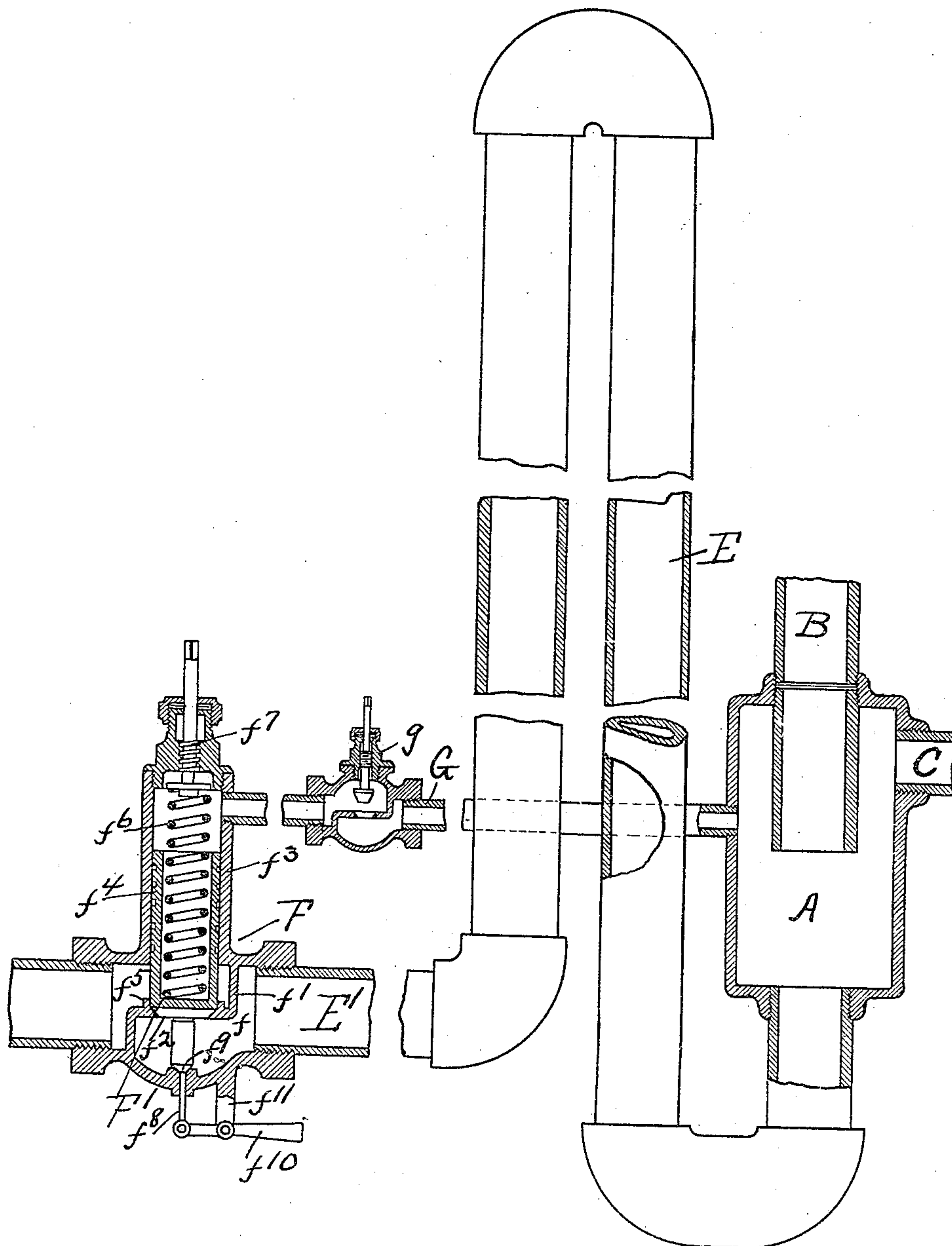


No. 841,311.

PATENTED JAN. 15. 1907.

R. CONRADER & A. J. GILLESPIE.
STEAM LOOP.

APPLICATION FILED JUNE 18, 1904.



Witnesses

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RUDOLPH CONRADER AND ANDREW J. GILLESPIE, OF ERIE, PENNSYLVANIA; SAID GILLESPIE ASSIGNOR TO SAID CONRADER.

STEAM-LOOP.

No. 841,311.

Specification of Letters Patent.

Patented Jan. 15, 1907.

Application filed June 18, 1904. Serial No. 213,185.

To all whom it may concern:

Be it known that we, RUDOLPH CONRADER and ANDREW J. GILLESPIE, citizens of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Steam-Loops, of which the following is a specification.

This invention relates to steam-loops; and it consists in certain improvements in the construction thereof, as will be hereinafter fully described, and pointed out in the claims.

Steam-loops have heretofore been made for the purpose of returning to the boiler the water produced by condensation in steam-pipes. It is desirable to arrange such devices that they may discharge the water produced by condensation not only into the boiler, but into any receptacle less than boiler-pressure or in some cases to the atmosphere. It is also desirable that such devices be operative with exhaust-steam or steam under very low pressure, as well as operative with the high pressure. This invention is designed to accomplish these desirable results.

The invention is illustrated in the accompanying drawing, wherein a loop is shown, the mechanism incident thereto being shown partly in section to better show construction.

The steam enters the steam-trap A through the pipe B and is conveyed from the pipe B to the pipe C through the trap A. The loop E is connected with the bottom of the trap A and discharges into the pipe E'. The pipe E' is connected with a valve device F. The valve device F comprises the chamber f , having the diaphragm f' , through which the valve-opening f^8 is arranged. Opposite the valve-opening f^2 a cylinder f^3 is arranged, and the valve F' has the piston or plunger f^4 extending from it into the cylinder f^3 . A pipe G connects the trap A with the upper end of the cylinder f^3 . This pipe G conveys steam to the upper end of the cylinder, so that the cylinder f^3 and plunger f^4 form a counter-pressure device, which acting on the valve F' balances the pressure incident to the steam exerted on the lower face of the valve.

From this it will be seen that the valve F' is only opened through the action of the pressure incident to the column in the loop and that it is immaterial whether the discharge-pipe is connected with the boiler with pressure as high as the steam-pressure or whether

it simply leads to the atmosphere. In either instance the discharge takes place with each accumulation of water in the loop, so that this loop device is of practically universal application.

We prefer to provide the small cylindrical projection f^5 for the valve, so that very little bevel may be required and the under surface of the valve subjected to pressure. We also prefer to provide the spring f^6 with the adjustable tension-screw f^7 . By this means the pressure on the valve may be increased or diminished, thus increasing or diminishing the necessary column of water in the loop to operate the valve.

We also prefer to provide means by which the valve may be positively opened, so as to ascertain that it is in working order and also to allow the air to pass out of the top. We provide the stem f^8 . This preferably has the valve f^9 for closing the opening through which the steam passes. The stem is pivoted on the lever f^{10} , and the lever f^{10} is pivoted on the arm f^{11} . It will readily be seen that by operating the lever f^{10} the stem f^8 may be pushed upward against the valve F, thus opening it. We also prefer to provide the connection G with the valve g , by means of which it may be shut off, so that the loop may be blown off at the side.

Where the device is used on exhausts for steam or steam under very slight pressure, the fact that the valve F is balanced prevents an inflow of air. The valve under the influence of the spring closes as soon as the column reaches the minimum position, which of course would be sufficient to overcome air-pressure, or at least the difference between the air-pressure and the partial vacuum formed in the loop.

What we claim as new is—

1. The combination with a steam-loop; of a discharge-valve and closed against pressure from the discharge end; and means for balancing the steam-pressure on said valve by subjecting both sides of the valve to said steam-pressure.

2. The combination with a steam-loop, a discharge-valve opening in the direction of movement of the fluid through it, and having the face thereof subjected to the liquid-pressure in the loop, means for balancing the steam-pressure on the valve.

3. The combination with a steam connec-

tion, and a steam-loop extending therefrom, of a discharge-valve for the loop balanced when closed against pressure from the discharge end, a counter-pressure device tending to maintain said valve in a closed position, connections between said counter-pressure device and the steam connection.

4. The combination with a steam connection, and a steam-loop extending therefrom, of a discharge-valve for the loop balanced when closed against pressure from the discharge end, a counter-pressure device tending to maintain said valve in a closed position, a steam-passage between the counter-pressure device and the steam connection.

5. The combination with a steam connection; a steam-loop extending therefrom; of a discharge-valve for the loop, said valve opening in the direction of the movement of fluid through it, the face of the valve being subjected to the liquid-pressure of the loop; and a counter-pressure device having substantially the area of the closed space of the valve; and a connection between the counter-pressure device and the steam connection.

6. The combination with a steam connection and steam-loop extending therefrom; of a discharge-valve balanced when closed against pressure from the discharge end; a cylinder opposite said valve; a plunger in said cylinder and arranged to operate against said valve; and a connection between said cylinder and said steam connection.

7. The combination with a steam connection and steam-loop extending therefrom, of a discharge-valve opening in the direction of the movement of fluid through it, and having its face subjected to pressure from the liquid in the loop, a cylinder opposite said valve, a plunger in said cylinder and arranged to operate against said valve, and a connection between said cylinder and said steam connection.

8. In combination with a steam connection and a steam-loop extending therefrom, of a discharge-valve balanced when closed against pressure from the discharge end, said valve opening in the direction of movement of fluid through it, and having its face subjected to the pressure of the liquid in the loop, and means for balancing the steam-pressure on said valve.

9. The combination with a steam connection; a steam-loop extending therefrom; of a discharge-valve for the loop opening in the direction of the movement of the fluid through it, and having its face subjected to the pressure of the liquid in the loop; and a counter-pressure device having substantially the area of the closed space of the valve; a connection between the counter-pressure device and the steam connection; and means for adjustably adding pressure to close the valve.

10. The combination with a steam connection; a steam-loop extending therefrom; of a discharge-valve for the loop opening in the direction of the movement of the fluid through it, and having its face subjected to the pressure of the liquid in the loop; and a counter-pressure device having substantially the area of the closed space of the valve; a connection between the counter-pressure device and the steam connection; and means for adjustably varying the pressure exerted by the pressure device to control the necessary column in the loop to effect the discharge.

11. The combination with a steam connection; a steam-loop extending therefrom; of a discharge-valve for the loop opening in the direction of the movement of the fluid through it, and having its face subjected to the pressure of the liquid in the loop; and a counter-pressure device having substantially the area of the closed space of the valve; a connection between the counter-pressure device and the steam connection; and a spring arranged to operate against the valve to maintain the valve in a closed position until a given height of column in the loop is reached.

12. The combination with a steam connection, a water-column chamber extending therefrom, a discharge-valve for said chamber, a spring tending to close said valve, said spring being opposed to the weight of the column of liquid in the chamber, and means for balancing the steam-pressure on the mechanism.

13. The combination with a steam connection; a steam-loop extending therefrom; of a discharge-valve for the loop; and a counter-pressure device having substantially the area of the closed space of the valve; a connection between the counter-pressure device and the steam connection; and a spring arranged to operate against the valve to maintain the valve in a closed position until a given height of column in the loop is reached; and means for varying the force of the spring.

14. The combination with a steam connection and steam-loop extending therefrom; of a discharge-valve; a cylinder opposite said valve; a plunger in said cylinder and arranged to operate against said valve; a connection between said cylinder and said steam connection; and means for manually actuating the valve to open it.

15. The combination with a steam connection; a steam-loop extending therefrom; of a discharge-valve for the loop; and a counter-pressure device having substantially the area of the closed space of the valve; a connection between the counter-pressure device and the steam connection; and a valve in said connection between the pressure device and steam connection.

16. The combination with a steam-loop E;
a steam connection A with which said loop
is connected; a discharge-valve device F
connected with the loop comprising the dia-
5 phragm f' having the valve-opening f^2
therein, the valve F' operating upon said
opening and connected with the plunger f^4 ,
and the cylinder f^3 in which the plunger op-
erates; the connection G connecting the con-
10 nection A with the cylinder f^3 ; the valve g

in said connection; and the stem f^8 for
manually opening the valve F' .

In testimony whereof we have hereunto
set our hands in the presence of two subscrib-
ing witnesses.

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ANDREW J. GILLESPIE.

Witnesses:

C. D. HIGBY,
H. C. LORD.