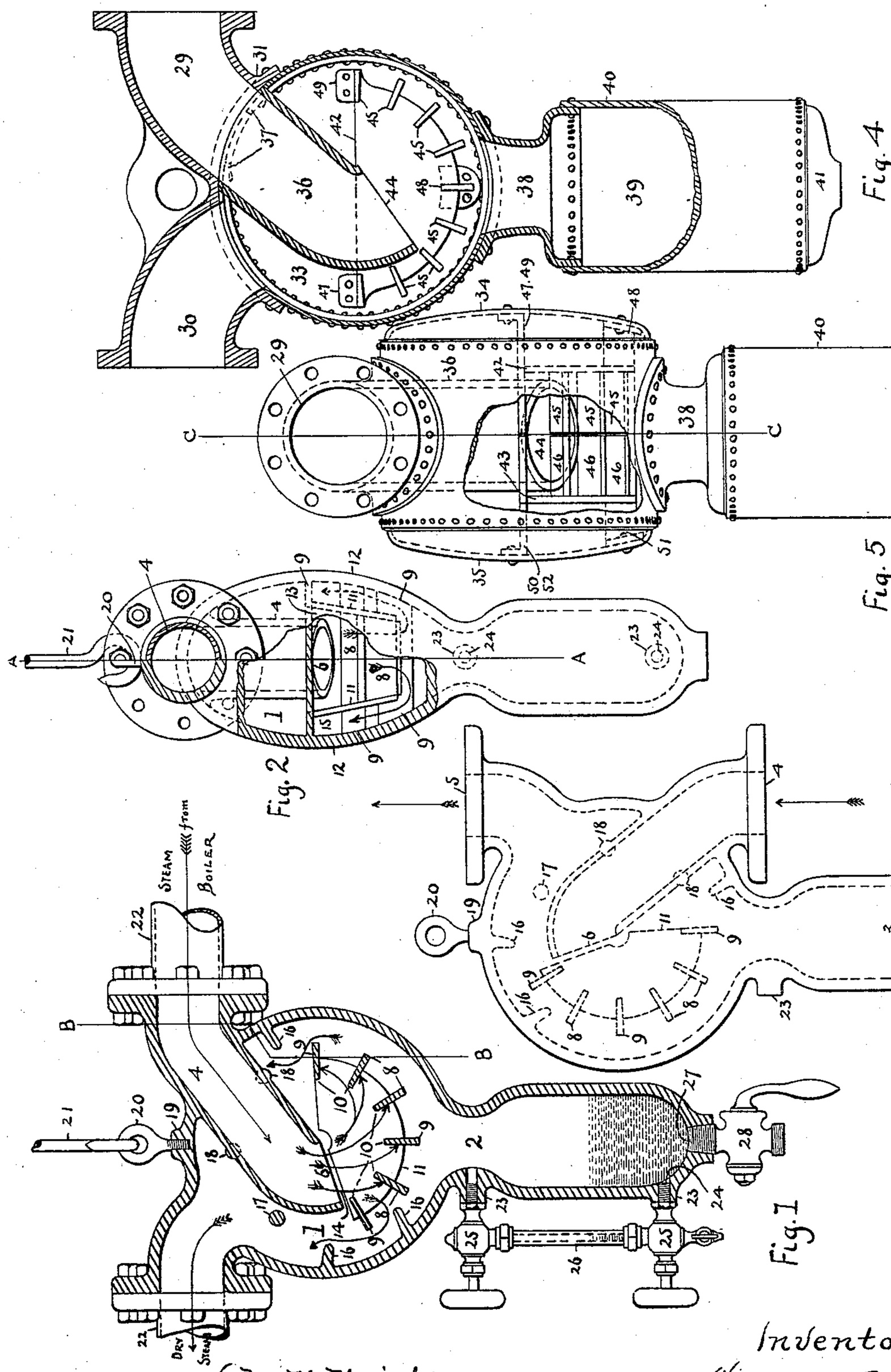
(No Model.)

W. C. JENNINGS.

SEPARATOR.

No. 594,350. Patented Nov. 23, 1897.



Witnesses { M. W. Wright
H. Watson.

Inventor
William C. Jennings
By R. C. Dwight
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM C. JENNINGS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE WATSON & McDANIEL COMPANY, OF SAME PLACE.

SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 594,350, dated November 23, 1897.

Application filed June 30, 1897. Serial No. 642,925. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. JENNINGS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Separators; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to mechanism for separating the liquids with which steam and gases may be saturated from the steam or gases and retaining the liquid in a receptacle where it may be afterward drawn off. The saturation is generally the result of condensation, which causes the steam, gas, or vapor to return to the liquid state from which it has been formed, but if it is allowed to pass to the engine or other place in which the steam or vapor is used it tends to cause much damage and decrease the efficiency of the steam or vapor if commixed with the liquids.

To accomplish the object of my invention, I interpose my separator between the means used to produce the steam or gases and the mechanism they are employed to operate, but construct it in manner to freely permit the flow of the dry steam or gases while changing its direction for the purpose of extracting the saturation. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical central section on line A A, Fig. 2, of the form adapted for attachment to horizontal pipes of ordinary size and in which nearly all parts are made integral. Fig. 2 is one-half in cross-section on line B B, Fig. 1, and one-half in elevation of the edge of Fig. 1. Fig. 3 is a side elevation of the form adapted for attachment to vertical pipes of sizes same as Figs. 1 and 2. Fig. 4 is partly a section on line *c c*, Fig. 5, and partly in elevation of the same size, adapted to extra large sizes and built up of separate parts. Fig. 5 is a vertical elevation of the edge of Fig. 4.

Similar reference-figures refer to similar parts throughout the several views.

By reference to Figs. 1 and 2 it will be seen my device consists of a chamber 1 of circular form, as viewed from Fig. 1, and flattened into an elliptical form in cross-section, as seen in Fig. 2, having at its lower edge an opening 2, forming an entrance to a well 3, formed circular in cross-section and reaching downward to a distance to be of a required capacity. At the top of chamber 1 at one edge I construct an inlet-pipe 4, which on entering the chamber 1 passes within and toward the center of the chamber 1, not touching its walls, and is then curved toward the outer edge of the chamber and away from the outlet-pipe 5, which is located oppositely to inlet-pipe 4 and leads outward from the chamber.

The object in curving the end of inlet-pipe 4 as I have done is for the purpose of discharging the flow through its orifice 6 in a manner to produce a centrifugal effect to throw off the heavy or liquid parts against part of the case and allow the steam or vapor to pass around the chamber-case 7 and enter outlet-pipe 5 in a dry condition. To still further accomplish the separation of the dry and liquid parts, I place baffle-plates 8 9 radially around the orifice 6 somewhat removed and with their inner edges 10 presented toward the orifice 6, so that as the volume of steam or gases is projected from the orifice 6 the baffle-plates 8 9 intercept it and catch the moist or liquid part, which thereafter drips off and by its own gravity descends into the well 3. The baffle-plates 8 9 extend between guide-plates 11, placed upon each side of pipe 4, opposite its orifice 6, and baffle-plates 9 also reach beyond the guide-plates 11 and attach to walls 12 of chamber 1, supporting themselves thereon, as well as baffle-plates 8 and guide-plates 11. The guide-plates 11 stand off from pipe 4 at the side, leaving spaces 13, and are brought nearer together at their lower edge. Their edges nearest orifice 6 are also removed somewhat from the end of pipe 4, leaving spaces 14. The guide-plates 11 direct the discharge from the orifice 6 against the baffle-plates 8 9, thence to part 7 of the case, confining the volume in the space between them, and

form passages 15 between their outer sides and walls 12 of chamber 1. In these spaces 15, as well as through the spaces 13 and 14, the volatile part of the discharge from orifice 6 passes and rises to outlet-pipe 5, where it passes away freed from its moisture and saturation.

In case any liquid should be carried beyond the baffle-plates 8 9 to the outer sides of the casing I attach intercepting-ribs 16 across the case to walls 7 12 to arrest the liquid flow and allow it by its gravity to descend to well 3.

Bars 17 18 tie the side walls of chamber 1 to each other, and 18 are also attached to inlet-pipe 4 for its support. At the upper part of casing 1 a boss 19 is formed, into which an eye 20 is screwed and in which a hooked rod 21 is inserted to suspend the whole apparatus to a beam, ceiling, or other convenient or suitable supporting structure, thus relieving the attached pipes 22 of any supporting strain. At 23 are bosses, through which are openings 24 into the well 3 and into which are inserted the upper and lower metal parts 25 of a water-gage having a glass tube 26, through which the height of the liquid in well 3 is indicated. At the bottom of well 3 is located a discharge-opening 27, into which, as shown in Fig. 1, a discharge-cock 28 is inserted, or instead of cock 28 a pipe may be inserted or coupled thereto and lead to an automatic trap to discharge the liquid, or any other suitable means may be employed for the purpose best suited to the location where it is used.

As before recited, my separator is specially constructed and designed to discharge the inlet-pipe 4 to obtain the advantages of the well-known law of centrifugal force from orifice 6 in an outward whirl and thereby precipitate the liquid or heavy part against the baffle-plates and casing-wall and there arrest it, causing it to enter the well, while the steam or gaseous volume rises and escapes.

The apparatus thus far described and illustrated in Figs. 1, 2, and 3 is preferably made integral, saving machine and hand fitting, bolts, rivets, &c.; but when the apparatus must of necessity be of large size and capacity I construct it of separate parts, as shown in Figs. 4 and 5, wherein the operation is the same as in Figs. 1, 2, and 3. In the modification as shown in Figs. 4 and 5 the outer parts of inlet-pipe 29 and outlet-pipe 30 are formed upon a saddle 31, adapted to seat upon and be secured to casing 32 of chamber 33, having outwardly-rounding heads 34 35. The inner part 36 of the inlet-pipe is made separate and fits through casing 32 and abuts pipe 29, it having inner lugs 37, by which it is secured in place. A flanged neck 38 is secured to the lower part of casing 34, and to it the well 39 is secured, it being formed of casing 40 and head 41. The well will be provided with a water gage and discharge mechanism similar to that illustrated in Fig. 1; but it is deemed unnecessary to redraw them in this connection. The guide-plates 42 43 upon the sides of orifice 44 are constructed with baffle-plates 45 46, which project therefrom and abut at the center of the apparatus. Plate 42 has lugs 47 48 49, which reach out and are attached to the head 34, and plate 43 has corresponding lugs 50 51 52 reaching out and secured to head 35.

Figs. 4 and 5 illustrate a form adapted to be applied to horizontal pipes, but when it is desired or is necessary to couple to perpendicular pipes the form will be modified similar to the manner shown in Fig. 3, or pipes at an angle may be provided for with equal facility.

I claim—

1. In a separator a circular chamber elliptically formed as to its vertical cross-section having an inlet-pipe entering therein at one side of the circular wall, near its top and an outlet-pipe leading therefrom at the opposite side of the circular wall, near its top, the inlet-pipe passing within the chamber, clear of its walls and outwardly being curved at its inner end, near the center of the chamber with its orifice constructed and arranged to centrifugally discharge its contents toward the outer side of the circular-chamber case, substantially as set forth.

2. In a separator, a circular chamber elliptically formed as to its vertical cross-section having an inlet-pipe entering the circular side near its top therein, and an outlet-pipe leading therefrom at the opposite side, the inlet-pipe being curved at its delivery end, near the center of the chamber, and its orifice constructed and arranged to centrifugally discharge its contents between guiding-plates, disposed at each side to direct the discharge to the circular side of the chamber oppositely to the exit by the delivery-pipe, substantially as described.

3. In a separator, a circular chamber elliptically formed as to its vertical cross-section, having a single curved inlet-pipe entering the chamber through its curved wall and arranged to centrifugally discharge its contents near the chamber's center, an outlet-pipe leading from the curved wall of the chamber oppositely to the inlet-pipe, and a well opening into the chamber and connected thereto by a neck smaller than the well and adapted to receive liquid deposit therefrom, substantially as described.

4. In a separator, a circular chamber elliptically formed as to its vertical cross-section having an outlet-pipe, having spaces between its exterior and the interior of the chamber and an inlet-pipe curved at its inner end for centrifugal discharge and guiding-plates supported at opposite sides of the inlet-pipe orifice substantially to each other, and to the elliptic sides of the chamber, and adapted to guide the discharge outward to the lower circular sides of the chamber and thereafter form passages between the outer sides and

the elliptic sides of the chamber for the passing of the dry part of the discharge to the delivery-pipe, substantially as described.

5. In a separator, a circular chamber elliptically formed as to its vertical cross-section, having an inlet-pipe entering the chamber, and an outlet-pipe, the inlet-pipe attached thereto entering to about the center of the chamber and having an orifice near the center of the chamber constructed and adapted to cause a centrifugal discharge, guide-plates at the sides of the orifice and baffle-plates supported thereon and between and so disposed as to intercept, divide and scatter the discharge from the inlet-pipe orifice, substantially as set forth.

6. In a separator, a circular chamber elliptically formed as to its vertical cross-section, an inlet-pipe within the chamber, and an outlet-pipe from the chamber, the inlet-pipe having a centrifugal discharge, and intercepting-ribs within the casing, and secured thereto at their ends and one edge and adapted to intercept any liquid carried by the flow of the steam or vapor upon the interior of the casing in the direction of the delivery-pipe, substantially as described.

7. In a separator having a chamber, an outlet-pipe and a centrifugally-discharging inlet-pipe, a depending well having means thereon and thereto connected to indicate by a glass tube the amount of deposit within the well, substantially as described.

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

WILLIAM C. JENNINGS.

Witnesses:
R. C. WRIGHT,
J. WALTER ZEBLEY.