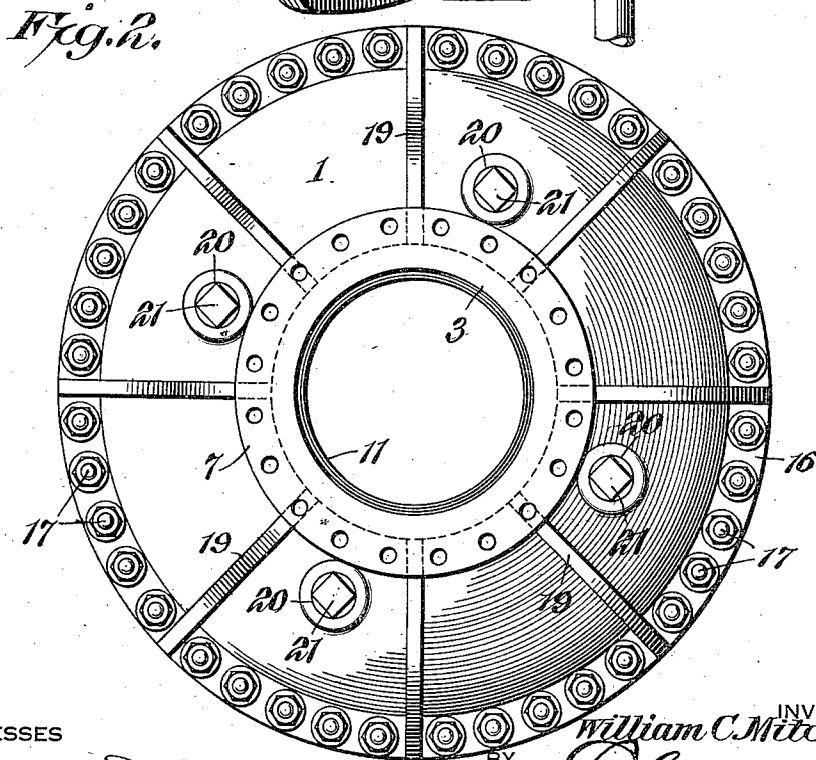
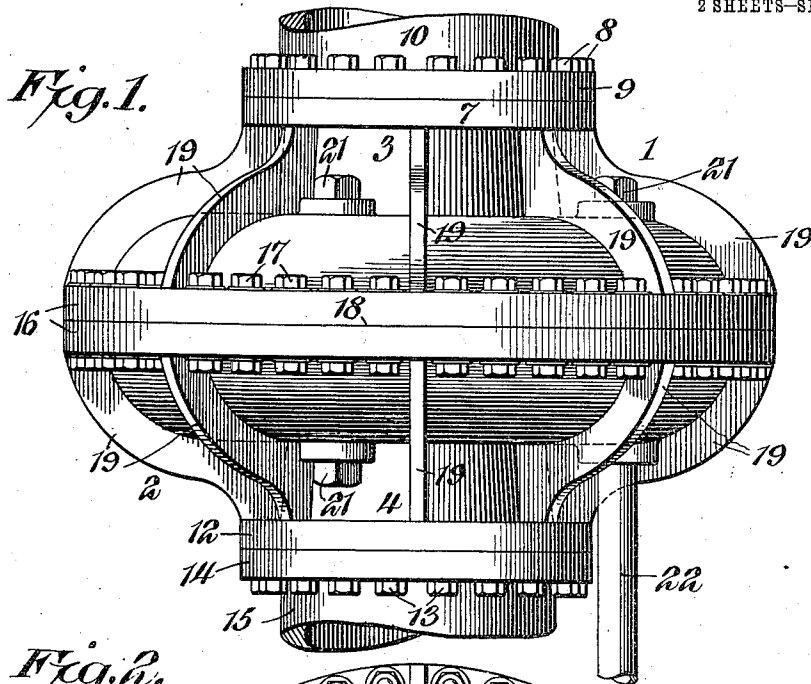


W. C. MITCHELL.  
STEAM SEPARATOR.  
APPLICATION FILED NOV. 14, 1910.

1,013,677.

Patented Jan. 2, 1912.

2 SHEETS—SHEET 1.



WITNESSES

*Howard D. Ott.*  
*H. J. Riley*

BY

INVENTOR,  
*William C. Mitchell,*  
*E. J. Siggers.*

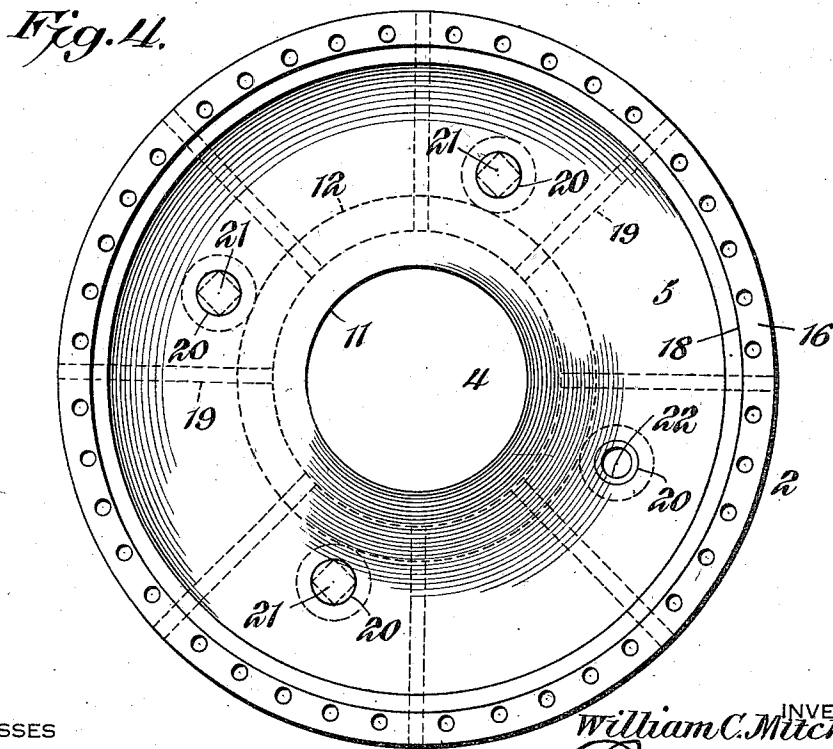
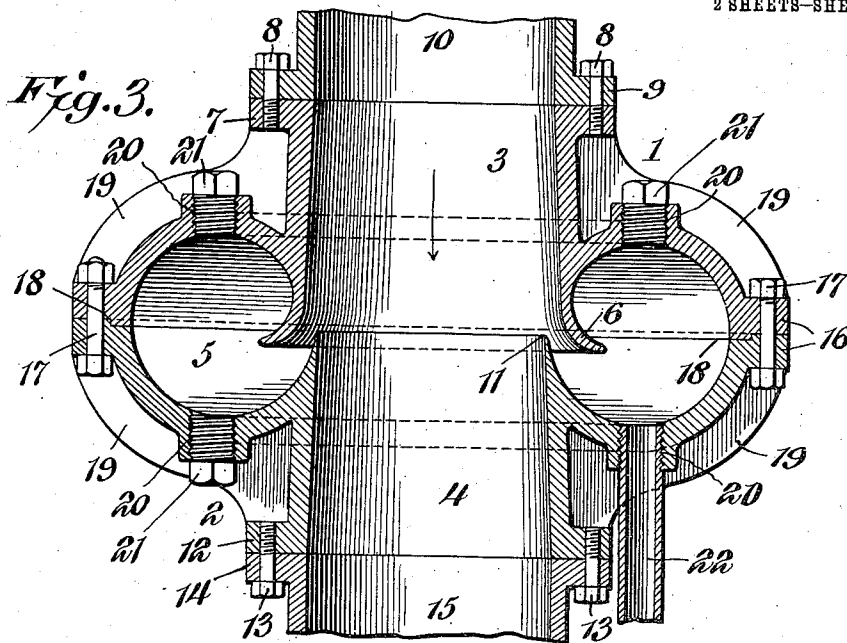
ATTORNEY

W. C. MITCHELL.  
STEAM SEPARATOR.  
APPLICATION FILED NOV. 14, 1910.

1,013,677.

Patented Jan. 2, 1912.

2 SHEETS—SHEET 2.



WITNESSES

*Howard D. Cox*  
*H. J. Riley*

BY

*William C. Mitchell* INVENTOR  
*E. J. Siggers*

ATTORNEY

# UNITED STATES PATENT OFFICE.

WILLIAM C. MITCHELL, OF SYDNEY, NOVA SCOTIA, CANADA.

## STEAM-SEPARATOR.

1,013,677.

Specification of Letters Patent.

Patented Jan. 2, 1912.

Application filed November 14, 1910. Serial No. 592,247.

*To all whom it may concern:*

Be it known that I, WILLIAM C. MITCHELL, a citizen of the United States, residing at Sydney, in the county of Cape Breton and Province of Nova Scotia, Canada, have invented a new and useful Steam-Separator, of which the following is a specification.

The invention relates to improvements in steam separators.

10 The object of the present invention is to improve the construction of steam separators, and to provide a simple, inexpensive and efficient steam separator, designed for separating water and oil from steam, and adapted to operate equally well in a vertical, horizontal or inclined position and when the flow of the steam is either up or down.

15 With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

20 In the drawings:—Figure 1 is a side elevation of a steam separator, constructed in accordance with this invention. Fig. 2 is a plan view of the same. Fig. 3 is a central vertical sectional view. Fig. 4 is a plan view of the lower section of the steam separator.

25 Like numerals of reference designate corresponding parts in all the figures of the drawings.

30 In the embodiment of the invention illustrated in the accompanying drawings, the steam separator, which is made in two sections, is divided horizontally at its center, forming upper and lower sections 1 and 2, but it may be constructed in any other preferred manner in either one or more pieces and with the sections arranged either vertically or horizontally when composed of sections. The steam separator consists of

an inlet tube 3, an outlet tube 4, and an annular tubular or cylindrical chamber 5, surrounding the inner end of the steam inlet and outlet tubes and connecting the same. The steam inlet tube tapers toward its outer end, and it gradually increases in diameter from its outer to its inner end, which is provided with a curved flaring annular flange 6, outwardly turned and extending into the annular chamber 5 and forming a trough or baffle for retaining the liquid contents of the chamber within the same and for directing the oil or water to the bottom of the chamber, when the device is arranged in a horizontal position. The outer end of the steam inlet tube is provided with an outwardly extending annular attaching flange 7, adapted to be secured by screws 8, or other suitable fastening means to a corresponding flange 9 of a steam pipe 10.

35 The steam outlet pipe 4, which is arranged in alinement with the steam inlet tube, tapers toward its inner end 11 and gradually increases in diameter from its inner end to its outer end. The inlet end of the steam outlet tube is of less diameter than the inner end of the steam inlet tube, and it extends into the same and is arranged concentric with and is spaced from the inner face of the steam inlet tube to provide an inclined annular passage or entrance to the chamber 5. The steam flows through the device in the direction of the arrow in Fig. 3 of the drawings, and as is a well known fact, the water and oil follows or flows along the inner face of the steam inlet tube 3 and is thereby trapped into the chamber 5. The flaring annular flange 6, which is of greater diameter than the inner end 11 of the steam outlet tube 4, is arranged in spaced overlapping relation with the same, and the steam outlet tube is tapered in thickness at its inner end, and the exterior of the inner end of the steam outlet tube is curved and is spaced from the inner face of the flaring flange 6. Cross sectionally the inner face of the annular chamber 5 is made slightly spiral by the curved annular flange 6, and if the force of the trapped liquid should cause the same to flow upward along

the outer wall of the annular chamber and upwardly across the top thereof, the flaring flange will prevent the escape of any of the liquid and direct the same into the bottom of the annular chamber and away from the entrance to keep the latter clear. Also the curved wall of the annular cylindrical or tubular chamber with the curved annular flange will produce a whirling motion of the trapped water, and will thereby prevent blocking or choking the chamber, which would otherwise result especially when the steam is carried a considerable distance through pipes and there is more or less condensation.

The trapping action of the device is effected when the device is arranged in any position, either vertical, horizontal or inclined, it being only necessary to arrange the inlet tube of the device in position to receive the steam as the same flows into the separator. The lower or outer end of the outlet tube is provided with an outwardly extending annular attaching flange 12, which is secured by screws 13 to a similar flange 14 of a steam pipe 15.

The upper and lower sections 1 and 2 are provided at the center of the outer wall of the annular chamber with outwardly extending annular attaching flanges 16, which are perforated at intervals for the reception of bolts 17, or other suitable fastening devices for securing the sections together. The meeting faces of the upper and lower sections are preferably recessed to form a joint 18, and a suitable gasket or packing may be interposed between the sections if desired. The sections are preferably reinforced at intervals by exterior longitudinal ribs or flanges 19, extending from the annular flanges 16 at the inner ends of the sections to the flanges 7 and 12 of the outer ends thereof. The annular chamber is provided in its top and bottom walls with upper and lower openings 20, threaded to receive screw plugs 21, or other suitable closures and adapted to permit a drain pipe 22 to be connected at a convenient point with the chamber for drawing off the liquid contents thereof. Any number of openings may be provided and they may be arranged at any desired point.

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

1. A steam separator including a steam inlet tube having a flared edge at its inner end, a steam outlet tube having its inner end smaller than and extending into the inner end of the inlet tube and projecting beyond the flared edge thereof, the inner side of the inlet tube and the outer side of the outlet tube being spaced apart at their ends to form an inclined passage for the water

or oil, and an exterior annular chamber connecting the inlet and outlet tubes and surrounding the inner ends of the same and adapted to collect the oil or water.

2. A steam separator including a steam inlet tube, a steam outlet tube having its inner end extended into the inner end of the inlet tube and spaced from the inner face of the inlet tube to provide a passage, and an exterior annular cylindrical chamber extending around the inner ends of the said tubes and connecting the same, the inner end of the inlet tube being provided with a flared annular edge extending into the said chamber and cooperating with the same to form a spiral, which is adapted to produce a whirling action of the water or oil within the chamber, direct the same from the inlet so as to keep the latter clear and prevent choking the chamber.

3. A steam separator including a steam inlet tube having a flared outwardly turned inner end, a steam outlet tube having its inner end smaller than and extending into the inner end of the inlet tube and spaced therefrom to provide an inclined passage for the oil or water, and an exterior annular cylindrical chamber extending around and connecting the inner ends of the said tubes, the said flared end projecting within the chamber and cooperating with the adjacent portion of the chamber to form a trough when the steam separator is in a horizontal position.

4. A steam separator including a steam inlet tube, a steam outlet tube having its inner end of less diameter than the inlet tube and arranged concentric with and spaced from the inner end of the inlet tube and forming an annular space or passage, and a chamber arranged exteriorly of and surrounding the inner ends of the said tubes, the inner end of the outlet tube being tapered in thickness and presenting a sharp edge to the flow of the steam and the inner end of the inlet tube being provided with a curved annular flange extending into the chamber in spaced overlapping relation with the tapered portion of the outlet tube.

5. A steam separator including a steam inlet tube having a flared edge at its inner end presenting curved inner and outer faces, a steam outlet tube having its inner end smaller than and extending into the inner end of the inlet tube and projecting beyond the flared edge thereof and tapered in thickness and presenting a curved outer face, which is spaced from the curved inner face of the said flared edge of the inlet tube to form a passage, and an exterior annular tubular chamber connecting the inlet and outlet tubes and surrounding the inner ends of the same and the said flared edge, which projects into the said chamber, the flared edge

and the walls of the chamber forming a spiral and adapted to produce a whirling action of the water or oil within the chamber to direct the same from the inlet to  
5 keep the latter clear and prevent choking the chamber.

In testimony, that I claim the foregoing

as my own, I have hereto affixed my signature in the presence of two witnesses.

WILLIAM C. MITCHELL.

Witnesses:

J. A. McLELLAN,

A. M. MACKENZIE.

---

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

---