J. E. SHARP.

STEAM SEPAPATING APPARATUS.

APPLICATION FILED APR. 16, 1917.

1,284,793.

Patented Nov. 12, 1918.

2 SHEETS—SHEET 1.

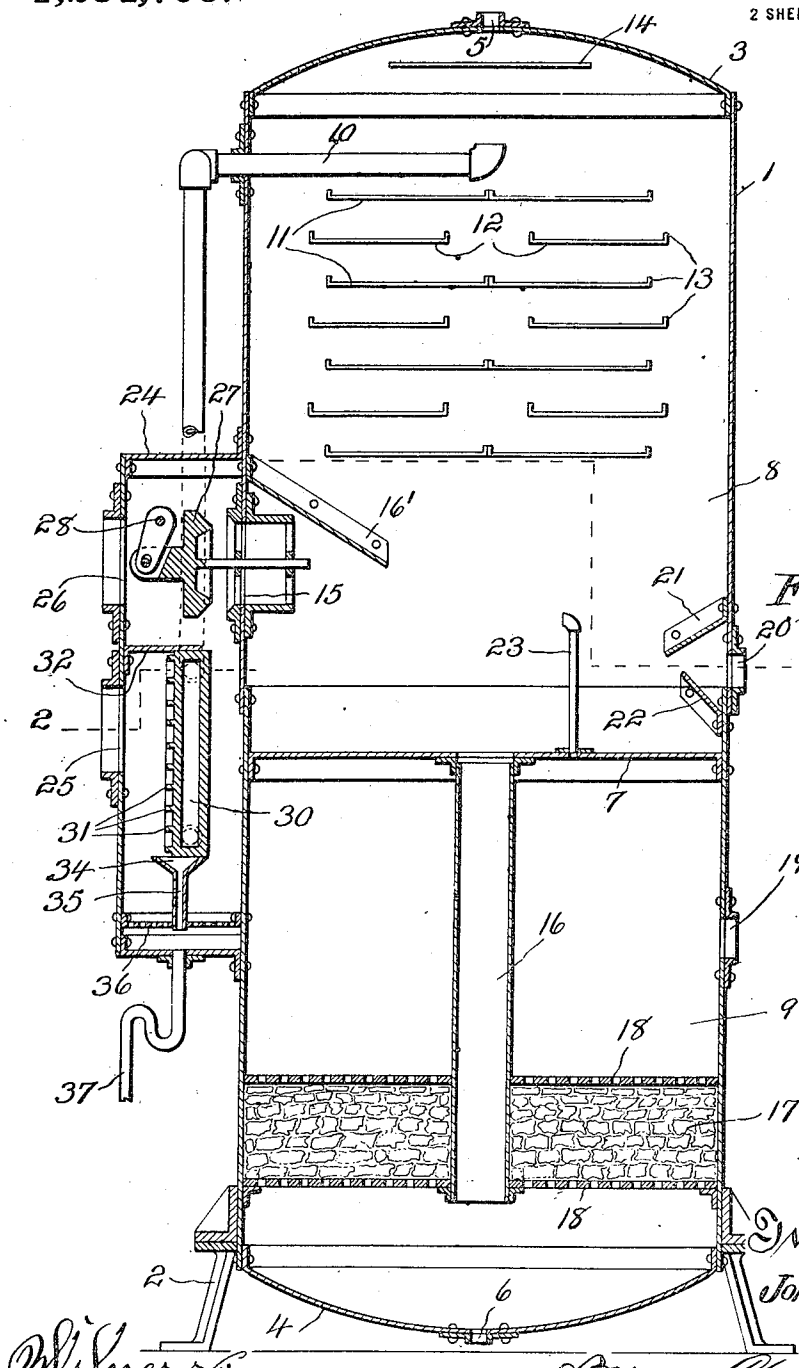


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

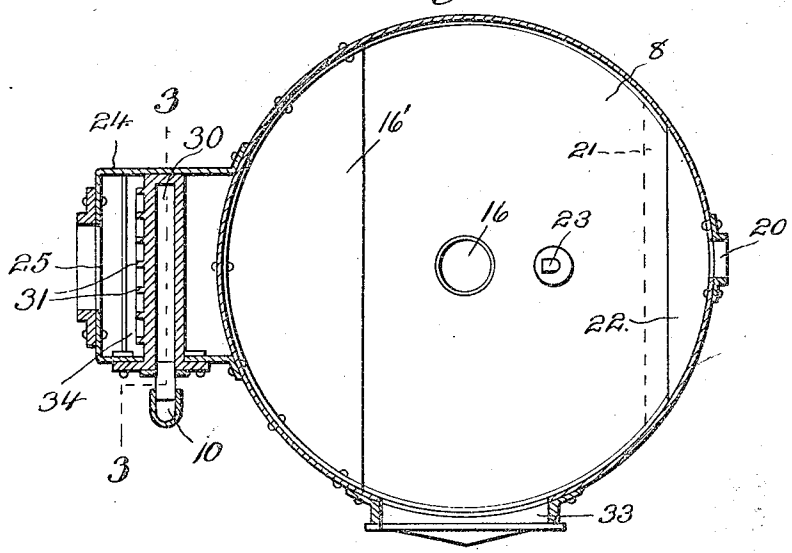
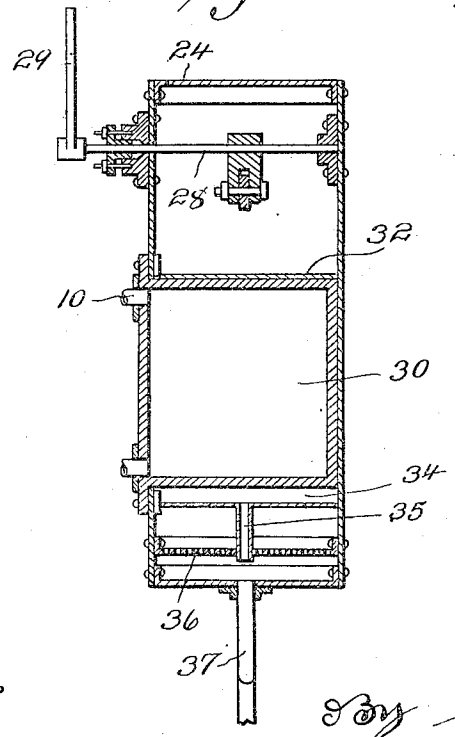


Fig. 3.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN E. SHARP, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO MILWAUKEE RELIANCE BOILER WORKS, OF MILWAUKEE, WISCONSIN.

STEAM-SEPARATING APPARATUS.

1,284,793. Specification of Letters Patent. Patented Nov. 12, 1918.

Application filed April 16, 1917. Serial No. 162,303.

To all whom it may concern:

Be it known that I, JOHN E. SHARP, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Steam-Separating Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof.

My present invention relates to new and useful improvements in attachments for feed water heaters, more particularly to steam separators therefor.

One object of this invention is to provide means in connection with a feed water heater to effectively remove oil and other extraneous matters from the steam before it comes into contact with the feed water. This means is also adapted for imparting a preliminary heating to the feed water before it enters the heater proper.

Another important object is to provide a supplemental steam chamber in addition to a feed water heater and which is connected to the latter by a valved passage-way, whereby the steam may be directed to either the main heater or to an atmospheric outlet.

With these and several other objects and advantages in view the invention resides in the novel features of construction, combination and arrangement of parts which will be hereinafter more particularly described, claimed, and shown in the drawings, wherein:

Figure 1 is a central vertical section through a feed water heater and steam separator constructed in accordance with my invention, certain parts connected therewith also being in section;

Fig. 2 is a horizontal section taken substantially on the plane of the line 2—2 of Fig. 1; and

Fig. 3 is a detail vertical section on the plane of the line 3—3 of Fig. 2.

The feed water heater proper to which my invention is applied consists of a casing 1 preferably cylindrical in cross-section and relatively elongated, said casing being disposed vertically and supported upon suitable legs 2. The top 3 and the bottom 4 are preferably concavo-convex with the convex sides outwardly, and the top is provided with a steam outlet 5, while the bottom has a drain 6.

A feed water pipe 10 enters the chamber 8 adjacent its top, and the water from this pipe flows therefrom on to a plurality of vertically spaced baffle plates 11 and 12.

A plate 14 in the top of the chamber 8 over the outlet from the pipe 10 serves as a shield to prevent the water from being discharged through the outlet 5 and also to direct such water downwardly.

The incoming exhaust steam from an engine enters the casing 1 through an opening 15 in the wall thereof below the baffle plates 11 and 12 and is deflected downwardly by a deflector plate, 16^1 so that it will strike any water in the casing before rising to the top thereof and circulating between the various baffle plates and through the water thrown therefrom. Thus a portion of the heat of the steam is imparted to the water in the lower part of the casing so that by the time it reaches the top thereof it will be ready to condense. The foregoing features form no part of the present invention and are described merely to show upon what manner of apparatus my improvements are preferably placed.

A supplemental heating and steam separating compartment 24 is secured to the wall of the casing 1 over the opening 15 therein, and the steam which passes through said opening enters this compartment through an inlet 25 adjacent the lower end thereof and at a point below the opening 15. The same wall of the compartment in which the inlet opening 25 is formed is also provided with an outlet opening 26 disposed substantially in alinement with the inlet 15 and therefore above the opening 25. A valve 27 is disposed in the compartment 24 and is adapted to close the opening 15 between said compartment and the casing 1, a valve seat surrounding said opening to receive the same. The opening and closing of this valve 27 is directed by means of a rock shaft and lever 28 and 29 respectively.

Also disposed in the compartment 24 is a substantially rectangular condensing plate 30, the same being positioned in the lower portion thereof and extended in a vertical position from one side wall to the other of the compartment and parallel to the wall in which the openings 25 and 26 are formed. The top and bottom of this plate are spaced respectively from the top and bottom of the compartment and the outer face is so posi-

tioned that exhaust steam which enters the opening 25 will impinge thereon, said outer face being formed with a number of cooling flanges 31. This condensing plate is also hollow and the feed water passes through the same on its way to the upper portion of the casing 1, said pipe 10 being connected thereto as shown in Fig. 2.

The steam as it enters the compartment 24 is directed beneath the bottom of the plate 30 and around the rear surface of said plate into the opening 15 by a baffle plate 32 which extends from the outer wall of the compartment to the top of said plate 30. The valve 27 when opened acts as a baffle and directs the steam into the openings 15 rather than through the outlet openings 26. On the other hand when the valve is closed, steam will readily flow through said outlet and can not enter the casing 1. This provision is made so that the casing 1 may be readily cleaned when necessary, a man-hole 33 being provided for this purpose.

The exhaust steam as it comes from the engines contains more or less lubricating oil and other matters in the form of a vapor, and although the filter will remove most of this matter, it is advisable to separate as much as possible from the steam before it enters the casing 1. This is a primary function of the condensing plate, which being cooled by the feed water passing therethrough will cause the oil to condense as it strikes the outer surface thereof and the flanges 31. The condensed liquid drips from the lower edge of the plate into a trough 34 and is conveyed therefrom by a drain pipe 35. This pipe 35 extends through the perforated plate 36 in the bottom portion of the compartment 24 and is carried away by suitable piping 37 connected therewith.

From this description it will be readily noted by the improved and novel combination of parts an extremely efficient steam separating apparatus has been produced. It is believed that the same will operate much more efficiently than any similar apparatus now in use.

I claim:

1. An apparatus of the class described comprising a casing, a fluid inlet into the casing, a supplemental compartment having an inlet and an outlet, a valved inlet passage-way between said compartment and casing, a valve movable in said valved inlet passage-way, said valve when open operating to deflect fluid from the inlet into said compartment through the passage-way, said fluid passing through the outlet in the compartment when said valve is closed, and an outlet from the casing.

2. An apparatus of the class described comprising a casing, a supplemental compartment, an inlet passage-way between said compartment and casing, a fluid inlet into the compartment, a hollow condensing plate in the compartment having an inlet and an outlet, said plate being arranged adjacent said inlet into the compartment to have incoming fluid impinge thereagainst, a fluid inlet into the casing, fluid entering the same after passing through said hollow condensing plate, a drain from the condensing plate, and an outlet from the casing.

3. An apparatus of the class described comprising a casing, a fluid inlet into the casing, a supplemental compartment, a valved inlet passage-way between said compartment and casing, a fluid inlet into the lower portion of the compartment, a fluid outlet in the upper portion of the compartment adjacent said passage-way, a condensing pipe in said compartment adjacent the inlet thereinto and spaced from the top and bottom thereof, a baffle plate extending from the top of the condensing plate to the wall of the compartment having the inlet opening therein, a valve movable in said valved inlet passage-way, said valve when open operating to deflect fluid from the lower end of the compartment into the passage-way, said fluid passing through the outlet in the compartment when said valve is closed, and an outlet from the casing.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee, in the county of Milwaukee and State of Wisconsin.

J. E. SHARP.

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