J. E. DUNN.

STEAM SEPARATOR.

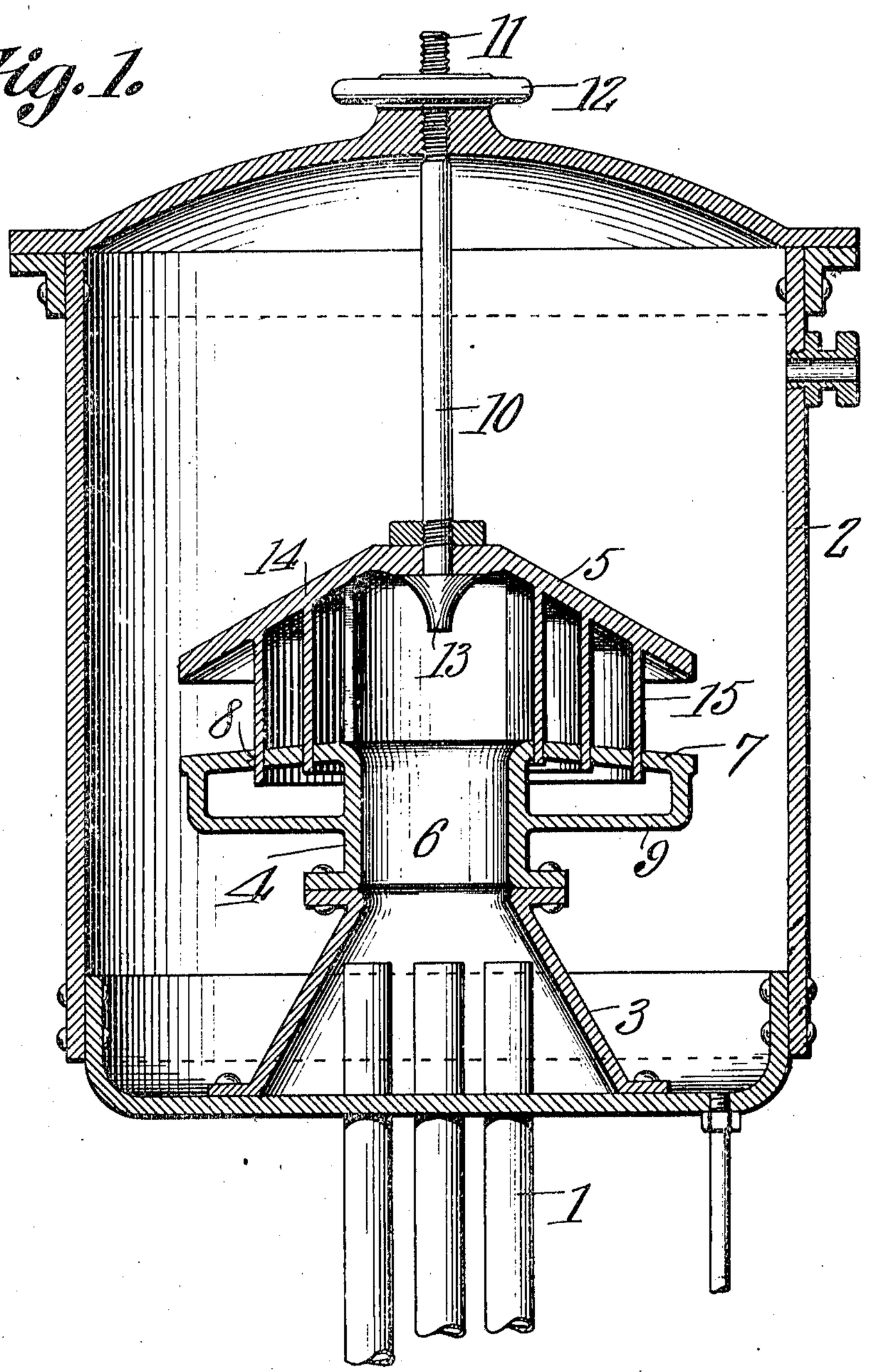
APPLICATION FILED MAY 23, 1910.

970,477.

Patented Sept. 20, 1910

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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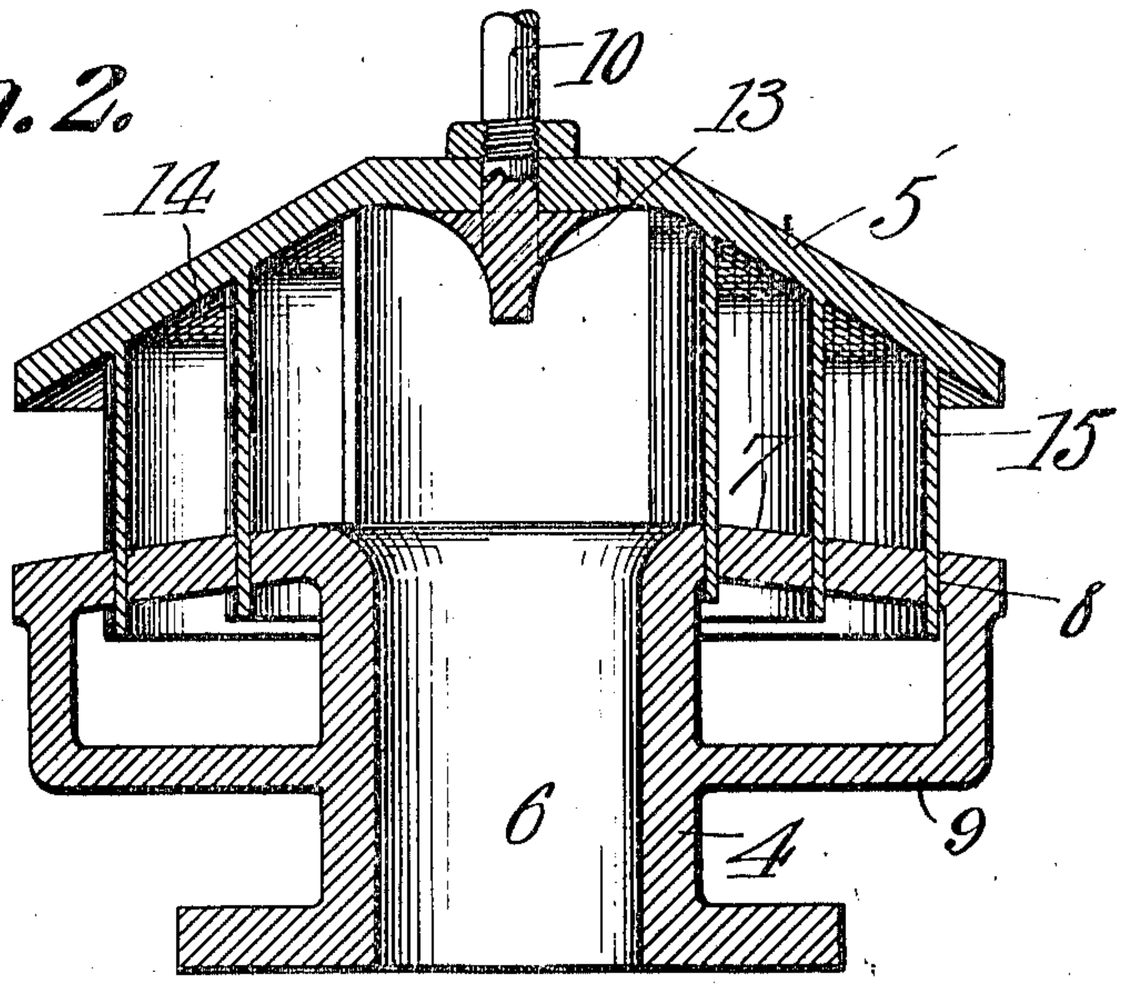
2 SHEETS—SHEET 2.

Fig. 2.



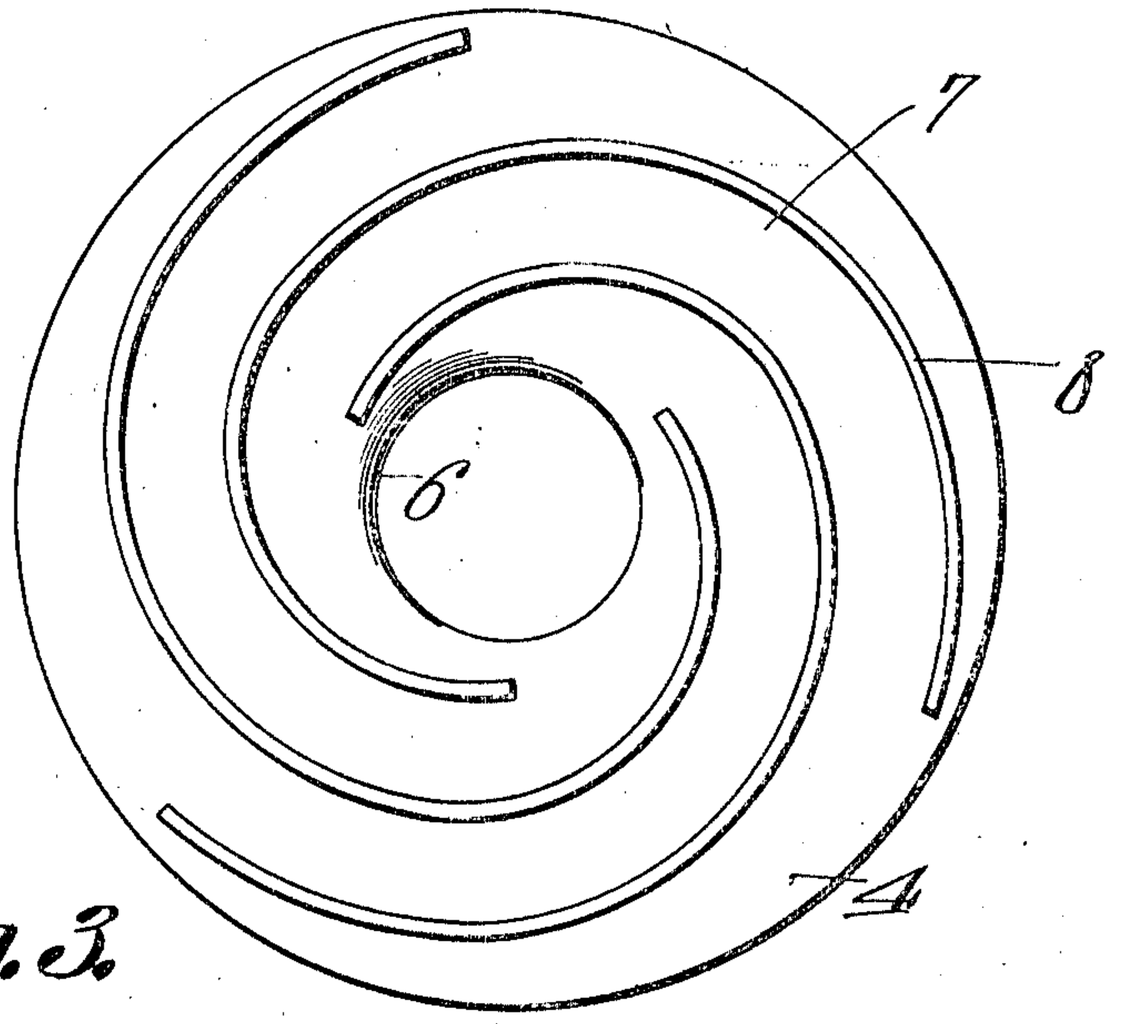


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOSEPH E. DUNN, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-SEPARATOR.

970,477. Specification of Letters Patent. Patented Sept. 20, 1910.

Application filed May 23, 1910. Serial No. 562,993.

To all whom it may concern:

Be it known that I, JOSEPH E. DUNN, a subject of the King of England, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Steam-Separator, of which the following is a specification.

This invention has relation to steam separators and it consists in the novel construction and arrangement of its parts as hereinafter shown and described.

The object of the invention is to provide a simple means for accomplishing the separation of steam from moisture which is usually contained therein in the form of bubbles and the device is especially designed to be used in connection with evaporators, vacuum pans, steam boilers and other devices wherein it is desirable to effect a separation of the moisture or liquid from the steam or vapor.

A further object of the invention is to provide in a steam separator a separator chamber with mechanism in said separator chamber for dividing and imparting a rotary or centrifugal movement to liquid and vapor passing therethrough. Said mechanism comprising spiral channels or passages and means whereby the cross sectional area of the said passages may be varied to meet and compensate for different volumes and pressures.

In the accompanying drawings:—Figure 1 is a vertical sectional view of the separator in the steam receptacle. Fig. 2 is a vertical sectional view of the separator proper. Fig. 3 is a top plan view of the lower member of the separator.

As illustrated in the accompanying drawings, 1 represents the evaporating tubes of an evaporator and 2 the receptacle into which they discharge. Upon the bottom of the receptacle 2 is mounted a hollow stand 3 which receives the discharge ends of the tubes 1.

The steam separator includes a base member 4 and a top member 5. The base member 4 is mounted upon the upper end of the stand 3 and is provided with a central opening 6 and an annular inclined ledge portion 7 having spiral openings 8. The ledge portion 7 has formed therein a compartment by an underlying trough 9 which in the present instance is formed integral with the member 4 and the ledge portion 7 thereof. The openings 8 lead into the compartment just above referred to.

The top member 5 is supported by a rod 10 which passes vertically through the top of the receptacle 2 and is threaded at its upper end as at 11 and upon which is screwed a hand wheel 12 which in turn bears against the upper surface of the top of the said receptacle 2. At the lower end of the rod 10 is fashioned or supported a cone 13 which is concentrically positioned with relation to the opening 6 through the base member 4 and the top member 5 is located just above the said cone 13. The top member 5 is provided with an annular downwardly inclined flange portion 14 the outer edge portion of which is nearer the outer edge portion of the ledge 7 than the intermediate portion is from the intermediate portion of the said ledge 7. The member 5 is provided upon its under side with spirally disposed vanes or partitions 15 the lower portions of which project through the openings 8 in the ledge 7 of the member 4. The vanes 15 are spaced from each other throughout their entire length and consequently there is sufficient area provided between these vanes to form passages to permit the escape of steam between the members 4 and 5 of the separator.

The operation of the separator is as follows: The moisture laden steam enters the tank 2 through the tubes 1 and passes up through the opening 6 of the separator member 4. The steam then passes laterally through the spaces between the vanes 15 and in a slightly downward direction between the inclined parts 7 and 14. As the steam passes between the members 4 and 5 as indicated it is split or divided by the vanes 15 into several streams and the said streams are directed in spiral courses downwardly disposed toward the outer edges of the members 4 and 5. This has the effect of scrubbing the bubbles of moisture carried by the steam against the sides of the vanes and the opposed surfaces of the portions 7 and 14 of the members 4 and 5 and consequently the said bubbles are ruptured and reduced to drops which precipitate upon the bottom of the receptacle 2 while the separated steam is free to rise. Upon any variation in the pressure the member 5 is adjusted with relation to the member 4 by manipulating the hand wheel 12 so that the transverse sectional

area of the passages between the vanes 15 may be increased or diminished to compensate for such variation and effect a uniform steam separation. The first moisture that collects upon the portion 7 of the member 4 and the sides of the vanes 15 will run down through the openings 8 and collect in the trough 9 until the said trough is filled and the lower ends of the vanes 15 are surrounded by the liquid which forms a seal about the openings 8. After this has taken place all of the moisture and steam which is admitted between the vanes 15 is compelled to traverse the entire length of the passages formed by the said vanes and thus the steam and moisture are subjected to the centrifugal action along the said courses.

Having described the invention what I claim as new and desire to secure by Letters Patent is:

1. A steam separator comprising spaced members one of which is provided with spirally disposed openings, the other member having spirally disposed vanes which enter said spiral openings, means for admitting steam between the members, and means for effecting adjustment between the members to vary the transverse sectional area of the passages between the vanes.

2. A steam separator comprising spaced members, spirally disposed vanes located between the members and dividing the intervening space into steam passages, and means for varying the transverse sectional areas of the steam passages between the vanes.

3. A steam separator comprising relatively movable members one of which is provided with spirally disposed openings, the other member having spirally disposed vanes which enter said spirally disposed openings, and a trough located upon that member having the spirally disposed openings, said trough forming an inclosure about the openings.

4. A steam separator comprising a receptacle, a separator proper located therein, and including members spaced from each other, means for adjusting the members with relation to each other, one member having a series of openings, and the other member having a series of vanes which fit snugly in said openings.

5. A steam separator comprising relatively movable members, one member having an annular peripheral portion provided with openings, and a trough extending from the outer portion of the annular portion to the intermediate portion of the member, and the other member having a series of spirally disposed vanes which fit snugly in said openings.

6. A steam separator comprising a receptacle, spaced members located in the receptacle, spirally disposed vanes located between said members and forming passages, and means for varying the transverse sectional area of the said passages.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOSEPH E. DUNN.

Witnesses:
MILTON WOLF,
FRED J. WIEDMANN.