

W. S. ELLIOTT.
FEED WATER HEATER.
APPLICATION FILED APR. 26, 1911.

1,056,895.

Patented Mar. 25, 1913.

4 SHEETS-SHEET 1.

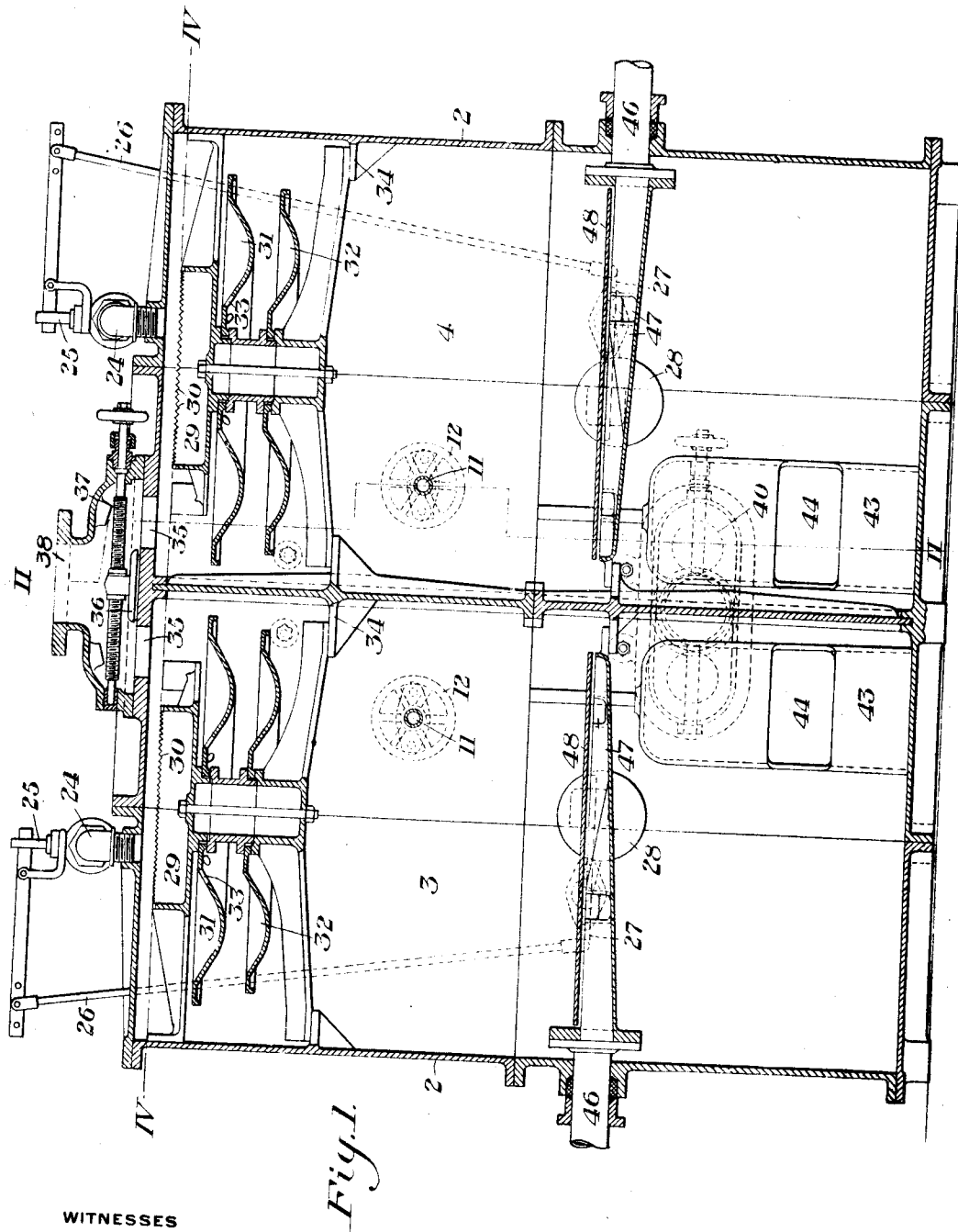


Fig. 1.

WITNESSES

R. A. Balderson
W. H. Fawcett

INVENTOR

Wm. S. Elliott
by Bahruse, Byrnes & Parmelee,
his Attys.

W. S. ELLIOTT.
FEED WATER HEATER.
APPLICATION FILED APR. 26, 1911.

1,056,895.

Patented Mar. 25, 1913.

4 SHEETS—SHEET 2.

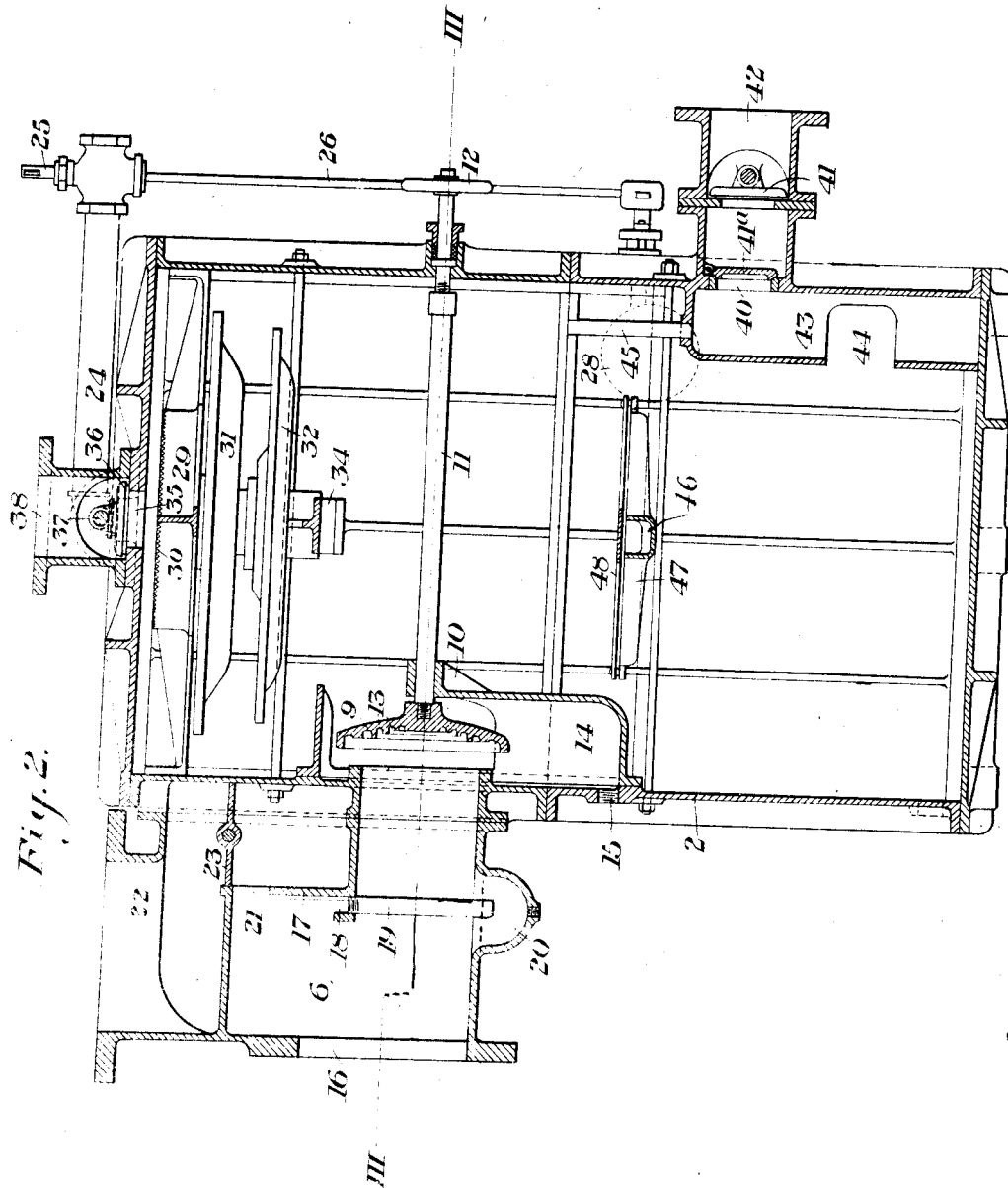


Fig. 2.

WITNESSES

R. A. Balderson,
W. L. Lanning,

INVENTOR

Wm. S. Elliott,
by C. A. Bowers, Rymur & Carmichael,
his Attys.

W. S. ELLIOTT.
 FEED WATER HEATER.
 APPLICATION FILED APR. 26, 1911.

1,056,895.

Patented Mar. 25, 1913.
 4 SHEETS—SHEET 3.

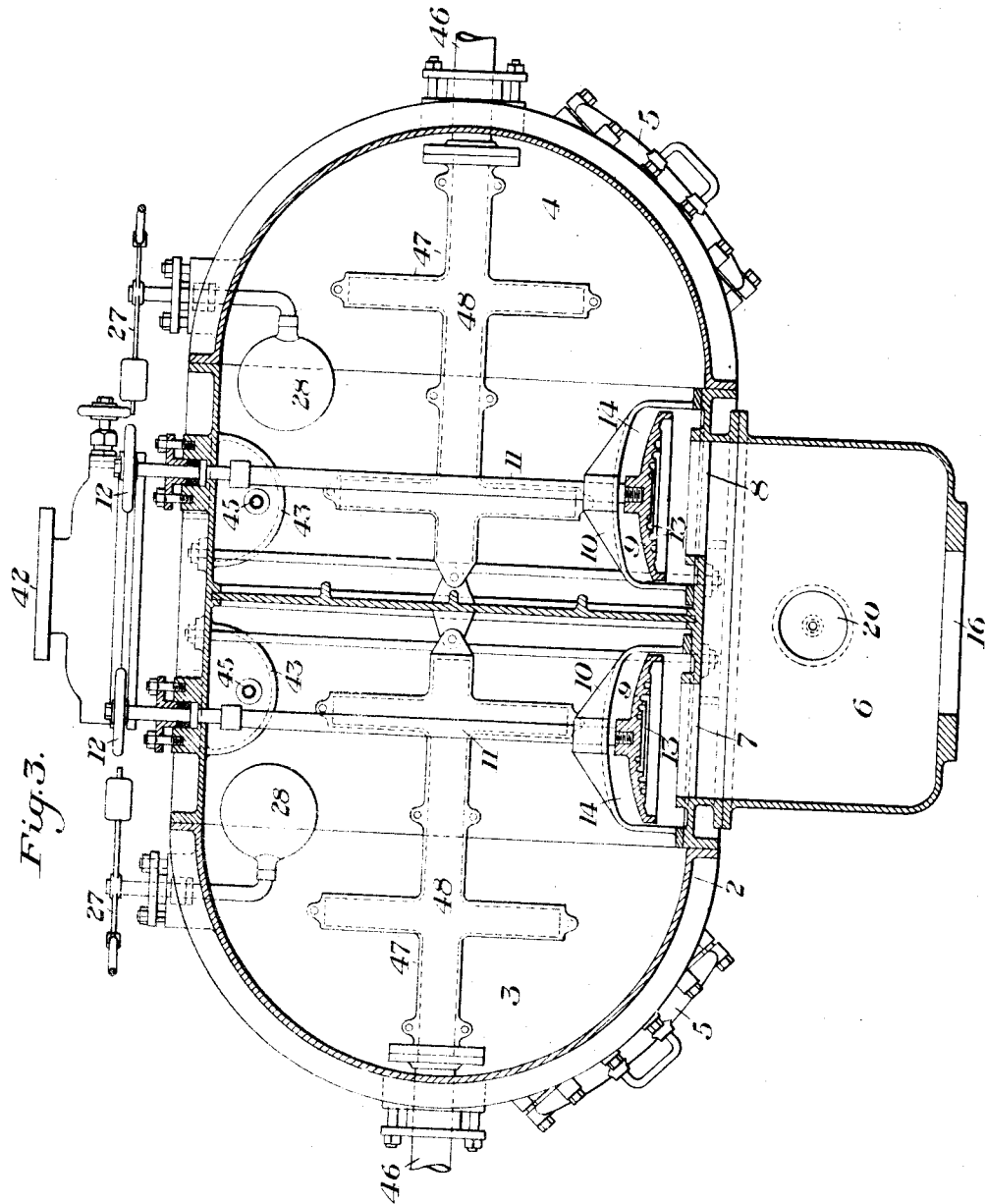


Fig. 3.

WITNESSES

R. A. Balderson
W. F. Farnes

INVENTOR

Wm. S. Elliott
 by *Behrman, Dykes & Parmelee*
 his Attys.

W. S. ELLIOTT.
 FEED WATER HEATER.
 APPLICATION FILED APR. 26, 1911.

1,056,895.

Patented Mar. 25, 1913

4 SHEETS—SHEET 4.

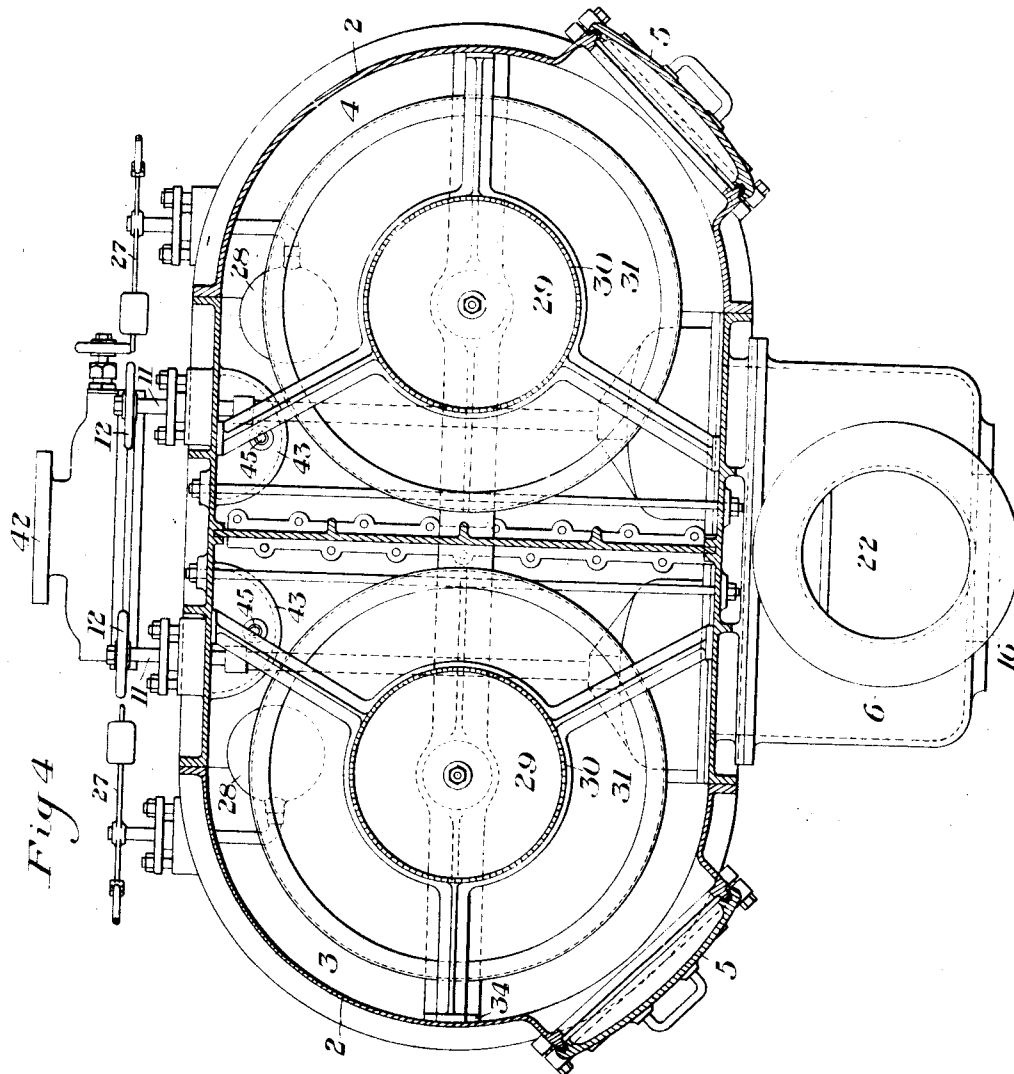


Fig 4

WITNESSES

R. A. Balderson,
 W. Fawcett

INVENTOR

Wm S. Elliott,
 by Robert R. Byrnes, Attorney
 his Attys.

UNITED STATES PATENT OFFICE.

WILLIAM S. ELLIOTT, OF PITTSBURGH, PENNSYLVANIA.

FEED-WATER HEATER.

1,056,895.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed April 26, 1911. Serial No. 623,503.

To all whom it may concern:

Be it known that I, WILLIAM S. ELLIOTT, of Pittsburgh, Allegheny county, Pennsylvania, have invented a new and useful Improvement in Feed-Water Heaters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of one form of feed water heater embodying my invention; Fig. 2 is a section on the line II—II of Fig. 1; Fig. 3 is a section on the line III—III of Fig. 2; and Fig. 4 is a section on the line IV—IV of Fig. 1.

My invention has relation to feed water heaters; and is designed to provide a heater having a plurality of heating compartments or chambers, together with the necessary inlet and outlet passages for water and steam, and controlling valves therefor, whereby said compartments may be operated simultaneously, or any compartment may be shut off for cleaning, repairs, or for varying the capacity, or for any other purpose, without interference with the other compartment or compartments.

In the drawings, I have shown my invention as applied to a two-compartment or twin open type heater; but it is to be understood that I do not limit myself to this construction, since a greater number of compartments may be employed, and the same features may be used on heaters of the closed type.

In the accompanying drawings, the numeral 2 designates the casing or closure of the heater, which may be in general of any suitable construction, and which is provided with an interior, transverse partition extending the full width and length of the casing and dividing the latter into the two chambers or compartments 3 and 4. The casing is preferably provided with a suitable number of manhole or clean-out openings normally closed by means of covers 5.

The casing is provided at one side with the steam entrance chamber 6. From this chamber a port 7 opens into the compartment 3, and another port 8 opens into the compartment 4. Each of the ports 7 and 8 is arranged to be controlled by a valve 9, which is mounted in a suitable valve cage 10, and is carried by a stem 11 which extends transversely across the interior of the casing and through the opposite wall there-

of, being provided at its outer end with a suitable hand wheel 12, or other operating means.

The sealing face of each valve is preferably provided with a plurality of ribs or corrugations 13, which act as separators for the oil and other foreign matter entrained in the entering steam. To catch this separated oil or other matter, a pocket 14 is formed below each valve, as best shown in Fig. 2, and having an outlet 15 at its bottom.

The steam enters the chamber 6 at the port 16, and when the heater is used in connection with a steam heating system placed opposite this port (see Fig. 2) is a baffle plate 17 having a corrugated, or other suitable surface, to also act as a separator. At the lower edge of this baffle is a pocket 18 from which leads a discharge pipe 19 which discharges into a pocket 20 at the bottom of the chamber 6. When not used in connection with a steam heating system, separator plate 17 can be omitted.

I also preferably provide the chamber 6 with a passage 21 above the upper edge of the baffle 17 and leading to an outlet passage 22 which is controlled by valve 23. When the heater is used in connection with a steam heating system, the passage 22 will connect to such system. If not used in connection with a heating system, passage 22 will lead to the atmosphere. The valve 23 provides means for regulating the amount of steam which may be passed into the heater. This valve 23 may be closed while steam is being passed into the heater, or it may be opened or partially opened.

The water to be heated enters the compartments 3 and 4 by means of the inlet pipes 24, one of which communicates with each of the compartments 3 and 4 at its upper end. Each of these pipes is provided with a control valve whose stem 25 has actuating connections 26 with a pivoted float lever 27 carrying a float 28, there being one of these floats in each of the compartments 3 and 4, and each float controlling the valve of the inlet pipe for that compartment. Each inlet pipe 24 is arranged to discharge into a receiving pan 29, which preferably has a saw-toothed upper edge 30. Placed below this receiving pan are a series of two or more relatively shallow trays 31 and 32, the upper tray 31 receiving the overflow from the saw-toothed edge of the pan 30 and having openings 33 therein which dis-

charge into the lower tray 32. The tray 32 overflows into the compartment, and this overflowing water passes through the steam filling the upper portion of the compartment. The pans 30 and trays 31 and 32 may be conveniently supported as indicated at 34 on projections carried by the side walls and by the central partition of the casing.

The upper portion of each compartment is provided with a steam outlet 35.

36 is a valve actuated by a stem 37, and which may occupy a central position between the two passages 35, or which may be moved to close either one of said passages. The passages 35 communicate with an outlet connection 38 (see Fig. 1).

Each compartment is provided with an outlet port 40, opening into an outlet connection 42, and which is controlled by a sliding valve 41 similar to the valve 36 just described. In order to prevent back flow from the outlet connection 42, each port 40 is provided with a check valve 41^a. The outlet connections preferably extend from outlet chambers 43, each of which has an inlet opening 44 below the water line, and also has a short pipe 45 extending from its top upwardly into the compartment above the normal water line. The check valves, as will be seen, assist the float-controlled inlet valves in maintaining a practically equal level in both compartments, since the water from the chamber having the higher water level will tend to hold the check valve at the outlet of the other chamber closed as long as any difference in water level remains. Each compartment is also provided with an overflow pipe or outlet 46, which extends within the compartment and nearly across the same, with laterally extending branches 47. The portions of these outlet pipes within the compartments are in the form of troughs having openings at the sides between the cover plates 48 immediately above them. The openings into these troughs are at substantially the normal water level of the compartments, which level is maintained by the action of the float-controlled inlet valves in combination with the check valves 41^a. These troughs form a means for removing and carrying off scum from the top of the water.

The operation will be readily understood from the foregoing description. It will be readily seen that either one or both of the compartments may be simultaneously in use; or that either compartment may be closed off while the other compartment is out of use for any reason.

The entire heater is simple in its construction and efficient in its operation, both as a heater and as a steam separator.

It will be obvious that my invention is susceptible of numerous changes in the details of its construction and arrangement

of parts. Thus, the form and character of the casing may be widely varied, any suitable form of valve may be employed, and various other changes may be made.

What I claim is:—

1. A duplex water heater having partition means dividing its interior into two separate heating chambers, each of said heating chambers having a steam inlet and a water inlet, and each chamber also having a water outlet, together with valve means mounted on the heater and controlling the inlets and outlets, whereby either of said chambers may be operated to the exclusion of the other; substantially as described.

2. A duplex water heater having partition means dividing its interior into two separate heating chambers, each of said heating chambers having a steam inlet and a water inlet, and each chamber also having a water outlet, together with valve means mounted on the heater and controlling the inlets and outlets, whereby either of said chambers may be operated to the exclusion of the other, together with means for maintaining substantially the same water level in both chambers; substantially as described.

3. A duplex water heater having partition means dividing its interior into two separate heating chambers, each of said heating chambers having a steam inlet and a water inlet, and each chamber also having a water outlet, together with valve means mounted on the heater and controlling the inlets and outlets, whereby either of said chambers may be operated to the exclusion of the other, the valves for the steam inlet openings being located interiorly of the heater and also forming steam separators.

4. A duplex water heater having partition means dividing its interior into two separate heating chambers, each of said heating chambers having a steam inlet and a water inlet, and each chamber also having a water outlet, together with valve means mounted on the heater and controlling the inlets and outlets, whereby either of said chambers may be operated to the exclusion of the other, the valves for the steam inlet openings being located within the heating chambers and having actuating rods extending across the chambers and through the opposite side walls thereof; substantially as described.

5. A duplex water heater having internal partitioning means dividing it into two separate chambers, each of said chambers having a separate steam and water inlet, and also a separate water outlet, the water outlets from the two chambers leading into a common passage, valve means for closing either outlet opening independent of the other, and an outwardly opening check valve in each of said openings; substantially as described.

70

75

80

85

90

95

100

105

110

115

120

125

130

6. A duplex water heater having internal partitioning means dividing it into a plurality of separate heating chambers, each of said heating chambers having its own steam and water inlets, and also a separate water outlet, valve means mounted on the heater for controlling said inlets and outlets and whereby either chamber may be used to the exclusion of the other, together with separating means for separating oil from the entering steam; substantially as described.

7. A water heater having internal partitioning means dividing it into two separate chambers, a steam inlet chamber carried by the casing and having separate openings communicating with the separate chambers of the heater, separate valves for controlling said openings, said valves also forming oil separators, and the inlet chamber also having another outlet passage for the steam, said passage having a controlling valve and a separator therein; substantially as described.

8. In a water heater, a heating chamber having a steam inlet opening, a valve arranged within the heater and movable toward and away from said opening to open and close the same, said valve having a corrugated seating face which forms an oil separator, and the heating chamber having a pocket below said opening to catch the separated oil; substantially as described.

9. A water heater, a steam inlet, and a valve controlling said inlet, said valve hav-

ing its seating face provided with a plurality of corrugations, said corrugations facing the inlet; substantially as described.

10. A heater having an inlet connection, a combined valve and separator plate controlling the passage of steam from the connection to the heater, and the inlet connection having a valve-controlled relief port; substantially as described.

11. A water heater having a steam inlet controlled by a valve disk, the face of said disk opposite the inlet constituting an oil separator; substantially as described.

12. A duplex water heater having partitioning means dividing its interior into two separate chambers, each of said heating chambers having a steam inlet and a water inlet, and each chamber also having a water outlet, valve means mounted on the heater and controlling the inlets and outlets, whereby either of said chambers may be operated to the exclusion of the other, the water outlets of the respective chambers communicating with a common chamber or passage and a check valve for preventing the fluid from one heater chamber from entering the other chamber when the latter is cut out of service; substantially as described.

In testimony whereof, I have hereunto set my hand.

WILLIAM S. ELLIOTT.

Witnesses:

GEO. H. PARMELEE,
H. M. CORWIN.