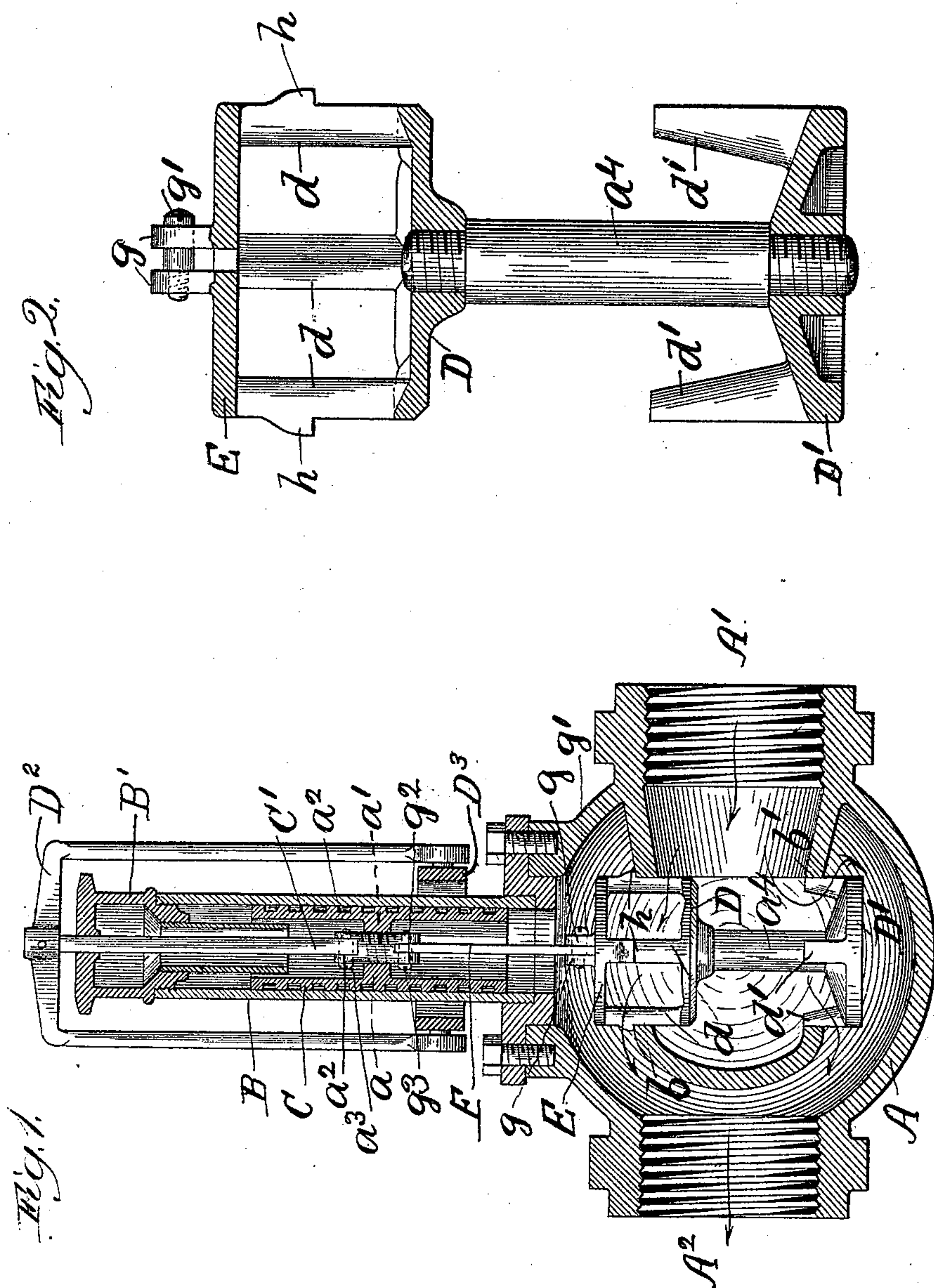


(No Model.)

G. M. DAVIS.  
PRESSURE REDUCING VALVE.

No. 518,000.

Patented Apr. 10, 1894.



Witnesses:  
 Geo. E. Daylord,  
 L. M. Freeman.

Inventor:  
Geo. M. Davis.  
By L. B. Coupland & Co.  
Attys.



# UNITED STATES PATENT OFFICE.

GEORGE M. DAVIS, OF CHICAGO, ILLINOIS.

## PRESSURE-REDUCING VALVE.

SPECIFICATION forming part of Letters Patent No. 518,000, dated April 10, 1894.

Application filed December 13, 1890. Serial No. 374,591. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE M. DAVIS, 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 Pressure-Reducing Valves, of which the following is a full, clear, and exact description, that will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in that class of valve devices set forth in Letters Patent No. 339,865, issued to me April 13, 1886.

The object of the present invention is to so improve the construction of the double valve as to equalize the pressure of the incoming current on the upper and lower valve alike and thereby maintain a proper balance. The double valve shown in the patent referred to is of the wing pattern and when in an open position the lower valve presents a greater area of surface to the action of the inflowing current, as the valve is below the seat and the current strikes the upper side; thus the surface of the impact is equal to the diameter. On the other hand the upper valve offers less resistance as the current has comparatively a clear opening above the valve, there being no flat surface to correspond to the impinging surface of the lower valve. The action is therefore irregular; the valve not responding to a slight variation of the pressure.

Figure 1 is a vertical transverse section of a device embodying my improved features; Fig. 2 a vertical section of the valve proper detached.

Referring to the drawings, A represents the body or casing inclosing the valve-chamber, A' the inlet and A<sup>2</sup> the exit-passage. The steam-cylinder B is mounted on the upper side of the valve-casing. Inside of this cylinder is located the tubular piston C, provided with the diaphragm,  $\alpha$ , having a centrally threaded aperture in which is inserted the correspondingly threaded stud,  $\alpha'$ , projecting both above and below said diaphragm, as shown. The upper end of this stud is provided with the lugs  $\alpha^2$  between which is inserted the lower end of the stem C' secured in place by the pin  $\alpha^3$  passing through the lugs and stem. The stem C' projects through a

central opening in the cap B', and loosely supports the yoke D<sup>2</sup>, as shown. The said yoke consists of a horizontal bar and two vertical bars extending downward at right angles therefrom, the lower ends of which are pivoted to the circular part of lever D<sup>3</sup>, which is fulcrumed at one end on the valve chamber and carries at its other end a movable weight for adjusting the pressure on the valves.

The double valve in this improvement is of the disk form; D representing the upper disk-valve, and D' the lower. These valves are connected by the cylindrical stem  $\alpha^4$ .

$b$  represents the upper and  $b'$  the lower valve seat. The upper valve is provided with a number of guide-posts  $d$ , and the lower valve with the corresponding posts  $d'$  which have a bearing in the valve seats and serve to retain the double-valve in its proper relative position. The cylindrical stem connection between the valves presents a smaller area to the action of the current than the wing valve. The cap-plate or disk, E, is seated on top of the guide posts of the upper valve and is of a diameter corresponding to that of the disk-valves. The double valve is shown in its full open position.

In operation, the incoming volume is divided into two currents, as indicated by the arrows, the upper current impinging on the under side of the cap-plate, E, which has the effect of equalizing the impact of the lower current on the upper surface of the lower valve, and maintaining an equilibrium and the sensitive action required in a device of this character. The upper side of the cap-plate E is provided with lugs  $g$  between which is secured the lower end of the link F, by the pin  $g'$ . The upper end of the link F is secured between the lugs  $g^2$ , formed on the lower end of the stud  $\alpha'$ , by means of the pin  $g^3$ . The shoulders  $h$ , formed on the outer sides of the guide posts  $d$  of the upper valve, are adapted to come in contact with the edge of the surrounding valve-seat and limits the movement of the double-valve device in that direction.

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

1. In a pressure reducing valve, the combination of the chambered casing, an inlet pipe



projecting into the chamber, an outlet port leading from the chamber, upper and lower valve openings in the inlet pipe, upper and lower valves connected together and adapted  
5 respectively to said openings, a cap-plate connected with the upper valve and overhanging its valve opening on the opposite side from the valve, shoulders or stops to prevent the cap-plate from closing the opening when the  
10 valves are opened, and means for balancing the valve; substantially as described.

2. In a pressure reducing valve, the combination of the chambered casing, an inlet pipe projecting into the chamber, an outlet port  
15 leading from the chamber, upper and lower valve openings in the inlet pipe, upper and lower valves connected together and adapted respectively to said openings, a cap-plate connected with the upper valve and overhang-  
20 ing its valve opening on the opposite side from the valve, a steam cylinder communicating with the chamber, a piston working in said cylinder and connected on one side with a weight carrying frame, and a link-and-pin  
25 connection between the other side of the piston and the cap-plate, substantially as described.

3. In a pressure reducing valve, the combination of the chambered casing, an inlet pipe  
30 projecting into the chamber, an outlet port leading from said chamber, upper and lower valves adapted respectively to said openings, a cap-plate connected with the upper valve and overhanging its valve opening on the opposite side from the valve, a steam cylinder  
35 communicating with the chamber, a piston working in said cylinder, a link-and-pin connection between one side of the piston and

the cap-plate, and a link-and-pin connection between the other side of the piston and a  
40 weight carrying frame; substantially as described.

4. In a pressure reducing valve, the combination of the chambered casing, an inlet pipe projecting into the chamber, an outlet port  
45 leading from the chamber, upper and lower valve openings in the inlet pipe, upper and lower valves connected together and adapted respectively to said openings, guide projections on the valves, a cap-plate connected with  
50 the upper valve and overhanging its valve opening on the opposite side from the valve, and shoulders or stops on the guide projections to prevent the cap-plate from closing the opening when the valves are opened; sub-  
55 stantially as described.

5. In a pressure reducing valve, the combination of the chambered casing, an inlet pipe projecting into the chamber, an outlet port  
60 leading from the chamber, upper and lower valve openings in the inlet pipe, upper and lower valves connected together and adapted respectively to said openings, and a cap-plate connected with the upper valve and over-  
65 hanging its valve opening on the opposite side from the valve, said plate being arranged to leave a free space between itself and the valve-opening during all the movements of the valve, and being also free of any connection with the side walls of the valve chamber;  
70 substantially as described.

GEORGE M. DAVIS.

Witnesses:

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L. B. COUPLAND.