No. 786,915. PATENTED APR. 11, 1905.

R. B. McGOWAN.

PUMP GOVERNING DEVICE.

APPLICATION FILED DEC. 7, 1903.

2 SHEETS—SHEET 1.

Fig. 1.

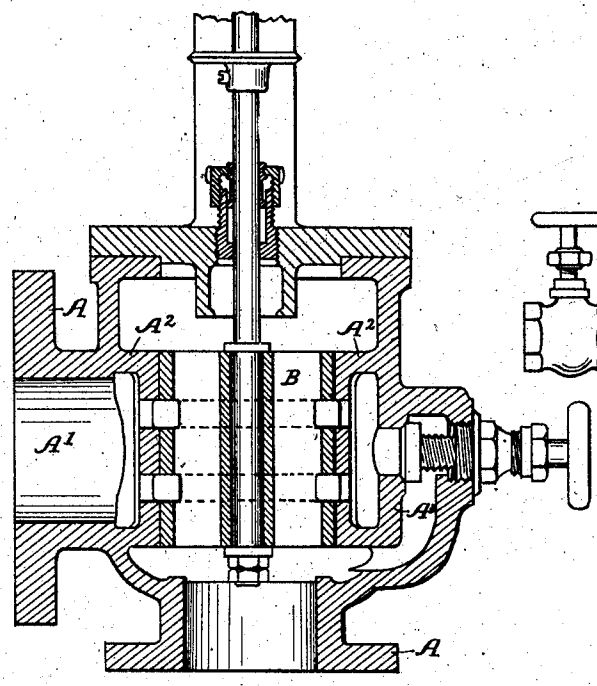
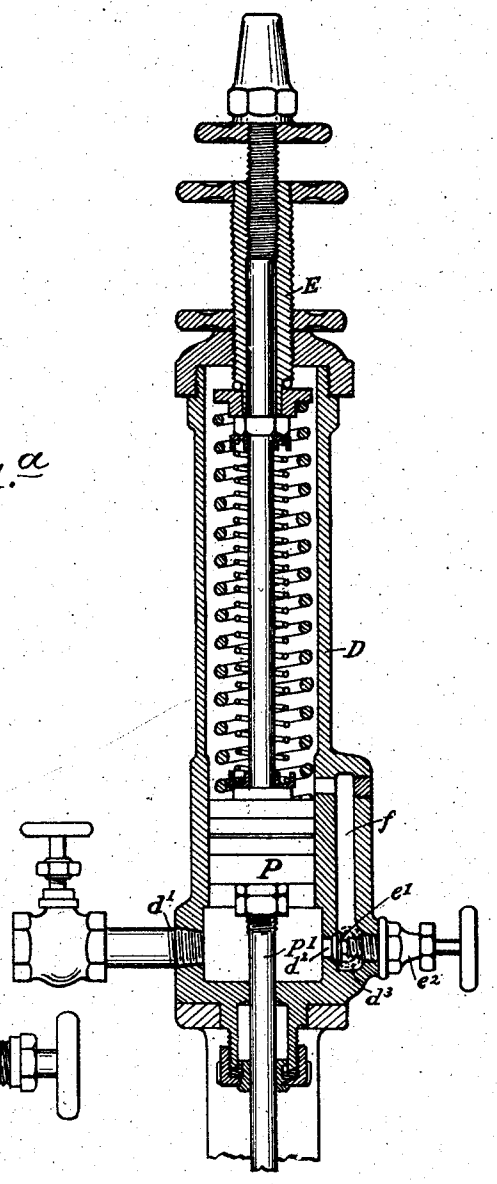


Fig. 1ª.



WITNESSES:

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2 SHEETS—SHEET 2.

Fig. 2.

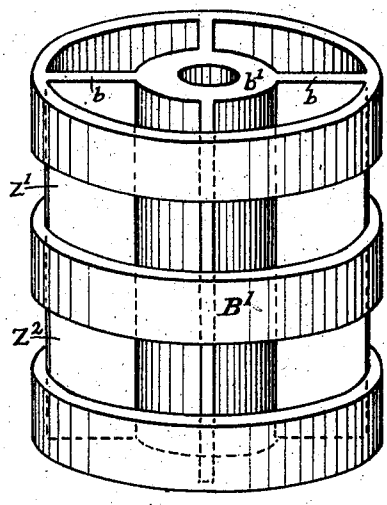


Fig. 3.

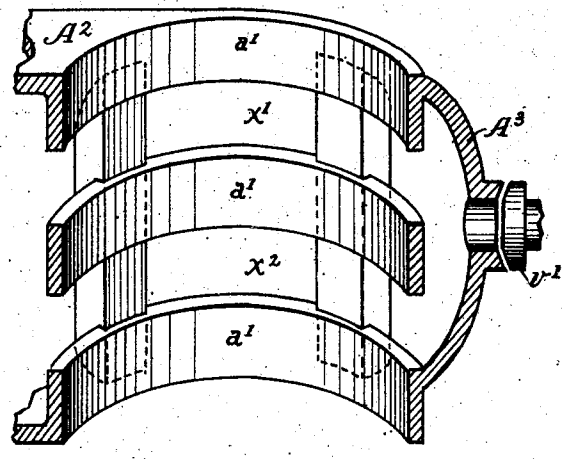
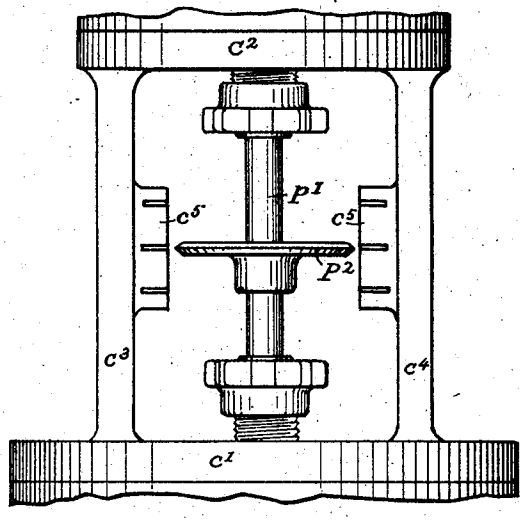


Fig. 4.



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UNITED STATES PATENT OFFICE.

ROBERT B. McGOWAN, OF NORWOOD, OHIO.

PUMP-GOVERNING DEVICE.

SPECIFICATION forming part of Letters Patent No. 786,915, dated April 11, 1905.

Application filed December 7, 1903. Serial No. 184,079.

To all whom it may concern:

Be it known that I, ROBERT B. McGOWAN, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Governing Devices for Pumps, &c., of which the following is a specification.

My invention relates, primarily, to governing devices for pumps utilized in raising water, compressing air, &c., operating against a head or pressure, which head or pressure is made available as a force to control and regulate the admission of steam or other power operating the motor, and, secondarily, to a governor device to reduce the pressure of steam, air, gas, or liquids within the pipe-line in which it is placed, the pressure on the receiving side of the device being utilized as the means to control and regulate the passage of steam, air, gas, or liquids through the device to the delivery side of same, and is in the nature of an improvement upon the invention shown in Letters Patent No. 730,682, issued to me June 9, 1903.

My present improvements consist, first, in an improved construction of the balanced steam throttle-valve and its seat whereby a more accurate and sensitive control is obtained; second, in the improved construction and arrangement of the indicating apparatus; third, in an improved construction of the drain and relief connection; fourth, in the improved construction of the adjustable spring wherein a double or compound spring is utilized to effect a more sensitive regulation and adapt the device to a wider range of pressures, all of these tending to a more perfect action and greater efficiency of the apparatus as a whole in respect to its main functions, and, lastly, in certain detail improvements in the structure as a whole tending to economy of production, compactness, &c., all as more fully set forth.

Part of the improvements herein described—namely, the throttle-valve and seat—may be used with advantage independently in all constructions where such valves are employed singly—as, for example, in ordinary steam-governors, pressure-regulators, &c.—and doubly, or two in combination with each other, for alternate action—as, for example, in pneumatic lifts, wherein one is utilized to control the admission and the other to effect the release of pressure necessary to perform the work.

My invention is illustrated in the accompanying drawings, in which—

Figures 1 and 1ª represent broken sectional views of the valve-chamber and throttle-valve and of the pressure-cylinder and its adjuncts, the two figures illustrating a complete form of my improved governor; Fig. 2, a perspective view of the open cylindrical throttle-valve detached; Fig. 3, a corresponding sectional elevation of the tubular valve-seat detached; and Fig. 4, an elevation of the frame connecting the valve-chamber and pressure-cylinder, showing the indicating mechanism.

Referring now to the drawings, A designates the valve-chamber, containing a throttle-valve B. C designates a yoke-frame consisting of a lower plate c' (constituting the top plate or cap of the valve-chamber) and an upper plate c^2, (constituting a seat for the pressure-cylinder hereinafter described,) these plates being connected by side standards c^3 c^4 into the yoke structure designated. D designates the pressure-cylinder, provided with a piston p, operating therein, attached to the upper extremity of a valve-stem p', extending downward through the plates c' c^2 between the standards c^3 c^4 into the valve-chamber A and attached below to the valve B. These parts, excepting as hereinafter specified, do not differ functionally and but little structurally from the corresponding parts of the governor shown and described in Letters Patent No. 730,682, heretofore referred to, as to which invention the present one may be regarded as an improvement as to certain features to be described herein in greater detail.

The construction of the valve is as follows: It is in the form of a cylindrical shell B′, (shown in Fig. 2,) connected by radial arms b with an axial socket or hollow stem b', in and to which the valve-stem p' is secured. The shell is partially cut away circumferentially in zones z' z^2, whereby steam admitted from all parts of the circumference through the same finds free egress downward through the

valve. The cylindrical seat of the valve is correspondingly formed, as indicated in Fig. 3, in a hollow extension A^2 of the inlet-port A′ of the valve-chamber A. Through the upper and lower walls of the extension A^2 is a connecting cylindrical wall a', having partially-vacant zones x' x^2 opening into the interior spaces of the hollow extension A^2 and registering with those of the valve-shell B. The zones of valve and valve-seat may be increased in number to reduce the travel and to effect still more sensitive regulation, as may be required in specific cases. The side wall A^3 of the hollow extension A^2 is continued around the shell a' to form an annular passage for the steam-supply and is provided with an aperture controlled by a direct-seating by-pass valve v' for admitting steam directly into the chamber A and thence to the pump-motor or piping system independently of the valve B. This general construction, as will readily be seen, gives a quick and sensitive action to the throttle-valve B with very slight vertical motion, thereby rendering the entire apparatus economical in construction.

The indicator devices I construct and arrange as follows: I cast or otherwise secure to the yoke-standards c^3 c^4, projecting inwardly, wings c^5, having corresponding marks at the edges, as shown in Fig. 4, indicating open and shut positions of the valve B. Co-operating with these is a circular indicating-plate p^2, secured upon the piston-rod or valve-stem p'. In its vertical movements between the wings c^5, its beveled edge serves as a pointer in relation to the marks thereon to indicate the exact position of the valve B in relation to its seat and may be readily seen from all sides of the apparatus at a glance. The indicator devices being thus wholly within the framework of the apparatus are protected from injury and take up no extra space.

Further improvements have relation to a condition of service wherein it is desirable to release any pressure within the cylinder for purposes of repacking while the governing appliance may be in service, the relation of the valve to the seat-openings being maintained for such interval by the adjustment of the stop-plates on valve-stem, and, secondly, to avoid the submergence of or contact with the mechanism contained within the pressure-cylinder by slippage past the piston. The construction to this end is as follows: The cylinder D has at its lower end and beneath the actuating-piston p an inlet-aperture d', connected to the tank or delivery-column, and an outlet-aperture d^2, connected to a waste-pipe d^3. The aperture d^2 is governed by a direct-seating valve e', being a part of the adjustable valve-stem held and guided in a center piece e^2 and provided with a terminal hand-wheel.

The construction of the other parts is not materially different from that described in my said Letters Patent, excepting that I connect the cylinder D above the piston P by a by-pipe f' with the waste-passage d^3 to take off any accidental leakage past the piston p to avoid corrosion or otherwise affecting the springs or other parts and to prevent any accumulation of pressure above the piston.

The spring-pressure against the back of the piston P is as described in my said former patent, excepting that to effect a greater range of pressures without sacrificing the sensitiveness of regulation I provide a spring of lighter tension within the main spring, which is regulated and adjusted by a screw-abutment E according to head or pressure desired to be maintained. The main function of the inner spring referred to is to close the valve B after the release of the pressure resisted by the tension of the main spring, thereby effecting an instant closing of the valve B not obtained in the use of the single or main spring.

In situations where the drafts upon the accumulated supply or head are intermittent and for economical and other reasons it is desired to keep the pump in operation at or above a minimum speed the usefulness of the device will be apparent.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In a pressure-governor, the combination of a governing-cylinder including an exterior circumferential supply-passage and a double circumferential port or series of ports, a hollow open-ended piston having a corresponding double circumferential port or series of ports adapted to register with those of the cylinder, a by-pass valve for said cylinder, a valve-stem attached to the throttle-valve, and a piston at the upper end of the stem, a pressure-cylinder within which the piston is operable, springs of different tensions embracing said stem and the combined drain and relief connection connecting the end of the pressure-cylinder and the waste-passage.

2. In a governing device of the character described, the combination of a valve-chamber, a yoke-frame connected therewith, a pressure-cylinder, a valve-stem, an indicator-plate carried upon and by said stem, and the indicator-wings upon the yoke-frame.

3. In a governing device of the character indicated, the combination of a pressure-cylinder having a waste-passage, a piston and stem operable in said cylinder, springs of different tensions with the cylinder, and the combined drain and relief connection connecting the spring end of the pressure-cylinder and the piston end of the cylinder with the waste-passage, substantially as and for the purpose set forth.

4. In a pressure-governor of the character indicated, the governor-chamber having an exit-port, an exterior circumferential supply-passage perforated to permit a by-pass to the

exit-port, a valve controlling said perforation on the inner wall of said supply-passage, a double circumferential port or series of ports and a hollow open-ended piston having a double circumferential port or series of ports adapted to register with those of the cylinder, substantially as set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROBERT B. McGOWAN.

Witnesses:
CHAS. HERBERT JONES,
JOSEPH R. GARDNER.