No. 679,491. Patented July 30, 1901.

H. D. BARAGWANATH.

CONDENSER.

(Application filed June 25, 1900.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

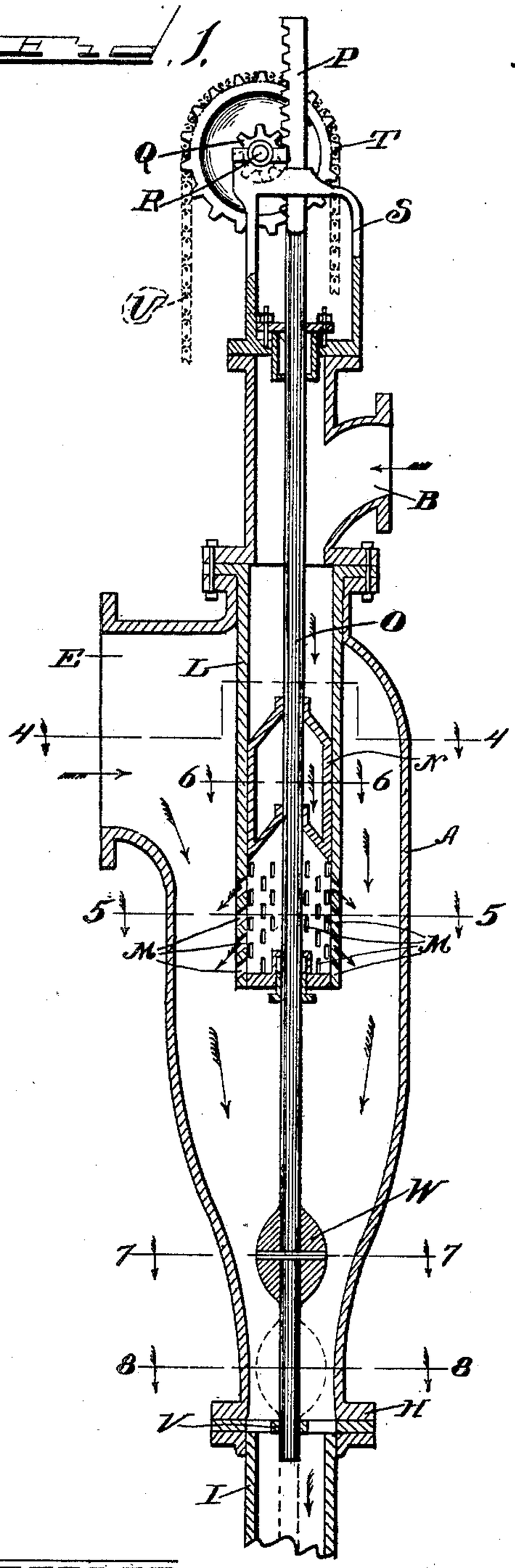

FIG. 2.

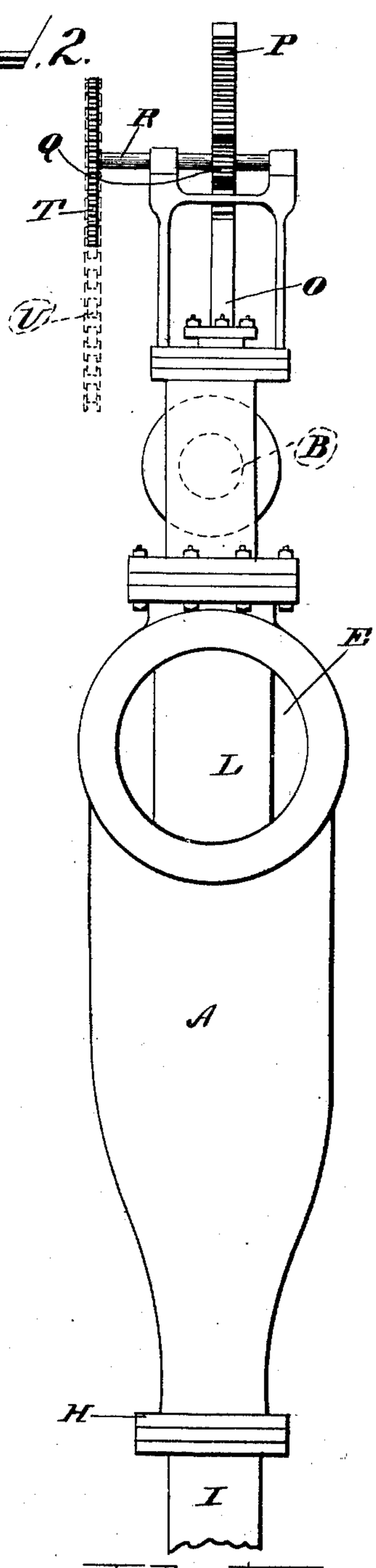

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Fig. 3.

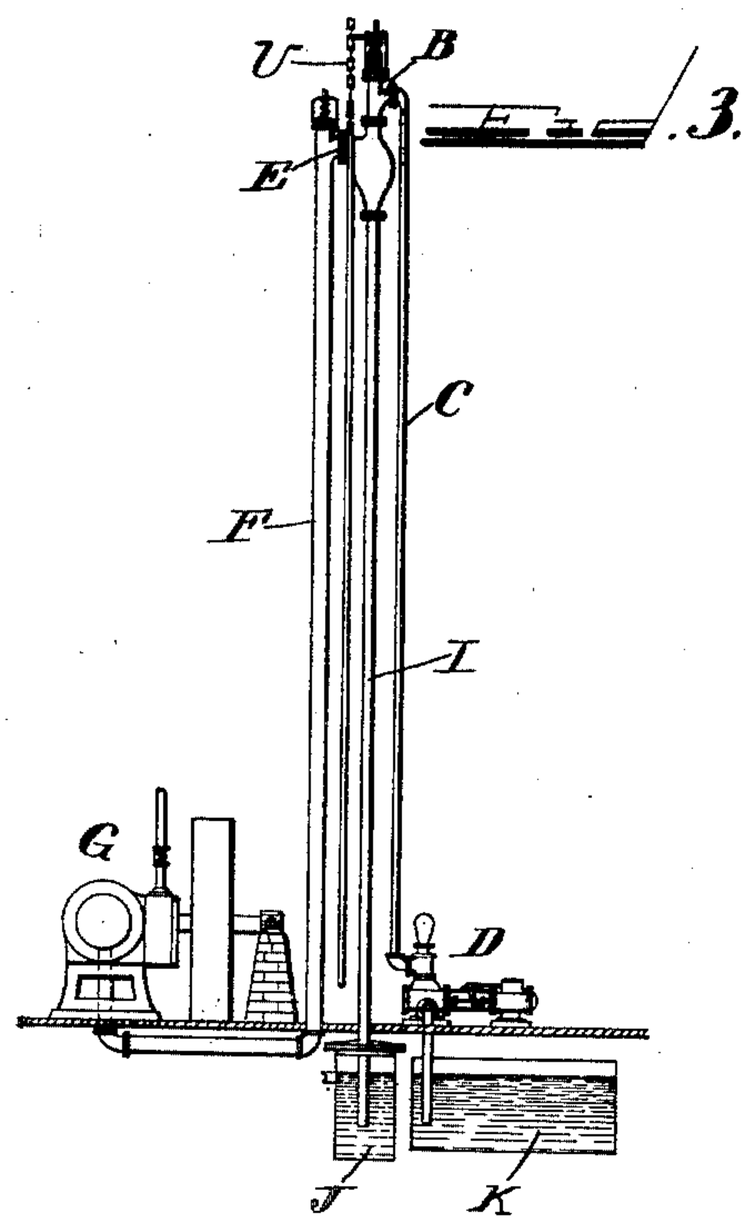


Fig. 4.

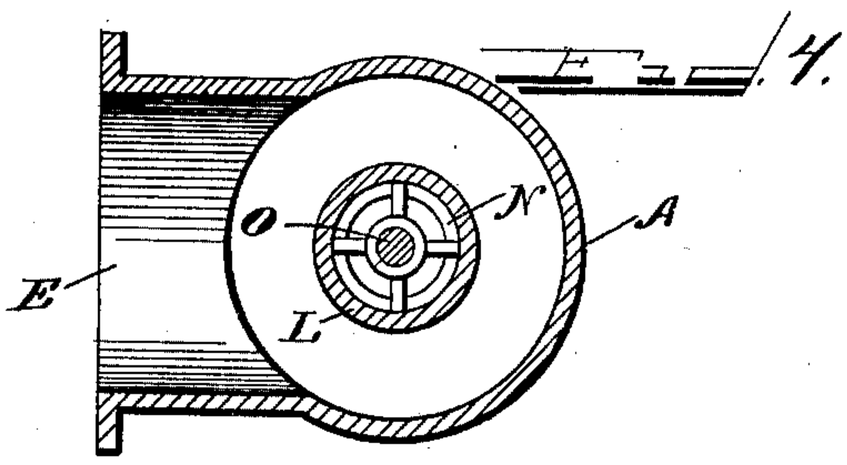


Fig. 6.

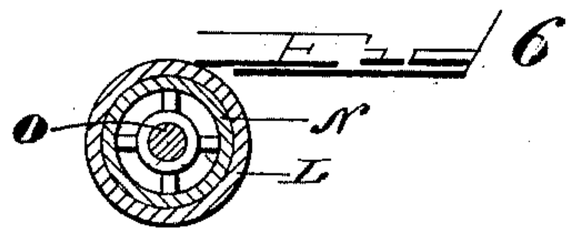


Fig. 5.

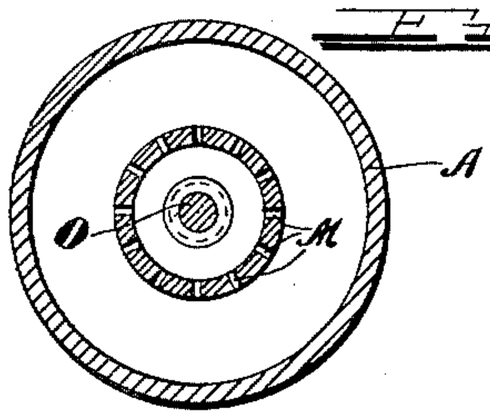


Fig. 7.

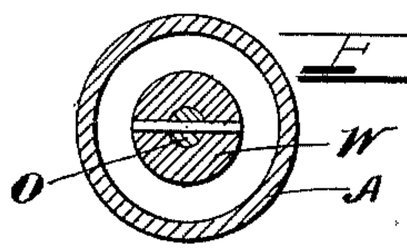
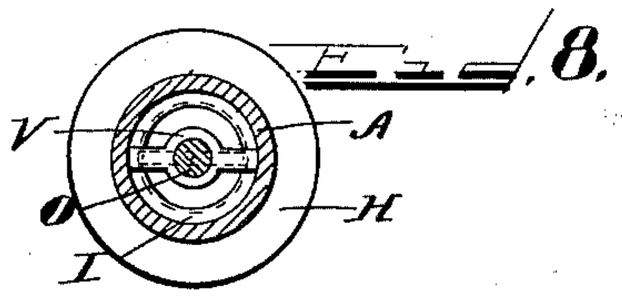


Fig. 8.



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UNITED STATES PATENT OFFICE.

HENRY D. BARAGWANATH, OF CHICAGO, ILLINOIS.

CONDENSER.

SPECIFICATION forming part of Letters Patent No. 679,491, dated July 30, 1901.

Application filed June 25, 1900. Serial No. 21,457. (No model.)

To all whom it may concern:

Be it known that I, HENRY D. BARAGWANATH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Condensers, of which the following is a specification.

This invention relates to improvements in condensers, and has for its primary object a condenser that shall be adjustable in such manner that it will operate as satisfactorily in conjunction with a plurality of engines as with a single engine, whereby a single condenser may be used in connection with a plant comprising a number of engines.

Another object is to have the condenser adjustable in such manner that a vacuum will be continually maintained whether one or more engines are in use and in which the amount of water necessary to be pumped to maintain the vacuum may be varied according to the work put upon the condenser.

A further object is to have the connection between the pump and condenser of such a character that the water will be delivered to the condensing-chamber in a circular apron, preferably in the form of a series of small jets covering the entire cross-area of the condensing-chamber between the exhaust-steam port and the discharge-port, and this, too, notwithstanding variations of the quantity of water that is being pumped.

A still further object is to have the water inlet and discharge from the condenser simultaneously adjustable, whereby a vacuum will be at all times maintained, notwithstanding variations in the quantity of water delivered to the condenser.

These and such other objects as may hereinafter appear are attained by the device illustrated in the accompanying drawings, in which—

Figure 1 represents a central vertical section through a siphon-condenser embodying my invention. Fig. 2 represents a side elevation thereof. Fig. 3 is a diagrammatic elevation illustrating the application of my condenser to a single-engine plant. Fig. 4 is a horizontal section on the line 4 4 of Fig. 1. Fig. 5 is a horizontal section on the line 5 5 of Fig. 1. Fig. 6 is a horizontal section on the line 6 6 of Fig. 1. Fig. 7 is a horizontal section on the line 7 7 of Fig. 1. Fig. 8 is a horizontal section on the line 8 8 of Fig. 1.

Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A indicates a casing constituting the condensing-chamber and provided with a connection B above said chamber for the pipe C, leading to the pump D, and with the connection E at the side of said chamber for the exhaust-pipe F, leading to the engine G, and with a connection H at the lower end of said chamber for the discharge-pipe I, leading to the hot-well J, the cold-well from which the pump takes its supply being shown at K in Fig. 3. This general arrangement is merely intended to be illustrative, as the pipes and connections would necessarily vary with the number, character, and disposition of the engines in connection with which the condenser is desired to operate, although I prefer that no substantial variation from the form and connections of the condenser shown in the drawings should be made, as this form has proven entirely satisfactory in practice.

Leading from the connection with the pump and projecting into the condensing-chamber is a valve-chamber, which I prefer to have in the form of the cylinder L, provided in the lower portion thereof, but not in the end, with a number of circumferential series of perforations M, all of which preferably have a downward trend from the interior to the exterior of the cylinder, as clearly shown in Fig. 1. In the upper part of the valve-cylinder works a trunk-valve N, secured to a valve-rod O, which passes up through the pump connection B and out through a stuffing-box at the top thereof, where the rod terminates in or has rigidly secured thereto a rack-bar P, meshing with a pinion Q, rigidly mounted upon the shaft R, suitably journaled in a bracket S, mounted upon the top of the connection B, said shaft having also mounted thereon a sprocket-wheel T, around which is trained a short length of sprocket-chain U, (shown in dotted lines in Figs. 1 and 2,) which may, if desired, be prolonged down within reach of the engineer or which may be connected at its ends, respectively, with ropes or

rods leading down within convenient reach of the engineer, so as to afford a means of rotating the sprocket-wheel T, and consequently the shaft R, and through it induce a vertical endwise movement up or down of the valve-rod.

I may here state that I do not desire to limit myself to the means shown and described for shifting or adjusting the valve-rod, as many such means will suggest themselves to one skilled in the art to which my invention appertains, and all such means are therefore contemplated by my invention, so long as they provide for the adjustment of the valve-rod. The valve-rod passes through the lower end of the valve-cylinder L and is prolonged to the discharge connection H, where it finds a guide in a spider V or other suitable projection, through which it freely works. Near the lower end thereof a valve W is rigidly mounted upon the rod, and adjacent to and opposing said valve the walls of the casing A are tapered in, so that the discharge-opening from the casing is of considerably less area than the exhaust-opening leading into said chamber from the engine or engines, and as the valve W is located centrally in the discharge-opening of the chamber such opening is still further throttled thereby. Obviously, on account of the curved or tapering shape of the lower end of the condensing-chamber, as the valve W is raised and lowered the throat of the discharge-opening will be widened or narrowed correspondingly, although it is desirable in practice that at the narrowest opening the discharge-passage should be greater in diameter than the valve W, so that the valve can never entirely close the discharge-opening.

As I have before stated, the sides of the discharge-passage may be either tapered or curved and the sides of the valve W should also be tapered or curved; but I prefer to have the walls of both the opening and the valve curved, substantially as shown in the drawings, the curve of the valve being substantially reversed to that of the walls, so that there shall be no abrupt change in the passage for the flow of water that would cause regurgitation or tend to break the vacuum induced by the water passing through the discharge-opening.

As the supply-valve N and the discharge-valve W are both rigidly secured to the valve-rod O, they will of course be simultaneously adjusted, so that as the supply of water to the condensing-chamber is throttled the discharge-opening will be correspondingly throttled, and thus the vacuum will be maintained notwithstanding the variations in the supply of water, and hence I avoid the necessity heretofore existing for pumping the same supply of water at all times, no matter what may be the quantity of steam to be condensed in order to maintain the vacuum. This effects a great saving in the operation of even a single engine, for the condenser may be adjusted to the variations of steam-pressure under which the engine is operating, and at the same time this adjustability adapts a condenser made of proper capacity for use in conjunction with a number of different engines, because the supply of water and the discharge of the water and condensed steam to and from the condenser may be easily and quickly varied and adjusted according to the number of engines being operated and the demands thereof in the way of taking care of their exhaust-steam. It will also be observed that by having the water-valve chamber cylindric and provided with the circumferential series of outlet-ports into the condensing-chamber the stream of incoming water from the pump will be delivered from the valve-chamber into the exhaust-chamber in the form of a circular apron made up of a series of small jets, the series of ports being preferably arranged in staggered relation with each other, so as to, in effect, make practically a perfect sheet of water interposed between the exhaust-steam inlet and the discharge-opening, which insures carrying out of the condenser-chamber practically every particle of air that is brought in either by the steam or water and also insures a rapid and certain condensation of all the steam that enters the casing, because it is forced to pass into the water in order to escape from the condensing-chamber.

A condenser made in accordance with my invention is of great efficiency, maintaining a high vacuum under all conditions, while having the decided advantage of adaptability for use in connection with one or more engines and for varying the amount of water necessary to maintain a vacuum according to the quantity of exhaust-steam to be condensed. Furthermore, the device is exceedingly cheap and simple, easy of access for repair or renewal of its parts, and is positive in all of its actions, besides having but few parts to become deranged.

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

1. In a condenser, the combination with the condensing-chamber having water supply and and discharge ports above and below said chamber and a steam-inlet port opening into said chamber, of a stationary valve-chamber within said condensing-chamber connected with the water-supply port and opening into the condensing-chamber between the exhaust-steam inlet and the discharge-port, said valve-chamber having a number of circumferential series of valve-controlled ports leading therefrom into the exhaust-chamber, substantially as described.

2. In a condenser, the combination with the condensing-chamber having water supply and discharge ports above and below said chamber and a steam-inlet port opening into said chamber, of a valve controlling the water-inlet port, another valve controlling the discharge-port, and a connection between said valves,

said valves being adjustable in a common direction to simultaneously open or close said ports, substantially as described.

3. In a condenser, the combination with the exhaust-chamber having water supply and discharge ports above and below the same, and a steam-inlet port opening therein, of a water-supply chamber connected with the inlet-port and discharging into said chamber between the steam-inlet and the discharge-port, said valve-chamber having a number of circumferential series of ports leading therefrom into the condensing-chamber, a valve working in said valve-chamber and adapted to successively close a series of ports leading therefrom, and adapted to gradually throttle the discharge-port from the condensing-chamber, said valves being simultaneously adjustable, substantially as described.

4. In a siphon-condenser, the combination with the valve-chamber having a water-supply port above same, a discharge-port at the lower end thereof, the walls of said chamber contracting toward the discharge-port and a steam-inlet port opening into said chamber, of a valve for controlling the water-supply and a valve working in the contracted portion of the condensing-chamber adjacent to the discharge-port, both of said valves being adjustable, substantially as described.

5. In a siphon-condenser, the combination with the condensing-chamber having water supply and discharge ports above and below the same and a steam-inlet opening therein, of a cylindric valve-chamber connecting with the inlet-port and extending into the condensing-chamber to a point between the steam-inlet port and the discharge-port, a number of circumferential series of ports in the sides of said valve-cylinder near the lower end thereof, a cylindric trunk-valve working in said cylinder and adapted to successively close the series of ports therein, a valve working in the lower contracted end of the condensing-chamber adjacent to the discharge-port, a valve-rod upon which both the supply and discharge valves are rigidly mounted and means for reciprocating said rod, substantially as described.

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Witnesses:
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