

*Andrews & Armstrong,
Governor.*

No 78,410.

Patented June 2, 1868.

Fig 1

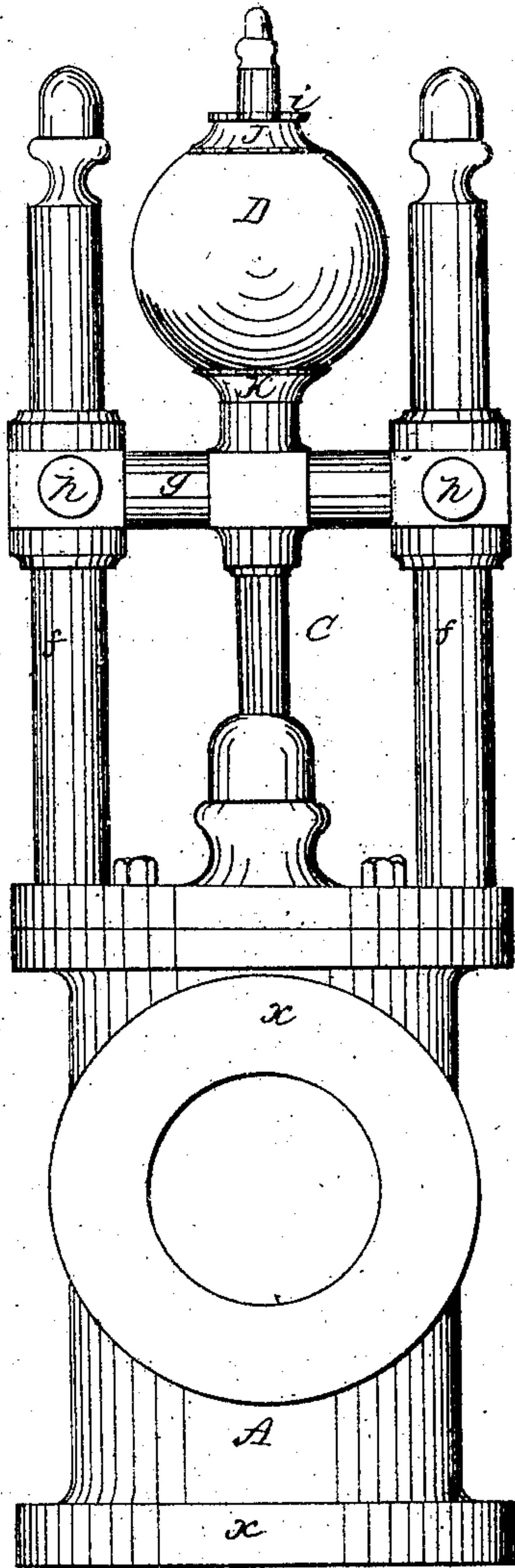


Fig 2.

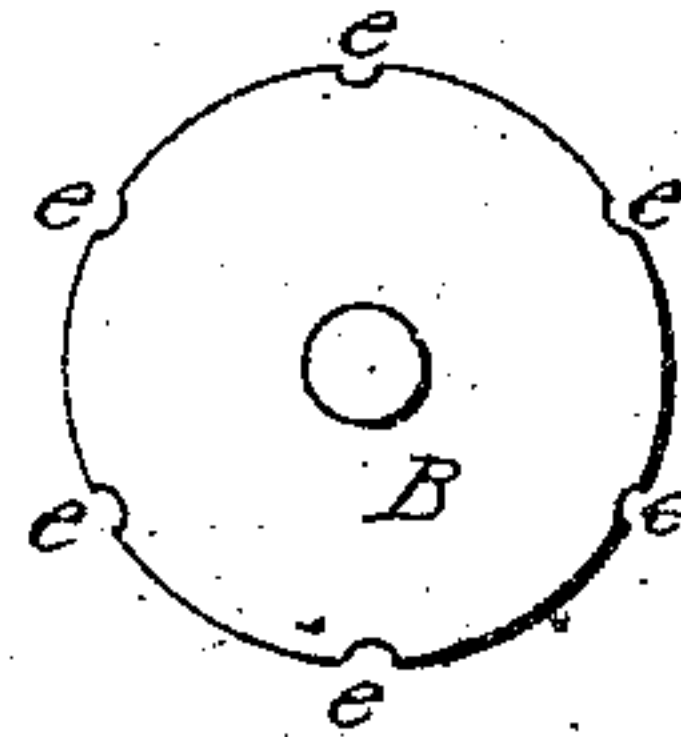


Fig 3.

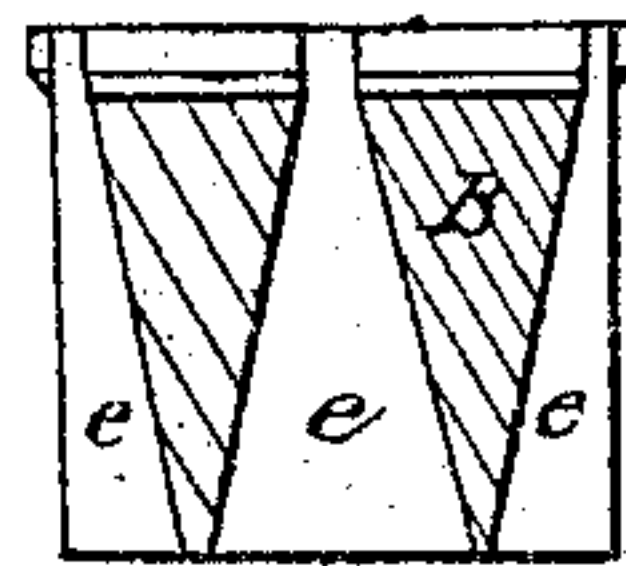


Fig 4.

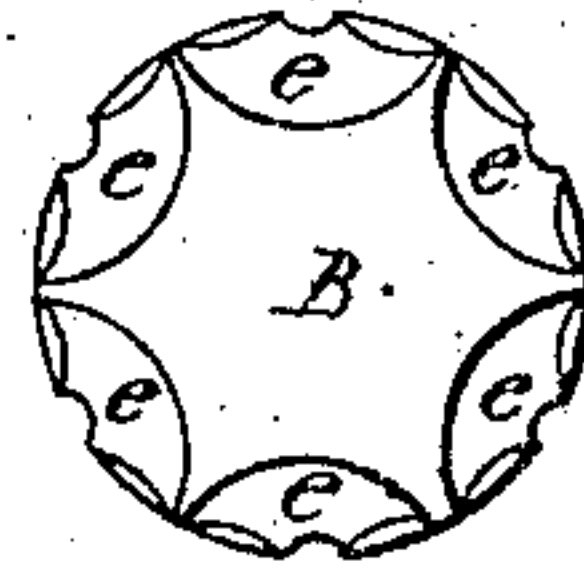
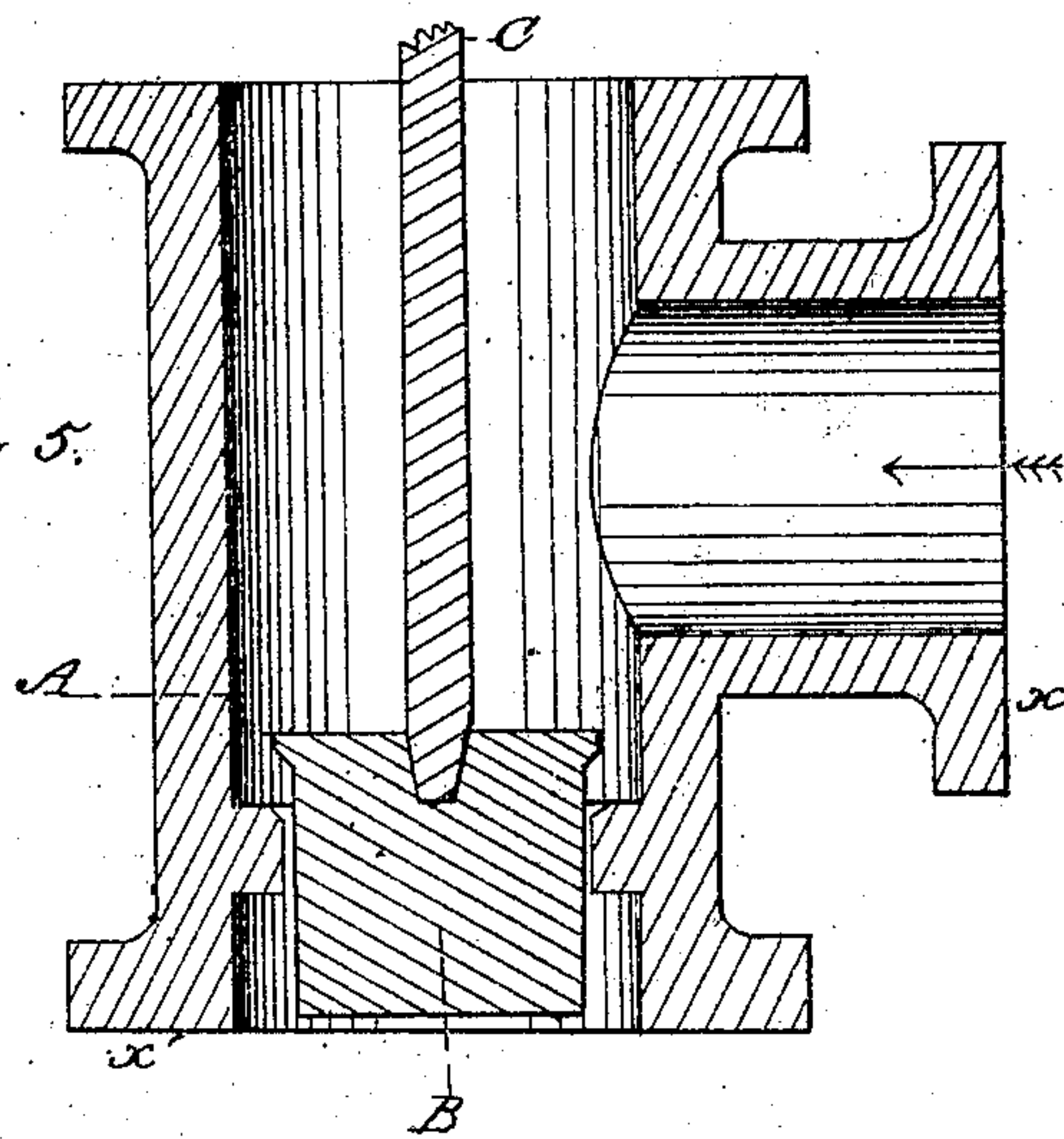


Fig 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

ROBERT ANDREWS AND EDWARD ARMSTRONG, OF ALLEGHENY, PA.

IMPROVEMENT IN GOVERNOR-VALVES.

Specification forming part of Letters Patent No. 78,410, dated June 2, 1868; antedated May 12, 1838.

To all whom it may concern:

Be it known that we, ROBERT ANDREWS and EDWARD ARMSTRONG, both of the city and county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Regulating-Valves for Steam-Engines; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon.

The nature of our invention consists in suspending a valve or valves by means of a spring or springs, steam or other device, and so arranged with relation to the cylinder and piston of the engine and the steam-boiler, that said valve or valves will regulate the supply of steam to said cylinder and piston in proportion to the increase or decrease in the pressure of the steam in the boiler, or the increase or decrease in the travel of the piston, the action of said valve or valves being in every case dependent upon either the variation of pressure of steam in the boiler, or the travel of the piston, combined with the means used for the suspending of the valve or valves.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

In the accompanying drawings, which form part of our specification, Figure 1 is a side elevation of our improvement in regulating-valve for steam-engines. Fig. 2 is a top view of the valve. Fig. 3 is a side view of the valve. Fig. 4 is a bottom view of the valve. Fig. 5 is a longitudinal section of the valve and its chamber.

In the drawings, A represents the valve-chamber. B represents the valve, which is attached to the stem C, provided with washers J and K, between which, on the stem C, is placed a gum spring, D, which is held in position on the stem C by the pin *i*. The stem C passes through and is suspended to the cross-piece *g*, held in the desired position on the columns *f* by means of the set-screws *h*. The form of the openings in the valve is clearly shown in Figs. 2, 3, and 4, and marked *e*. As the form, arrangement, and the relation that the several parts bear to each other are clearly shown in the accompanying drawings,

and will readily be understood by the skillful mechanic, we will at once proceed to describe the operation of our improvement.

We place our regulating-valve at any desired point between the cylinder of the engine and steam-boiler, connecting the steam-supply pipe to the flanges *x* and *x'*. We then adjust the cross-piece *g* on the columns *f*, so that the valve B will admit the necessary supply of steam to the cylinder—that is to say, we raise or lower the valve in accordance with the power required of the engine at the starting off. Now, if the pressure of steam in the boiler at the starting-off point should be one hundred pounds' pressure to the square inch, and it required this pressure to enable the engine to do its work with the valve B adjusted as described, then any change in the pressure of steam in the boiler or change in the travel of the piston will cause the valve B to rise or fall in proportion to the change of said pressure or travel. If the pressure in the boiler increases, or the travel of the piston increases by relieving the engine from part of its load or from other cause, in either of these events the valve will be forced down by the increased pressure of the steam on the upper end of the valve, and the pressing down of the valve will diminish the inlet of steam to the cylinder in proportion to such increased pressure on the upper end of the valve. If the pressure of steam in the boiler should decrease, or the travel of the piston should decrease in speed, so that the pressure of steam above and below the valve B becomes about equal, then the valve B will be raised up by the spring D, the action of which will be readily understood by reference to the accompanying drawings. The raising up of the valve will increase the inlet of steam to the cylinder, and thereby keep up the desired travel of the piston.

It will readily be seen and understood from the above description that the valve B is raised or lowered by the difference of pressure of steam on the ends of the valve. If the pressure of steam is greatest on the upper end, then it will be lowered; but if the pressure is greatest on the lower end, then it will be raised.

Now, we wish it clearly understood that we do not confine ourselves to any one mode of suspending the valve, nor to any one form or

kind of valve, for the skillful mechanic will readily understand that in the application of our improvement to large engines it may be necessary to use a partly-balanced valve, and other things in constructing engines may require changes of form in the valve used in our improvement, and also in the manner of suspending it.

Having thus described the nature, construction, and operation of our improvement, what we claim as of our invention is—

The arrangement of the valve B, stem C, spring D, adjustable suspension-bar *g*, and columns *f*, constructed, arranged, and operating substantially as herein described, and for the purpose set forth.

ROBERT ANDREWS.

EDWD. ARMSTRONG.

Witnesses:

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ALEXANDER HAYS.