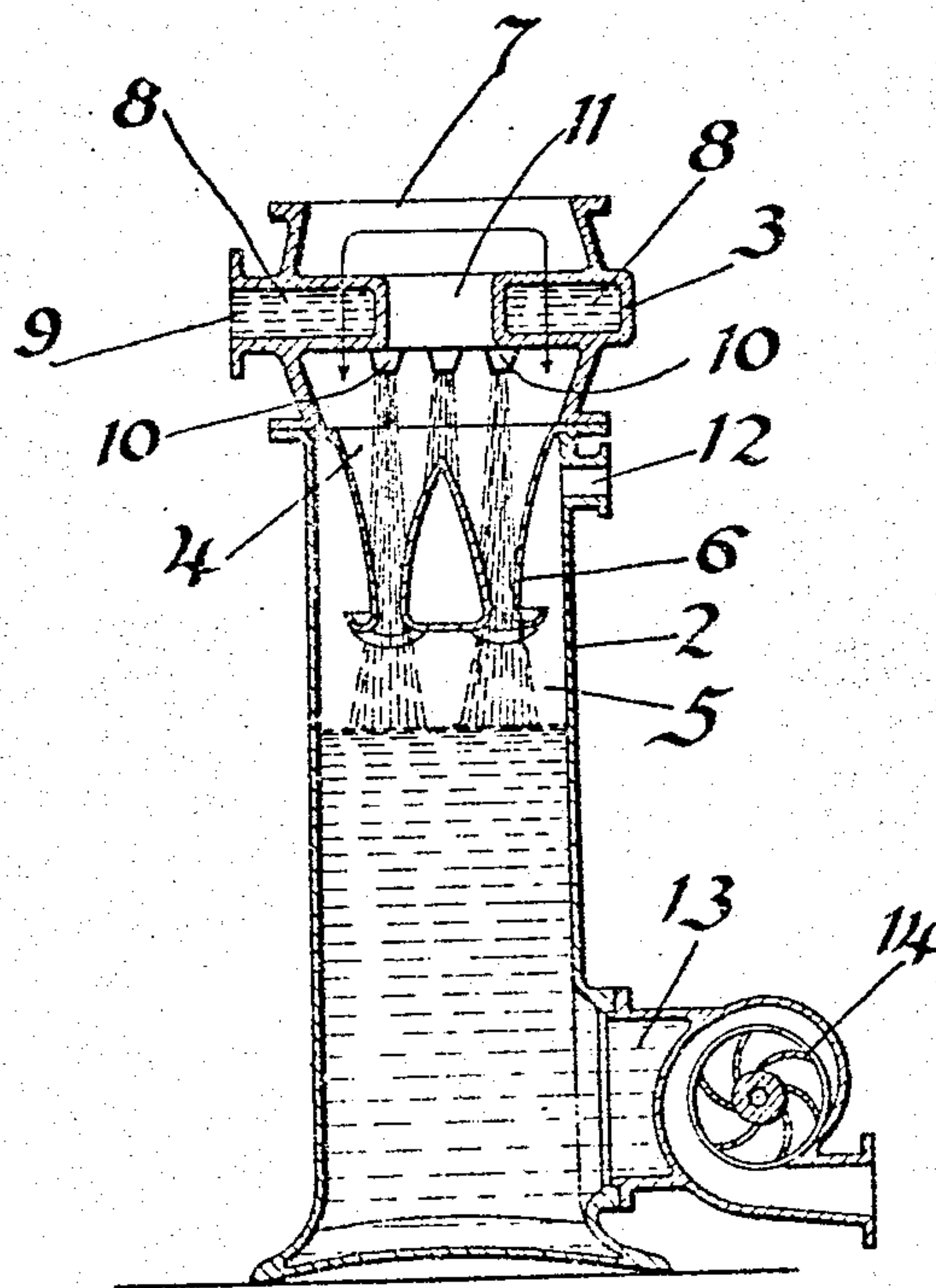


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CONDENSER.

APPLICATION FILED JULY 6, 1908.

990,278.

Patented Apr. 25, 1911.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

MAURICE LEBLANC, OF PARIS, FRANCE, ASSIGNOR TO SOCIETE ANONYME POUR L'EXPLOITATION DES PROCEDES WESTINGHOUSE-LEBLANC, OF PARIS, FRANCE.

## CONDENSER.

990,278.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed July 6, 1908. Serial No. 442,076.

*To all whom it may concern:*

Be it known that I, MAURICE LEBLANC, a citizen of the Republic of France, residing at Villa Montmorency, Auteuil, Paris, France, have made a new and useful Invention in Condensers, of which the following is a specification.

This invention relates to jet condensers, and more particularly to condensers of the parallel flow type, that is condensers in which the condensing water and the steam or vapor to be condensed flow in the same direction through the condenser.

An object of this invention is the production of a jet condenser in which the air and other non-condensable gases are discharged, by the flow of condensing water, from the condensing chamber into a chamber of higher pressure from which they are discharged into the atmosphere. This and other objects I attain in a condenser embodying the features herein described and illustrated.

In the single sheet drawing accompanying this application and forming a part thereof, a condenser embodying my invention is illustrated in vertical sections.

A cylindrical shell portion 2 is provided with a removable portion 3 and incloses a condensing-chamber 4 and a collecting chamber 5, which communicate with each other through an annular nozzle 6, located within the shell portion.

The top portion 3 is provided with a port 7 which is adapted to communicate with a source of vapor or steam to be condensed.

An annular chamber 8 is provided in the top portion and adapted to communicate through a port 9 with a source of condensing water supply. Annularly arranged discharge nozzles 10 communicate with the chamber 8 and discharge jets of water downwardly through the chamber 4 and into the annular nozzle 6. A vapor or steam passage 11 is surrounded by the chamber 8 and is adapted to deliver vapor or steam into the space inclosed by the jet discharging nozzles 10. The annular nozzle 6 converges from the chamber 4 to the chamber 5 and discharges into the chamber 5, which is provided with an air or non-condensable gas delivery port 12 and a water discharge port 13. The port 12 is adapted to be connected to a fluid ejecting apparatus for discharging the air or other non-condensable

gases from the chamber 5 into the atmosphere. The intake of a centrifugal pump 14 communicates with the port 13 and the pump operates to discharge the water from the chamber 5.

The vapor or steam entering the condenser through the port 7 is delivered by the passage 11 to chamber 4 where it is exposed to the cooling and condensing action of the water jets discharged from the nozzles 10. The water discharged from the nozzles 10 is broken up into a mass of separate drops which are collected by the converging walls of the nozzle 6 and are compressed into a stream, thereby confining and mechanically carrying globules of undischarged vapor or non-condensable gases. This vapor and the non-condensable gases are discharged with the water into the collecting chamber 5. The kinetic energy of the water jet is utilized to compress the non-condensable gases in their passage through the converging nozzle 6 and to deliver them to the chamber 5. Experience has shown that under the conditions described and illustrated, the pressure in the chamber 5 may be maintained at 2 or 3 c/m's of mercury higher than the pressure in the chamber 4. This is advantageous in that the air or other non-condensable gases may be discharged from the chamber at a higher pressure than is ordinarily encountered in condensers. Furthermore, the steam or condensable vapors in passing through the constricted throat of the nozzle 6 are intimately mixed with the condensing water and are therefore condensed. The condensing water and the water of condensation are discharged from the chamber 5 by the pump 14 which, if desired, may be replaced by any reciprocating pump.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim is:

1. A jet condenser comprising a condensing chamber provided with jet delivery nozzles and a vapor or steam inlet port, a collecting chamber provided with a water



outlet port and an air or gas outlet port, and an annular converging nozzle adapted to receive the water discharged from said jet delivery nozzles and to deliver it to said collecting chamber.

2. A jet condenser comprising a shell divided into a condensing and a collecting chamber, a plurality of jet delivery nozzles and a vapor delivery port communicating with said condensing chamber, a water discharging and a gas delivery port communicating with said collecting chamber, and an annular converging nozzle establishing communication between said condensing and said collecting chambers.

3. A condensing apparatus comprising a condensing chamber provided with a jet delivery nozzle and a vapor or steam inlet port, a collecting chamber provided with a water outlet port and a gas or air outlet port and a nozzle located between said chambers and adapted to receive the water discharged from said jet delivery nozzle and to deliver it to said collecting chamber.

4. A condensing apparatus comprising a condensing chamber, a collecting chamber, a plurality of jet delivery nozzles and a vapor delivery port communicating with said condensing chamber, a water discharge and a gas delivery port communicating with collecting chamber and a nozzle establishing communication between said condensing and said collecting chambers.

5. In a condensing apparatus, a condensing chamber, a collecting chamber and a plurality of water jet devices for entrain-

ing and compressing the non-condensable vapors and gases and discharging them from said condensing chamber into said collecting chamber.

6. In a condensing apparatus, a condensing chamber, a collecting chamber, a vapor delivery port and a condensing liquid supply port communicating with said condensing chamber, a liquid discharge port and a non-condensable gas delivery port communicating with said collecting chamber and means cooperating with the flow of condensing liquid from said supply port for discharging the condensing liquid, the liquid of condensation, the condensable and the non-condensable vapors from said condensing vapor into said collecting chamber and for compressing the vapors prior to their entrance into said collecting chamber.

7. In a condensing apparatus in which the vapors to be condensed and the condensing liquid flow in the same direction, a cooling chamber for the condensable and non-condensable vapors and the condensing water and a plurality of water jet devices for compressing the non-condensable vapors prior to their entrance to said collecting chamber.

In testimony whereof I have hereunto subscribed my name this 22 day of June, 1908.

MAURICE LEBLANC.

Witnesses:

BON JEANETTE GUNZBURY,  
H. C. COXE.