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FEED WATER HEATER.

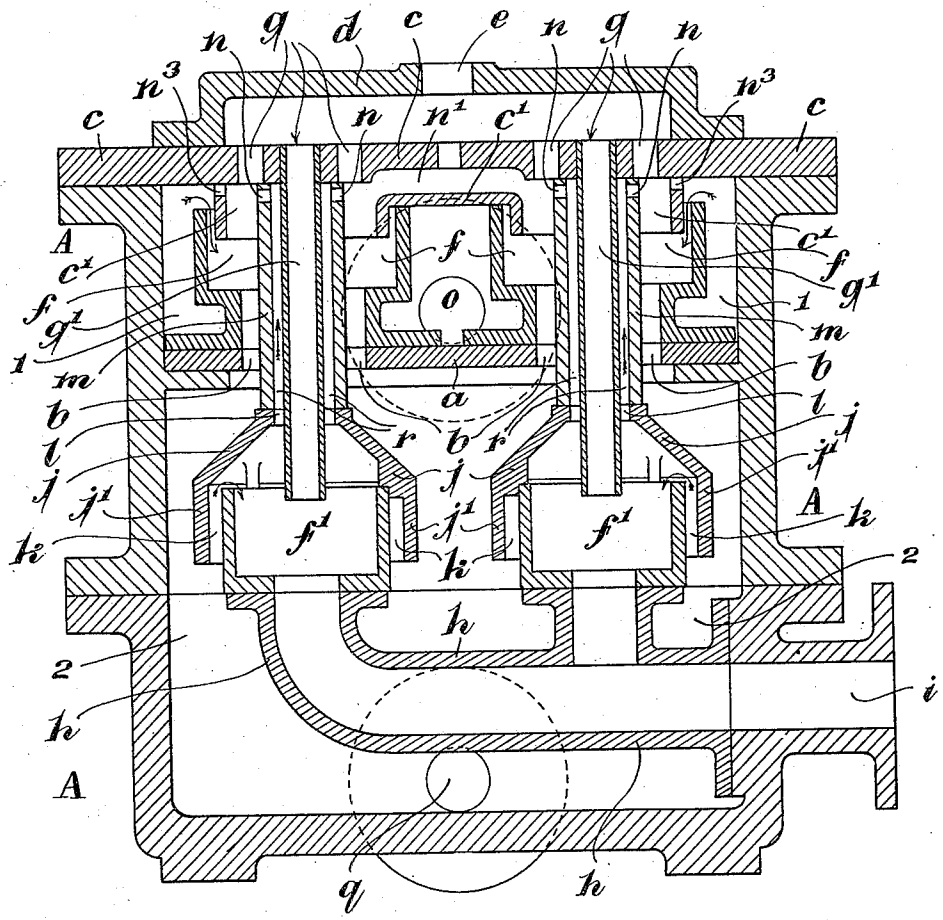
APPLICATION FILED OCT. 15, 1910.

1,044,909.

Patented Nov. 19, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



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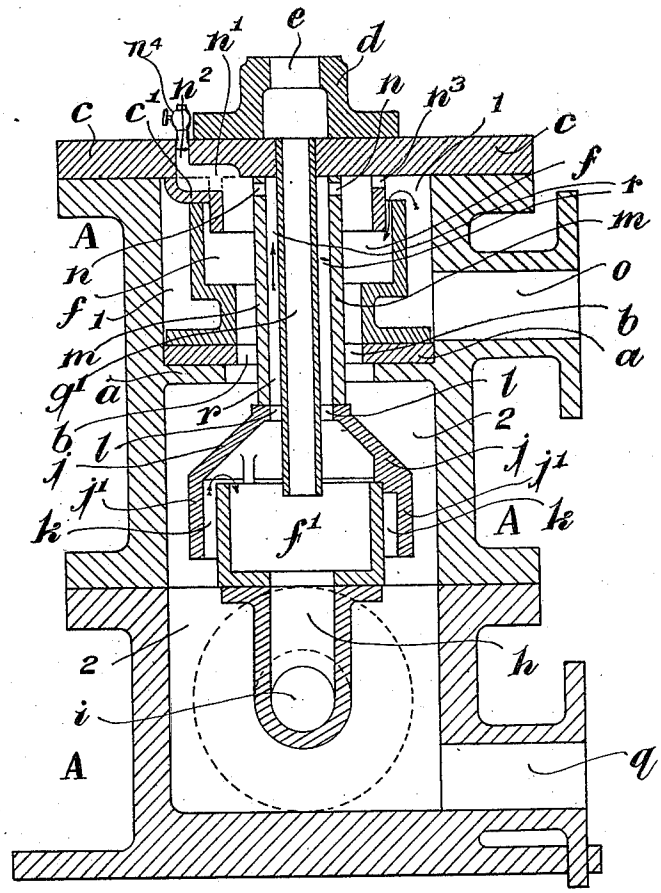
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN POLLOCK, OF BELFAST, IRELAND; ANN JANE POLLOCK, EXECUTRIX OF SAID JOHN POLLOCK, DECEASED, ASSIGNOR TO JAMES POLLOCK, OF BROOKLYN, NEW YORK.

FEED-WATER HEATER.

1,044,909. Specification of Letters Patent. Patented Nov. 19, 1912.

Application filed October 15, 1910. Serial No. 587,171.

To all whom it may concern:

Be it known that I, JOHN POLLOCK, a subject of the King of Great Britain, residing at Belfast, Ireland, have invented certain new and useful Improvements in Feed-Water Heaters, of which the following is a specification.

This invention relates to feedwater heaters for use in connection with steam boilers, of the type described in the specification of my United States Patent No. 932810 dated 31st August, 1909, in which steam is used for raising the feedwater to the desired temperature before feeding same to the boiler, and the object of the present invention is to construct a heater of this class which is specially adapted for use in connection with locomotive boilers.

By the use of the present invention in connection with locomotive boilers there is a considerable saving in fuel and the steaming capacity of the boiler is improved, while the high temperature at which the water is fed to the boiler saves undue strain on tubes, stays and plates, moreover, all sediment contained in the feedwater is deposited in the heater and can be removed from time to time, as desired, and is not carried into the boiler.

In order that my said invention may be properly understood, I have hereunto appended two explanatory sheets of drawings, whereon:—

Figures 1 and 2 are sectional views of a heater as constructed under this invention.

In carrying out my invention, the heater, which is, or may be, fitted on the top of the boiler behind the funnel or in any other suitable position, occupies very little space and may be inclosed in a metal casing. The heater, preferably, consists of a suitable cylinder or casing A which may be made in two parts suitably secured together and divided internally into upper and lower compartments 1, 2, by means of a division plate *a* having openings *b* therein. The cylinder or casing A is closed at its upper end by means of an end piece *c* to the exterior of which is secured a hollow cover plate *d* which forms a steam chest for the steam entering the heater by means of the opening *e*.

Fitted in the upper compartment 1 of the heater are two hollow stepped receptacles *f* which communicate with the lower compartment 2 by means of the openings *b* in the division plate *a*. The end piece *c* is shaped on its under side so as to form a cover c^1 for the receptacles *f*, said cover c^1 being so arranged that water from the interior of the compartment 1 can pass into the interior of the stepped receptacles *f* when the heater is in operation, as indicated by the arrows. The end piece *c* is provided with two series of openings *g* which permit of steam passing from the hollow cover plate *d* to the interior of the stepped receptacles *f* while, in the central opening of each of the series of openings *g*, a downwardly projecting tube or pipe g^1 is fitted for conducting steam to the interior of two hollow receptacles f^1, f^1, fitted in the lower compartment 2.

The receptacles f^1 f^1, are fitted to a flanged bend *h* which communicates with the discharge opening *i* in the wall of the heater and are provided with conical or tapered covers *j* having depending rims or extensions j^1 which surround the exteriors of the receptacles f^1, f^1, in such manner as to leave annular passageways *k*.

The conical or tapered covers *j* are provided with an opening *l* at their upper ends through which the tube or pipe g^1 passes, and, fitted on the upper end of each of the conical or tapered covers *j* is a cylindrical casing or tube *m* which extends upward until it contacts with the end piece *c*. These casings or tubes *m*, in conjunction with the tubes or pipes g^1 form annular passageways *r* for the escape of air from the interior of the receptacles f^1, f^1, and they are provided with exit orifices *n* at their upper ends by means of which the air is conducted to a passage-way n^1 formed in the cover c^1 from which it escapes to the atmosphere by the opening n^2 in the end piece *c*, as shown in Fig. 2, the size of the opening n^2 being preferably regulated by means of a plug cock n^4 fitted therein. Similarly air in the interior of the receptacles *f* can escape by means of the passage-way n^1 and opening n^2. The covers c^1 of the receptacles *f* are also provided with openings n^3 by means of which air in the upper compartment 1 can likewise escape to the atmosphere by the passage-way n^1 and opening n^2. The upper compartment 1 is provided with a feedwater inlet *o* while in the lower compartment 2 is provided the feedwater outlet *i*

and a blow-off outlet q. Steam is admitted to the feedwater heater by means of the opening e formed in the hollow cover plate d.

The action of the apparatus is as follows:—Steam is admitted by the inlet opening e to the heater, thereby heating same, while the air in the interior of the heater escapes to the atmosphere by the annular passage-ways r, orifices n, passage-way n^1, and openings n^2, n^2. Feed-water is admitted by the inlet opening o to the upper compartment 1, and, mixing with the steam therein, fills the interior thereof and passes over the lips of the receptacles f, as shown by the arrows, into the interior of said receptacles. The feedwater thereafter passes into the lower compartment 2 contacting with the exterior surfaces of the conical or tapered covers j in its passage and absorbing heat therefrom. The water gradually fills the compartment 2, and, rising up the annular passage-ways k, passes over into the interior of the receptacles f^1, f^1, from whence it passes by the passageway in the flanged bend h to the discharge opening i. By means of the blow-off outlet q, all sediment deposited from the feedwater in the compartment 2 can, from time to time, as required, be blown out, thereby preventing same entering the boiler.

Owing to the construction of the heater, the feedwater is brought into contact with the steam supply from its moment of entry and the arrangement of the heater is such that, as the feedwater passes through same, its temperature gradually rises until, at the point of discharge, it approximates the temperature of the steam supply itself.

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

1. A feed water heater for boilers comprising, in combination, a steam-heated hollow structure, an upper compartment in the structure, a stepped receptacle in the upper compartment, means for supplying water to the exterior of the said receptacle, a steam chest on the structure means for supplying steam from the steam chest to the interior of the receptacle, a lower compartment in the structure, a stepped receptacle in the lower compartment, means for supplying steam to the interior thereof from the said steam chest, a cover for the latter receptacle, means for directing water from the interior of the upper receptacle to the cover of the lower receptacle, into the lower compartment and thence into the lower receptacle and so to the boiler, and means for directing air from the upper and lower compartments to the atmosphere.

2. A feed water heater for boilers comprising, in combination, a steam-heated hollow structure, an upper compartment in the structure, stepped receptacles in the upper compartment, means for supplying water to the exteriors of the said receptacles, a steam chest on the structure means for supplying steam from the steam chest to the interiors of the receptacles, a lower compartment in the structure, stepped receptacles in the lower compartment, means for supplying steam to the interior thereof from the steam chest, covers for the latter receptacles, means for directing water from the interiors of the upper receptacles to the covers of the lower receptacles, into the lower compartment and thence into the lower receptacles and so to the boiler, and means for directing air from the uppr and lower compartments to the atmosphere.

3. A feed water heater for boilers comprising, in combination, a steam-heated hollow structure divided into upper and lower compartments, means for supplying feedwater to the upper compartment, stepped receptacles fitted in the upper compartment and communicating with the lower compartment, receptacles in the lower compartment having conical covers and communicating with the lower compartment and with an outlet to the boiler, a steam chest communicating with the steam supply and with the receptacles in the upper compartment and steam supply pipes communicating with the receptacles in the lower compartment and with the steam chest.

4. A feedwater heater for boilers comprising, in combination, a steam-heated hollow structure divided into upper and lower compartments, an end piece for the hollow structure having openings for supplying steam to the upper and lower compartments and to receptacles fitted in the upper and lower compartments, a steam chest fitted on the end piece so as to communicate with said openings and connected with the steam supply, air escape means fitted in the hollow structure, means for supplying water to the upper compartment and means for supplying water to the boiler from the receptacles in the lower compartment.

5. A feedwater heater for boilers comprising, in combination, a hollow structure divided into upper and lower compartments, a steam chest in communication with the steam supply means for supplying steam from the steam chest to both the upper and lower compartments means for supplying feedwater to the upper compartment, stepped receptacles fitted in the upper compartment and communicating with the lower compartment, receptacles in the lower compartment, detachable conical covers supported on said receptacles, a flanged bend fitted in the lower compartment supporting the receptacles therein and communicating with said receptacles and with an outlet to the boiler, and air escape means in the

upper compartment communicating with the receptacles in the upper and lower compartments.

6. A feedwater heater for boilers comprising, in combination, a hollow cylinder divided into upper and lower compartments, means for supplying steam to the upper compartment in the cylinder, means for supplying feedwater to the upper compartment, receptacles fitted in the upper compartment and communicating with the lower compartment, covered receptacles in the lower compartment communicating with air escape and steam supply means in the upper compartment and with an outlet to the boiler.

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

JOHN POLLOCK.

Witnesses:
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