

R. L. VOSBURGH.
FEED WATER HEATER.
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921,756.

Patented May 18, 1909.

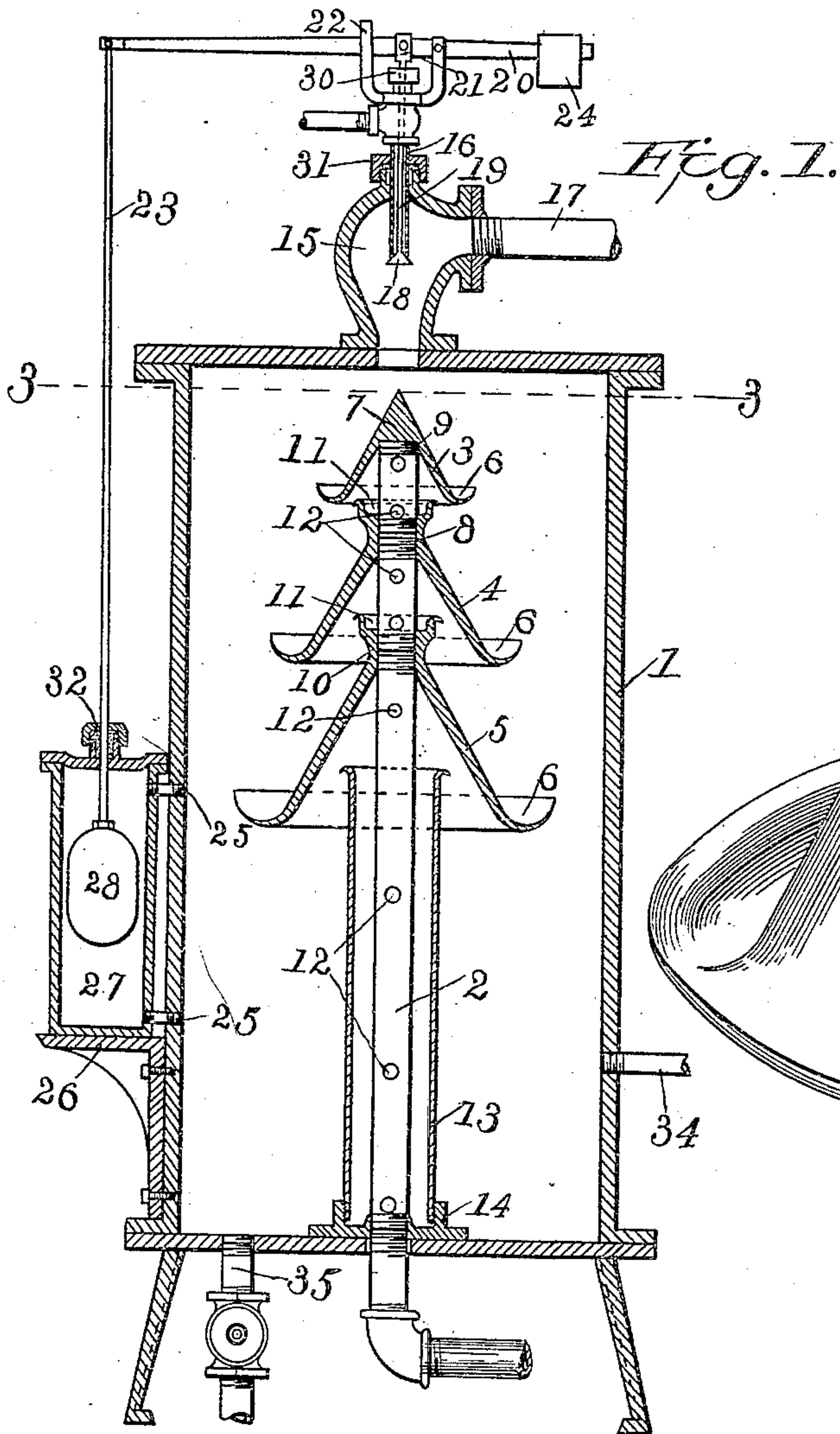


Fig. 1.

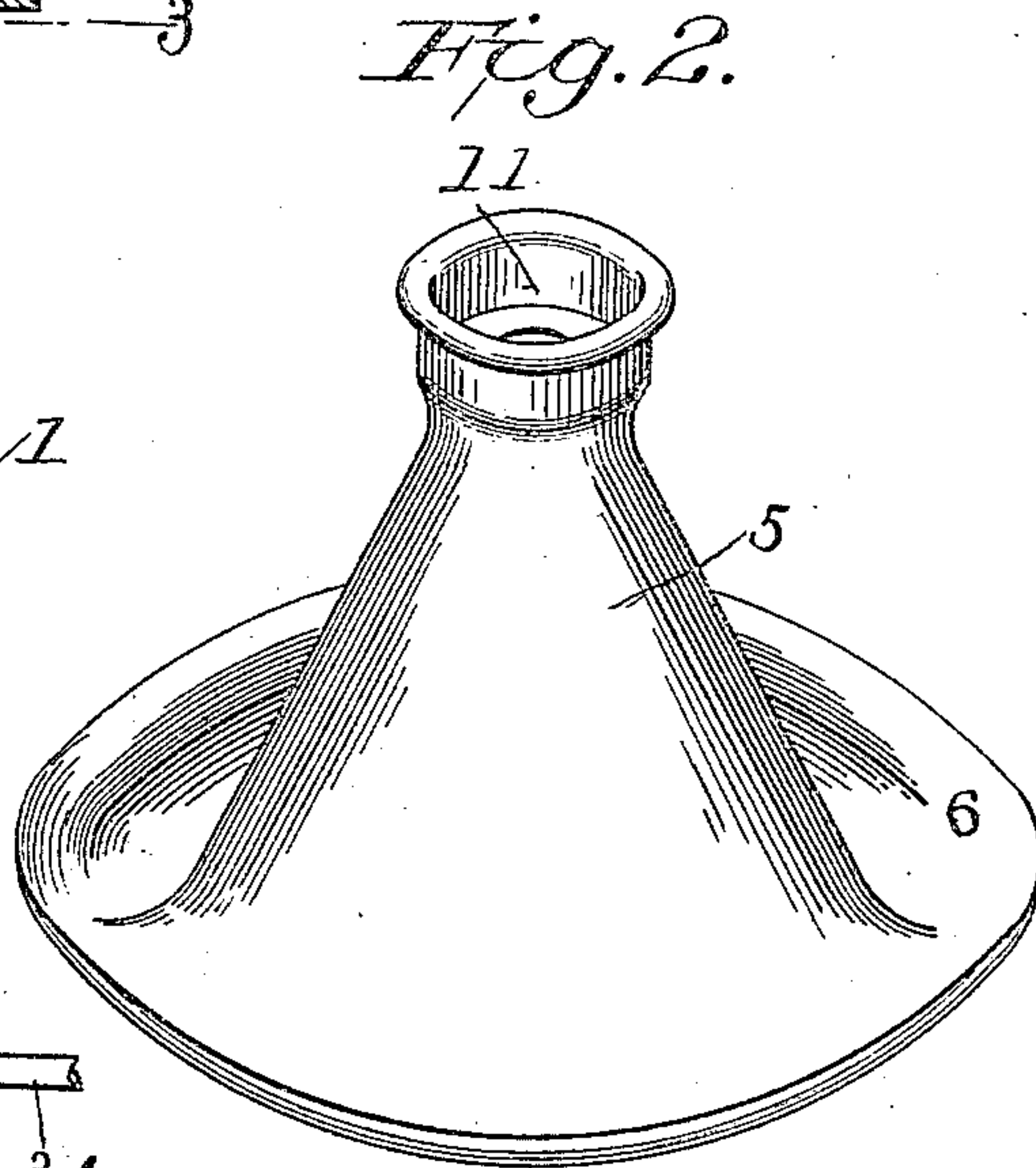


Fig. 2.

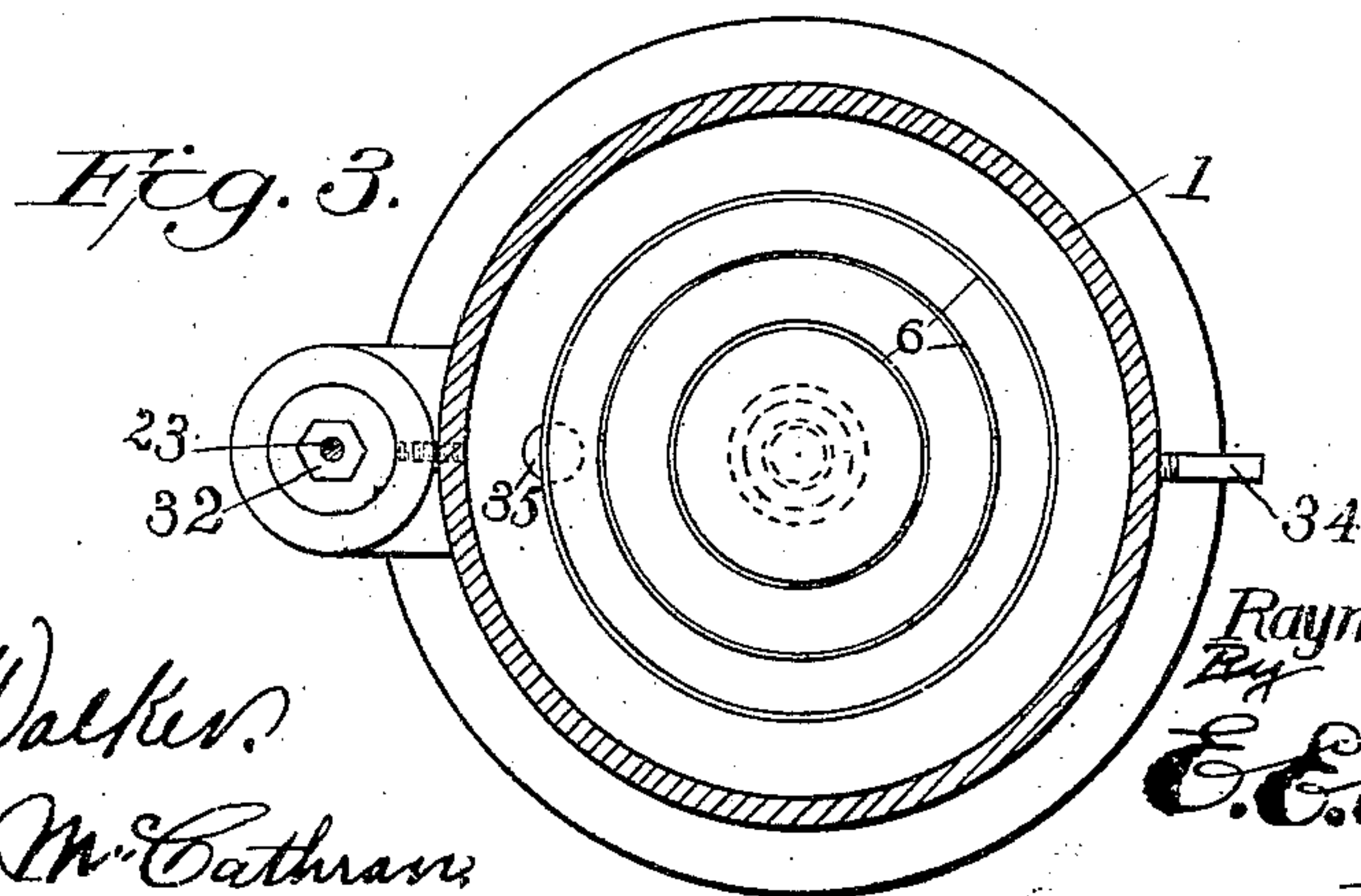


Fig. 3.

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UNITED STATES PATENT OFFICE.

RAYMOND L. VOSBURGH, OF ABERDEEN, WASHINGTON.

FEED-WATER HEATER.

No. 921,756.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, RAYMOND L. VOSBURGH, a citizen of the United States, residing at Aberdeen, in the county of Chehalis and State of Washington, have invented certain new and useful Improvements in Feed-Water Heaters, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to a feed-water apparatus, and the object thereof is to provide an automatic device for supplying steam boilers of high pressure engines with feed water, which has been intimately mixed with
15 the exhaust steam of the engine in a given inclosure or chamber.

The invention has for its further object to furnish a heater in which the distributing elements are arranged to secure the speediest
20 utilization of a given amount of heat with the least complicated and expensive construction of apparatus.

To the accomplishment of the recited objects and others coördinate therewith, the preferred embodiment of the invention resides in that construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings and embraced within the scope of the appended claims.

25 In said drawings:—Figure I is a vertical sectional view of the complete apparatus. Fig. II is a detail perspective view of one of the distributing members, and Fig. III is a transverse sectional view taken along lines
30 3—3 of Fig. I.

Like reference numerals designate corresponding parts in the drawings.

The invention involves a chamber (1), of any desired cross sectional contour having
40 arranged therein a vertically extending pipe (2) upon which are mounted, at certain intervals, a plurality of substantially cone-shaped superimposed distributing members (3), (4), and (5), said members having their
45 base portions disposed to form annular gutters (6), and progressively increasing in size from the topmost to the bottom member, the former having a solid apex (7) for the purpose of initially deflecting the admixture of
50 steam and water, as will be presently explained. The upper proximal ends of all the members are screw threaded as at (8), (9), and (10) and are adapted to engage the complementary screw threaded portions of the

vertically extending pipe (2), and at the
55 respective points of engagement of said members with the pipe the former taper or converge downwardly in order to insure a thorough radiation of the heat through these parts. Furthermore, two of the distributing
60 members have their upper distal ends formed to present annular recesses (11) which receive the particles of condensation. Intermediate the distributing elements are provided, preferably, two perforations (12) for the exit of
65 the exhaust steam, and it is desired to position these exits along the entire extent of the outlet pipe (2). To prevent the efflux of the water through the outlet pipe (2) there is arranged a vertically extending cylindrical in-
70 closure (13), the same being mounted upon the base plate (14) at the bottom of the chamber (1).

On the top of the chamber and preferably medially thereof there is connected a sub-
75 stantially rotund elbow pipe (15) which is common to the water inlet pipe (16) and the steam inlet pipe (17). Conjunctively with the water inlet there is employed a conical shaped valve (18) at the extremital portion
80 thereof, the stem (19) extending upwardly through the water inlet pipe (16) and being pivotally connected to the horizontally disposed link (20) at (21), the said link being supported intermediate its ends by a suit-
85 able U shaped or yoke member (22) and having one end connected to a vertically extending link (23), the other end having an adjustable weight (24). Communicating with the chamber (1) through the medium of
90 pipes (25) and arranged adjacent and exteriorly of said chamber on the bracket (26) is a float chamber (27), the float (28) being carried by the lower terminal of the ver-
95 tically extending rod (23). Stuffing boxes (30), (31), and (32) are positioned at suitable places along the connections of the water pipe (16) and the rotund elbow (15), and also at the top of the float chamber.

The numerals (34) and (35) designate, re-
100 spectively, the suction and drain pipes of the chamber.

The operation of the apparatus is as follows:—Water enters pipe (16) and is atom-
105 ized by the conical valve (18) and commingled with the exhaust steam from the engine which is admitted through pipe (17), this admixture being precipitated upon the cone

(3) in the form of a thin sheet and running over the edge of the gutter thereof, whereupon it drops upon the cone (4), a portion of the steam making its exit through perforations (12) of pipe (2) to the atmosphere. This operation is continued throughout the above steps according to the number of cones employed when it falls into the lower part of the heater and is drawn off through the suction pipe (34) by a suitable boiler feed pump. The float (28) in chamber (27) is free to ascend or descend with the level of the water, and thereby control the admission of water to the chamber. To exemplify, when the water level descends, due to the action of the feed pump, the float (28) descends accordingly, pulling on bell-crank levers (20) and (29) which in turn open valve (18) thereby admits more water and maintains the proper water level within the chamber (1). The weight (24) which is adjustable on lever (20) is provided for counteracting water pressure on valve (18).

From the foregoing explication it will appear evident that the water in mingling with the steam and passing over the heated cones in thin sheets must become intensely heated, and it is retained in this condition for so long a time while passing through the apparatus that all of the metallic salts or aluminous combinations, or other foreign matter contained in the water becomes thoroughly precipitated, and are filtered out, so that nothing but pure water is admitted to the boiler.

It should be understood that in its broader aspects my invention comprehends the employment not only of the various means described, but of equivalent means for performing the recited functions. While the arrangement shown is thought, at the present time, to be preferable, I desire to reserve the right to effect such modifications and variations thereof as may come fairly within the scope of the appended claims.

Having thus described the invention, what is claimed, is:—

1. In a feed-water heater, the combination of a chamber having mounted therein a plurality of substantially cone shaped, superimposed distributing elements progressively increasing in size from the topmost to the bottom element, and adapted to receive an admixture of steam and water, the topmost element having a pointed deflecting apex, the subjoined elements having their upper distal ends provided with annular recesses, and all of said elements having their lower distal ends formed with gutters.

2. In a feed-water heater, the combination of a chamber a pipe vertically disposed within said chamber and having a plurality of longitudinal steam exits, a plurality of substantially cone shaped, superimposed distributing elements connected to said pipe

and progressively increasing in size from the topmost to the bottom element, and adapted to consecutively receive an admixture of steam and water, and means for automatically controlling the admission of water to said chamber.

3. In a feed-water heater, the combination of a chamber, a pipe vertically disposed within said chamber and having a plurality of steam exits, a plurality of substantially cone shaped, superimposed distributing elements detachably connected to said pipe and progressively increasing in size from the topmost to the bottom element, and adapted to consecutively receive an admixture of steam and water, said exits extending below the level of the water chamber, a casing inclosing the lower extremity of said pipe, and means for automatically controlling the admission of water to said chamber.

4. In a feed-water heater, the combination of a chamber having a common steam and water inlet, and a plurality of vertically disposed cone shaped superimposed distributing elements progressively increasing in size from the topmost to the bottom element and adapted to consecutively receive an admixture of steam and water, and means actuated by the level of the water in said chamber for automatically controlling the admission of water thereto.

5. In a feed-water heater, the combination of a chamber, a pipe vertically disposed within said chamber and having a plurality of steam exits, a plurality of substantially cone shaped, superimposed distributing elements connected to said pipe and progressively increasing in size from the topmost to the bottom element, and adapted to consecutively receive an admixture of steam and water, the sides of said elements, in vertical cross section, presenting a gradual diminution of thickness from the point of connection with said pipe to their lower extremital portions.

6. The combination with a feed-water heater having a plurality of superimposed distributing elements arranged therein, of a feed-water regulator having a common steam and water inlet, said water inlet comprising a conical valve, a bell crank pivotally secured to the stem of said valve, a float chamber communicating with the heater, and a float connected to one end of said bell crank and the other end carrying an adjustable weight.

7. The combination with a feed-water heater having a plurality of superimposed distributing elements arranged therein, of a feed-water regulator involving a substantially rotund elbow, a water inlet pipe depending centrally therein, a conical valve arranged on the inner terminal of said pipe and having a stem extending through the outer

terminal of said pipe, a yoke member, a horizontally disposed link connected to said member, said valve being secured to said link medially of said yoke member, means
3 for automatically controlling the ingress of steam through said valve, and a steam inlet connected to said casing.

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

RAYMOND L. VOSBURGH.

Witnesses:

ANNIE H. ABEL,
LUCY E. ABEL.