

No. 856,551.

PATENTED JUNE 11, 1907.

J. F. SENTER.
SEPARATOR.

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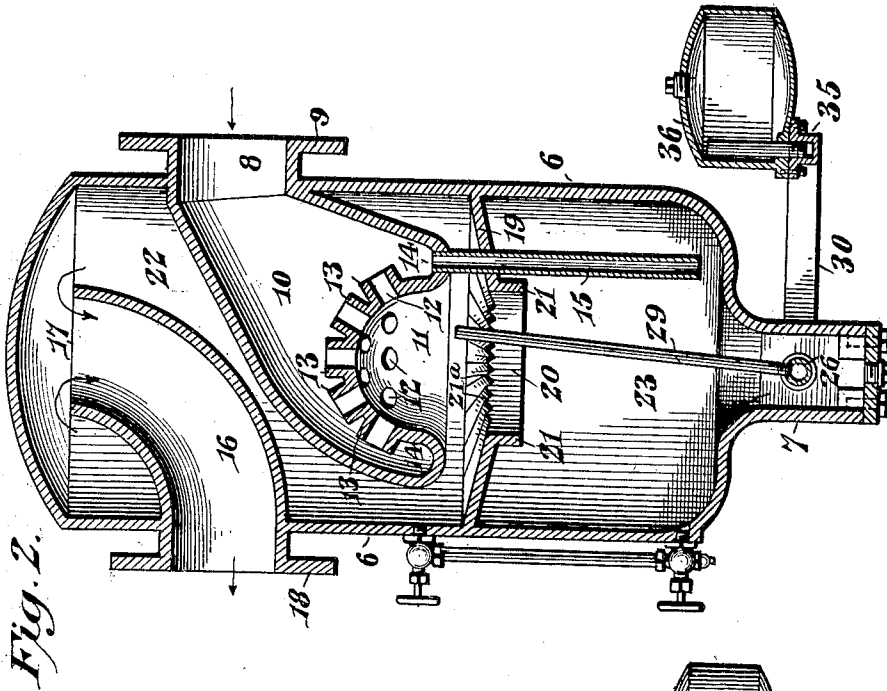


Fig. 2.

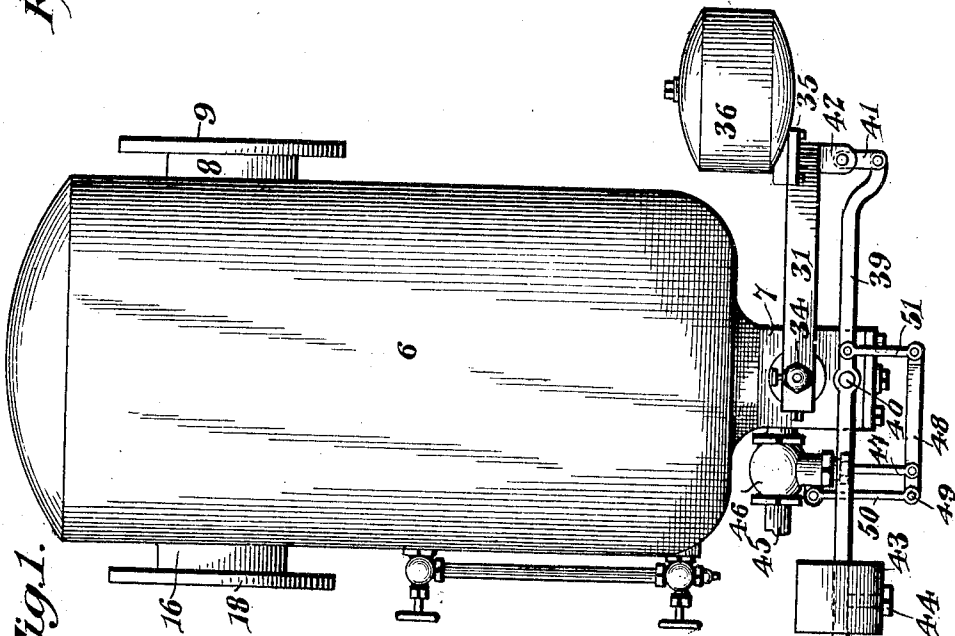


Fig. 1.

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SEPARATOR.

No. 856,551.

Specification of Letters Patent.

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Application filed March 16, 1906. Serial No. 306,361.

To all whom it may concern:

Be it known that I, JOHN F. SENTER, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented a new and useful Separator, of which the following is a specification.

This invention relates more particularly to means for separating moisture, grease and the like from steam, but is not limited to these particular uses as the same may be successfully employed in other relations.

One of the principal objects is to provide novel and efficient means for effecting the thorough separation of moisture and the like from steam, and the conveyance of the former away from the path of travel of the latter, so that the chance of the steam again taking up the moisture is reduced to a minimum.

Another and important object is to provide mechanism of a simple, novel and advantageous nature for automatically effecting the discharge of the accumulated liquid when the same reaches a predetermined amount, which amount may be readily regulated as found convenient, desirable, or necessary.

The preferred, but not the only embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the mechanism. Fig. 2 is a vertical sectional view through the same.

In the particular embodiment disclosed, a casing is provided, which is preferably, though not necessarily, in the form of an upright cylinder 6, having a depending portion 7 of less diameter than the main body of the cylinder and angular in cross section. A supply conduit 8 projects horizontally through one side of the upper portion of the cylinder, being provided with an exteriorly projecting flanged coupling 9 and an inwardly projecting discharge nozzle 10, which nozzle is offset and extends downwardly, being preferably flared, as shown in Fig. 2. The nozzle is provided with an end wall 11 that is inwardly dished or concaved, and said end wall has a series of outlet openings 12. Each outlet opening is surrounded by a nipple 13, and said nipples extend rearwardly into the nozzle, being radially disposed, and conse-

quently spaced apart. The particular formation of the nozzle and end wall forms an annular moisture-conducting channel 14 that surrounds the nipples, and communicating therewith is a depending drain pipe 15 extending into the lower portion of the casing. An outlet conduit 16 in substantially the form of an elbow has an inlet end 17 that projects toward the upper end of the casing or in an opposite direction to the discharge nozzle 10 that projects toward the lower end of said casing. The inlet 17 is located above the discharge nozzle and in line therewith. The outlet end of the conduit projects through the opposite side of the casing 6 to the inlet 8, and is in substantial alignment therewith, as shown in Fig. 1. Said outlet is provided with a suitable coupling flange 18.

Arranged directly below the discharge end of the nozzle 10 and in an intermediate portion of the casing is an apron 19 that is in the form of a partition, said apron inclining downwardly and centrally to a central opening 20, surrounded by a depending flange 21. The opening 20 is of greater diameter than the inlet end of the conduit, and the upper surface of the apron is radially fluted to provide downwardly extending channels 21^a that lead to said central opening. As a result, the said apron divides the interior of the casing into an upper steam or separating chamber 22, and a lower liquid reservoir 23, the drain pipe 15 from the nozzle extending through the apron and communicating with the lower portion of the reservoir 23 at one side of and above the depending angular portion 7 of said casing. With this structure, it will be apparent that the steam and moisture entering through the conduit will pass into the discharge nozzle 10 and the heavier moisture will be thrown against the inwardly extending end wall 11 of the nozzle, while the steam will pass through the openings 12, and passing over the apron 19, upwardly, will enter the discharge conduit 16. Because of the inwardly extending nipples 13, the collected moisture, grease, and the like cannot pass through the end wall 11 with the steam, but will trickle down the walls of the nozzle and escape through the drain pipe 15 into the reservoir 23. Because of the comparatively large area of the opening 20, there is no par-

tical current of steam passing therethrough, and consequently little liability of the steam that is passed through the nozzle taking up and carrying off the water in the reservoir. Therefore the steam, which discharges from the casing, is practically dry.

Mechanism is provided for periodically effecting the discharge of the accumulated liquid in the reservoir portion 23. This mechanism is covered by claims in co-pending application, Serial No. 306,362, and consequently no specific claims are made to the same herein. So far as the structure is concerned, it may be stated that an outlet pipe 45 is employed, in which is located a controlling valve 46. A gravity tank 36 has steam and liquid communication with the interior of the casing 6 through swinging arms 30 and 31, and this tank is connected to a lever 39 having a counterweight 43 thereon. The lever 39 has a link connection 51 with another lever 48, fulcrumed at one end, and as shown at 49 to a link 50. The stem 47 of the valve 46 is connected to the lever 45. With this structure, as the water accumulates in the reservoir portion 23, it will flow into the gravity tank 46, and when the weight of said tank overbalances the weight 43 the lever 29 will be swung, thereby operating the lever 36 and opening the valve 36, permitting the discharge of the water from the separator and from the tank 36. Thus said tank becomes lighter and the weight 43 will overbalance it, returning it to its original position and operating the valve 46 to cut off the discharge through the pipe 45.

From the foregoing, it is thought that the construction, operation, and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In a separator of the class described, the combination with a casing, of a supply conduit extending into the casing and having a discharge nozzle located within and inclosed by the casing, said nozzle having an outlet opening within the casing, and a rearwardly extending nipple surrounding the opening and located within the casing.

2. In a separator of the class described, the combination with a casing, of a supply conduit extending into the casing and having a discharge nozzle located within and inclosed by the casing, said nozzle having an outlet opening within the casing, a rearwardly extending nipple surrounding the opening and located within the casing, and a liquid drain

communicating with the interior of the nozzle.

3. In a separator of the class described, the combination with a casing, of a supply conduit extending into the casing and having a discharge nozzle located within and inclosed by the casing, said nozzle having a plurality of outlet openings within the casing, and a plurality of rearwardly extending nipples surrounding the openings and located within the casing.

4. In a separator of the class described, the combination with a casing, of a supply conduit extending into the casing and having a discharge nozzle located within and inclosed by the casing, said nozzle having a plurality of outlet openings within the casing, a plurality of rearwardly extending nipples surrounding the openings and located within the casing, and a liquid drain pipe communicating with the interior of the nozzle within the casing and discharging into the lower portion of said casing.

5. In a separator of the class described, the combination with a casing, of a nozzle located within and inclosed by the casing, said nozzle extending downwardly and having openings in its lower wall, the nozzle furthermore having a channel surrounding the openings, and a drain pipe communicating with the channel and discharging into the casing.

6. In a separator of the class described, the combination with a casing, of a supply conduit extending into the casing at one side and having a downwardly extending flared nozzle, said nozzle being provided in its lower wall with a plurality of openings, and a channel surrounding the openings, rearwardly extending nipples each surrounding an opening and located within the nozzle, a depending drain pipe communicating with the channel and having its lower end disposed within the lower portion of the casing, and an outlet conduit having an inlet end arranged within the casing above the nozzle.

7. In a separator of the class described, the combination with a casing, of a discharge nozzle located within and surrounded by the casing, said nozzle having an inwardly dished end wall provided with an outlet opening.

8. In a separator of the character described, a discharge nozzle having an inwardly dished end wall provided with a series of outlet openings.

9. In a separator of the character described, a discharge nozzle having an inwardly dished end wall provided with a series of outlet openings, and nipples surrounding the openings and projecting rearwardly within the nozzle.

10. In a separator of the character described, the combination with a casing having an outlet, of a supply conduit connected to the casing and having a discharge nozzle projecting thereinto, said nozzle having an

inwardly dished end wall provided with a series of outlet openings, nipples carried by the end wall, said nipples surrounding the openings and extending inwardly within the nozzle, and a drain outlet communicating with the interior of the nozzle at one side of the nipples.

11. In a separator of the character described, the combination with a casing, of an outlet conduit communicating with one portion thereof, and a supply conduit having a discharge nozzle projecting into the casing and having its inner end inwardly concaved and provided with outlet openings.

12. In a separator of the character described, the combination with a casing, of an outlet conduit extending into the casing from one side and having an inlet end projecting toward one end of said casing, a supply conduit extending into the opposite side of the casing and having a discharge nozzle projecting toward the other end of the same, said nozzle being provided with an inwardly dished end wall having openings therethrough, nipples surrounding the openings and projecting rearwardly within the nozzle, and a drain outlet communicating with the interior of the nozzle at one side of the nipples and with the interior of the casing.

13. In a separator of the character described, the combination with a casing, of a supply conduit having a downwardly extending discharge nozzle located within the casing and provided with an upwardly dished end wall having openings, nipples surrounding the openings and projecting rearwardly within the nozzle, a depending drain pipe connected to the nozzle and having a discharge end disposed in the lower portion of the casing, and an outlet conduit having an inlet end arranged within the casing above the nozzle.

14. In a separator of the class described, the combination with a casing, of an inclined apron located in an intermediate portion of the casing and forming an upper separating compartment, and a lower liquid reservoir, separating means located in the compartment and including a discharge nozzle, and a drain pipe extending from the nozzle downwardly through the apron into the reservoir.

15. In a separator of the class described, the combination with a casing, of a downwardly inclined apron located in an intermediate portion of the casing and forming an upper separating compartment, and a lower liquid reservoir, said apron having a central opening, a nozzle projecting into the upper portion of the reservoir above the opening, and liquid conducting means leading from the interior of the nozzle downwardly through the apron at one side of the central opening.

16. In a separator of the character described, the combination with a casing, of an apron arranged across an intermediate portion of the same and having a central opening, said apron having channels in its upper side leading to the opening, a supply conduit having a discharge nozzle arranged over the apron, said nozzle being provided with an end wall having an inwardly dished portion provided with openings, and nipples surrounding the same, a drain pipe connected to the nozzle and extending through the apron, and an outlet conduit having an inlet end arranged within the casing.

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

JOHN F. SENTER.

Witnesses:

A. H. CHAPMAN,
A. B. JOHNSON.