No. 734,737.

PATENTED JULY 28, 1903.

J. W. NEIL.

GOVERNOR.

APPLICATION FILED JUNE 21, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

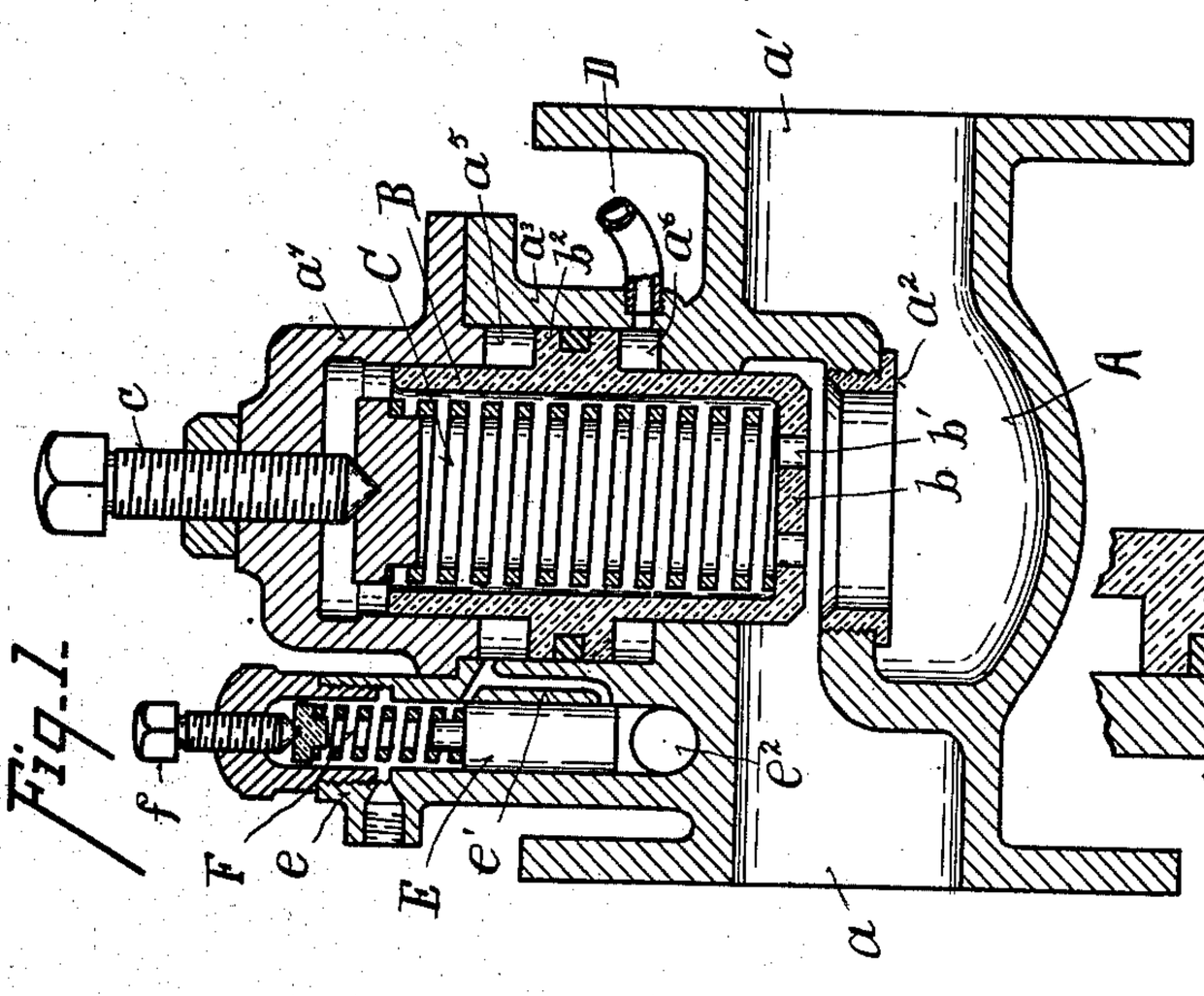


Fig. 3.

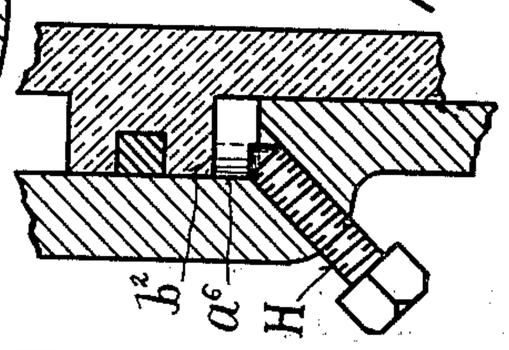
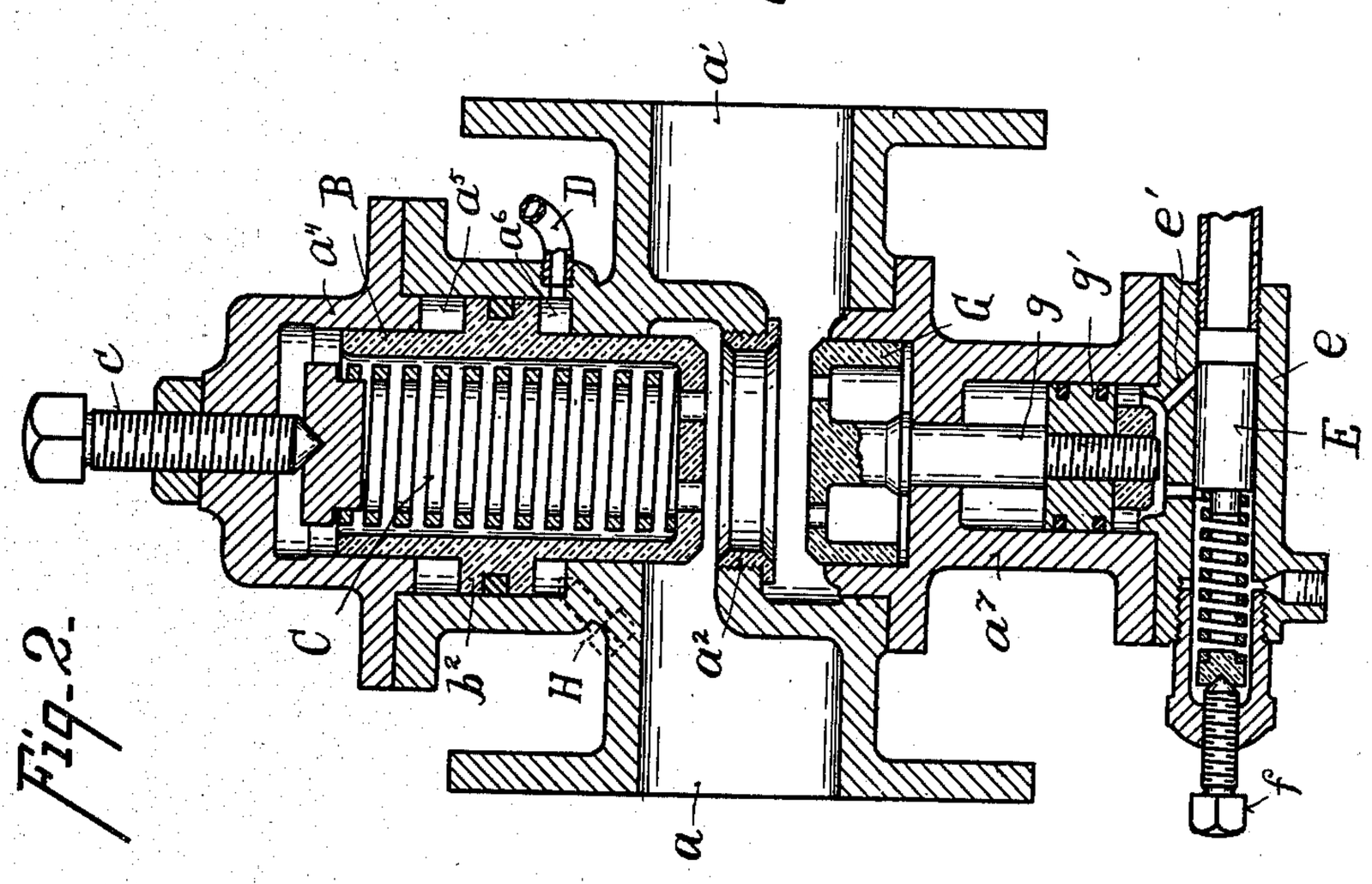


Fig. 2.



Witnesses
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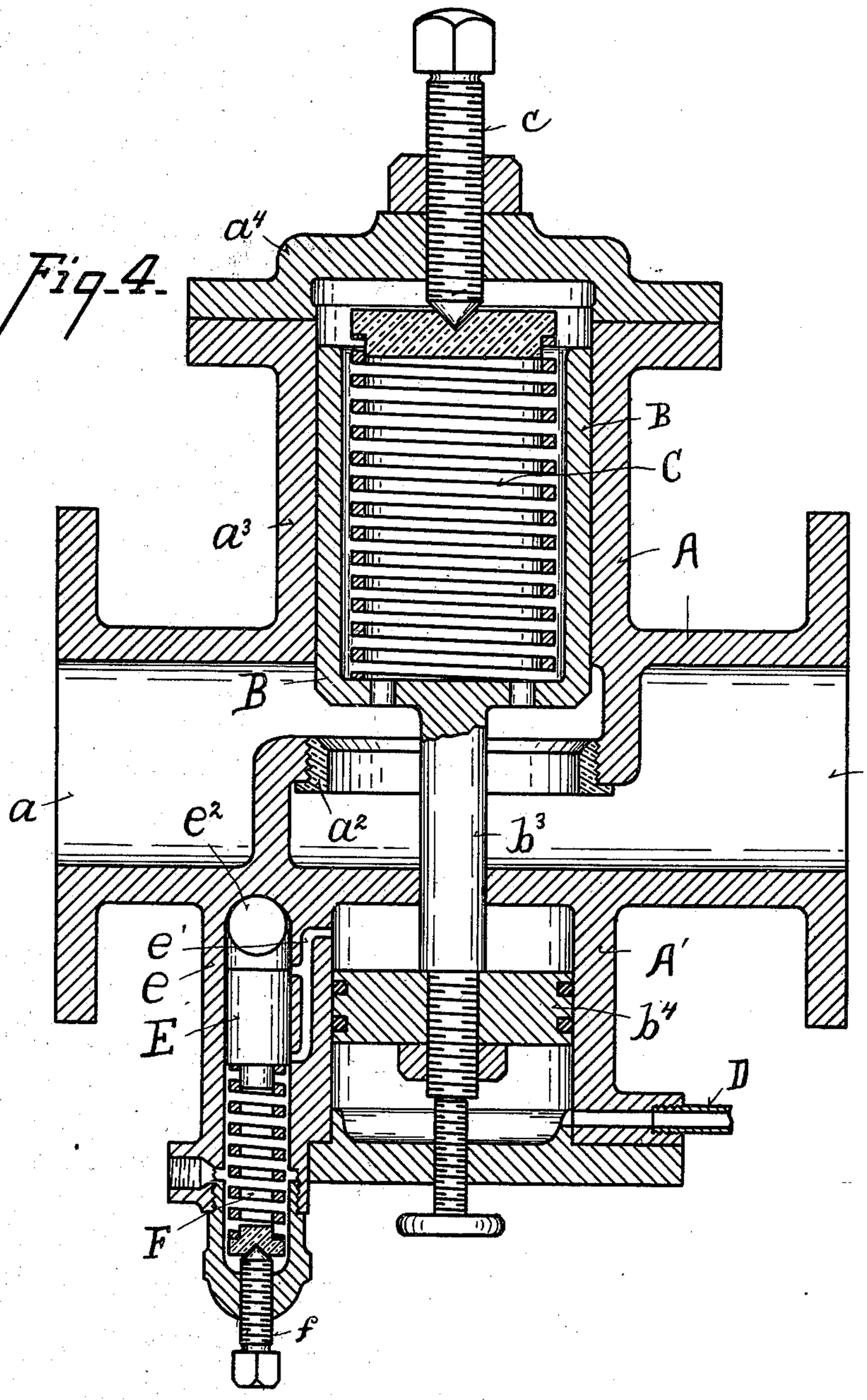
NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.



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No. 734,737. Patented July 28, 1903.

UNITED STATES PATENT OFFICE.

JOHN W. NEIL, OF CINCINNATI, OHIO.

GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 734,737, dated July 28, 1903.

Application filed June 21, 1902. Serial No. 112,564. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. NEIL, a citizen of the United States of America, and a resident of Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Governors, of which the following is a specification.

The object of my invention is a valve for regulating the supply of steam to pumping-engines, so that as the pressure against which the engine is working increases the valve will be carried from its seat in direct proportion thereto and which when a limit-pressure has been reached will be carried to its seat automatically.

The invention is illustrated in the accompanying drawings and will first be described in connection therewith and then be pointed out specifically in the claims.

Referring to the accompanying drawings, Figure 1 is a central sectional view of a governor or valve embodying my invention. Fig. 2 is a modified form thereof. Fig. 3 is a detail view, upon an enlarged scale, showing the means for raising the valve from its seat by hand. Fig. 4 is a central vertical view of another modification.

Referring to the parts, valve-casing A has an admission-port a, a discharge-port a', a horizontal diaphragm perforated to form the valve-seat a^2, an upwardly-projecting cylindrical extension a^3, which is closed at its top by a cap a^4 and within which slides the valve B, which is normally held to its seat by a spring C, the tension of which may be regulated by a set-screw c, extending downward through the top of extension a^3. Valve B consists of a cylindrical shell open upon its upper end and closed upon its lower end b, except for perforations b' therein. These perforations permit the steam to pass up into the valve when it is raised from its seat, and thereby render it a balanced valve. The parts thus far described are common to the modifications shown in all the figures.

In Figs. 1 and 2 extension a^3 is enlarged a short distance above the steam-passage, and valve B has a horizontal annular flange b^2, which divides the enlarged portion of extension a^3 into chambers a^5 and a^6, respectively, above and below the flange b^2. Into chamber a^6 a pipe D, leading from discharge of the engine to the governor, is led. Now it is seen that when the discharge-pressure increases that the valve B is raised from its seat in proportion thereto to allow a greater supply of steam to be admitted to the pump to meet the increased demands upon it. The proportion in which the valve will raise may be regulated by changing the tension of the spring C.

Upon the side of casing A in Fig. 1 is formed an auxiliary casing e, which has a channel e' running into chamber a^5 above flange b^2. Within casing e is an auxiliary piston-valve E, which normally covers channel e', the valve being held in its position by a spring F, whose tension is set at that of the limit-pressure by means of a set-screw f at the top of the valve-casing e. A channel e^2 leads into casing e at the opposite end of the valve E from the spring F.

Now it is seen that when the pressure at discharge exceeds that above which it is desired that the pump shall not go valve E will be raised, channel e' opened, and the pressure will be communicated to the top of the flange b^2, thereby balancing the pressure upon the under side of the flange coming into pipe D, and spring C will carry the valve to its seat and retain it there until the pressure at discharge falls below the limit-pressure, when the valve E will be returned by the spring F, so as to cover channel e', when, the pressure being taken off of the upper side of flange b^2, the pressure upon the lower side will immediately raise it a distance proportionate to the work demanded of the pump.

In the modification shown in Fig. 2 casing A has a downward extension a^7 below the valve-seat, within which slides a secondary valve G, which has a downwardly-extending stem g and a piston g' upon the end of the stem to fit snugly within extension a^7. Valve-casing e is placed upon the lower end of casing a^7 and has a channel e' leading into it beneath piston g'. Now when the pressure at discharge exceeds a certain limit valve E will be carried back of channel e' and the pressure will carry valve G up, seating it upward against valve-seat a^2 and closing off the supply of steam to the pump.

In each of the forms shown in Figs. 1 and 2 there is a hand-screw H, extending inward

through casing A beneath flange b^2, by which the valve may be raised from its seat voluntarily when desired.

In the modification shown in Fig. 4 flange b^2 is omitted from valve B, which then fits snugly within extension a^3 along its entire circumference. Valve-casing A has formed upon it centrally below the valve-seat a closed cylindrical chamber A′, and valve B has a downwardly-extending vertical valve-stem b^3, which extends into chamber A′ and receives a circular piston b^4. Into chamber A′ pipe D from the discharge of the pump is led beneath piston b^4. Valve-casing e is placed upon the side of chamber A′ and communicates therewith by means of channel e', which leads into the chamber above the piston b^4. Valve E is normally held over said channel e' by spring F, and into the valve-chamber pipe e^2 from the discharge is led in the manner above described. Now with this modification it is seen that as the pressure at discharge of the pump increases it exerts a pressure upward on piston b^4 and raises valve B from its seat in proportion thereto and that when the pressure at discharge reaches the limit valve E is carried down, thereby uncovers channel e', allows pressure to be communicated to the upper side of piston b^4, counterbalancing the pressure on the under side and allowing spring C to carry the valve to its seat.

With a governor of my construction the valve is kept open in proportion to the amount of work demanded of the pump until the limit of pressure is reached, when the auxiliary valve E will open and carry the valve to its seat; but as soon as the pump has been reduced below the limit the valve opens immediately to admit enough steam to meet the demands made upon the pump and only enough steam for that purpose—neither too much nor too little. If too much steam were admitted, the pump would, as the term is used in the trade, "run away"—that is, its piston would fly back and forth in an ungovernable fashion. If too little steam were admitted to meet the demands, it is seen that it would take a good while for the pump to regain its proper working.

I have shown my invention in the best form known to me; but it is obvious that many more mechanical changes might be made therein without departing from the spirit or scope of my invention.

What I claim is—

1. In a pressure-governor, a valve-casing, a valve-seat therein, a valve, a means for exerting a yielding pressure upon the valve to carry it toward its seat, and a means for communicating the pressure to be controlled to the valve to carry it from its seat, substantially as shown and described.

2. In a pressure-governor the combination of a valve-casing, having a channel therethrough for the passage of an actuating fluid, a valve within the casing for regulating the opening of the channel, a means for exerting a yielding pressure upon the valve to carry it to a position closing the channel, a means for communicating the pressure against which the pump works to the valve in a direction to move it so as to enlarge the channel, a secondary valve to open only by a pressure exceeding a certain limit, a channel connecting the main and the secondary valves, and a channel connecting the secondary valve and the pressure against which the pump is working whereby when the limit of pressure is exceeded the secondary valve is opened, thereby communicating the pressure to the main valve to close the same, substantially as shown and described.

3. In a pressure-governor the combination of a valve-casing, a valve-seat therein, a valve, a spring for carrying the valve to its seat, a piston connected to the valve, a chamber upon the side of the piston away from the valve-seat, a second chamber upon the side of the piston toward the valve-seat, a channel leading into one of the chambers and placing it in communication with the pressure to be controlled, a secondary valve-casing, a secondary channel placing the secondary casing in communication with the other chamber, a valve within the secondary casing, a means for holding the valve over the secondary channel with a predetermined pressure and a means for communicating the pressure to be controlled to the valve to move it so as to uncover the secondary channel when the limit-pressure is passed, substantially as shown and described.

4. The combination of a valve-casing having an inlet and an outlet opening, a perforated diaphragm between the openings and forming the valve-seat, a valve in the casing consisting of a cylindrical shell closed upon the end toward the valve-seat, except for a series of perforations in the end for the admission of steam into the shell to balance the valve when it is raised from its seat, substantially as shown and described.

JOHN W. NEIL.

Witnesses:
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