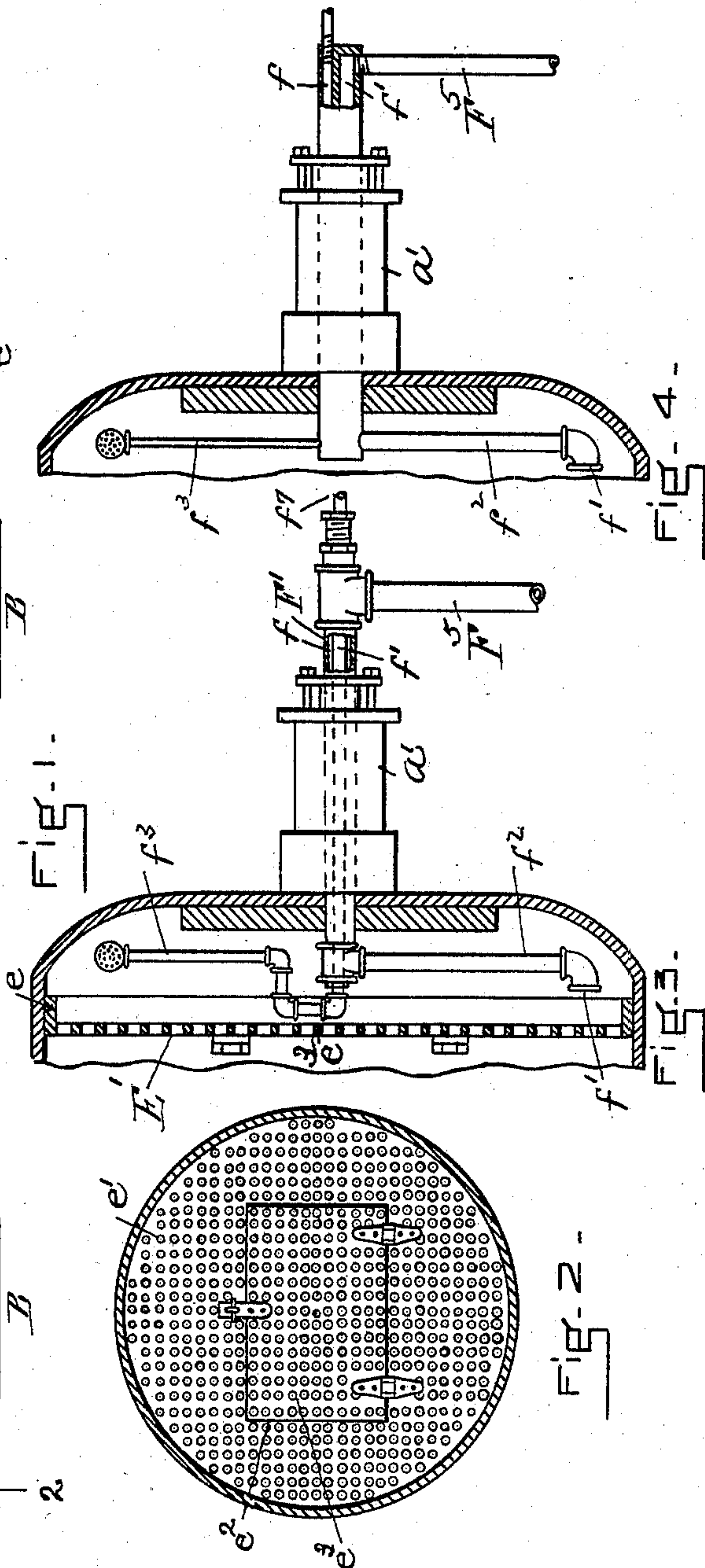
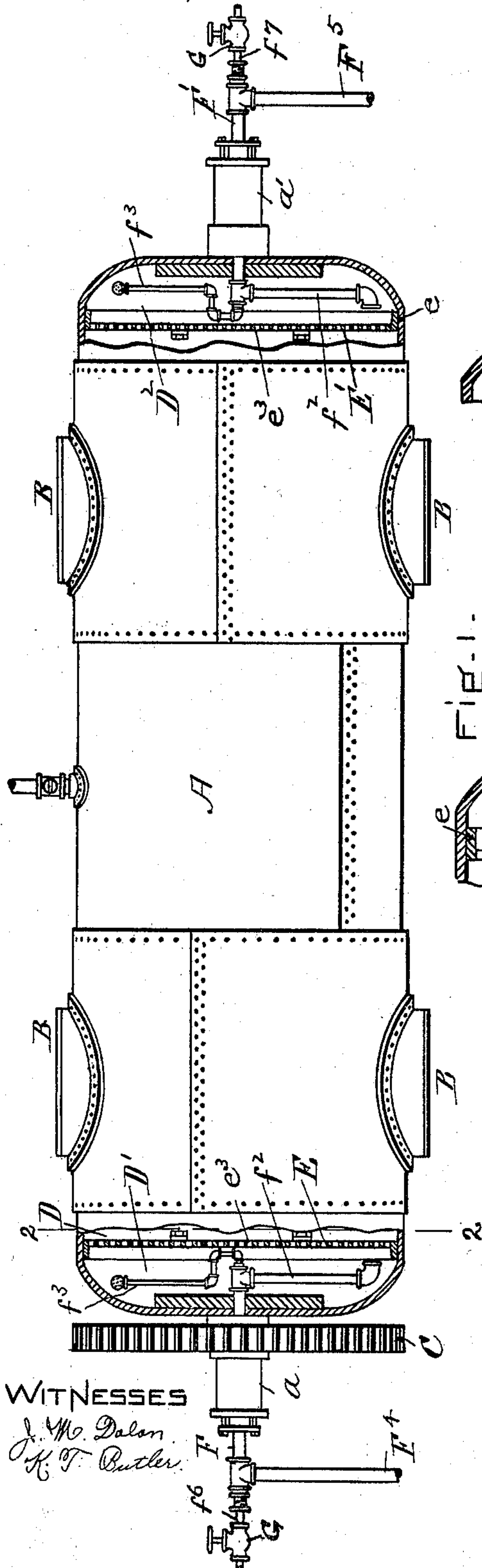


(No Model.)

B. D. RISING.
ROTARY BLEACHING BOILER.

No. 604,086.

Patented May 17, 1898.



WITNESSES

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ROTARY BLEACHING-BOILER.

SPECIFICATION forming part of Letters Patent No. 604,086, dated May 17, 1898.

Application filed June 1, 1897. Serial No. 638,862. (No model.)

To all whom it may concern:

Be it known that I, BRADLEY D. RISING, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Improvement in Rotary Bleaching-Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

In the drawings, Figure 1 is a view of the boiler in side elevation, portions of the casing of the boiler at each end being broken out to represent the interior construction. Fig. 2 is a view in vertical section upon the dotted line 2 2 of Fig. 1 and in elevation of the parts back of said line. Fig. 3 is an enlarged view, in vertical section lengthwise the boiler, of one end thereof. Fig. 4 is a similar view representing a slight modification, to which reference is hereinafter made.

A is the shell of the boiler. It is made of metal plates riveted together and is of any desired shape and has at its ends the hollow trunnions $a a'$, which are mounted upon suitable bearings. (Not shown.)

The boiler-holder is provided with any desired number of manholes B, through which the rags or material to be bleached is inserted into the cavity of the boiler and removed, and these manholes are covered by suitable covers. The boiler is revolved by a gear C, attached to one of the trunnions and engaged by a driving gear or pinion. (Not shown.)

Near each end of the boiler is a perforated diaphragm or partition extending entirely across the boiler and separating it into the main space D and the end spaces $D' D^2$. The partitions are lettered E E', respectively. Each is made of metal and has a flange e extending from its outer edge, by means of which it is supported in the boiler and fastened to its shell. The partition-plate may have any desired number of perforations e' , and they are preferably not over a quarter of an inch in diameter, and they connect the large receiving-chamber D of the boiler with the small chambers $D' D^2$. Each partition-plate may also have a manhole e^2 , which is closed by a perforated hinged manhole-door e^3 .

There extends into each of the chambers $D' D^2$, through the hollow trunnions $a a'$, respectively, the stationary pipes F F', one at each end of the boiler. Each stationary pipe has an inlet-passage f and an outlet-passage f' , the inlet-passage being preferably larger than the outlet, and each pipe has extending from its inner end within the chambers $D' D^2$ the stationary sections $f^2 f^3$, the sections f^2 extending downwardly from the inner end of their respective pipes to near the bottom of their respective chambers $D' D^2$ and are open at their lower ends and connect at their upper ends with the passages f . The sections f^3 extend upwardly to near the top of the chambers $D' D^2$, are open at their upper ends, and connect with the passages f' . The pipes F F' at their outer ends are connected with the steam-supply pipes $F^4 F^5$, which open into the passages f and the pipes $f^6 f^7$, the passages of which are connected with the passages f' . There is thus provided at each end of the boiler a narrow chamber of the diameter of the boiler and means for introducing steam into the lower part of each of said chambers and for providing an outlet from the upper part of said chambers, and there is communication between these chambers and the main chamber of the boiler by means of the perforations in the partition-plates.

It will be understood that the pipes F F' and the pipes $f^2 f^3$ are stationary and that the boiler is slowly rotated. The pipes F F' of course pass through suitable stuffing-boxes in the trunnions.

In operation the boiler is first charged with the rags or other material to be bleached and the bleaching liquor, the bleaching liquor occupying from one-fourth to one-third of the capacity of the boiler and, entering the chambers $D' D^2$, partially filling them—say to one-fourth or one-third of their height—and covering the outlets of the pipes f^2 . The charging-manholes are then closed and steam at any desired pressure let into the end chambers $D' D^2$ through the passages $f f'$ and the pipe-sections f^2 , the steam discharging into the bleaching liquor in the lower part of each chamber, where it serves to heat the same.

The rags or material to be bleached are held

in the large chamber D and are prevented by the partitions from entering the end chambers D' D².

The unheated air in the chambers may escape through the passages f' , entering said passages through the openings in the stationary pipes f^3 , which openings are in the upper part of the end chambers. These passages may be continuously opened or opened a while at the starting of the boiling operation and then closed or opened at intervals at that time and later, and I have represented the pipes $f^6 f^7$ as provided with valves G for opening and closing or partially closing said passages f' .

By this construction the boiler is provided with a narrow chamber at each end, which is separated from the main chamber by perforated partitions which permit the flow of liquor from the main chamber into and out of the end chambers, but prevent the entrance of the rags or material to be bleached or boiled thereto, and each of the end chambers is provided with means for rapidly heating the liquor which flows into and from it through the perforations as the boiler is rotated.

It will be understood that the circulation is produced and maintained throughout the boiler without causing the steam to be brought into contact with the stock in the compartment D, and that this circulation, whether compelled or produced by the arrangement and operation of the mechanism herein specified, under the influence of the introduction of steam into the end chambers, forces a circulation or flow of the liquor back and forth between the end chambers and the main chamber.

While I have shown the liquor-heating chambers as arranged at the ends of the boiler, and while I consider that such arrangement is the best arrangement for them, yet I do not limit myself to such a location, as they may be arranged in other parts of the boiler or away from the ends, and while I prefer that the boiler have two, one, preferably centrally arranged in the boiler, would answer.

I would further say that instead of the means shown for heating the liquor in the liquor-heating chambers I may use any other suitable means for raising the temperature of the liquor—such, for instance, as an electric heater contained in said chamber or any other suitable liquid-heating device.

By providing the boiler with the end chambers, which are fluid-containing chambers, as distinguished from the main chamber, which holds the fluid and the material which is being treated, provision for the better circulation of the fluid through the main chamber is obtained, and this is the case whether the fluid is heated in the said chambers or not.

The inlet and outlet passages in the stationary pipe extending through the hollow trunnions may be provided by two pipes, one

within the other, the smaller one having a passage about it, as represented in Figs. 1 and 3, or by means of a cylindrical casting, which shall have the passages extending through it side by side, as represented in Fig. 4.

It will be seen that the liquor-heating chambers hold at one time but a relatively small part of the entire liquor of the boiler, and while the liquor is constantly running into them and from them that this circulation is not sufficiently rapid to prevent the liquor which is within them from being very quickly heated by the heating devices therein, so that a rapid heating of the liquor is occasioned and a continuity at any temperature maintained, for these reasons, namely: that the heating energy of the heating device is expended solely upon the liquor in relatively small volume while the liquor is in slow circulation through the heating-chambers, and this not only secures a rapid heating of all the liquor in the boiler at first and permits it to be maintained at the desired temperature, but also economizes the cost of heating, as this method requires a much smaller expenditure of heating medium than is now required in the old type of apparatus.

The steam delivered into the chambers D D' may be taken directly from the boiler or from any other source, or it may be exhaust-steam.

I would further say that hot water of any required temperature under any desired pressure may be let into the end chambers D D' in lieu of steam, either directly or it may be passed into and out of said chamber through a heating-coil contained therein.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination with a rotary bleaching-boiler having a main compartment to hold the material or stock under treatment and auxiliary liquor-heating compartments adjacent to said main compartments, of stationary liquor-heating devices in said auxiliary chamber which deliver the heating medium to the lower part of said auxiliary liquor-heating compartments, and partitions separating said main compartment from the said auxiliary compartments, said partitions allowing free circulation of the liquor through the several compartments but preventing escape of the material under treatment from the main compartment into the auxiliary liquor-heating compartment.

2. The combination with a rotary bleaching-boiler having a main compartment to hold the material or stock under treatment and auxiliary liquor-heating compartments adjacent to said main compartment, a stationary steam-pipe passing through the trunnion of said rotary boiler and depending within the same so as to deliver steam at a point near the bottom of the auxiliary liquor-heating compartments and always below the level

of the liquor therein, and partitions separating said main compartment from the said auxiliary compartments, said partitions allowing free circulation of the liquor through the several compartments but preventing escape of the material under treatment from the main compartment into the auxiliary liquor-heating compartment.

3. The combination with the rotary bleaching-boiler having a main compartment to hold the material or stock to be treated, and auxiliary liquor-heating compartments adjacent to said main compartment, of pipes leading through the trunnion of said boiler into said auxiliary compartments one of said pipes connecting with a stationary depending pipe so as to deliver steam or other heating medium near the bottom of the auxiliary compartment at a point below the level of the liquor, the other pipe connecting with a stationary vertical pipe rising to a point near the top of the boiler so as to permit exit of the heated air, partitions separating said main compartment from said auxiliary compartments, said partitions allowing free circulation of the liquor through the several compartments but preventing escape of the material under treatment from the main compartment in the auxiliary liquor-heating compartments, and manholes in said partitions to allow access to said auxiliary compartments.

4. The combination in a rotary boiler of the main compartment having one or more openings thereto and manhole-plates for closing the same, the liquor-heating chambers D' , D^2 at the ends of the boiler, the perforated diaphragms having manholes, and doors or covers for said manholes opening into the main compartment, the said doors or covers for said

manholes being provided with perforations, as and for the purposes described.

5. In a rotary boiler the main compartment D , and end compartment and a perforated partition-plate having a manhole and a perforated gate or cover for the same.

6. The combination with a rotary boiler having hollow trunnions, of a stationary pipe or casing having a plurality of passages through said trunnions, pipes supported at the inner end of said casting and connecting with the passages therethrough and pipes connected with said passages outside of said boiler.

7. The combination of the boiler, its hollow trunnions, means for rotating the boiler, its main chamber, the auxiliary chambers which are separated from the main chamber as specified, the stationary pipes extending through the hollow trunnions to said auxiliary chambers and having two passages, a stationary downward extension from one of said passages in said auxiliary chamber or chambers having an opening at or near its lower end and a stationary upward extension from the other of said passages, having an opening at or near its upper end.

8. The combination of the rotary boiler having a main compartment D and the end compartments D' , D^2 , the perforated plates E , the hollow trunnions, the stationary pipes having two passages extending through said trunnions into the chambers D' , D^2 , the stationary branch pipes, one of which is an inlet and the other an outlet pipe, and valves in the outlet-pipes outside the boiler.

BRADLEY D. RISING.

In presence of—

CHAS. MCKERNON,
J. J. RISING.