

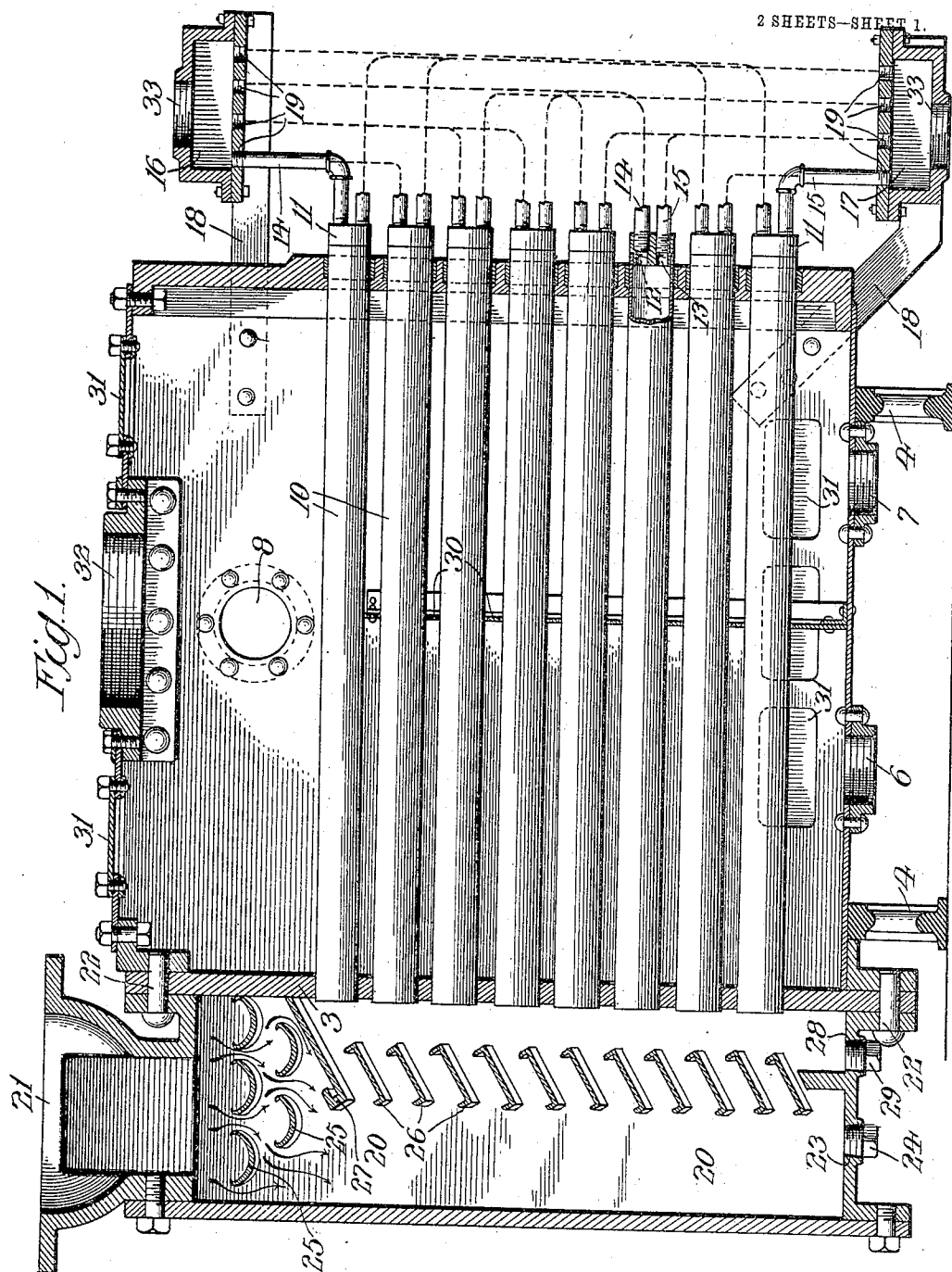
No. 816,602.

PATENTED APR. 3, 1906.

H. C. RUGGLES.
CONDENSER.

APPLICATION FILED JAN. 25, 1906.

2 SHEETS—SHEET 1.



Witnesses:

Edmund A. Thayer
John D. Allen

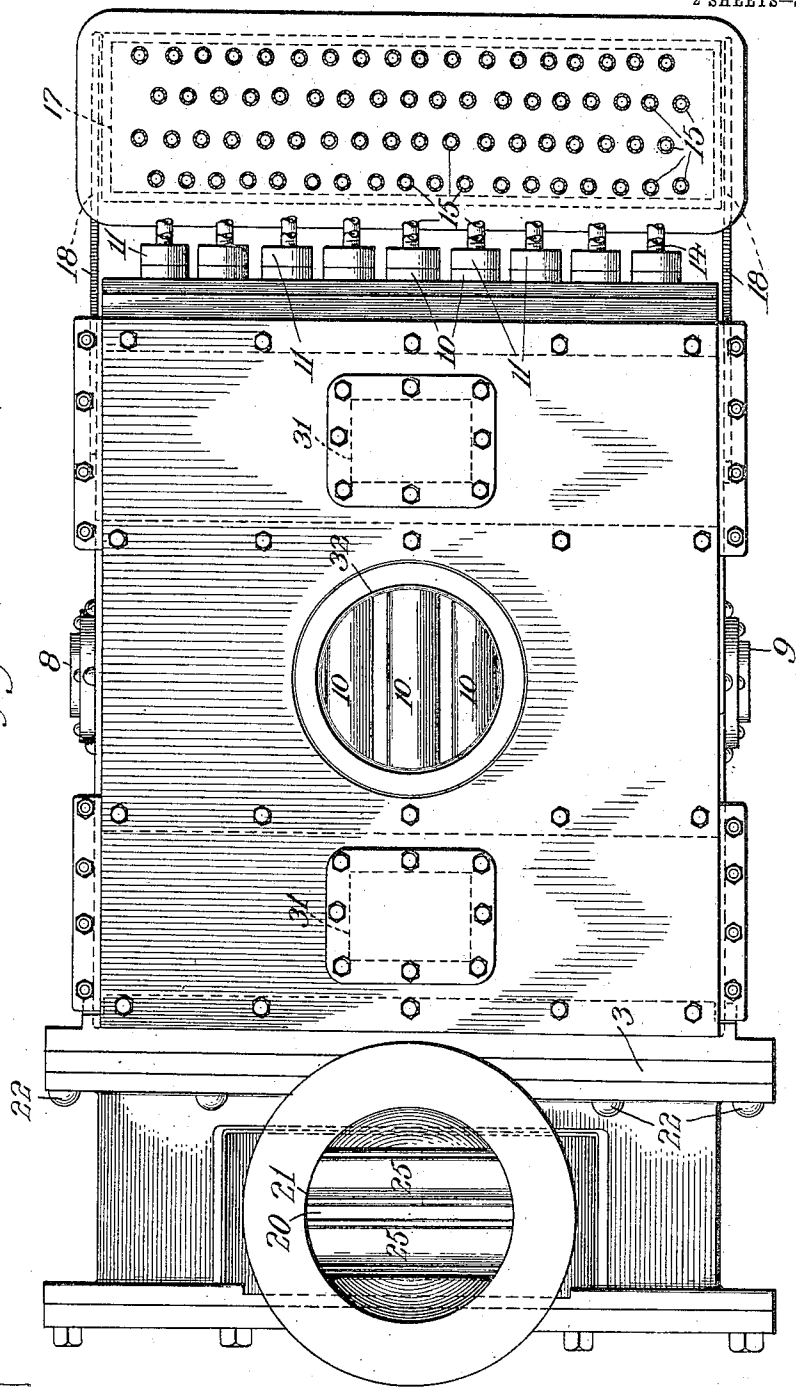
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H. C. RUGGLES.
CONDENSER.

APPLICATION FILED JAN. 25, 1906

2 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

HIRAM C. RUGGLES, OF PASADENA, CALIFORNIA.

CONDENSER.

No. 816,602.

Specification of Letters Patent.

Patented April 3, 1906.

Application filed January 25, 1906. Serial No. 297,844.

To all whom it may concern:

Be it known that I, HIRAM C. RUGGLES, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented new and useful Improvements in Steam-Condensers, of which the following is a specification.

The main object of my invention is the separation of the impurities from the steam before it enters the condensing-tubes.

Another object is to permit the escape of all gases from the condensed water before it is finally discharged to the condensed-water outlet.

Another object is to provide means whereby the steam in the condenser-tubes is rapidly and efficiently condensed.

I accomplish these objects by the device described herein and illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a central longitudinal section through the condenser. Fig. 2 is a plan view of the condenser with parts broken away and removed to more clearly illustrate the construction.

Referring to the drawings, 3 is the shell or casing of the condenser-chamber, preferably rectangular in form, which is mounted on transverse supports 4 and has water-inlets 6 and 7 located in the bottom thereof and water-outlets 8 and 9 at or near the top. Suitably secured inside the shell and preferably extending longitudinally thereof are tubes 10, which at the outer end extend a short distance outside the shell and are closed by screw-plugs 11, which are provided with screw-threaded openings 12 and 13 for the reception of pipes 14 and 15, whose outer ends are suitably connected to gas and water discharge chambers 16 and 17, respectively, as is best shown in Fig. 1 of the drawings, from whence water or gas is drawn off in any convenient manner. These water and gas chambers are preferably rectangular in form and are placed a convenient distance from the outer end of the condenser to which they are connected and supported by brackets 18. Both chambers have a number of threaded openings 19 in their top and bottom plates for the reception of the pipes 14 and 15, which lead from the condenser-tubes. These chambers have outlets 33 located at any convenient point in their tops and bottoms.

At one end suitably connected to the shell

3 is a purifying-chamber 20, which has a steam-inlet 21 located at the top thereof. This purifying-chamber extends transversely across the end of the shell 3 and is suitably connected thereto by bolts 22, which form a steam-tight connection. Located below the steam-inlet in chamber 20 are a number of removable separating-plates for ridding the exhaust-steam of impurities before it enters the condensation-tubes. These plates extend transversely across the chamber 20 and are inclined toward one end to permit of the easy flow of impurities separated from the steam to the bottom of the chamber, where they are drawn off through the opening 23, which is closed by a plug 24. These separating-plates are of different forms. The plates 25, located directly below the steam-inlet, are of curved form and receive the first impact of the steam on its entering the condenser and separate it from the coarser impurities, such as oil, grease, and other coarse matter. Located below these curved separating-plates and extending transversely across the purifying-chamber and at a slight inclination are channel-separating plates 26. These plates, except the topmost one, 27, are located a short distance away from the inner ends of the condenser-tubes 10, so that any water that may be forced backwardly out of the condensing-tubes 10 will fall to the bottom of the purifying-chamber, where it can be drawn off through the opening 28, which is closed by the screw-plug 29.

In order to insure a more rapid and efficient means of condensation, I have provided a partition 30, which is located in the center of the condenser-chamber shell and extends transversely across it. This partition extends from the bottom of the shell, to which it is suitably secured, to the topmost row of tubes and serves to separate the water which enters through the inlets 6 and 7. The water surrounding the outer ends of the tubes is colder than in the inner division, where the steam is hotter and condenses the remaining steam in a much more rapid and efficient manner.

The condenser-chamber shell is provided with the usual hand-holes 31, located at convenient points on the shell for cleaning.

On the top of the condenser I have shown a vapor-outlet 32, from which the vapor arising from the heated water in the shell may be drawn off in any convenient manner and con-

veyed to another condenser, (not shown,) where it may be subjected to the same process as that I have heretofore described.

The operation of the condenser is as follows: The water enters the inlets 6 and 7 and flows upwardly and around the condenser-tubes to the outlets. Steam is then admitted to the condenser by means of the steam-inlet 21 impinging directly on the curved separating-plates 25, which free it from its coarser impurities, such as oil, grease, and other coarse matter. Then it passes over the inclined separating-plates 26, where it deposits the remaining impurities, then through the condenser-tubes, where it is rapidly condensed into pure water, which then flows outwardly and downwardly through the pipes 15, secured to the outer end of the tubes, to the water-chamber 17, whence it is drawn off in any suitable manner into a storage-tank. (Not shown.) The gases which are freed from the water are carried upwardly and out of the tubes through the gas-pipes 14 to the gas-chamber 16, to which is connected any suitable vacuum-pump. (Not shown.)

It will thus be seen from the foregoing description that I have produced a highly-efficient and rapid steam-condenser that is capable of purifying and condensing a large quantity of exhaust-steam into pure water at a minimum amount of time and expense.

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

1. In a steam-condenser a condenser-chamber provided with water inlets and outlets; a series of tubes secured therein, communicating at one end with a steam-supply chamber and the other end of each tube terminating in a plurality of discharge-openings.

2. A steam-condenser comprising a steam-supply chamber; a condenser-chamber provided with water inlets and outlets; a series of tubes secured therein communicating at one end with a steam-supply chamber, said

chamber having an inlet in the top thereof, the other ends of said tubes terminating in a plurality of discharge-openings, said openings connected to discharge-chambers having outlets; and a series of separating-plates secured inside of said steam-supply chamber.

3. A steam-condenser comprising a steam-supply chamber having an inlet at the top; a condenser-chamber provided with water inlets and outlets; a series of tubes secured therein communicating at one end with a steam-supply chamber, the other ends of the tubes terminating in discharge-outlets, said outlets connected to discharge-chambers having outlets; and a series of removable inclined separating-plates secured inside of said steam-supply chamber.

4. A steam-condenser comprising a steam-supply chamber having an inlet at the top; a water-receiving chamber having an outlet; a gas-receiving chamber having an outlet; a condenser-chamber provided with water inlets and outlets; a partition secured in said chamber between the inlets; a series of tubes secured therein communicating at one end with said steam-supply chamber, the other ends of said tubes having closures with a plurality of openings therein, one of said openings communicating downwardly with said water-receiving chamber and the other opening communicating upwardly with said gas-receiving chamber; a series of removable curved inclined separating-plates secured in a horizontal plane below the inlet to the steam-chamber; a series of removable inclined channel-separating plates secured one above the other adjacent the inlet ends of said tubes.

In witness that I claim the foregoing I have hereunto subscribed my name this 17th day of January, 1906.

HIRAM C. RUGGLES.

Witnesses:

EDMUND A. STRAUSE,
HENRY T. HAZARD.