No. 820,665. PATENTED MAY 15, 1906.

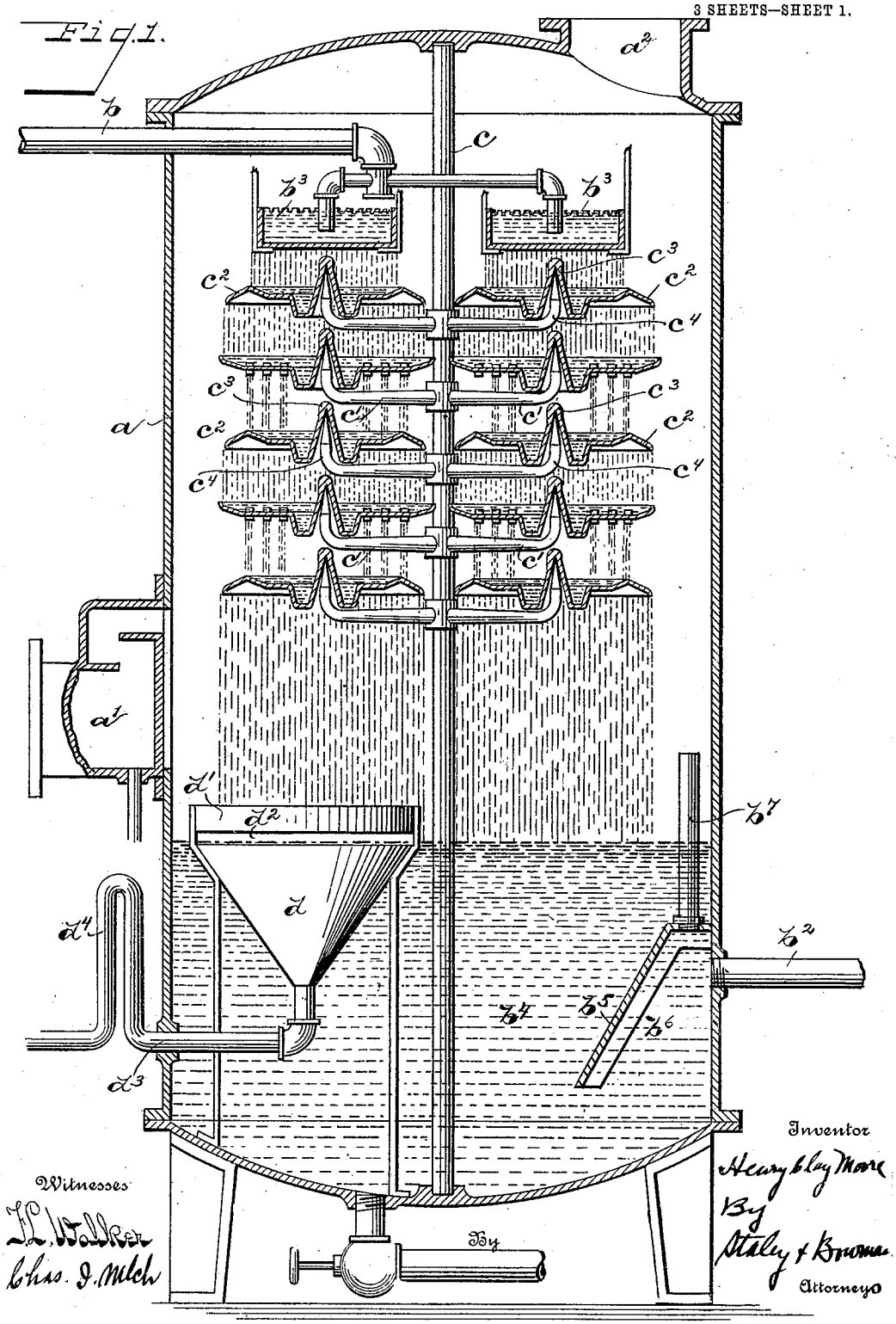
H. C. MOORE.

FEED WATER HEATER.

APPLICATION FILED JUNE 23, 1905.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses
L. Walker
Chas. J. Mech

Inventor
Henry Clay Moore
By
Staley & Browne
Attorneys

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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3 SHEETS—SHEET 2.

Fig. 2.

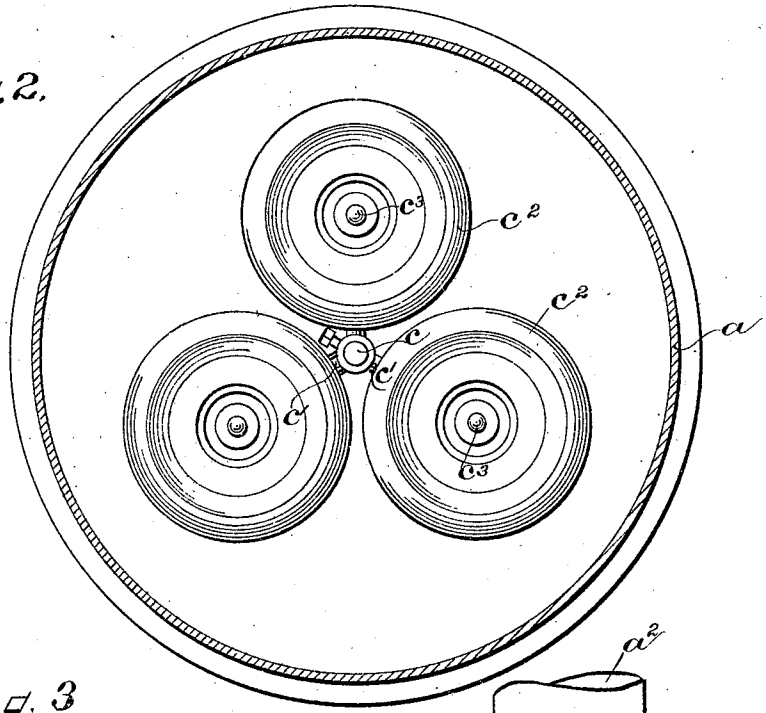
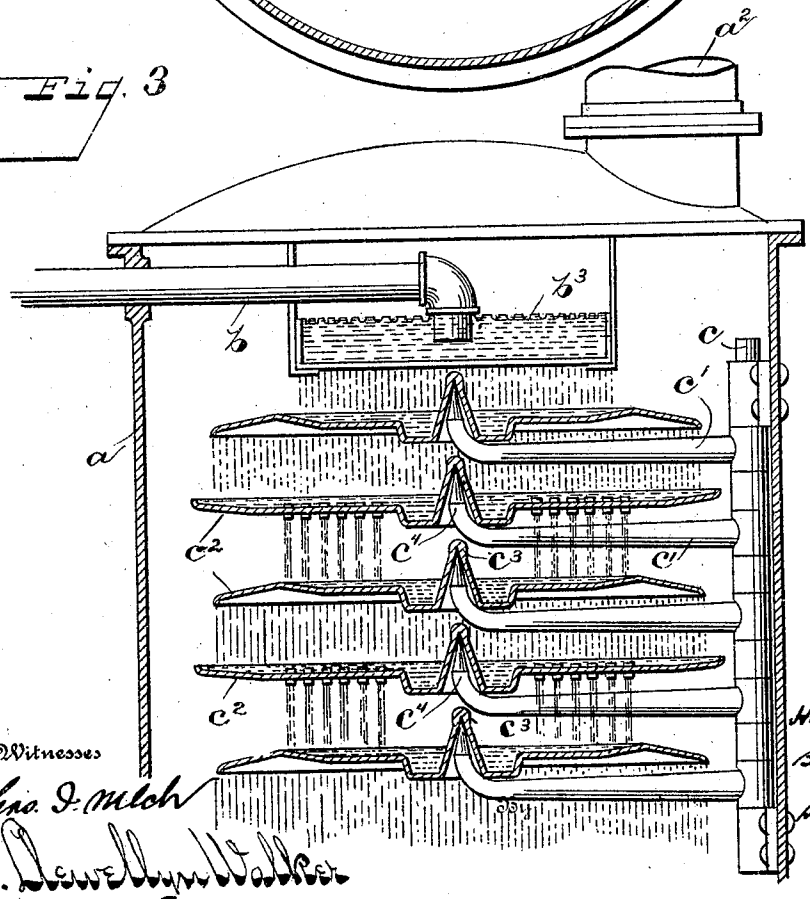


Fig. 3



Witnesses

Chas. D. Mech

F. Llewellyn Walker

Inventor

Wm. Clay Moore

By

Staley & Bowman

Attorneys

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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3 SHEETS—SHEET 3.

Fig. 4

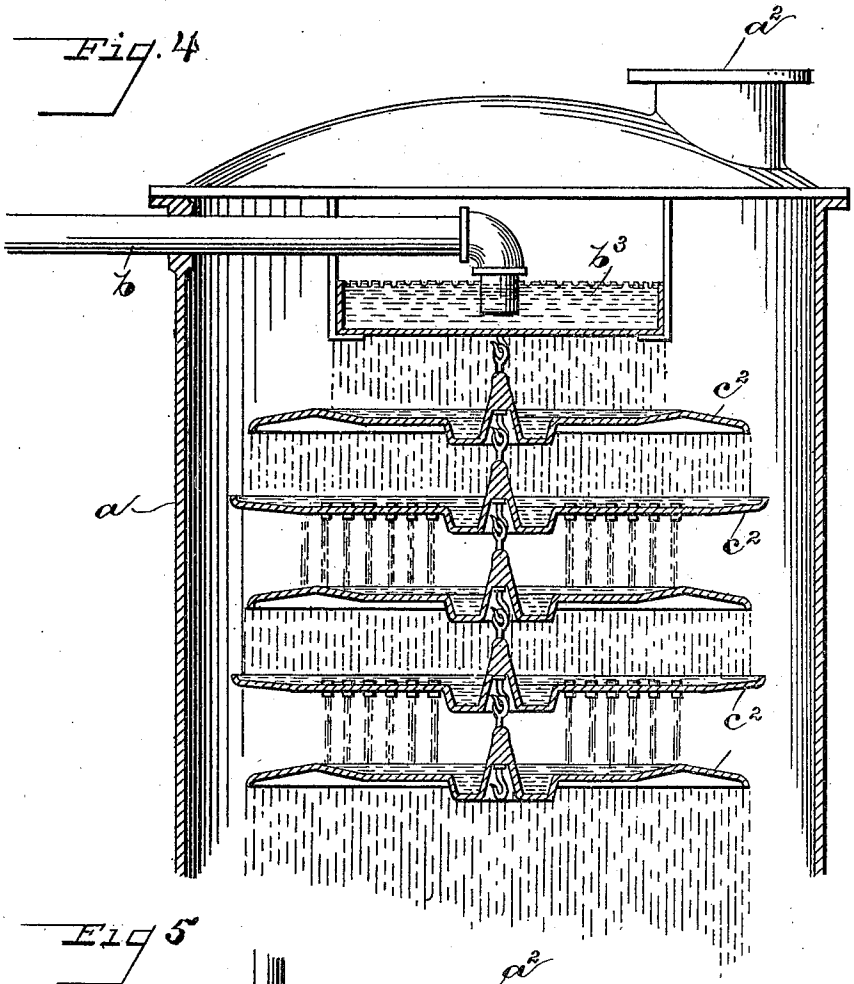
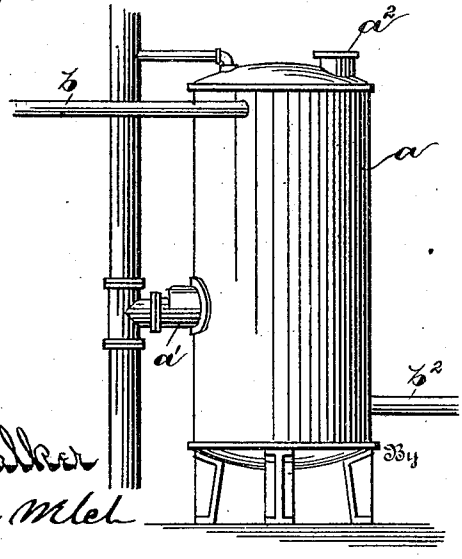


Fig 5



Witnesses

J. L. Walker

Chas. D. Mlel

Inventor

Henry Clay Moore

By Staley & Bowman

Attorneys

UNITED STATES PATENT OFFICE.

HENRY CLAY MOORE, OF ATLANTA, GEORGIA.

FEED-WATER HEATER.

No. 820,665. Specification of Letters Patent. Patented May 15, 1906.

Application filed June 23, 1905. Serial No. 266,653.

To all whom it may concern:

Be it known that I, HENRY CLAY MOORE, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Feed-Water Heaters, of which the following is a specification.

My invention relates to improvements in water-heaters, and especially that type of heater adapted to feed-water or steam boilers by means of the exhaust-steam.

The object of my invention is to provide in a heater of this type an improved form of pan or plate over which the water passes, which shall be self-leveling.

A further object of the invention is to provide means by which the pans may be supported and arranged so as to be removable and readily accessible for cleaning.

I attain these objects by the construction shown in the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation of the device embodying my invention. Fig. 2 is a longitudinal section of the same, showing the arrangement of the pan. Figs. 3 and 4 are vertical sectional elevations showing modifications. Fig. 5 is an elevation showing a modified arrangement of the steam-supply pipe.

Like parts are represented by similar letters of reference in the similar views.

In the said drawings, a represents the outer casing; a', the steam-inlet; a^2, the steam-outlet. b is the water-supply pipe, and b^2 is the water-escape pipe. Extending vertically in the outer casing a is a supporting-shaft c, and on this shaft is mounted a series of arms c', which carry the pans c^2. These pans may be of any desired shape or construction to receive and distribute the water, either by overflowing from the edges or by passing down from suitable openings in the bottom thereof. To provide for leveling the pans, or rather to make them self-leveling or self-adjusting, I provide each pan with a central bearing c^3, preferably adapted to fit on a cone or tapered trunnion c^4, formed on the arm c'. The bearing c^3 in the pan preferably extends upwardly from the center of the pan to a point above the water-level therein, the trunnion c^4 being correspondingly extended. The pans are preferably circular in shape and adapted to be revolved upon these trunnions. The arms c' are also preferably revoluble. This may be accomplished by having the shaft c revoluble (see Figs. 1 and 2) or by having the arms mounted on suitable sleeves adapted to turn on the shaft, as shown in Fig. 3.

In the construction shown in Fig. 1 I employ three arms in each set extending from the central shaft. I have three pans in each set, the water from each set of pans being adapted to fall in the usual way to the next lower set and thence to the outlet b^2. By having the cone-shaped trunnions and bearings in the arms and pans, respectively, the pans are adapted to level themselves, and thus cause an even distribution of water, even though the heater-casing or the supporting-shaft should be out of line or out of the vertical.

Water may be introduced to the pans by the supply-pipe b by the usual overflow-pans b^3. The lower part of the heater is adapted to form a reservoir b^4 for the hot water, and this reservoir is preferably divided by a partition b^5, so as to form a chamber b^6 immediately surrounding the exit-pipe b^2. From this chamber b^6 there extends a vent-pipe b^7 into the body of the heater above the water-line. Should the inlet-valve fail to work, and therefore not maintain the water-level, there would be danger of pumping too much water from the heater. When the water-level would fall to the level of the pipe b^2, the pump would suck in exhaust-steam through the pipe b^7, causing the pump to race, and readily indicating to the engineer that something was wrong. Within the lower part of the chamber I also preferably employ an oil receiver or trap d. This oil-receiver d is provided with a cover d' and an opening d^2 below the same along the water-line in the chamber d^4. The receiver d is cone-shaped and has a pipe d^3 leading from the bottom thereof, having a trap d^4, which permits the escape of the contents thereof at intervals after the water and oil have reached a certain height therein. The oil and grease which float on the top of the water are adapted to flow into the receiver d and escape through the pipe d^3. It is to be understood that the lower end of the shaft c, in the construction shown in Fig. 1, might be supported in a bridge-tree, thus permitting the oil-trap d to be located centrally, where it would draw equally from all directions.

In Fig. 3 I have shown a single vertical series of pans, and in this case the shaft c is supported at the side of the casing and has the arms hinged thereon, so that they can be

rotated on the shaft so as to move the pans or shelves into position opposite the case-opening for cleaning or otherwise, the pans being rotatable upon their trunnions, as in Fig. 1. In Fig. 4 I have shown a different method of supporting the pans for self-leveling. In this case instead of being supported from below the pans are supported from above and are hung on a central point, so that they will be self-leveling and also rotatable for access for cleaining.

It will be seen from the above construction that I provide a feed-water heater in which the sediment-pans are self-leveling and being movable and rotatable are readily accessible for cleaning or removal.

Having thus described my invention, I claim—

1. In a feed-water heater, a series of pans or shelves supported centrally by a single support which permits the pan to level itself, substantially as and for the purpose specified.

2. In a feed-water heater, a series of pans each supported centrally on an arm having an extended trunnion, the bearing for said pan being arranged above the water-line thereof, substantially as specified.

3. The combination with a supporting-shaft and arms movable thereon of a series of pans, each having a central extended bearing, and a trunnion on said arms to fit in said bearings, substantially as specified.

4. The combination with a central shaft, a series of arms thereon, each having a plurality of extended trunnions, and pans having central bearings adapted to fit in said trunnions, substantially as and for the purpose specified.

5. In a feed-water heater, a series of pans, a support for each of said pans, upon which the respective pans are balanced and which permits the pans to level themselves, the point of support being located above the center of gravity of the respective pans, substantially as specified.

6. In a feed-water heater, a series of pans, a single support upon which the respective pans are balanced, and means for varying the relation of said pans with a given point of the heater-shell, substantially as specified.

7. In a feed-water heater, a series of pans, a single support for each of said pans, the bearing between the support and pan being located above the water-line of the pan, substantially as specified.

In testimony whereof I have hereunto set my hand this 31st day of May, A. D. 1905.

HENRY CLAY MOORE.

Witnesses:

W. A. BAUGHAN, Jr.,

F. H. LICHTENWALTER.