

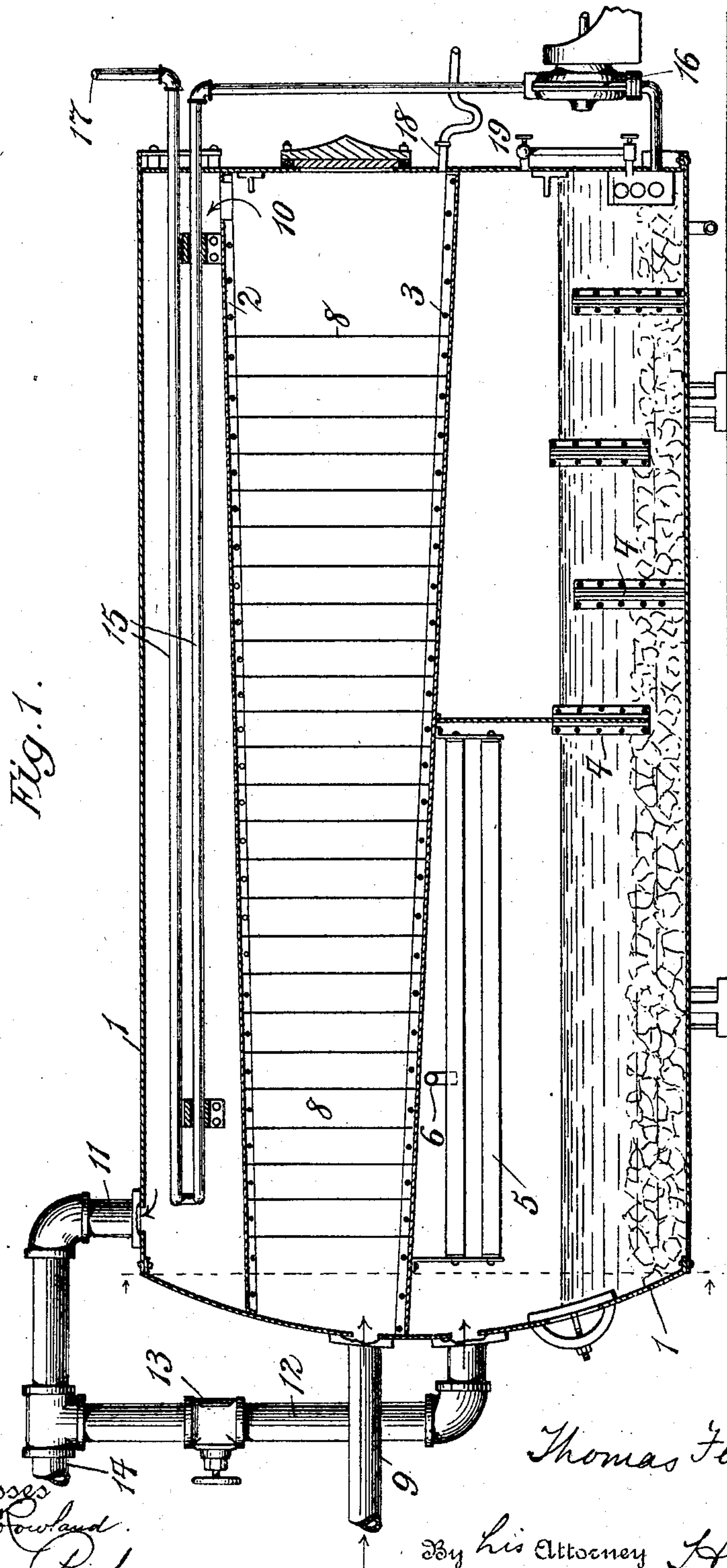
No. 795,827.

PATENTED AUG. 1, 1905.

T. FERGUSON.
FEED WATER HEATER AND PURIFIER.

APPLICATION FILED OCT. 1, 1904.

2 SHEETS—SHEET 1.



Witnesses
Edward L. Dowland
Florence Pick

Thomas Ferguson
Inventor

By his Attorney H. S. Mackay

No. 795,827.

PATENTED AUG. 1, 1905.

T. FERGUSON.
FEED WATER HEATER AND PURIFIER.
APPLICATION FILED OCT. 1, 1904.

2 SHEETS—SHEET 2.

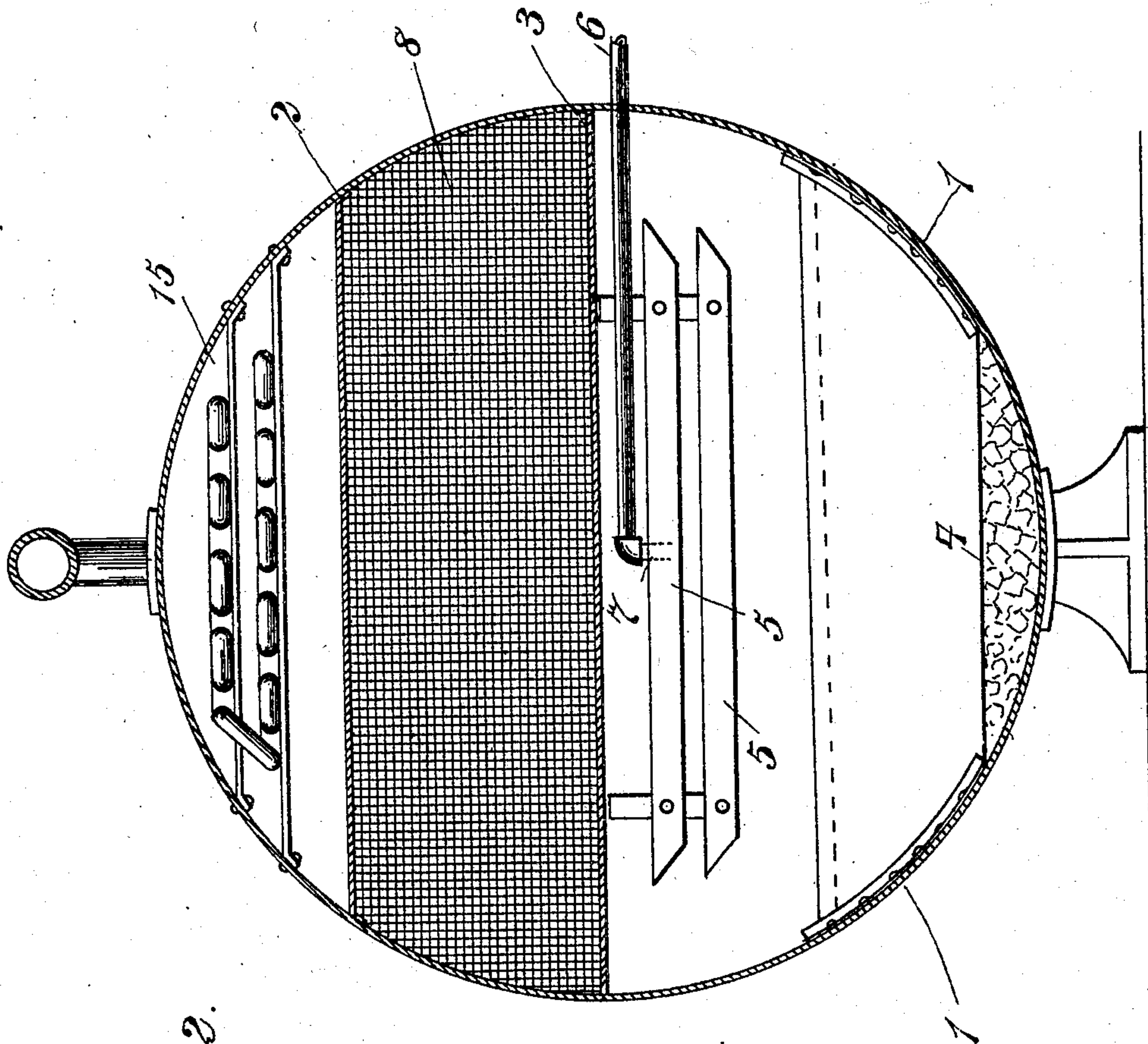


Fig. 2.

Witnesses
Edward H. Rowland,
Florence Pick

Thomas Ferguson
Inventor
By His Attorney H. H. Mackay

UNITED STATES PATENT OFFICE.

THOMAS FERGUSON, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE FERGUSON COMPANY, A CORPORATION OF NEW YORK.

FEED-WATER HEATER AND PURIFIER.

No. 795,827.

Specification of Letters Patent.

Patented Aug. 1, 1905.

Application filed October 1, 1904. Serial No. 226,788.

To all whom it may concern:

Be it known that I, THOMAS FERGUSON, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, and State of New York, have invented a certain new and useful Improvement in a Combined Feed-Water Heater and Purifier, of which the following is a specification.

This invention has relation to a compact, simple, and reliable device for use in connection with steam-boilers, whereby the exhaust-steam is cleared of oil carried in suspension without waste of water, is condensed and purified, and then returned to the boiler, said steam serving before condensing to heat the feed-water thus supplied.

The invention is illustrated in a preferred form in the accompanying drawings, wherein—

Figure 1 is a longitudinal section of the device, and Fig. 2 is a transverse section of the same.

The outer casing 1 of this device incloses a space divided into three chambers formed by the separating-plates 2 and 3, which extend entirely across the total space inclosed within the casing and from end to end of the casing.

The space above the top plate 2 will be referred to herein as the "reheating-chamber," while the space between the plates will be called the "separating-chamber," and the space beneath the plate 3 will be called the "condensing-chamber." In the last-named chamber a certain depth at the bottom is intended to hold the condensed steam and the condensing-water, and in the drawings the normal upper level of the water is indicated by a broken horizontal line. At one end of this water-space substantially vertical baffle-plates 4 extend entirely across the chamber and are so placed as to make it necessary that all water flowing out of the device shall take a path alternately over and under said baffle-plates. The spaces between the baffle-plates are partly filled with broken coke or other filtering and purifying material, as indicated in the drawings, and this material may, if desired, occupy a part of the space intended to hold water outside of the baffle-plates. Beneath the plate 3 I prefer to suspend one or more wide shallow pans 5 to receive, in the first instance, the cold condensing-water brought in by the pipe 6, which discharges at 7. Equivalent condens-

ing means in this chamber are within my broad invention.

Across the separating-chamber between the plates 2 and 3 I place successive screens of wire mesh, (shown at 8,) and the exhaust-steam which enters by the pipe 9 is forced to pass through these meshes on its way to the opening 10, whereby it enters one end of the heating-space above the plate 2. The pipe 11, at the opposite end of this space, is used to carry off the exhaust-steam which, if it is to be condensed, proceeds by a branch pipe 12 into the condensing-space. If the valve 13 is closed, the exhaust-steam is discharged at 14.

Into the heating-space above the plate 2 is carried the long coil of piping 15, leading from the pump 16 and leading out again at 17 to the boilers. Water is supplied to the reheating-pipe 15 by means of the pump 16, which in turn is supplied from the body of water in the condensing-chamber.

I supply a pipe 18, leading to a trap 19, for drawing off oil from the separating-chamber.

The operation of my device is as follows: As the exhaust-steam passes through the wire nettings 8 the oil contained in the steam adheres to the wire and trickles down to the upper surface of the plate 3, which plate is preferably inclined slightly toward the pipe 18. The nettings 8 being metal and being connected to the hot plates 2 and 3 are maintained at a sufficient temperature to prevent condensation to any appreciable extent of the exhaust-steam, and the result is that the oil is drawn off through the trap 19 without loss of water. This is an important point, inasmuch as the difficulty hitherto experienced with former separators has been the waste of water with the oil separated, and this is an item of importance wherever the supply of good water is limited. As the exhaust-steam, which is kept hot by the plates 2 and 3, passes through the reheating-chamber from 10 to 11 it gives up a great part of its heat to the feed-water in the coils 15, and if the device is properly proportioned, with due regard to temperature and pressure, the steam will pass into the condensing-chamber at a temperature just above that of condensation. In this condition the steam will come in contact with the pans 5 opposite the entrance of the pipe 12, and the stream of cold water, which enters by the pipe 6 and overflows at the edges of the

pans, will condense the steam, which will then fall with said water onto the bottom of the condenser-chamber. The pump 16 then carries this water back to the boilers through the reheating-coils 15.

A variety of modifications of the structure herein set forth can be made by those skilled in the art without departing from this invention, and I am therefore not to be understood as limiting myself to the details herein shown and described.

What I claim is—

1. In a device of the class described and in combination with a steam-boiler, a casing divided into three chambers by two metal plates, condensing means in the lowest chamber, oil-separating means in the middle chamber, an oil-trap leading out of said middle chamber, feed-water pipes leading through the top chamber and into said boiler and means for leading steam first through said middle chamber, then through the top chamber and lastly into said condensing-chamber, substantially as described.

2. In a device of the class described, and in combination with a steam-boiler, a casing divided into three chambers by two metal plates,

condensing means in the lowest chamber, a series of wire-mesh partitions in the middle chamber, an oil-trap leading out of said middle chamber, feed-water pipes leading through the top chamber and into said boiler, and means for leading steam first from one end of the middle chamber to the other, then in the opposite direction through the top chamber and lastly into said condensing-chambers, substantially as described.

3. In a device of the class described and in combination with a steam-boiler, a casing divided into three chambers by two metal plates, condensing means in the lowest chamber, oil-separating means in the middle chamber, an oil-trap leading out of said middle chamber, a pump connected to the bottom chamber, a pipe leading from said pump first through the top chamber and into said boiler and means for leading steam first through said middle chamber then through the top chamber and lastly into said condensing-chamber, substantially as described.

THOMAS FERGUSON.

Witnesses:

H. S. MacKAYE,
FLORENCE PICK.