

No. 756,537.

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F. A. SIMONDS.
STEAM SEPARATOR.
APPLICATION FILED JUNE 8, 1903.

NO MODEL.

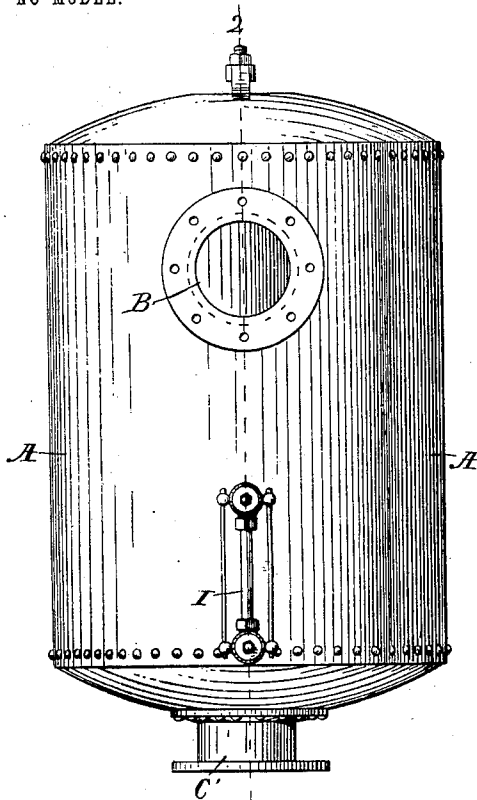


Fig. 1.

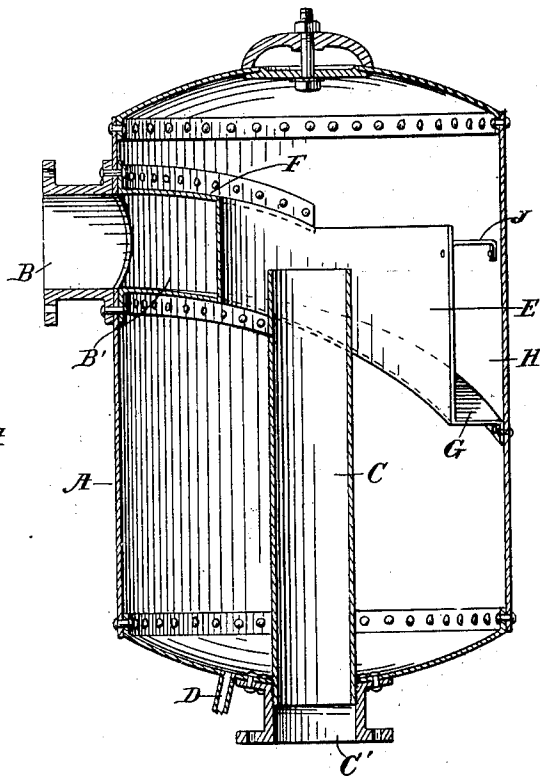


Fig. 2.

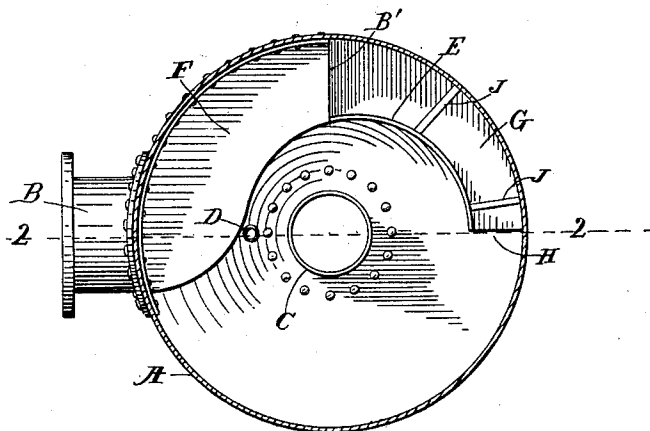


Fig. 3.

Witnesses
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STEAM-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 756,537, dated April 5, 1904.

Application filed June 8, 1903. Serial No. 160,489. (No model.)

To all whom it may concern:

Be it known that I, FRANK ARTHUR SIMONDS, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Steam-Separators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in steam-separators; and its object is to provide a simple and effective device, to avoid blowing water through the device, to reduce resistance to the flow of steam, to provide increased capacity, and to provide the device with certain new and useful features herein-after more fully described, and particularly pointed out in the claims.

My invention consists of the combination and arrangement of parts hereinafter more fully described, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of a device embodying my invention; Fig. 2, a vertical section of the same on the line 2 2 of Figs. 1 and 3 with the glass I omitted, and Fig. 3 a plan view of the same with the upper end removed to show the internal construction.

Like letters refer to like parts in all of the figures.

A represents the case, preferably cylindrical in form and closed at each end with a suitable head. The steam is admitted to this case through a suitable lateral opening B near the top of the case. In the interior of the case and commencing opposite this opening is a separating-chamber B', extending spirally downward and partially around the interior of the case. The case forms the outer wall of this chamber, and the inner wall E of the same is eccentric to the axis of the case, whereby the chamber decreases in its horizontal dimension as it proceeds around the case. The bottom G of the separating-chamber is inclined spirally downward from beneath the opening B and extends the entire length of the inner wall E. The top F of this chamber terminates about midway of the

length of the inner wall and bottom, thus leaving a lateral opening for the upward escape of the steam and an end opening H for the discharge of the water. The wall E terminates opposite this top opening substantially in a horizontal plane. This portion of the wall is also strengthened by the brace-bars J, connecting it to the case. In the axis of the lower head is a suitable opening C', in which is inserted a pipe C, extending upward in the axis of the case to near the top of the same and with its open end opposite the wall E to receive the steam after it is separated from the water.

D is a pipe to draw off the accumulated water, to which any suitable trap is attached.

I is a suitable glass tube to show the water should any accumulate in the case.

The steam and water to be separated entering at B are directed spirally and downward in the chamber B until sufficient centrifugal force is developed to throw the water toward the inner surface of the case and through the opening H. Part of the steam escapes over the top of the inner wall E after leaving the chamber B' and thence passes directly into the pipe C. The remaining steam passes through the opening H and rotating in the case will discharge the water against the case and will rise and also enter the pipe C. The water by its greater gravity is carried by the centrifugal force around the interior of the case and after it has made the circuit will pass beneath the bottom G and is effectually retained in the case and directed downward without any portion of it coming within the current of the steam. I thus avoid a very common difficulty in steam-separators—to wit, the blowing through of the water by the rapid currents of steam.

In this device there is but little obstruction presented to the flow of the steam there-through, for that the steam can rotate freely about the axis of the case, and the lighter central portion is given ample room to escape into the pipe C. I thus secure greater capacity for a given size of device. It will also be observed that the water is discharged directly through the opening H and below the open end of the pipe C, and the steam escapes lat-

erally and upward over the wall E and above the open end of said pipe.

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

1. In a steam-separator, the combination of a case having an inlet-opening, a separating-chamber extending from the inlet-opening and having an open end to discharge water, and an open upper side to discharge steam, and an exit-pipe in the case.

2. In a steam-separator, a case having an inlet-opening, a spiral and downwardly-inclined separating-chamber having an open lower end to discharge water, and an open upper side to discharge steam, and an exit-pipe in the case and having its open end above the bottom of the end opening of the separating-chamber.

3. In a steam-separator, the combination of a case having a lateral inlet-opening, a separating-chamber extending spirally downward from the inlet-opening and open at its upper side throughout a part of its length, and also open at its lower end, and an exit-pipe in the axis of the case and having its open end near the top of the case.

4. In a steam-separator, a case having a lateral inlet-opening, a separating-chamber extending spirally downward from the inlet-opening, said chamber being reduced horizontally and enlarged vertically toward its inner end, and also being open at the top throughout a portion of its length at the inner end, and an exit-pipe in the axis of the case, and having its open end near the top of the same.

5. In a steam-separator, a cylindrical case closed at the ends and having a lateral opening

near the top, a separating-chamber extending from said opening and having its outer wall formed by the case, and an inner wall to said chamber arranged eccentric to the axis of the case, a bottom to said chamber extending spirally downward from beneath said opening, and a top to said chamber extending from above said opening above a portion only of said chamber, and an exit-pipe in the axis of the case.

6. In a steam-separator, the combination of a cylindrical case closed at the ends and having a lateral inlet-opening near the top, a tapered, spiral, and downwardly-inclined plate attached to the case, a vertical wall extending upward from the inner edge of said plate and eccentric to the axis of the case, and an exit-pipe in the axis of the case and having its open end opposite said wall.

7. In a steam-separator, the combination of a cylindrical case closed at the ends and having a lateral inlet-opening near the top, a tapered, spiral, and downwardly-inclined plate attached to the case at its outer edge and below the said opening, a corresponding plate above said opening and of less length than the first-named plate, a vertical wall connecting said plates and extending the full length of the lower plate, and having a horizontal upper edge extending beyond the upper plate, and an exit-pipe in the axis of the case and having its open end opposite said wall.

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

FRANK ARTHUR SIMONDS.

Witnesses:

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GEORGIANA CHACE.