

No. 652,070.

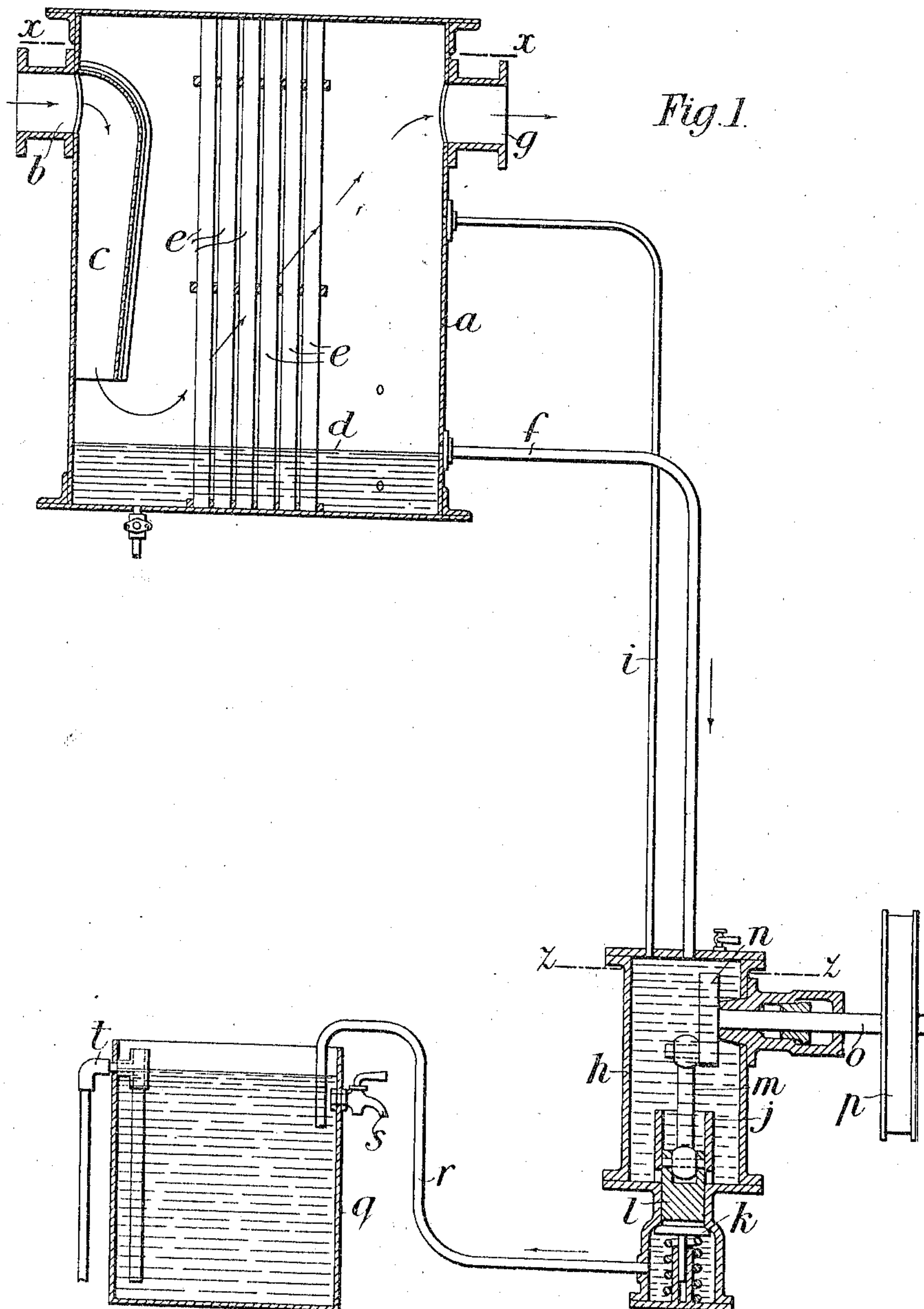
Patented June 19, 1900.

W. J. BAKER.
STEAM SEPARATOR.

(Application filed Aug. 7, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

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Fig. 2.

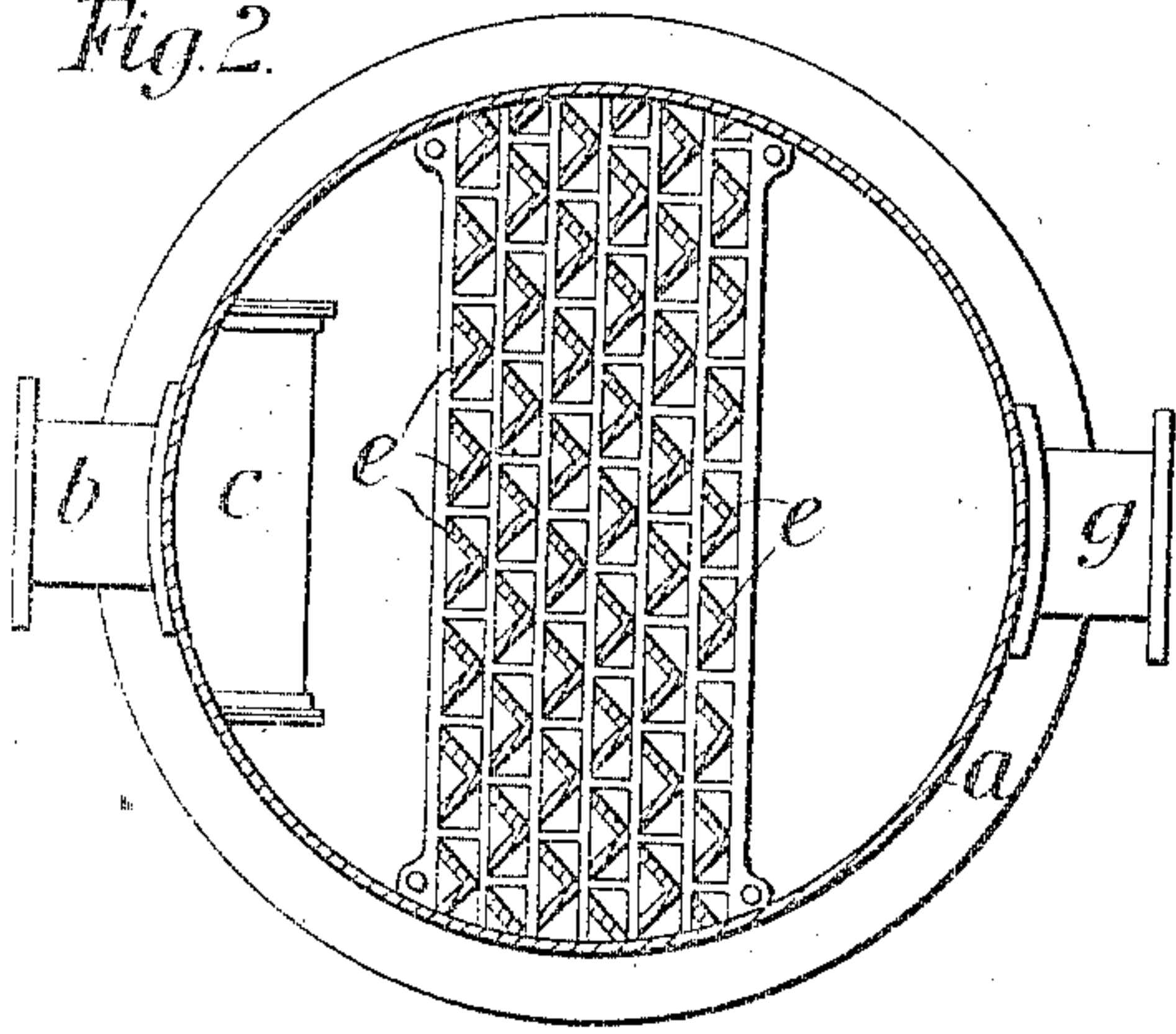


Fig. 3.

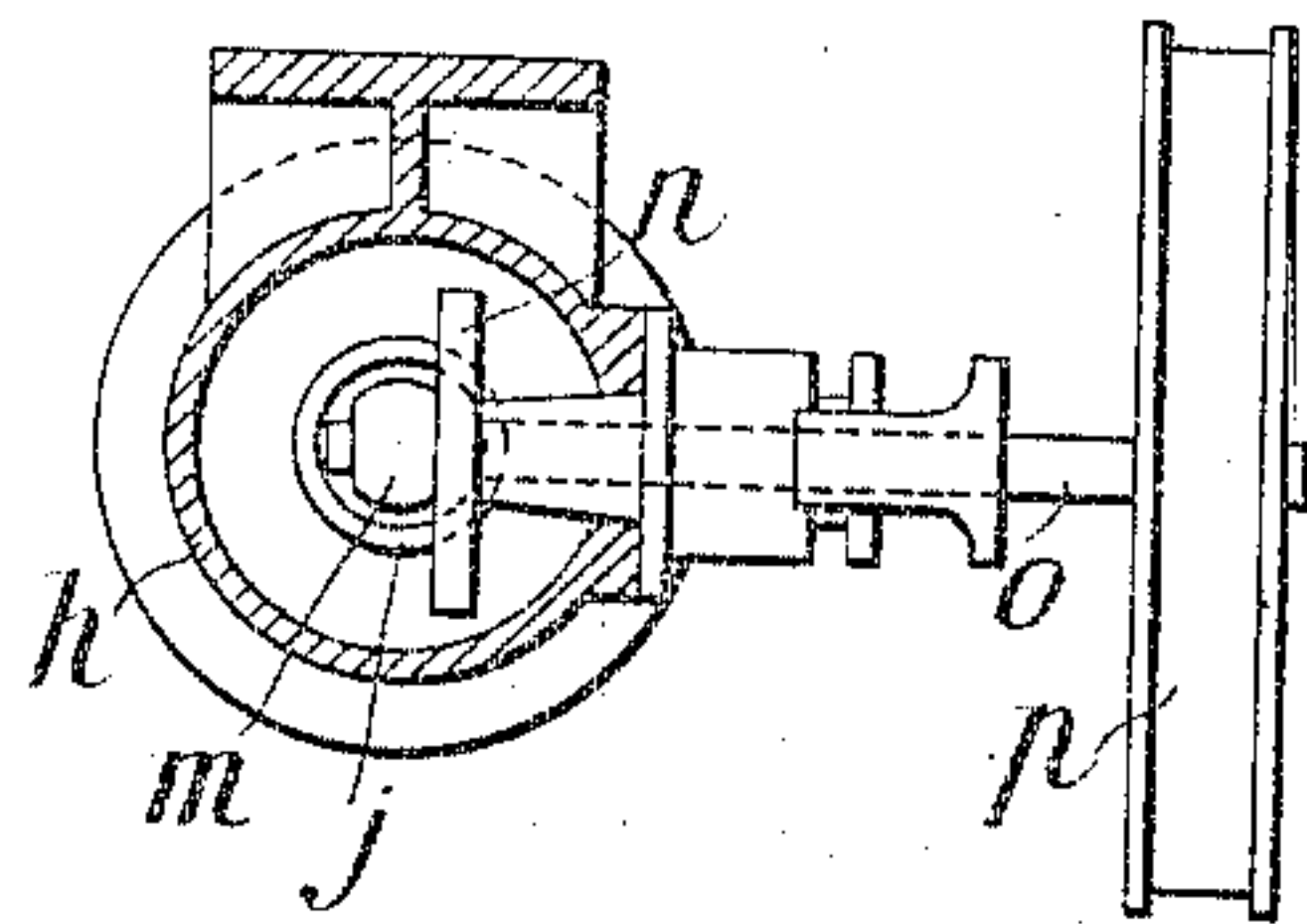


Fig. 4.

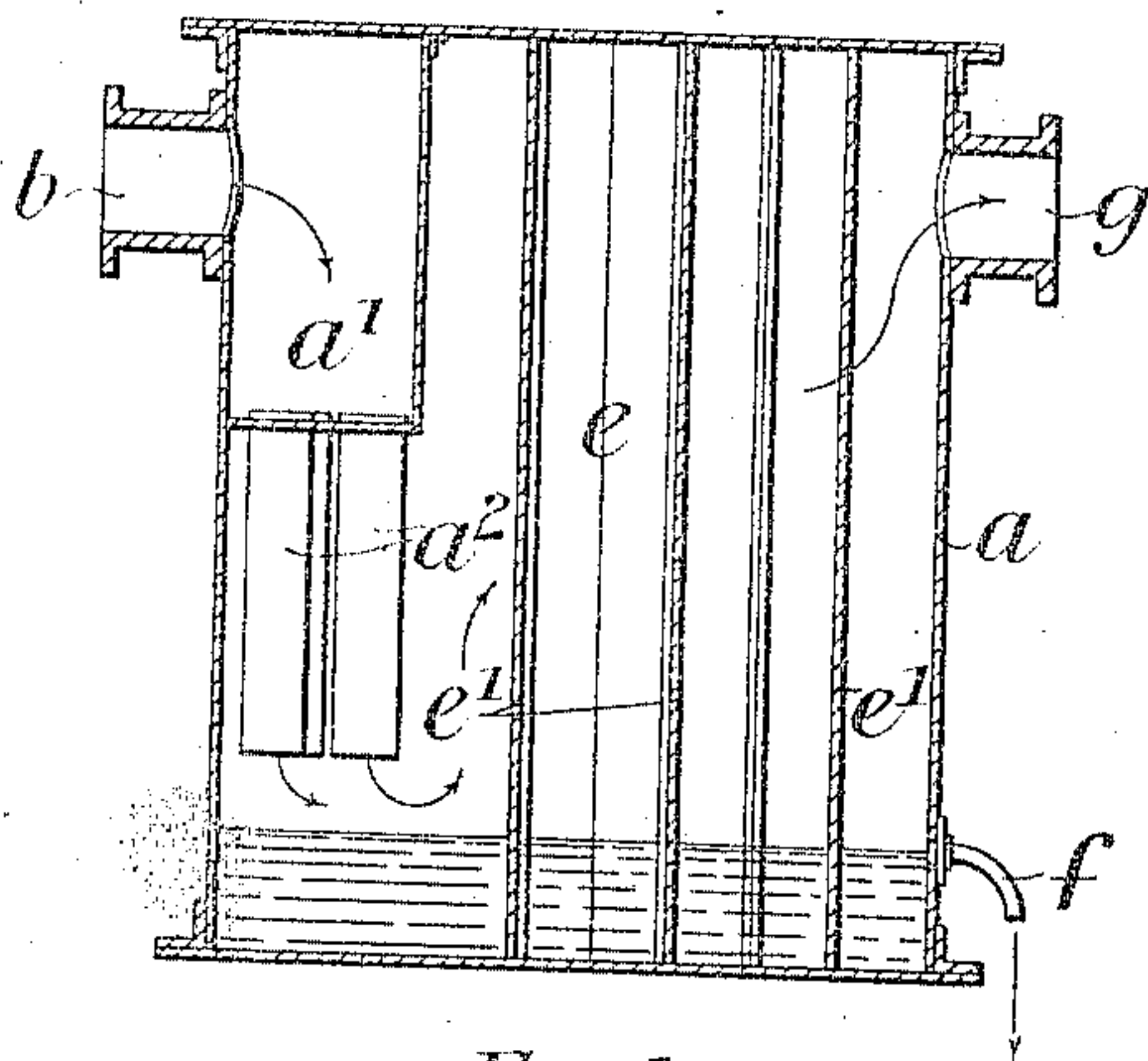
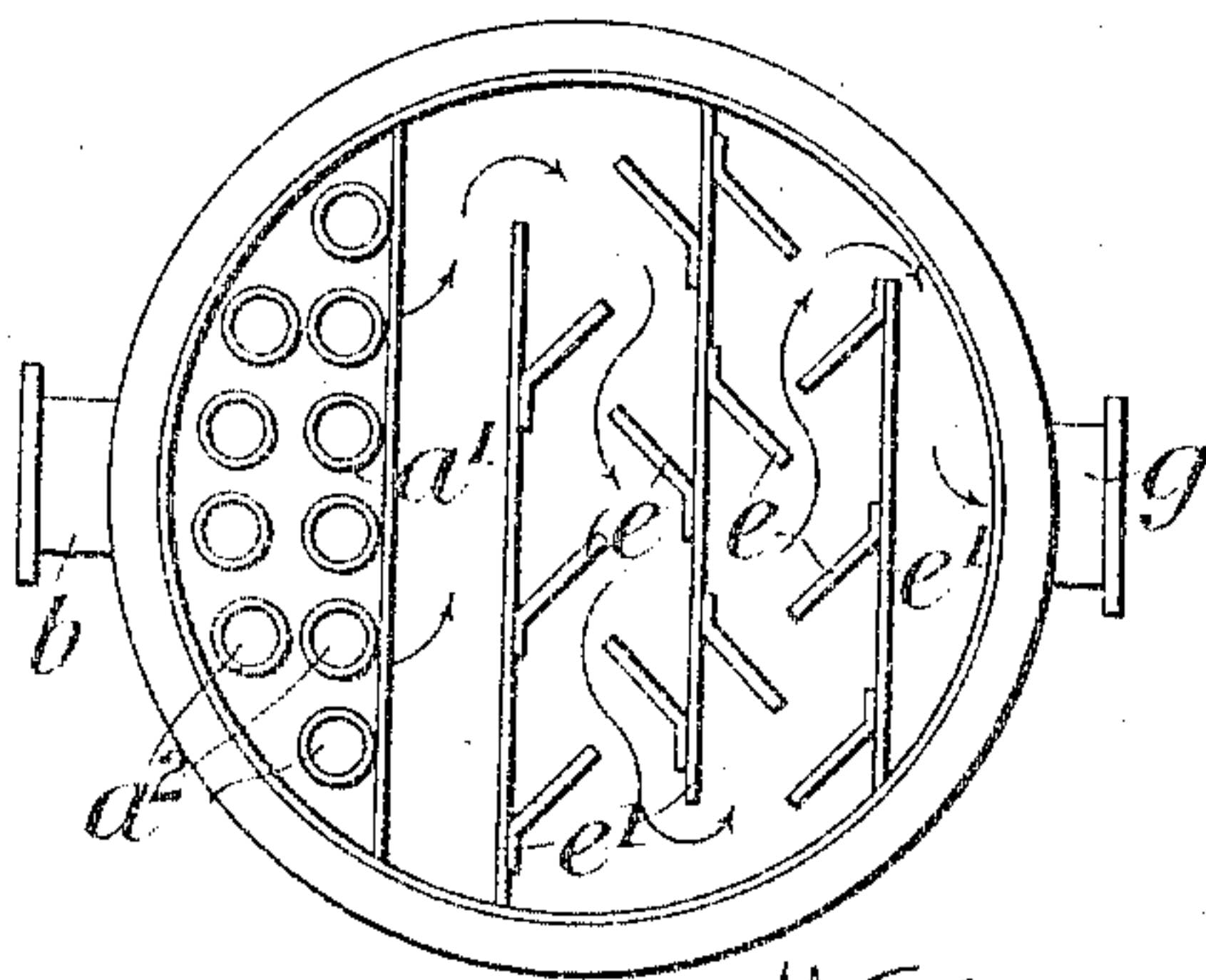


Fig. 5.



Witnesses.

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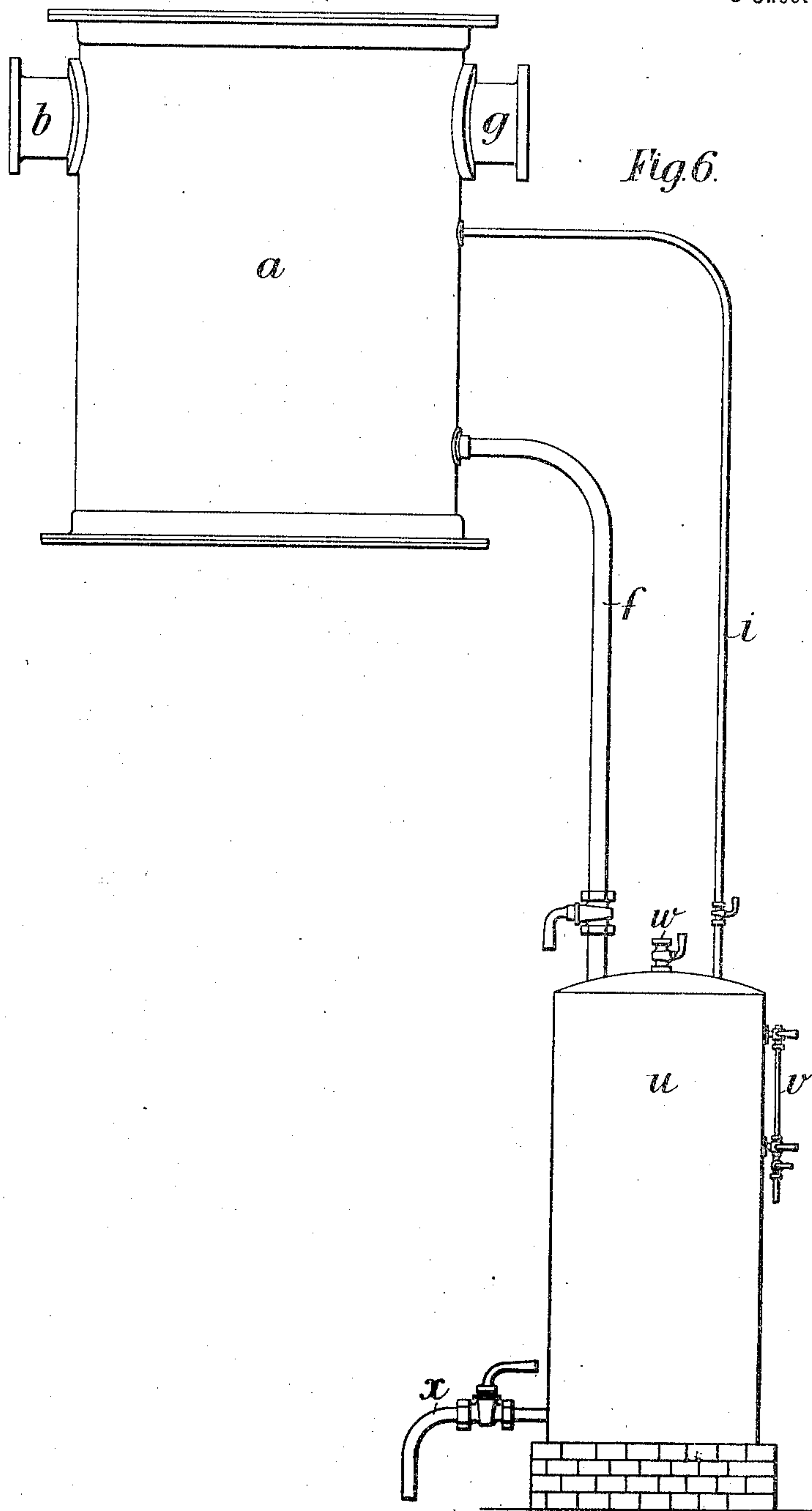
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(Application filed Aug. 7, 1899.)

(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

WILLIAM JAMES BAKER, OF SCARBOROUGH, ENGLAND.

STEAM-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 652,070, dated June 19, 1900.

Application filed August 7, 1899. Serial No. 726,496. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JAMES BAKER, a subject of the Queen of Great Britain, residing at Scarborough, England, have invented new and useful Improvements in or Connected with Apparatus for Separating Water and Oil or Grease from Steam, of which the following is a specification.

My invention relates to improvements in or connected with separators for removing oil or grease and water from steam, which separators are combined with a special form of pump for drawing away the separated water and oil and a settling-tank for facilitating the recovery of the separated oil.

To enable my invention to be fully understood, I will describe it by reference to the accompanying drawings, in which—

Figure 1 represents a sectional elevation of my improved separator, pump, and settling-tank. Fig. 2 is a sectional plan of the separator, the section being taken on the line $x x$, Fig. 1. Fig. 3 is a sectional plan of the pump, the section being taken on the line $z z$, Fig. 1. Fig. 4 represents a sectional elevation, and Fig. 5 a plan, of a modified form of separator, the cover being removed in the latter figure; and Fig. 6 illustrates the improved separator connected with a close receiver instead of with a pump.

Similar letters of reference indicate the same or similar parts in all the drawings.

Referring first to Figs. 1 to 3, a is the shell of the grease-separator, and b is the inlet branch pipe thereof, the said inlet-pipe being adapted to be connected to the exhaust-pipe conveying the steam from which the grease is to be removed. Immediately upon entering the separator the steam expands and is conducted by the deflector c to the surface of the water d , which occupies the well or bottom portion of the separator a , and upon the surface of which water all greasy spray is attracted and collected. The steam then takes a turn in an upward direction, as indicated by the arrows, Fig. 1, and is caused to pass through the spaces left between several rows of vertically-arranged angle-iron bafflers e , upon the inner or channel-like surfaces of which the steam impinges and leaves the whole of the remainder of the grease it contains, which grease, mixed with a small por-

tion of condensed water, trickles down to the well of the separator. The grease, as it collects, passes out by the overflow-pipe f . After passing the rows of angle-iron bafflers the purified steam passes out of the separator by the outlet branch g . As these separators are generally connected with the condenser of a steam-engine, it follows that a vacuum constantly exists in the separator, owing to which vacuum the grease and water accumulating in the well would not flow away against atmospheric pressure. A small pump is therefore necessary, which operates in a close receiver h , connected with the separator by the overflow-pipe f and by the air-pipe i , which latter equalizes the vacuum in the separator and the receiver. At the bottom of the close receiver h is the pump-barrel j , having apertures formed in its sides through which the greasy water from the receiver flows, being forced down past the valve k , which after each downward stroke is forced up into its seat by a spiral spring. The pump-ram l is actuated by means of a short connecting-rod m and the crank n upon the shaft o , which passes through a stuffing-box at the side of the receiver h and is driven by the pulley p , carrying a belt driven from the nearest shafting or by an electromotor. The grease and water from the pump pass into the settling-tank q through the pipe r , and in this tank the separated oil rises to the surface and is at times drawn off at the bib-cock s , the water constantly passing away from the bottom of the tank and overflowing at the outlet-pipe t .

In the separator represented in Figs. 4 and 5 the outer shell a , inlet branch b , and outlet branch g , and overflow-pipe f are similar to those shown in Figs. 1 and 2 and hereinbefore described; but in this arrangement when the greasy steam has entered the separator by the inlet branch b it immediately expands in the chamber a' , fixed within the shell a , and deposits a large portion of grease therein, which grease and separated water, as well as the steam, pass down the pipes $a^2 a^2$, the steam impinging upon the surface of the water in the well or lower part of the separator, whereby further portions of grease are attracted and separated. Finally the steam passes between parallel plates $e' e'$, fixed across the separator, as shown, from which pro-

ject alternate bafflers *e e*, placed an at angle to the plates. In the recesses thus formed the remainder of the oil contained in the steam is deposited with greasy water, which gravitates to the well of the separator and is drawn off, as before described. The purified steam passes out at the branch *g*. Instead of the pump previously referred to for drawing off the collected oil and water from the oil-separator an air-tight receiver may be employed of the kind represented at Fig. 6 and which is placed below the level of the separator. The top of this receiver *u* is connected to the upper part of the separator by the air-pipe *i* and through the overflow-pipe *f*. The oil and water as they are condensed flow into the receiver *u*, the vacuum in the said receiver being equalized to that existing in the separator by means of the air-pipe *i*. A water-gage *v* is provided to show when the receiver is full.

To empty the receiver *u* the valves of the overflow-pipe *f* and the air-pipe *i* are both closed, the vent-cock *w* is opened, and the greasy water and oil are then drawn off through the cock *x*.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

30 1. In apparatus for separating oil and grease from steam, the combination of a casing or shell having a steam-inlet and a water-well, of means for deflecting the entire head of the entering steam upon the surface of the water and of baffles against which the steam, re-
35 flected from the surface of the water, impinges, substantially as hereinbefore described.

40 2. In apparatus for separating oil from steam, the combination with a casing or shell having a steam-inlet and a water-well, of an expansion-chamber within said casing adjacent to the steam-inlet provided with a dis-

charge adapted to direct the entire head of steam directly against the surface of the wa- 45 ter and baffles within said casing, substantially as described.

3. In apparatus for separating oil from steam, the combination with a casing or shell having a steam-inlet and a water-well, of an 50 expansion-chamber within said casing adjacent to the steam-inlet, a plurality of pipes communicating with said expansion-chamber and discharging the entire head of steam directly against the surface of the water, a se- 55 ries of parallel plates provided with angular baffles secured to said plates, substantially as described.

4. In an oil-separator, the combination with a casing provided with a water-well and a 60 steam-inlet discharging the entire head of steam directly against the water in said well, of a receiving-chamber, a conducting-pipe extending from said casing to the receiving- 65 chamber and a separate pipe extending from said casing above the water-line to the upper part of the receiving-chamber for equalizing the pressure within said casing and chamber, substantially as described.

5. In an oil-separator, the combination with a casing provided with a water-well and a 70 steam-inlet adapted to deflect the entire head of steam against the water in said well, of a receiving-chamber, a conducting-pipe extend- 75 ing from said casing to the receiving-chamber and a separate pipe extending from said casing above the water-line to the upper part of the receiving-chamber for equalizing the pressure within said casing and chamber and a pump in said receiving-chamber, substan- 80 tially as described.

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Witnesses:

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