

(No Model.)

2 Sheets—Sheet 1.

J. J. WILSON.
FEED WATER HEATER.

No. 482,069.

Patented Sept. 6, 1892.

Fig. 1.

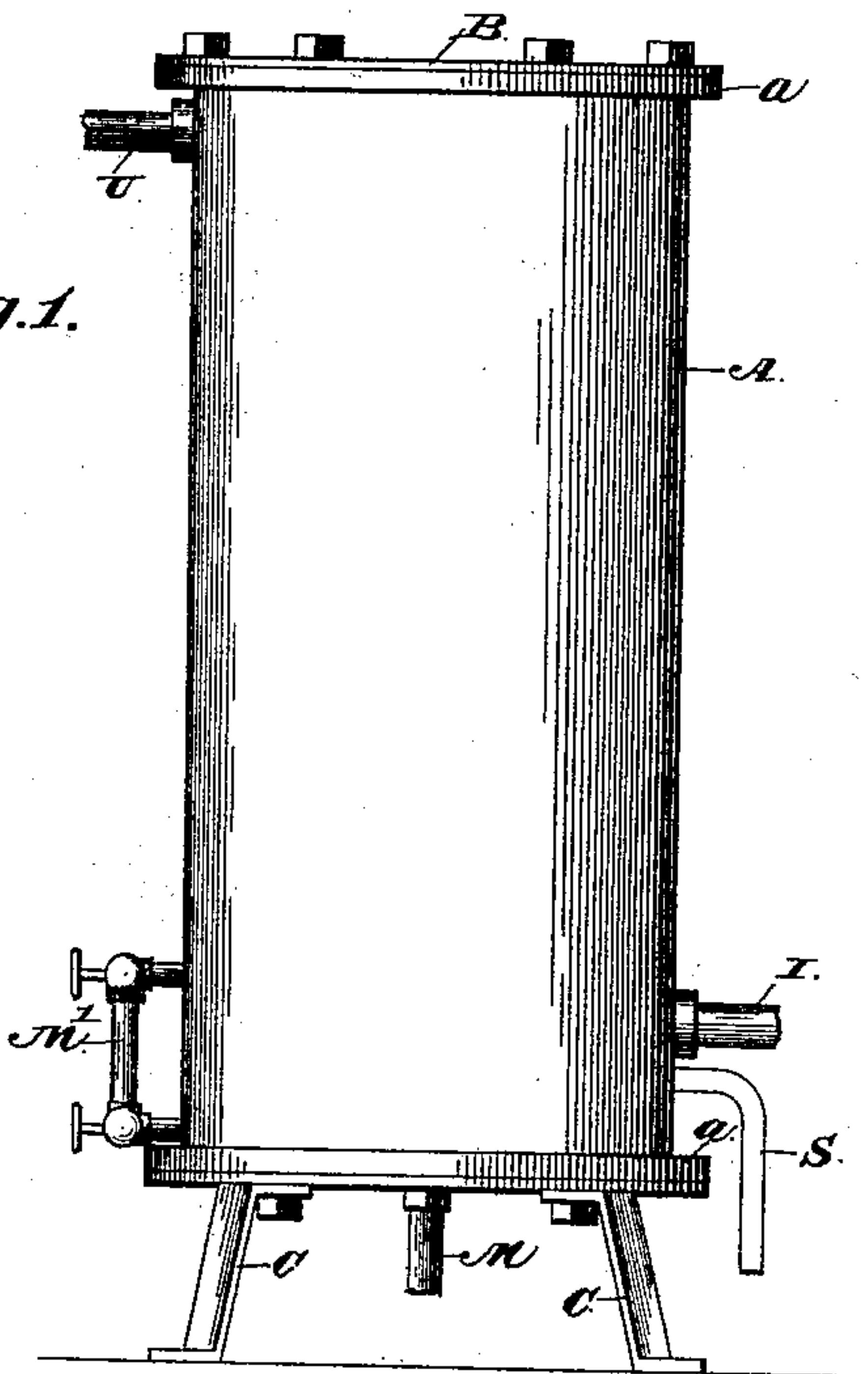


Fig. 3.

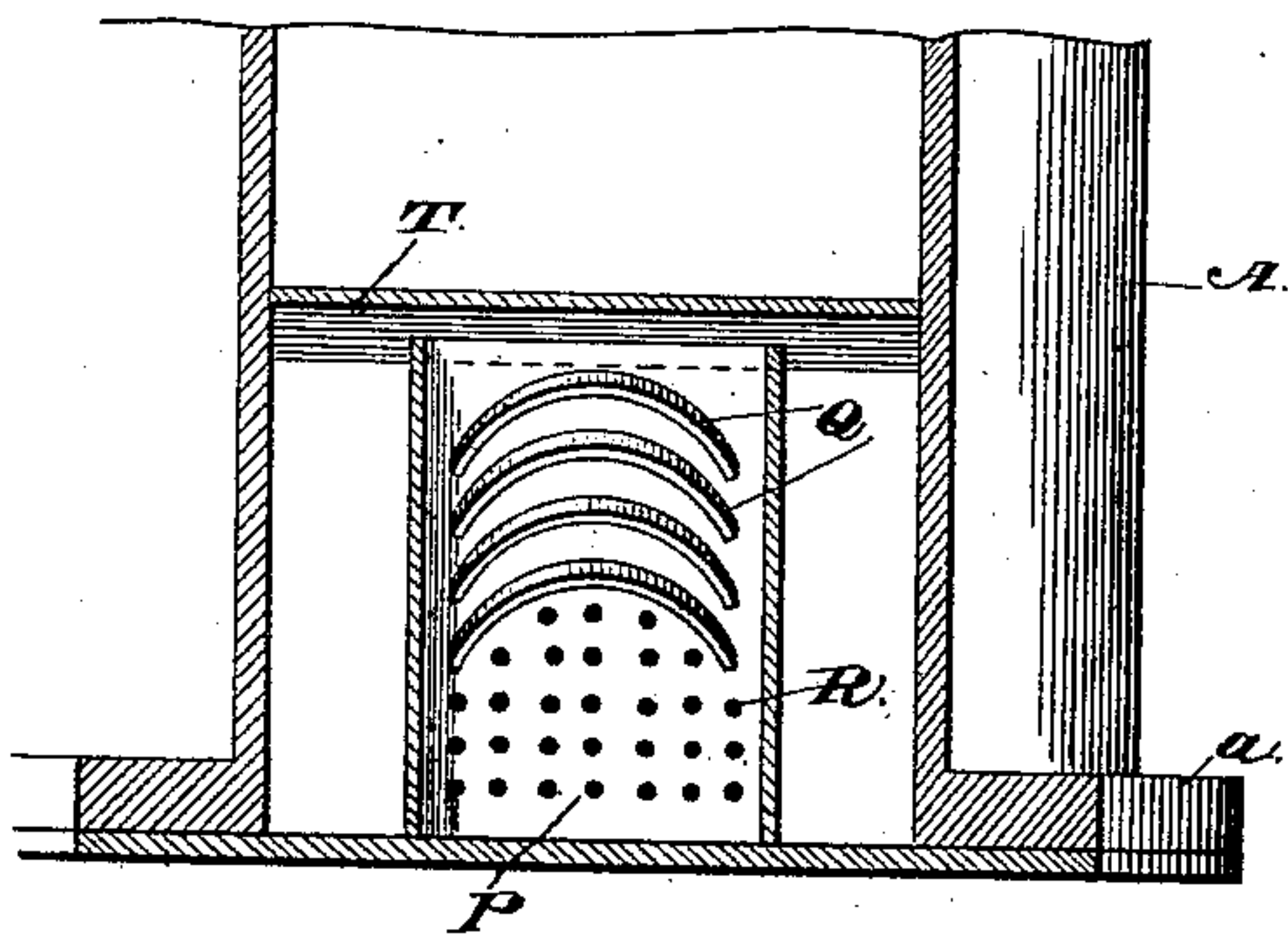
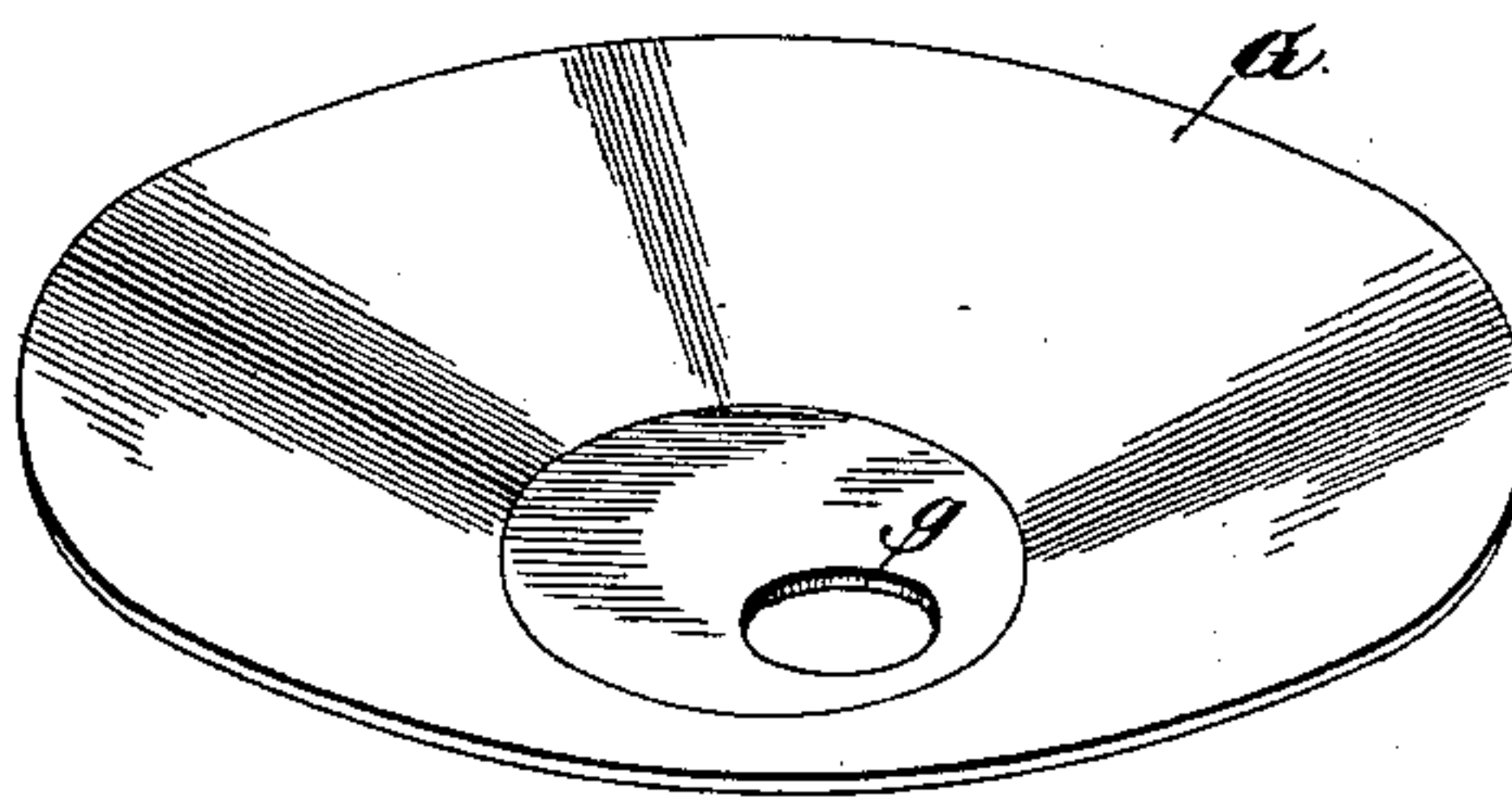


Fig. 4.



Witnesses

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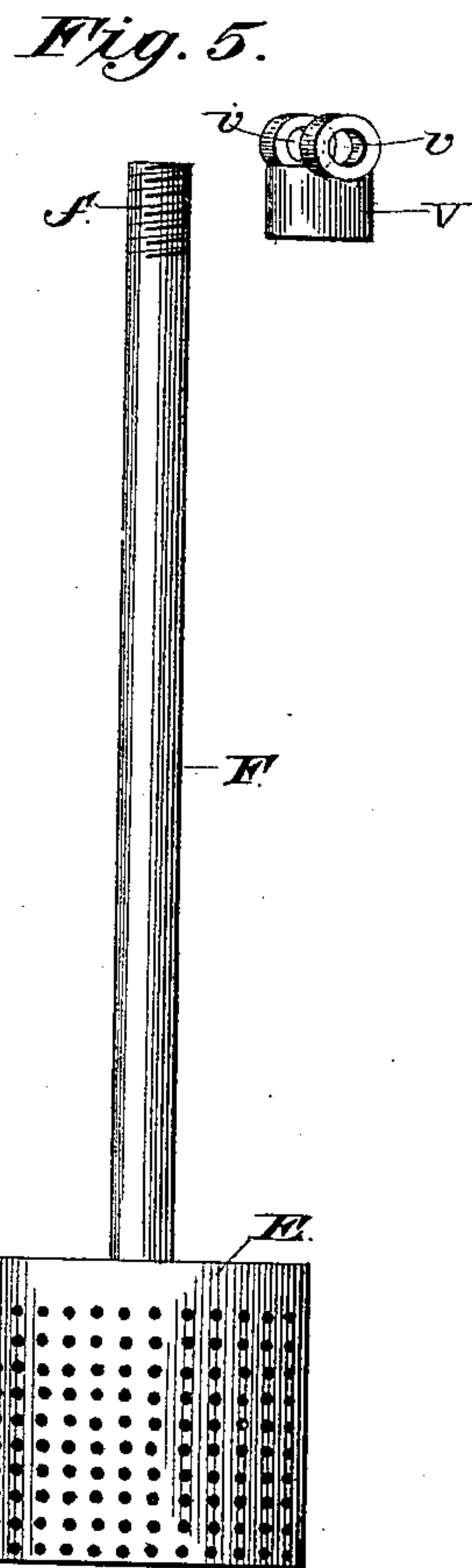
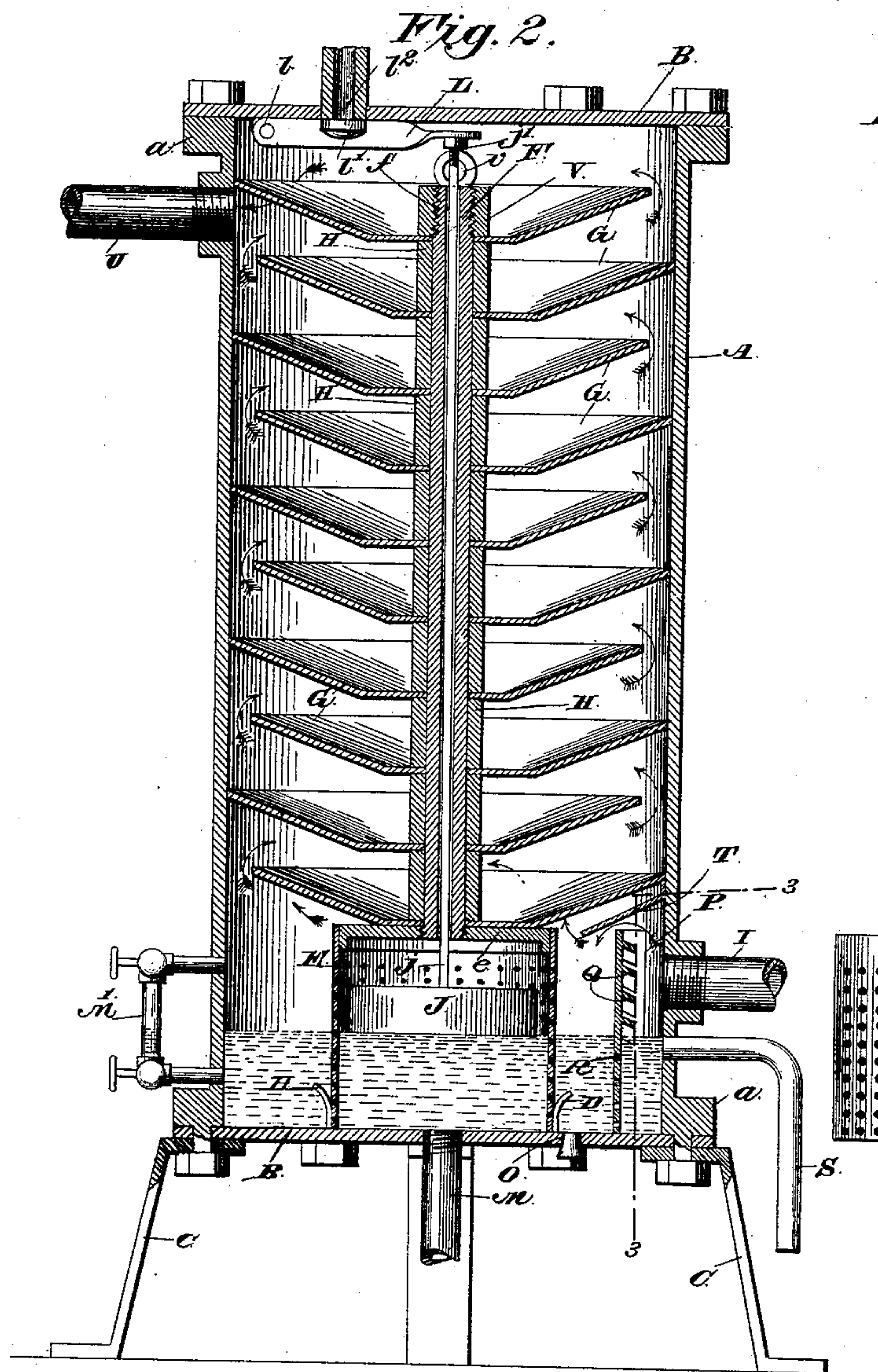
(No Model.)

2 Sheets—Sheet 2.

J. J. WILSON.
FEED WATER HEATER.

No. 482,069.

Patented Sept. 6, 1892.



Witnesses

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Inventor

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UNITED STATES PATENT OFFICE.

JOHN J. WILSON, OF WAHOO, NEBRASKA.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 482,069, dated September 6, 1892.

Application filed January 21, 1892. Serial No. 418,958. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. WILSON, a citizen of the United States, residing at Wahoo, in the county of Saunders and State of Nebraska, have invented a new and useful Feed-Water Heater, of which the following is a specification.

This invention relates to feed-water heaters; and it has for its object to provide an apparatus of this class which thoroughly heats the water which is to be fed to the boiler and by the use of the exhaust-steam from the machinery used in connection with the boiler.

It is the primary object of this invention to construct a feed-water heater in a substantial manner, and one in which the water fed therein shall be subjected to successive steps of heating from its entrance to its exit from the heater, and at the same time to provide means whereby the oil carried by the exhaust-steam will be separated therefrom and conducted off.

With these and many other objects in view, which will readily appear as the nature of the invention is fully understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a side elevation of my improved feed-water heater. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a detail sectional view on the line 3 3 of Fig. 2. Fig. 4 is a detail view of one of the water basins or pans. Fig. 5 is a detail elevation of the perforated cylinder and the vertical tube supported thereon.

Referring to the accompanying drawings, A represents the outer cylinder of the heater. The said cylinder is provided with the upper and lower encircling flanges *a*, to which are securely clamped the top and bottom heads B, which inclose the top and bottom of said cylinder, which is supported upon suitable legs or standards C, bolted to the lower bottom edges of the cylinder. The bottom head B is provided with the inner retaining-lugs D, projecting within the bottom of the cylinder and receiving the bottom perforated cylinder E, which is seated upon the bottom of the main cylinder and held centrally thereon by means of said retaining-lugs. The said perforated

cylinder E is capped by the head *e*, which receives the lower screw-threaded end of the vertical supporting-tube F, extending from the top of said perforated cylinder E to a point adjacent to the top of the main cylinder of the heater.

Mounted over and supported upon the vertical supporting-tube F are a series of concaved circular water pans or basins G. The said concaved pans are regularly spaced from each other by the intermediate spacing blocks or collars H, fitting over said vertical tube F, intermediate of each pan G, the series of which extends the full length of said vertical tube. The water-pans G have their central perforations *g*, which receive the vertical supporting-tube, arranged on alternate sides of their centers, so that one pan will have one edge touching one side of the main cylinder A, while the next adjacent pan will have its opposite edge touching the opposite side of the cylinder, thus providing an alternate or zigzag disposition of said pans with relation to each other, so that the heating-steam entering the cylinder at I in one side thereof below the lowermost pan, will have a zigzag passage up through said pans to heat the water therein and running over the same.

Working within the perforated cylinder E in the bottom of the main heating-cylinder A is a rounded float J, which is adapted to rise and fall with the water in the bottom of the cylinder. The said float carries a light float-stem *j*, which extends up through the vertical supporting-tube F, and carries upon its upper end a strike-nut *j'*, which as the said float rises is adapted to engage the outer end of the pivoted valve-lever L. The said valve-lever L is hinged or pivoted at one end at *l* to the top head or cap of the main cylinder, and is provided with a valve *l'*, which works over the water-supply inlet-pipe *l*² in the top of said cylinder. It will thus be seen that when a sufficient quantity of water has accumulated in the bottom of the cylinder the float will cause the valve *l'* to be closed and shut off the supply of water into the cylinder. The accumulated water is drawn off through the bottom opening M, which is connected with the suction-pump, which carries the heated water to the point of use. The height of the water in the bottom of the cyl-

inder A is indicated by an ordinary water-gage M', connected with one side and near the bottom of said cylinder, which when desired may be drained through the drain-opening O, also located in the bottom of said cylinder.

Supported upon the bottom of the cylinder and over the steam-inlet opening I is an inclosed oil-collecting chamber P, which is adapted to collect and be discharged of the accumulations of oil which are taken from the exhaust-steam which enters the heater through said opening, which is connected with the exhaust-pipe of the engine. The said oil-chamber extends slightly above the plane of said steam-opening I, and is provided upon the wall directly opposite the said opening with a vertical series of curved downwardly-inclined oil-deflecting projections Q, against which the steam upon entering strikes, and which direct the particles of oil downward into the chamber, while the steam escapes over the open upper end of said oil-collecting chamber. The said opposite wall of said oil-chamber is perforated, as at R, near the bottom thereof, so as to allow the water of condensation to pass therethrough into the main cylinder, while the lighter accumulations of oil floating upon the water within said oil-chamber pass off through the oil-drain pipe S, communicating with said oil-chamber directly below the steam-pipe opening.

An inclined steam-deflecting plate T is secured to the side of the cylinder A and extends over the open upper end of the oil-chamber P and projects downwardly into the cylinder to direct the course of the steam transversely across the bottom of the cylinder from which it passes sinuously through the network of water-pans, heating the water therein and passing thereover, and finally passes out through the steam-opening U, located near the top of the main cylinder A. It will be noted that as the water passes through the inlet-pipe ¹² the top pan is first filled. The water then runs over the edges of said top pan in a thin film and runs over the bottom or under side of the same pan to the under spacing block or collar, and then fills the next lower pan, and so on to the bottom of the cylinder. The exhaust-steam entering at the bottom of the cylinder and in passing up through the network of water-pans comes in contact with a great area of water, which is thereby thoroughly heated by the time it reaches the bottom of the cylinder from which it is drawn off when desired. It may be noted at this point that the extreme upper end of the supporting-tube F is screw-threaded, as at f, to receive the clamping or binding nut V, engaging said threaded end and securely clamping the series of water-pans and spacing-blocks tightly together. Said clamping-nut V is provided with opposite perforated ears v, which provide means for the removal of the network of water-pans

within the cylinder when so desired for the purpose of repair or cleansing. The construction, operation, and utility of the herein-described feed-water heater are now thought to be apparent without further description.

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

1. In a feed-water heater, the combination of a cylinder having a top water-inlet and a lower steam-inlet, a vertical supporting-tube centrally supported within said cylinder, a series of regularly-spaced concaved water-pans having eccentrically-disposed bottom perforations receiving said vertical supporting-tube and alternately disposed with relation to each other, so that the said concaved pans have their edges alternately contacting with the inner sides of the cylinder to form a tortuous steam-passage, a float-actuated valve-stem moving through said supporting-tube, and a valve arranged over the upper end of said stem, substantially as set forth.

2. In a feed-water heater, the combination of a cylinder having an upper water-supply opening and lower steam-inlet, of a supplemental perforated cylinder resting upon the bottom of said main cylinder, a vertical supporting-tube supported upon said perforated cylinder, a series of spaced water-pans mounted upon said vertical tube and arranged out of line with each other, and a float-actuated valve working over said water-supply opening, substantially as set forth.

3. In a feed-water heater, the combination of a cylinder having an upper water-inlet and a lower steam-inlet, a supplemental perforated cylinder resting upon the bottom of said main cylinder, a vertical supporting-tube extending above said perforated cylinder, a series of spaced water-pans mounted over said supporting-tube, a float inclosed by and working within said perforated cylinder, a float-stem connected with said float and working through said tube, and a valve controlled by said float-stem working over the water-inlet, substantially as set forth.

4. In a feed-water heater, the combination of a cylinder having an upper water-inlet and a lower steam-inlet, a supplemental perforated cylinder resting upon the bottom of the main cylinder, a vertical supporting-tube supported upon said perforated cylinder, a series of concaved water-pans mounted over said tube and arranged out of line with each other, intermediate spacing collars or blocks mounted over said tube, a float-controlled stem working through said tube, a valve-lever hinged to the top of the cylinder and carrying a valve working over the water-inlet and controlled by said float-controlled stem, and an oil collecting and discharging chamber located directly opposite said steam-inlet and opening into the cylinder, substantially as set forth.

5. In a feed-water heater, the combination of a cylinder having an upper valve-controlled water-inlet and a steam-inlet in one

side near the bottom thereof, an oil-collecting
chamber located directly opposite said steam-
inlet and extending slightly above the same,
said oil-chamber having a series of downward-
5 ly-inclined curved deflectors arranged upon
one wall thereof directly opposite said steam-
inlet, a series of perforations directly below
said deflectors and opening into the cylinder
for the escape of the water of condensation, an
10 oil-drain below the steam-inlet and above the
top line of perforations, and an inclined steam-
deflector arranged over the open upper end

of said oil-chamber and projecting down-
wardly beyond the same into the cylinder to
direct the steam throughout the bottom of the 15
latter, substantially as set forth.

In testimony that I claim the foregoing as
my own I have hereto affixed my signature in
the presence of two witnesses.

JOHN J. WILSON.

Witnesses:

F. P. McCUTCHAN,
HENRY MILLER.