

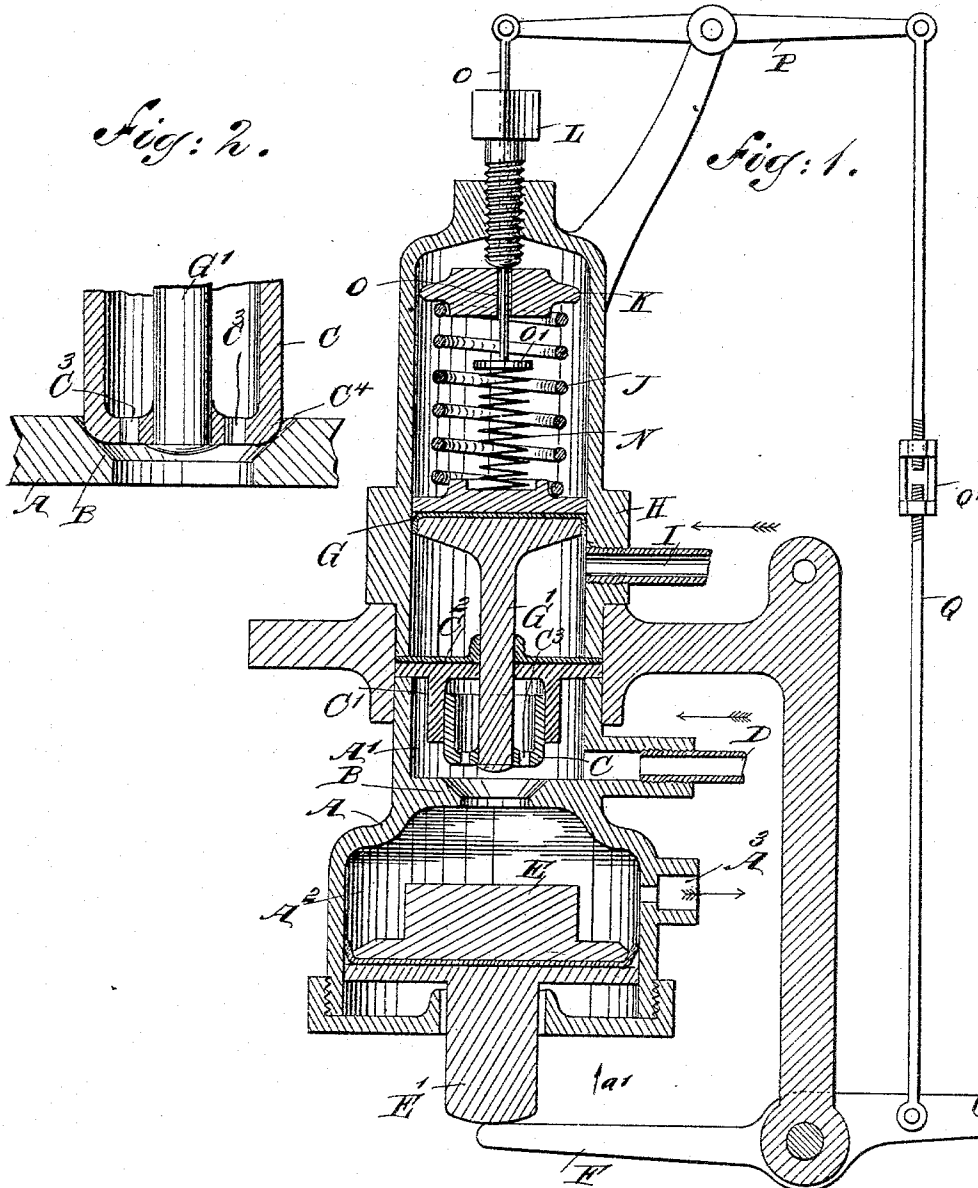
(No Model.)

2 Sheets—Sheet 1.

T. P. FORD.
VALVE.

No. 531,917.

Patented Jan. 1, 1895.



WITNESSES:

Chas. Nicola.
Thos. G. Foster.

INVENTOR

T. P. Ford

BY

Munn & Co.
ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

T. P. FORD.
VALVE.

No. 531,917.

Patented Jan. 1, 1895.

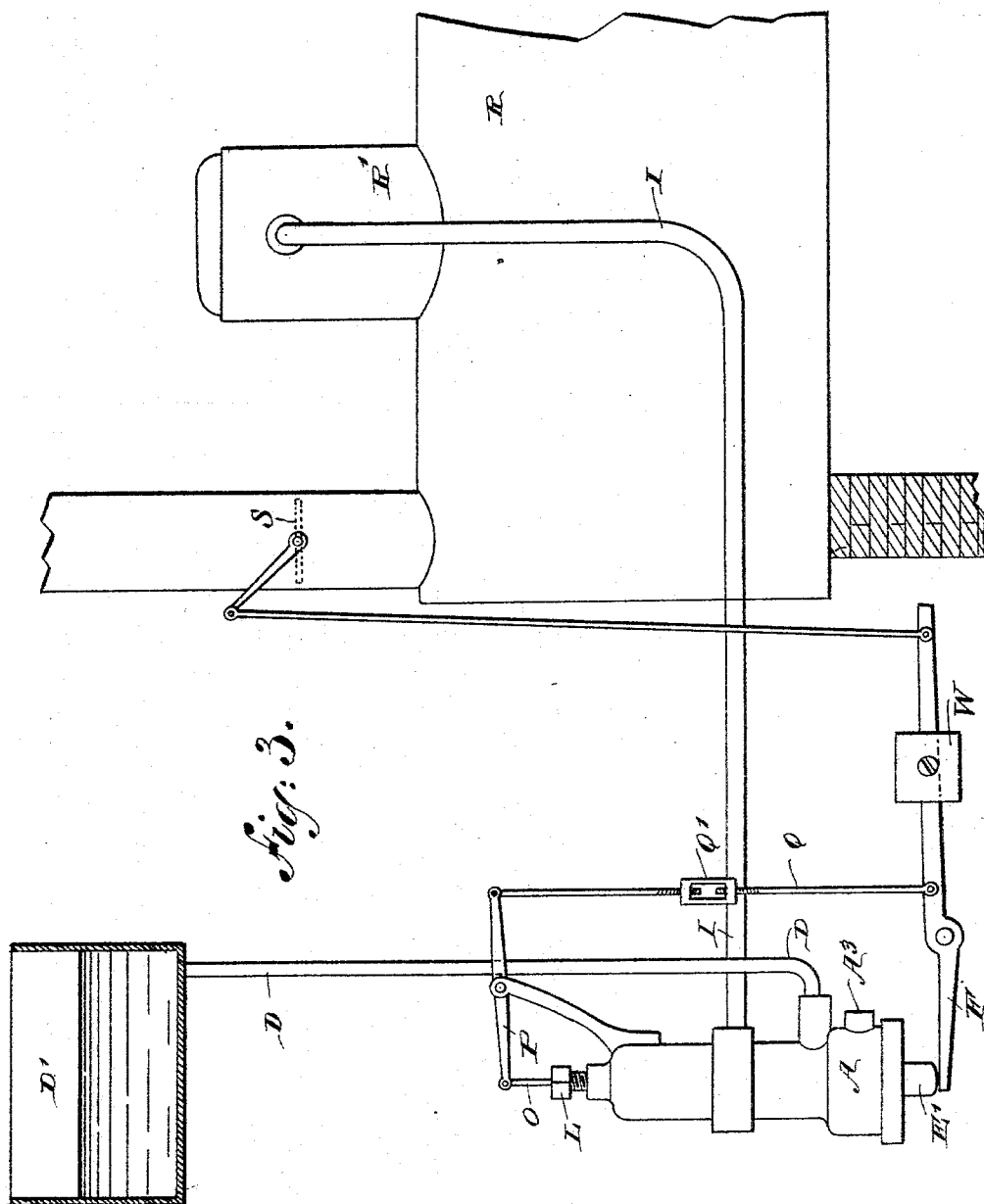


Fig. 3.

WITNESSES:

Chas. Viola
John L. Lora

INVENTOR

T. P. Ford

BY

Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

THOMAS P. FORD, OF BROOKLYN, NEW YORK.

VALVE.

SPECIFICATION forming part of Letters Patent No. 531,917, dated January 1, 1895.

Application filed April 10, 1894. Serial No. 507,014. (No model.)

To all whom it may concern:

Be it known that I, THOMAS P. FORD, of Brooklyn, in the county of Kings and State of New York, have invented new and useful
5 Improvements in Valves, of which the following is a full, clear, and exact description.

The invention relates to valves, such as shown and described in Letters Patent of the United States Nos. 489,799 and 503,843,
10 granted to me on the dates of January 10, 1893, and August 22, 1893, respectively.

The object of the present invention is to provide certain new and useful improvements in valves, whereby a sensitive action of the
15 valve is obtained on the slightest variation of the fluid pressure.

The invention consists of certain parts and details, and combinations of the same, as will be fully described hereinafter and then
20 pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate
corresponding parts in all the views.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is an enlarged sectional
25 side elevation of the valve proper and its seat. Fig. 3 is a side elevation, partly in section, of the improvement in connection with a boiler.

The improved valve is provided with a valve body A, formed with a valve seat B, dividing
30 the body A into the compartments A' and A², of which the former contains a valve C, adapted to be seated on the valve seat B so as to cut off communication between the cham-
35 bers A' and A², the said chambers being in communication with each other as long as the valve C is unseated from the valve seat B.

Into the chamber A' leads a pipe D connected with a suitable source of fluid pressure
40 supply such as a water tank D', shown in Fig. 3, and in the chamber A² is fitted to slide a piston E, adapted to be moved in a downward direction by the fluid pressure passing
45 through the pipe D, the chamber A', and the open valve seat B into the chamber A², as will be readily understood by reference to Fig. 1. On the under side of the piston E is arranged
50 a piston rod E', adapted to press a lever F connected with a regulating device of any approved construction, and serving to regulate and control the fluid pressure as hereinafter

more fully described. In the chamber A² is arranged a drain opening A³, to permit the fluid pressure passing into the said compartment to drain out of the same whenever the
55 valve C is seated on the seat B.

The escape opening A³ from the cylinder A² is made smaller than the inlet pipe D to the chamber A', so that fluid may enter the cylinder
60 faster than it can escape, in order that a pressure may be maintained in the chamber A² as long as the position of the valve C will permit the fluid to pass into the cylinder A²
65 faster than it can pass out.

The valve C is preferably of cylindrical cup shape, and is held on the lower end of a piston
70 rod G' extending upwardly and carrying at its upper end a piston G mounted to slide in a cylinder H, separated from the compartment or chamber A' by a partition C², through
75 which passes the said piston rod G', and which partition supports on its under side an annular flange C', in which is fitted to slide the cup-shaped valve C.

Into the lower end of the cylinder H discharges a pipe I, connected with a suitable
80 source of pressure supply, for instance, the steam compartment R' of a boiler R, in case the lever F is connected with a device regulating the draft of the said boiler such as a damper, S, to control the pressure of steam
85 in the said boiler.

On the top of the piston G, presses a spring J, abutting with its upper end on a head K, controlled by a set screw L screwing in the
85 top of the cylinder H, so that the said set screw regulates the tension of the spring J. On the top of the piston G also presses a light spring N, resting with its upper end on a disk O'
90 held on a rod O passing loosely through the head K and the set screw L, to connect at its upper outer end with a lever P, fulcrumed on a bracket secured to the cylinder H. The
95 lever P is pivotally connected with the lever F by a link Q provided with a turnbuckle Q', so that when the lever is moved downward by the action of the piston E, then the link Q is
100 moved upward to actuate the lever P so as to press the rod O downward to compress the spring N, and thus exert an auxiliary pressure on the piston G.

In the bottom of the valve C are formed a number of openings C³, through which the

fluid passing into the chamber A' can pass so as to equalize the pressure on both sides of the said valve. The lower corner of the valve C is rounded off, as at C⁴, see Fig. 2, whereby the valve in seating, touches the valve seat only in a circular line, whereby the valve is rendered very highly sensitive.

The operation is as follows: In case the valve is used for regulating, for instance, a damper controlling the draft under a boiler, to regulate the steam pressure of the boiler, and the several parts of the device are in their normal position, then the pressure of the spring J holds the valve C down on its seat (see Fig. 2), as long as the pressure in the boiler is normal. The damper S is then open. When the boiler pressure increases, the piston G will be forced upward, so that the valve C is moved in a like direction, and communication is established between the chambers A' and A² whereby the fluid in pipe D is allowed to act on the piston E to force it downward and actuate the damper regulating device to close the damper as shown in Figs. 1 and 3, the lever F being swung in the opposite direction to that of the arrow a'. As soon as the pressure in the boiler again decreases, the pressure of the spring J will return the valve C to its seat, so as to relieve the piston E from pressure. The damper regulating device is weighted as shown at W, or spring-controlled, and the said weight or its equivalent causes the piston E to move upward, allowing the fluid to escape at A³, and the damper is thus returned to its open position to increase the draft. At the same time, the link Q by moving downward, produces an upward pull on the spring N and thereby facilitates the upward movement of the piston G and valve C when the pressure in the boiler again increases. Thus by the connection of the link Q with the levers F and P, the rod O and spring N, I am enabled to start the piston G downwardly, so as to render the valve more sensitive. It is understood that this valve may be employed for various other purposes than the one mentioned.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a regulating device and mechanism for controlling the same, of two chambers separated by a valve seat, and one having a drain opening and the other being connected with a supply of fluid under pressure a piston arranged in the said chamber having the drain opening, the said piston being operatively connected with the said controlling mechanism to actuate the same, a valve controlling the said valve seat to admit or cut off fluid pressure to or from the said piston, a cylinder and a piston therein, the said piston being connected with the said valve and the cylinder being provided with an inlet port connected with a separate and independent supply of fluid under pressure, substantially as described.

2. The combination with a regulating device and mechanism for controlling the same, of two chambers separated by a valve seat, and one having a drain opening and the other being connected with a supply of fluid under pressure, a piston arranged in the said chamber having the drain opening the said piston being operatively connected with the said controlling mechanism to actuate the same, a valve controlling the said valve seat to admit or cut off fluid pressure to or from the said piston, a cylinder and a piston therein, the said piston being connected with the said valve and the cylinder being provided with an inlet port connected with a separate and independent supply of fluid under pressure, and a yielding connection between the said cylinder piston and the said controlling mechanism to start the said piston downward and to render the said valve more sensitive, substantially as described.

THOMAS P. FORD.

Witnesses:

THEO. G. HOSTER,
C. SEDGWICK.