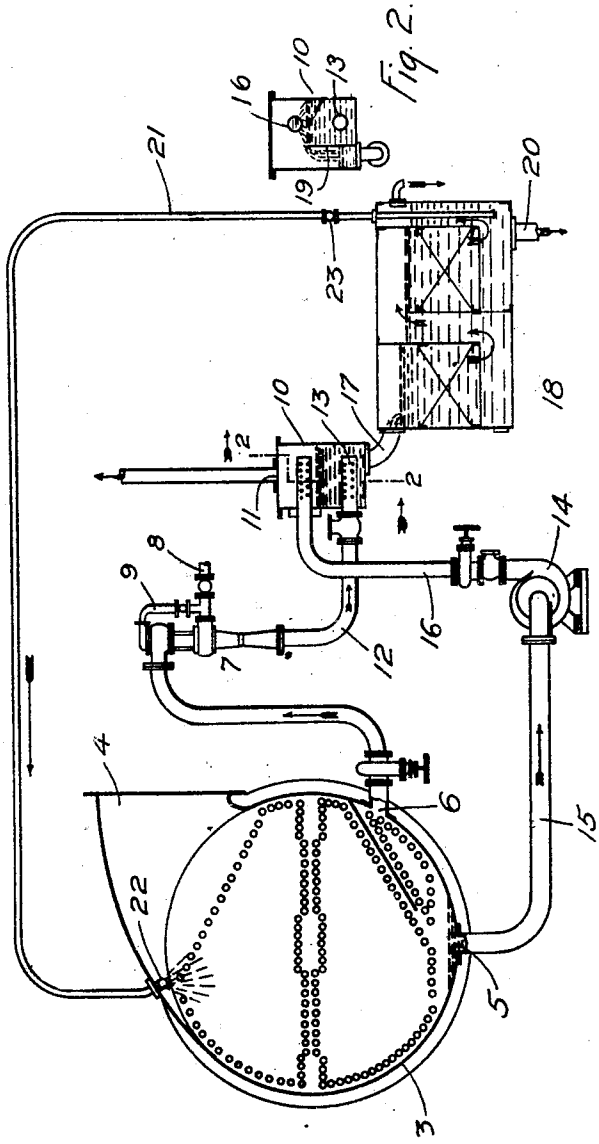
M. LEBLANC.

CONDENSING APPARATUS.

APPLICATION FILED NOV. 17, 1915.

1,288,058. Patented Dec. 17, 1918.



INVENTOR

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CONDENSING APPARATUS.

1,288,058. Specification of Letters Patent. Patented Dec. 17, 1918.

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To all whom it may concern:

Be it known that I, MAURICE LEBLANC, a citizen of the Republic of France, residing at Val-sur-Seine, Croissy, Seine et Oise, France, have invented a new and useful Invention in Condensing Apparatus, of which the following is a specification.

This invention relates to condensing apparatus and more particularly to apparatus in which a steam ejector is employed as the vacuum pump of the condenser.

An object of the invention is to produce a condensing apparatus provided with a steam ejector operating as a vacuum pump in which condensate from the condenser is employed in condensing the steam discharged from the ejector and in which improved means are employed for preventing the discharge of steam from the ejector to the atmosphere, when no steam is delivered to the condenser to be condensed.

A further object is to provide means for conserving steam, or more specifically to prevent the waste of water by discharging steam into the atmosphere.

A further and more general object is to produce means in connection with a feed water heater for preventing the feed water from boiling and thereby being wasted by evaporation.

In the drawings accompanying and forming a part hereof, Figure 1 is a diagrammatic illustration of a condenser installation embodying my invention.

Fig. 2 is a sectional view along the line 2—2 of Fig. 1.

As illustrated, the apparatus includes a condenser 3, provided with an inlet port 4, a condensate delivery port 5, and an air offtake port 6. The inlet port 4 is adapted to communicate with the exhaust of an engine or turbine delivering steam to be condensed. The air offtake port 6 is shown in communication with an ejector 7, receiving motive fluid, for example steam, through piping 8 and branch piping 9. The discharge end of the ejector communicates with an air separator 10, provided with an air vent port 11. In the separator illustrated, the arrangement of the exhaust piping 12 of the ejector is such that the piping terminates in a nozzle 13, submerged by water contained within the separator. The condensate discharge port of the condenser communicates with a condensate pump 14, through piping 15, and the pump discharges the condensate to the separator 10 through a pipe or piping 16. As illustrated, the pipe 16 is provided at its end, and within the separator, with a nozzle which is located above the normal water level within the separator, and is adapted to deliver the condensate in the form of spray or separate streams to the separator. As illustrated in Fig. 2, the water discharge pipe 17 of the separator communicates with a feed water tank 18 and receives water overflowing a weir 19, located within the separator 10.

Under ordinary operating conditions of the condensing apparatus, that is, when the condenser is receiving steam to be condensed through the port 4, the water of condensation is delivered by the pump 14 to the separator 10. The steam and non-condensable gases, such as air, issuing from the discharge of the ejector 7, are also delivered to the separator 10, where the steam is condensed by the cooling and condensing action of the water of condensation and the air is liberated, the overflow from the separator 10 being delivered to the feed water tank 18 and ultimately to the hot well or back to the steam generator through delivery port 20. In this way the separator performs the three-fold function of separating the air, heating the feed water and condensing the steam from the ejector.

When the prime mover or engine is not in operation or when it is operating under such light load that the steam delivered by it to the condenser is not sufficient to provide sufficient water of condensation to condense or fully condense the steam issuing from the ejector 7, steam will be lost by blowing out through the vent port 11 of the separator to the atmosphere. In order to prevent this, I have provided means for delivering water of condensation or water from the tank 18 to the condenser for the purpose of providing sufficient water to complete the condensation of steam in the separator 10.

In the illustrated embodiment of the invention, this is accomplished by providing piping 21 between the tank 18 and the condenser 3 which terminates within the tank below the surface of the water contained therein, and within the condenser in a spray nozzle 22. This nozzle is preferably located in the upper portion of the condenser and is arranged to so deliver the water issuing from

it that it will flow over a relatively large number of tubes within the condenser before reaching the condensate discharge port 5. The piping 21 is provided with a valve 23 for the purpose of controlling the delivery of water through it, and the atmospheric pressure will force water through the piping into the condenser when this valve is open.

With this arrangement, water may be delivered from the tank 18 to the condenser either for the purpose of augmenting the condensate delivered to the pump 14 during light loads on the engine or turbine, communicating with the port 4, or for the purpose of providing the entire supply of condensing water delivered to the separator 10. The water issuing from the nozzle 22 is cooled in its passage over the tubes of the condenser and consequently is effective as a condensing agent within the separator. This, therefore, prevents wasting of the steam issuing from the discharge of the ejector 7.

While I have described but one embodiment of my invention, it will be apparent to those skilled in the art that various changes, substitutions, additions and omissions may be made in the apparatus illustrated without departing from the spirit and scope of the invention as set forth by the appended claims.

What I claim is:

1. In combination with a main condenser, a steam actuated ejector for withdrawing noncondensable vapors from the condenser, an auxiliary condenser having an atmospheric vent port, a liquid discharge port and a fluid inlet port, a spray nozzle located within the auxiliary condenser for delivering a water spray in the path of travel of fluid entering the fluid inlet port and moving toward the vent port, means for delivering water of condensation from the main condenser to said spray nozzle, means located within the auxiliary condenser for retaining a body of water between said fluid inlet port and the atmospheric vent port, a fluid distributing nozzle communicating with the fluid inlet port and located below the surface of the body of water so retained, means for delivering fluid discharged from the ejector to said distributing nozzle, and means for returning water of condensation from the auxiliary back to the main condenser.

2. In combination with a main condenser, a steam actuated air ejector for withdrawing noncondensable fluids from the condenser, an auxiliary condenser having a fluid inlet port communicating with the exhaust of the ejector, an atmospheric vent port, a liquid discharge port, and a liquid inlet port receiving condensate from said main condenser, a spray nozzle located within the auxiliary condenser and communicating with said liquid inlet port, and arranged to deliver a spray of condensate between the fluid inlet port and the vent port, means within the auxiliary condenser for retaining a body of condensate and for forming a weir over which condensate flows from the body to the liquid discharge port, and a fluid distributing nozzle located below the surface of the body of condensate so retained and communicating with said fluid inlet port.

In testimony whereof, I have hereunto subscribed my name this 21st day of October, 1915.

MAURICE LEBLANC.

Witnesses:
V. DELOBBER,
CHAS P. PRESSLEY.