction and the combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which

Figure 1 is a vertical section through a steam boiler furnace having my improved feed water heater applied thereto; and Fig. 2 is a detail horizontal section taken on the plane indicated by the line 2—2 in Fig. 1.

In the drawings 1 represents a steam boiler having a furnace or a fire box 2. Arranged in the upper portion of the latter, beneath the crown sheet 3, is a water feed pipe 4, the opposite ends of which extend through the front wall of the boiler, as shown. The portion of the pipe 4 within the fire box may, if desired, be coiled, bent back and forth in zig zag shape, or otherwise constructed to increase its length, but as illustrated, it is in the form of a substantially rectangular loop supported by brackets 5. The outer end 6 of the pipe, which I will term the inlet end or branch, is connected to an injector 7, or a pump, or any suitable means for forcing water through the inlet or supply pipe 6. In the pipe 6 is arranged a suitable check valve 8 and two cut off valves 9, 10, the latter being arranged between the check valve and the boiler and on the opposite sides of a branch pipe 11. This pipe contains a cut off valve 12 and has its other end 13 opening into the boiler, adjacent to the bottom of the water space in the same. The other outer end 14 of the pipe 4 contains a cut off valve 15 and has its end 16 opening into the boiler at a point slightly beneath the normal water level in the latter. The controlling or cut off valves 9, 10, 12, and 15, are preferably in the form of globe valves.

In operation, the valve 9 is normally closed and the valves 10, 12, 15 are normally open so that the water in the boiler will pass upwardly through the branch pipe 11 into the supply pipe 6, then through the heating pipe 4 and then through the discharge branch or pipe 14 into the upper portion of the boiler, a constant circulation of water through the system of pipes being thus insured, and owing to the disposition of all the pipes of the system below water level of the boiler, said pipes will be constantly filled with water. When it is desired to feed water to the boiler, and to have the same heated to a high temperature before entering the latter, the valve 12 is closed, the valve 9 opened and the pump or injector 7 is started so that cold water will pass through the supply pipe 6, then through the heating pipe 4 and then through the outlet branch pipe 14 and into the boiler, its passage through the pipe 4 causing it to be raised to a high temperature without the expenditure of more fuel than is necessary to maintain a fire sufficient to keep up steam in the boiler. It is obvious therefore that the device will effect a great saving in fuel. The check valve 8 prevents the water backing through the supply pipe 6. Should it be desired to feed cold water to the boiler, the valve 10 is closed and the valves 9, 12 opened so that the water will pass from the injector or pump through the supply pipe 6 and into the branch 11 which discharges it into the lower portion of the boiler. In case of accident to the heating pipe 4 in the fire box, the valves 10, 15 are closed, thereby cutting off circulation through it so that it may be easily repaired without the necessity of draining the boiler. The foregoing arrangement of the valves also permits the water heating device to be discarded or thrown out of use in case of breakage, since the water may be supplied directly to the boiler through the branch 11.

Having thus described my invention what I claim is:

The herein described feed water heater comprising in combination with a steam boiler having a water space surrounding its fire box, of a coil supporting bracket 5 ar-

ranged within the fire box upon one of its walls, the feed water heating coil 4 arranged in the upper portion of the fire box and engaged with said bracket, said coil having the horizontal discharge end 14 extending outside of the front of the boiler, then downwardly and then inwardly into the water space of the boiler below the normal level of the water, the controlling valve 15 in said branch or end 14, said coil also having its inlet end or branch extending outside of the boiler, the branch pipe 11 having the vertical branch depending from said inlet end of the coil and the horizontal branch extending into the water space of the boiler at a point below the discharge end 14 of the coil, the controlling valve 12 in said branch pipe 11, controlling valves 9, 10 in the inlet pipe of the coil on opposite sides of the branch pipe connection, and the check valve 8 in said inlet end or branch in advance of the valve 9.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

LUTHER HENRY CAVERLY.

Witnesses:
CARL OLSON,
AGNES SHORTALL.