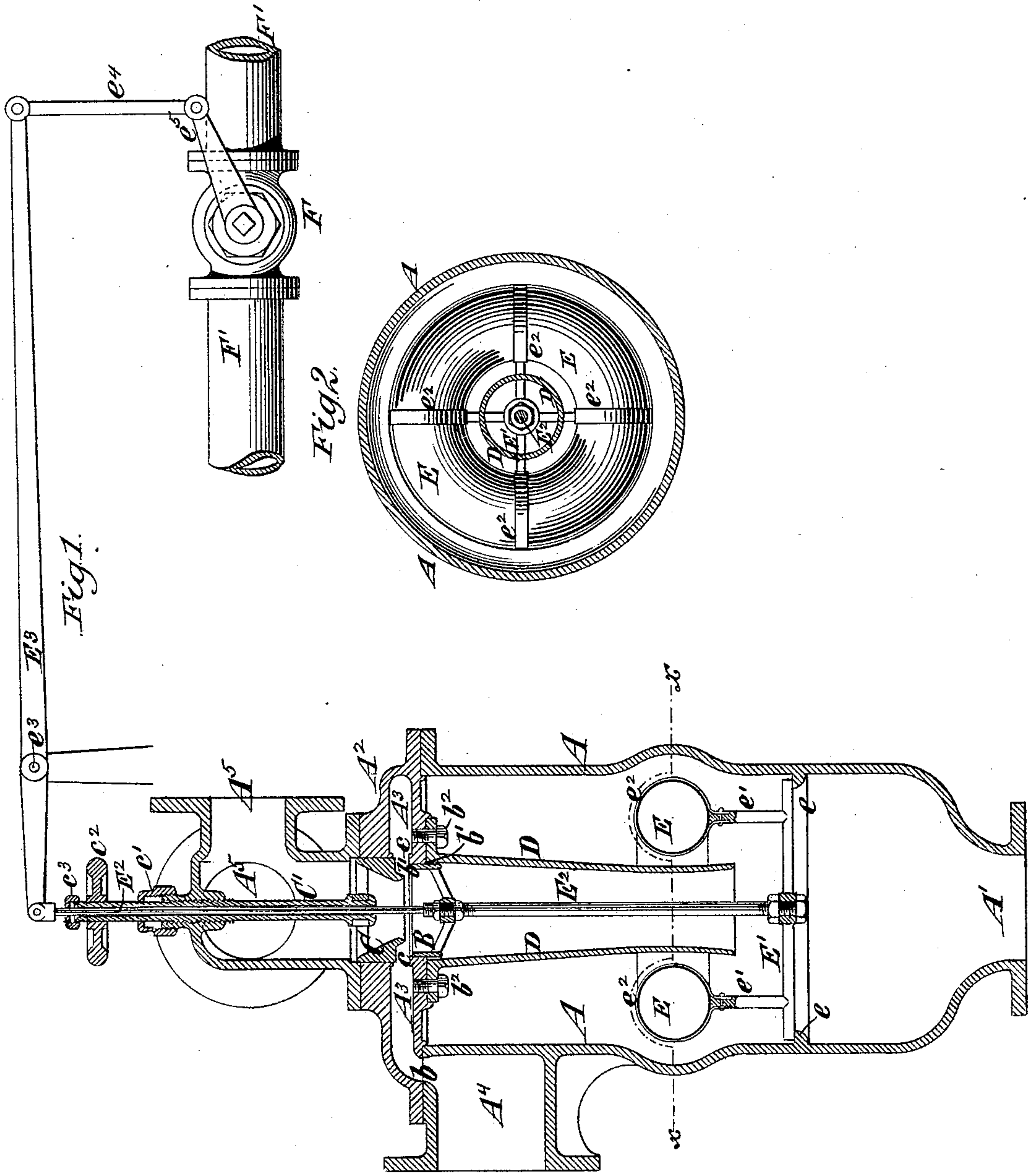


(No Model.)

W. CRAIG.
CONDENSER.

No. 365,119.

Patented June 21, 1887.



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UNITED STATES PATENT OFFICE.

WILLIAM CRAIG, OF BROOKLYN, NEW YORK.

CONDENSER.

SPECIFICATION forming part of Letters Patent No. 365,119, dated June 21, 1887.

Application filed April 7, 1887. Serial No. 233,978. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CRAIG, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Condensers, of which the following is a specification.

My invention is more particularly intended to be applied to the suction-pipes of pumps, so that the water which supplies the pump will be made effective in condensing the steam employed to drive the pump-operating engine; but the invention is also applicable to condensers employed for steam-engines, vacuum-pans, and other purposes.

The condenser which forms the subject of my invention comprises a body made in a suitable casting and an upper chamber which has inlets for steam and water, and which communicates by a throat with the body, and in the throat is arranged a valve which controls the flow of water into the body of the condenser, and is connected with a float for varying the inflow of water, according as the level of water in the condenser rises or falls.

In order that the water entering the body of the condenser shall not in its fall disturb the float, I provide a pipe or passage which leads downward from the throat to or slightly below the level of water in the body, and the float is arranged laterally beyond this pipe or passage and is, in preference, made of annular form, loosely surrounding but not fitting the exterior of the pipe or passage. The float may be connected with a guiding frame or spider, which is arranged below the end of the downwardly-extending pipe or passage, and is connected by a rod with the valve in the throat; and opposite the valve in the throat I preferably arrange a second valve, which may be adjusted upward or downward by hand from the exterior of the condenser.

When the condenser is employed in connection with a steam-pump, the valve which controls the flow of water through the throat into the body of the condenser may be connected in any convenient manner with the throttle-valve, whereby the supply of steam to the direct-acting or other engine which operates the pump may be controlled, and both these valves may be connected with and operated simultaneously by the float. Indeed,

if the condenser be employed in connection with an engine used for power purposes other than operating a pump-piston, the float may be dispensed with and the connections between the valve which controls the flow of water through the throat of the condenser and the throttle-valve, or other analogous device, which controls the supply of steam to the engine, will insure the simultaneous adjustment of said water-controlling valve and throttle-valve or device to correspondingly increase or diminish the flow of water and supply of steam.

In the accompanying drawings, Figure 1 represents a vertical section of a condenser embodying my invention, including a throttle-valve, which is connected with the float; and Fig. 2 is a horizontal section upon about the plane indicated by the dotted line *xx*, Fig. 1.

Similar letters of reference designate corresponding parts in both figures.

A designates the body of the condenser, which may be of cast metal, and which has at the bottom an outlet, A', through which it is connected with the suction-pipe of the pump. The casing or body A is surmounted by a head, A², having cored within it a chamber, A³. With the chamber A³ communicates an inlet, A⁴, for the portion of the suction-pipe which extends to the condenser. In this example of my invention the inlet or branch A⁴ for connection with the suction-pipe is formed upon the body A, and the port or passage *b*, leading therefrom to the chamber A³, constitutes a water-inlet to such upper chamber.

A⁵ designates the steam-inlet, and, as here represented, I have shown two branches or inlets, A⁵, at right angles to each other, so that the steam-pipe, whatever be the direction from which it leads to the condenser, may be conveniently connected therewith. The upper chamber, A³, communicates with the body A of the condenser by a throat, *b'*, in which I have represented a ring-shaped valve, B, and directly opposite this valve and throat, and in the steam-inlet, I have represented a second ring-shaped valve, C. From the throat *b'* a pipe or passage, D, extends downward into the body of the condenser, and terminates at its lower end at about the level of or slightly below the water in the condenser. This pipe or passage D is here represented as made sep-

arate from the head A^2 and as secured thereto by bolts b^2 , it being fixed in position. The steam entering at A^5 passes downward through the throat b' and through the pipe or passage D, and the water for condensing the steam flows laterally inward over the edge of the valve B and through the space c provided between the two valves B C. It will therefore be seen that any rising movement of the valve B will diminish the flow of water through the throat b' into the body of the condenser.

E designates the float, which is arranged laterally beyond the pipe or passage D, and which, as here shown, is of annular form, loosely surrounding the pipe or passage, but not in any sense fitting thereon. Inasmuch as the pipe or passage D extends below the normal position of the float, which is at the water-level, the water flowing through the pipe or passage D will not materially disturb the float.

As here represented, the float is connected with a guiding frame or spider, E' , which may rest upon a ledge or shoulder, e , projecting inward from the body of the condenser, and which has upwardly-extending arms e' connected with the float—in this example of my invention by bands e^2 embracing the float. I have here employed four bands for this purpose, as best shown in Fig. 2; but the number is immaterial. The guiding frame or spider E' is connected by a rod, E^2 , with the valve B, and it will thereby be understood that any rising or falling movement of the float E will correspondingly affect the valve B.

In this example of my invention the valve C is operated by a tubular stem, C' , which extends through a stuffing-box, c' , in the top of the condenser, and is provided with a hand-wheel, c^2 , whereby it may be turned; and I have also shown the rod E^2 as extending above the valve B, through the tubular stem C' , and through the stuffing-box c^3 at the top thereof, and connected with the lever E^3 , which is fulcrumed at e^3 .

F designates a throttle-valve which is arranged in a section of pipe, F' , and this pipe may be supposed to be the steam-pipe through which steam is supplied to the pump-operating or other engine in connection with which the condenser is used. The lever E^3 is connected by a rod, e^4 , with the arm e^5 on the valve F, and it will therefore be understood that any rising or falling movement of the float B will not only diminish or increase the flow of water through the throat b' into the condenser-body, but will also diminish or increase the flow of steam through the valve F to operate the engine.

When the condenser is employed in connection with an ordinary steam-engine used for power purposes, the float may be dispensed with, the rod E^2 being in such case only employed to connect the valve B and lever E^3 , and the throttle-valve F, or a governor, or a movable part of an automatic cut-off, consti-

tutes a device whereby the supply of steam for operating the engine is controlled. The valve B and the steam-controlling device are by the lever E^3 and rod E^2 so connected that they may be shifted simultaneously to correspondingly increase or diminish the supply of steam to the engine and the supply of water passing through the throat b' for condensing such steam.

The valve C may be set so as to admit substantially the flow desired through the space c , and the valve B will vary the flow as the supply of steam may be increased or diminished.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a condenser-body and an upper chamber having inlets for steam and water and communicating by a throat with the body, of a valve in said throat, a pipe or passage leading downward from the throat and fixed in position within the body, a float arranged laterally beyond the pipe or passage, and connections between said valve and float, substantially as herein described.

2. The combination, with a condenser-body and an upper chamber having inlets for steam and water and communicating by a throat with the body, of a valve in the throat, a pipe or passage extending downward from the throat, an annular float loosely surrounding but not fitting the pipe or passage, and connections between the float and said valve, substantially as herein described.

3. The combination, with the body A and the upper chamber having inlets for steam and water and communicating by a throat, b' , with the body, of the valve B in the throat, the pipe or passage D, the annular float E, loosely surrounding the pipe or passage, the guiding frame or spider E' , connected with the float, and the rod E^2 , connecting said frame or spider with said valve, substantially as herein described.

4. The combination, with a condenser-body and an upper chamber having steam and water inlets and communicating by a throat, b' , with the body, of a valve in said throat and a throttle-valve for controlling the supply of steam for operating a pump, a float arranged within the condenser-body, and connections between the float and said two valves whereby the rising movement of the float will diminish the flow of water through said throat and will more or less close the throttle-valve, substantially as herein described.

5. The combination, with the condenser-body and an upper chamber having steam and water inlets and communicating by a throat with the body, of the valves C B, arranged opposite each other in the steam-inlet and throat, the tubular stem C' , for operating the valve C by hand, the pipe or passage D, the annular float loosely surrounding the pipe or passage, and the rod E^2 , connecting the float with the valve B and prolonged upward through the tubular

stem C' to the valve-operating lever E³, substantially as herein described.

6. The combination, with a condenser-body and an upper chamber having steam and water inlets and communicating by a throat with the body, of a valve, B, for controlling the flow of water through the throat, a device for controlling the supply of steam to an engine in connection with which the condenser is used, and connections between the valve B and said

controlling device whereby the valve B and said device will be operated simultaneously to correspondingly increase or diminish the supply of water through the throat and the supply of steam for operating the engine, substantially as herein described.

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