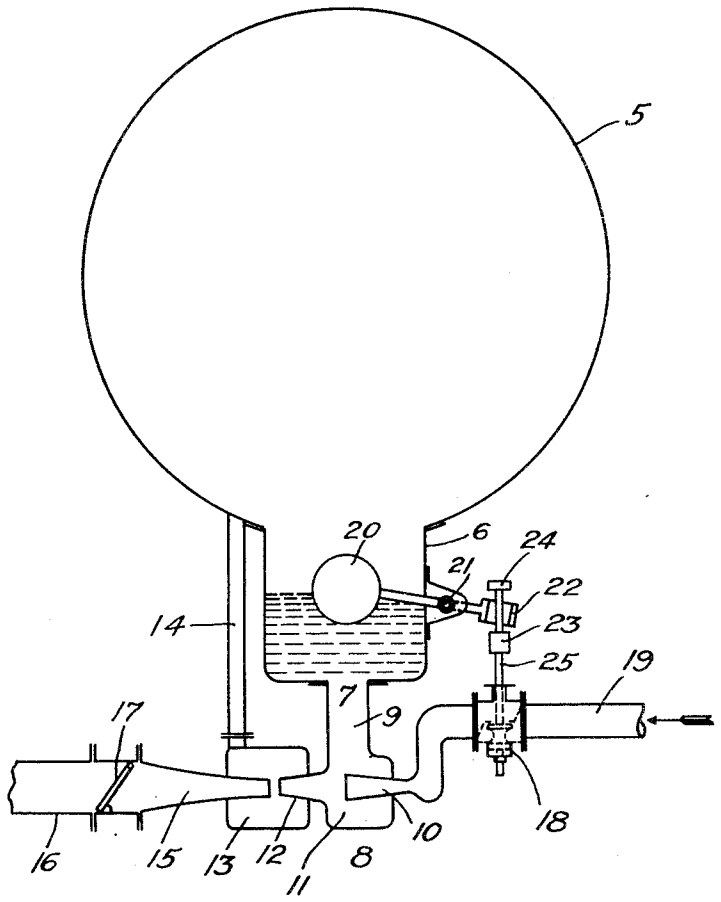
R. N. EHRHART.

CONDENSING APPARATUS.

APPLICATION FILED JUNE 28, 1917.

1,352,437. Patented Sept. 14, 1920.



WITNESSES:

INVENTOR.

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CONDENSING APPARATUS.

1,352,437. Specification of Letters Patent. Patented Sept. 14, 1920.

Application filed June 28, 1917. Serial No. 177,557.

To all whom it may concern:

Be it known that I, RAYMOND N. EHRHART, a citizen of the United States, and a resident of Edgewood Park, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Condensing Apparatus, of which the following is a specification.

This invention relates to condensing apparatus and has for an object the production of new and improved means for withdrawing condensate from condensers.

While a steam actuated ejector is employed in withdrawing condensate from a condenser, difficulty is encountered due to the fact that the ejector must be of sufficient capacity to remove all the condensate even when the condenser is operating under conditions of maximum overload, consequently the ejector does not receive sufficient condensate, under normal and light load conditions of the condenser, to insure effective operation of the ejector. The ratio of water to steam is so increased under light or even normal loads that the water is heated to a prohibitive temperature at which the ejector is rendered inoperative.

An object of my invention is to produce an ejecting apparatus for withdrawing water of condensation from a condenser, in which means are employed for preventing undue or objectionable heating of the water as it traverses the working passages of the ejector.

These and other objects are attained by means of apparatus embodying the features herein described and illustrated in the single sheet drawing accompanying and forming a part hereof.

The drawing is a diagrammatic sectional view of condenser apparatus embodying my invention.

My present invention consists in providing automatic means for controlling the operation of the ejector so as to prevent undue or prohibitive heating of the water as it traverses the working passages of the ejector. This is accomplished in the present embodiment of the invention by providing means for controlling the delivery of the steam or impelling fluid to the ejector and by so adjusting the controlling means that the ejector will only be called into operation when there is sufficient condensate to prevent a prohibitive rise in temperature or, more properly, to condense the steam delivered to the ejector as impelling fluid. In other words, the apparatus illustrated is adapted to so control the ejector that it operates at infrequent periods and the timing of the periods of operation is such that the ejector while in operation will be subjected to normal load conditions.

My invention may be employed in connection with any type of condenser, but I have diagrammatically illustrated a surface condenser 5 provided with a condensate well 6, in which the condensate collects as it is formed and from which it is withdrawn. The condensate discharge port 7 of the condenser is formed in the bottom wall of the well 6 and the condensate is adapted to be delivered through this port to an ejector 8 by means of a passage 9.

The ejector illustrated includes a divergent nozzle 10 which communicates with a source of expelling fluid such as steam which is adapted to discharge into and through a mixing chamber 11 which communicates with the passage 9. A convergent tube 12 communicates with the mixing chamber and is axially alined with the nozzle 10. The convergent end of this tube terminates in an overflow chamber 13 which is illustrated as in open communication with the interior of the condenser 5 through a passage 14. A divergent tube 15 projects into the chamber 13 and is axially alined with the convergent tube 12. The discharge end of the tube 15 communicates with a pipe or passage 16, which is illustrated as provided with a non-return or check valve 17.

The delivery of steam to the nozzle 10 is controlled by means of a valve 18, which is located in the steam pipe 19. This valve is in turn controlled by a float 20, which is located within the well 6 and is so connected to the valve 18 that it will actuate the valve only after it has moved through a relatively wide angle. In other words, the operative connection between the float 20 and the valve 18 is such that the valve is opened and closed by relatively great differences in the level of the water in the well 6. This is accomplished in the illustrated embodiment of the invention by providing a lost motion between the float and the valve so arranged that the valve will

not open until a relatively large amount of water has accumulated in the well 6 and then it will not close until after the well is almost completely empty.

The float illustrated is mounted on an arbor 21, located within the well 6 and which projects through a suitably packed aperture in a side wall of the well. A valve engaging arm 22 is rigidly mounted on the projecting portion of the arbor and is so arranged that it will engage stops or collars 23 and 24 formed on the stem 25 of the valve 18. The stops are placed relatively far apart so that the valve will remain open, after it has been opened by the engagement of the arm 22 with the collar 23, until substantially all of the water has been withdrawn from the well 6. The float actuated arm 22 will then engage the collar 24 and close the valve. Any type of valve may be employed, but it is of course preferable to employ a balance valve so as to impose a minimum amount of work on the float.

With this arrangement of apparatus the ejector will operate periodically and only when there is sufficient water to insure its operating at full capacity. Under such conditions, the water traversing the ejector will not be heated to a prohibitive temperature and consequently the ejector will not only be effective in withdrawing condensate from the condenser, but it will operate with high efficiency. It will, of course, be understood that some means, such as the valve 17, must be provided to prevent a return flow of water through the tail pipe 16 when the ejector is shut down.

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

What I claim is:

1. Condenser apparatus comprising a condenser, a hot well communicating with the condenser provided with a steam-actuated condensate ejector, a balanced valve located exteriorly of the hot well for controlling the steam supply to the ejector, a shaft mounted for oscillation projecting through the hot well casing into the hot well, a float actuated lever within the hot well secured to the inner portion of the shaft responsive to variations in the quantity of condensate in the hot well, and a lever secured to the outer portion of the shaft adapted to be actuated by the said float actuated lever and having a lost motion connection with the said valve whereby the valve is actuated by the float at extreme limits of its movement.

2. Condenser apparatus comprising a condenser, a hot well communicating therewith, a steam-actuated condensate ejector arranged exterior of the said hot well and in communication therewith, a valve for controlling said ejector, and condensate-level controlled means for actuating said valve comprising a float within the hot well and motion communicating means between the float and valve whereby the opening and closure of the valve is responsive to the level of condensate in the hot well.

3. Condenser apparatus comprising a condenser, a hot well communicating therewith, an ejector, including steam and discharge pipes, arranged exteriorly of the hot well and communicating therewith, a valve for the steam pipe, float means within the hot well adapted to open and close the valve, and a check valve in the discharge pipe.

In testimony whereof, I have hereunto subscribed my name this 26th day of June, 1917.

RAYMOND N. EHRHART.

Witness:
C. W. McGHEE.